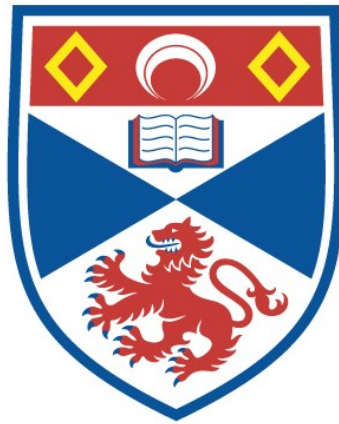


ORGANISATIONAL SELF-RENEWAL :
PROCESS DESIGN

Broer Teichert

A Thesis Submitted for the Degree of PhD
at the
University of St Andrews



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ORGANISATIONAL SELF-RENEWAL: PROCESS DESIGN

by

Broer Teichert

A thesis submitted in partial fulfillment of
the requirements for the degree of

Doctor of Philosophy (Ph D)



University of St. Andrews

Department of Management

2004



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Abstract

Firms compete based on their relative ability to renew as much as they do on their ability to extract profits from product-markets. Drawing from literature and case studies the research explores how renewal is affected in organisations. The main dynamics of the renewal process, and the issues and skills involved in its management, therefore, receive detailed treatment.

Relevant data is gathered from a variety of primary and secondary sources. The research begins with an effort to understand the forces that trigger and processes that act to sustain decline in organisations. These findings are contrasted with a number of case studies that serve the identification of underlying characteristics and dynamics common to successful organizations. This comparison serves to uncover principles of successful organisation and that hold the key to renewal and sustained growth.

The main objective of this research is to increase the understanding and awareness of the processes, problems and successful means of organisational renewal. Underlying is the concern to develop more formalised models and translate these findings into a useful conceptual framework as a basis and stimulus for further research and as a helpful guideline for management practitioners to handle successfully the problems of entropy and organisational ossification of their business.¹

¹ This research project was carried out at the Department of Management of the University of St. Andrews as part of the Training & Mobility of Researchers Programme financed by the European Commission (TMR Contract No. ERBFMBICT961318).

Declarations

I, Broer Teichert, hereby certify that this thesis, which is approximately 100 000 words in length, has been written by me, that it is the record of work carried out by me and that it has not been submitted in any previous application for a higher degree.

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I was admitted as a research student in October 1993 and as a candidate for the degree of Doctor of Philosophy (PhD) in October 1994; the higher study for which this is a record was carried out in the University of St Andrews between 1994 and 2003.

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Dedicated to the memory of Jenko Fekkes and Mo Malek

Preface

Drawing from literature and case studies this research work seeks to develop an understanding of how self-renewal is affected within an organisation through a partly emergent rather than an entirely deliberate process. This research attempts to answer the question how an organisation can develop the capability of self-renewal by identifying relevant processes and investigating their facilitative or obstructive role.

Background

Many different forces and processes, operating in most areas of life, appear to be eroding current economic, political and social structures. Designing organisations that are suited for survival and success in the context of such dynamic environments is being addressed by practitioners and academics alike. An increasing body of literature suggests that organisations have to transform themselves to restore effectiveness with the aim of sustaining and renewing their capabilities and regaining competitiveness. In case of existing organisations, this is referred to as a renewal stratagem. The complex and dynamic nature of organisations makes any self-renewal effort a formidable challenge requiring a systemic approach. This is captured in the design of the **Strategic Organisational Renewal Meta (STORM)**-model developed by the author, which provides the theoretical framework guiding the field studies and subsequent analysis.

Methodology

This research is exploratory, i.e. directed at theory building and seeks to answer question how an organisation can develop the capability of self-renewal by identifying relevant processes and investigating their facilitative or obstructive role. The lack of an elaborate and well-established theory on organisational renewal in conjunction with the complexity of the phenomenon of interest argues in favour of a qualitative approach. The need to study the renewal efforts in context, the involvement of multiple, interconnected units of analysis, the aim of developing in-depth understanding of the phenomenon and the processes involved present a compelling argument for focusing rather on quality than quantity of the data. The research is therefore case-based, providing in-depth studies of three high-performing companies. The case study selection and design was guided by the following theoretical propositions:

Proposition 1. There exist two types of process categories in organisations that can be distinguished by their exertion of converging or diverging forces on the activities of an organisation.

Proposition 2. An organisation's capacity to renew can be systematically fostered by organisational processes and systems

Proposition 3. Most organisations systematically increase the number of controls (both in quantity and quality) as they grow in size.

Proposition 4. With increasing size organisations lose their potential to change.

Proposition 5. Organisations become increasingly inert over time as procedures, roles, routines and structures establish implying that organisations lose their capacity to change with increasing age.

Proposition 6. Organisations unintentionally engage in processes of selection and reinforcement that are dominated by short-term considerations but limit future strategic flexibility and manoeuvrability.

Proposition 7. Organisations depend on and employ similar processes to convert inputs into outputs. The processes employed are determined by the nature of organising work flow and information sharing and, therefore, similar in different organisations.

Proposition 8. Organisations can only transform in radical steps.

The findings from the individual case analysis are compared and contrasted with accounts from the fairly well-established research on organisational decline and failure to identify relevant processes. Using narrative and causal maps, underlying dynamic relationships are investigated for their respective role in the renewal process.

Conclusion

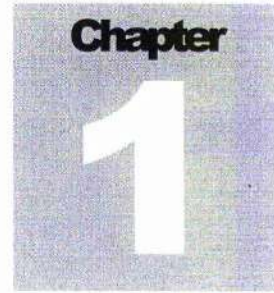
Firms compete based on their relative ability to renew as much as they do on their ability to extract profits from product-markets. Organisational renewal is central to long-term competitive strength by realising a vision that radically changes an organisation's products or services, customers, market channels, skills, sources of

margin, competitive advantage, and persona - integrating these changes with core competencies and capabilities.

Faced with increasing dynamic complexity most organisations respond by institutionalising and amplifying control processes. These measures are aimed at increasing stability and efficiency through uncertainty and risk reduction; inadvertently they are also the source for convergence and inertia causing the organisation to lose its capability to change eventually leading to the decline and possibly failure of the organisation. In order to break the vicious circle of such destructive forces, an organisation needs to actively harness its creative and inventive potential.

The research findings suggest that many paths lead to organisational renewal, however with increasing dynamic complexity of an organisation, possibilities for direct leadership intervention become limited and systemic management and design necessarily gain importance for exploiting inherent organisational potential. A self-renewal stratagem should therefore not so much focus on moving a company from its current state to a desired viable future state, but on developing a long-term sustainable organisation that continuously seeks to renew itself by balancing the paradoxical forces for preservation and progress. While forces for preservation are usually firmly institutionalised, potential forces for progress often remain neglected and therefore need to be systematically unleashed by structural triggers provoking inquiry, communication, and creativity and by support mechanisms providing suitable leverage to sustain organisational vitality. The case studies further highlight that, despite differing contextual influences and settings, organisations employ similar activities to convert inputs into outputs. This finding suggests that individual organisational solutions may be effectively transferred from one organisation to another.

The STORM-model provides a helpful instrument to assess an organisation's *potential* for self-renewal provided by existing structures and processes. It can also assist decision-makers in developing an effective renewal stratagem by enabling the identification of leverage points for altering patterns of activity, behaviour and performance and by providing guidance for their integration with the dynamic whole.



ORGANISATIONAL RENEWAL:
PROCESS DESIGN

Literature Review

1. A Review of the Transformation and Renewal Literature

This chapter is an initial attempt to classify the nature of transformations and specifically to look at the nature of transformation efforts, which seek to build “triggers” for continuous self-renewal into organisations. This chapter will attempt to draw from existing theoretical research and combine this with the more practical accounts of companies that have undertaken transformations involving changes in their strategy, structure, process, and behaviour. This chapter will set the frame for the development of an integrative theory and provide the foundation for the empirical research work connecting many different perspectives as well as hitherto competing opinions and conflicting research results regarding transformation, theory on change and adaptive organisations.

1.1 Introduction

During the 1960s and 1970s, the strategy field’s preoccupation with growth and diversification was reflected in the popular frameworks of the period, such as portfolio matrices. Since the early 1980s the emphasis has shifted. In today’s business environment, more than at any time in history, the only constant is change. Many of the world’s leading corporations have responded by fundamentally reassessing their basic strategies, restructuring their corporate portfolios, renewing and rejuvenating their core businesses, and radically reengineering basic business processes. As Robert Waterman, in *The Renewal Factor* (1982: 2), has noted, “Somehow there are organisations that effectively manage change, continuously adapting their bureaucracies, strategies, systems, products, and cultures to survive the shocks and prosper from the forces that decimate their competition [...] They are *masters of renewal*.” The fact is that managers are going to have to become masters of change and renewal to be effective in the future (Kanter, 1983). Driven primarily by the emergence of the new economy, the processes of transformation and renewal have since become central concerns of the strategy field.

This thesis is centrally concerned with renewal in established companies. Beyond the grand theme of the “why” this research seeks to answer the more important questions

of “what” and “how”. The main dynamics of the renewal process, and the issues and skills involved in its management shall, therefore, receive detailed treatment. The goal of this chapter is to provide a systematic and comprehensive overview of the current state of the art.

1.1.1 The Renewal Imperative

When discussing the drive to transform their organisations, many executives point to the fact that the “world is changing.” Although the present issues which surround the environmental change are not new, more recent research advocates that the current climate of change is quantitatively and qualitatively different from those experienced in the 60s and the early 70s (e.g. Mitroff, 1987; Mohrman & Mohrman, 1990; Tichy, 1983). For example Peter Vaill (1989: xiv) compares the rapidity of change within modern business environments to permanent white water and states that:

The present environment of chaotic change requires a response so different from the traditional managerial approach of diagnose-plan-implement-evaluate that perhaps I should not even use the simple word change to refer to the kinds of events contemporary managers are facing.

Three drivers of change are commonly mentioned. First, the political and economic changes that have occurred in the last two decades have unleashed a multitude of economic and societal forces, which will impact industries and economies for some years to come. Second, the long forecasted information revolution has taken root. Especially the development of computer networks has profound effects on the gathering, building and exploitation of knowledge, as well as on the nature of interpersonal and organisational communication. Knowledge is now more pervasive and globally accessible than ever before. Third, the saturation of households in domestic markets during the 1970s and 1980s has resulted in enhanced competition on a global scale (Drucker, 1990, 1993). Product life cycles in many industries have decreased markedly and customer service expectations have risen. When combined with the greater accessibility of knowledge, the competitive push has yielded shorter windows in which to exploit opportunities.

These shorter life spans for economic opportunity and for differential exploitation of knowledge create the need for organisations to manage their portfolio of product-

market opportunities and businesses in a more dynamic fashion. The entire nature of enterprises and employment is at the start of a massive historical transformation. While agile networks of producers are replacing mass production, mass marketing is giving way to individualised marketing and the ability to deliver customised solutions on a massive scale. Standardised long-lived products and services are giving way to constantly changeable products and services with seemingly reduced development-to-market lead-times and decreasing duration of product life cycles. This 'new' world is also characterised by intense competition bypassing national frontiers and unions. It is spanned by dynamic computerised relationships among corporations using global networks, enabling electronic reaction times, virtual operations, and massive automation creating an increasingly complex organisational environment as well as increasing the number of ties between environment and organisation.

Some say that the ability to manage the flow of information represents the basis for the new business model of the Communications Age. We submit, however, that more is involved than that. The communications revolution is merely the facilitator of a more fundamental social and business influence: an unstoppable trend toward *increased connectivity*. (Gouillart & Kelly, 1995: 4).

Complexity and change increasingly mark the organisational environment. As a result of the intensity and diversity of the forces many organisations are experiencing increasing turbulence making large-scale organisational change and adaptation a central research issue (Peters, 1987; Morgan, 1988; Handy, 1990). Furthermore, this "[environmental] turbulence is a condition that will intensify, not abate" (McCann & Selsky, 1984: 87). The ability to cope with these often dramatically altering contextual forces has therefore become a key determinant of competitive advantage and survival (D'Aveni, 1994). Success and survival over the long term depend on the ability of the organisation to match this external turbulence with sufficient internal dynamism.

So far in the twentieth century, we have already seen the basis of competitive advantage shift at least four times: from price and volume to quality, then to speed, and finally to "mass customization." Each era has incorporated the attributes of its predecessors and then added new and progressively more challenging requirements on top of them. In what promises to be an even more volatile and demanding twenty first century, the competitive ante is certain to be raised even higher. Factors which were once sources of genuine

competitive advantage will become simply the minimum entrance requirements for even staying in the game. The premium will then shift to the ability to manage major strategic change effectively and almost continually. (Kiernan, 1993: 8)

While some organisations have been able to adapt to a more rapidly changing world or have grown as a result of new opportunities (Pfeffer, 1994), many are in steep decline and still struggling to find suitable solutions. Companies that are put into receivership usually require quite drastic outside intervention to ‘turnaround’ and regain competitive momentum. Many of these cases have been well documented in studies that are collectively referred to as the ‘turnaround’ literature.²

In this body of literature the failure of contemporary organisations is often attributed to leaders who have failed to see turbulent environments that call for radical change in their organisation (Burns, 1978; Land, 1992; Nanus, 1989; Tichy & Devanna, 1986). This conclusion reflects the conventional wisdom, that renewal requires a new vision maker. However, increasingly also the “Taylorian” model of labour division (Taylor, 1903, 1911) and the “Weberian” model of bureaucracy (Weber, 1947) are being questioned in their ability to manage the opportunity set within an organisation and to adapt to changing circumstances.

Organizations designed to provide goods and services in yesterday's world are discovering that what made them successful in the past no longer applies. An exclusive emphasis on efficiency within the organisation is not enough. A renewed focus on being innovative, market-driven, adaptive, and competitive in the outside world is now mandatory for success. Such a fundamental change in approach requires a major effort toward corporate transformation. Every familiar procedure involved in creating, designing, producing, and selling a product or service must be reexamined using a new set of guidelines. (Kilman & Covin, 1990: xiii.)

² For comprehensive reviews of this research see Hoskisson & Hitt (1990), Johnson, R. A. (1996) and McKiernan (2003).

1.1.2 The Organisational Renewal Stratagem

The transformation of organisations has become an important management topic (Hall, 1984; Pauchaut & Mitroff, 1992). While becoming a common topic in the business press, it is still an emerging field for both practice and research. There are many partial accounts of the transformational process appearing on the bookshelves and in business magazines. The academic research on strategic transformation has been growing rapidly in recent years (e.g. Garud & Van de Ven, 2002; Kilmann & Covin, 1988; Kochan & Useem, 1992; Levy & Merry, 1986; Mohrman et al., 1989; Pettigrew et al., 2001; Torbert, 1987; Volberda et al., 2001). There is also increasing interest in looking at organisational transformation through different lenses and disciplines, such as innovation (e.g. Clark & Starkey, 1988; Hussey, 1997; Tushman & Anderson, 1997), learning (e.g. Argyris & Schon, 1978; Cohen & Sproull, 1996; Senge, 1990; Senge et al. 1994), competitiveness (e.g. D' Aveni, 1994; Hamel & Prahalad, 1994), and entrepreneurship (e.g. Kanter, 1983, 1989; Kao, 1989; Stopford & Baden-Fuller, 1994).

Some authors have focused on improving corporate management and performance against the general backdrop of transformation (e.g. Henrici, 1986; Kilmann, 1984; Mills, 1991; Vollmann, 1996). Moreover, much of the literature is prescriptive in nature, which raises the question of the relevance of the insights and suggested solutions in different contextual settings (Brakel, 1985). One of the current problems facing researchers working in this area is the topic's breadth.

Transformational changes are fundamental and usually involve multiple dimensions (e.g. behaviour, systems, strategy, process, etc.) taking place in multiple stages over long periods, and are done in many different ways (Blumenthal & Haspeslagh, 1994). They are directed at "improved performance" which in this context often means reinventing the past (i.e. re-establishing past levels of performance).

To renew an organisation is to restore or revitalise it in some way. The concept of organisational renewal assumes that in the beginning of an organisation's life, at its founding, there was something of value, some shared experience that was authentic and meaningful. Over time, this original feeling of authenticity, of meaning, has either faded or been lost. Renewal

involves going back to the founding values to reconnect the past to the present, to rediscover the old in the new.

Renewal is about the future – it requires social vision of the future, of what society could be – but is firmly rooted in the past. (Hurst, 1995: 3)

However, the current debate tends to neglect the more elusive but increasingly critical questions of implementation.

1.1.3 Definition

'Transformation' (e.g. Pascale, 1990; Goss et al., 1993; Vollmann, 1996) and 'self-renewal' (e.g. Ghoshal & Bartlett, 1994, 1998; Grinyer & McKiernan, 1994; Nonaka, 1988) have become catchall phrases for a variety of practices and economic and organisational outcomes. Not surprisingly, there are various connotations of both terms (Levy & Merry, 1986). In addition, there are hosts of terms used interchangeably such as rejuvenation (Baden-Fuller & Stopford, 1992), regeneration, revitalisation (Waterman, 1987), and reinvention (Goss et al., 1993).³ Furthermore, terms like restructuring and reengineering, which also refer to strategies of major change, add to the already existing confusion.

This is reflected in the ambiguity of emerging definitions. There is, therefore, a need to add substance to them, and to widen the understanding of the concept. The aim of this section is to propose a working-definition, which can be used to distinguish self-renewal from other change efforts by organisations.

While the goal of all transformational efforts is to improve performance, many efforts to improve performance are not transformational. Reengineering and restructuring usually refer to change strategies that lead to a more immediate, tangible impact on systems and structure within organisations. Restructuring refers to strategies that

³ 'Transformation' and 'self-renewal' are probably most commonly used to refer to the kind of change initiatives discussed in this thesis. They will be used interchangeably throughout, although Levy and Merry (1986) point out that renewal refers to the transformation of existing organisations. Regeneration, revitalisation, rejuvenation, and reinvention are often used synonymously as they stand for efforts that are also aimed at bringing about major organisational changes. However, their specific word choices seem to implicate a specific strategy (e.g. re-inventing the past) possibly making them more appropriate as labels for particular types of transformational strategies.

ultimately result in the reduction of the work force. Other terms that are used synonymously are refocusing, de-layering, de-cluttering, and right-sizing (Hamel & Prahalad, 1994). Reengineering (Hammer & Champy, 1993) aims to root-out needless work and get every process in the organisation pointed in the direction of customer satisfaction, reduced cycle time, and total quality. However, both strategies are mainly focused on efficiency improvements. The focus of a transformational strategy is the creation of a different organisation and is primarily aimed at re-establishing effectiveness. Although restructuring and reengineering do not qualify as transformational strategies they may become necessary steps within a self-renewal strategy.

Transformation is a concept used by strategy writers for years. Many researchers characterise the nature of a transformation in very general terms, such as a "radical" or a "sweeping" change. There is a general tendency to conceive of organisational transformation as comprising holistic, multi-level, discontinuous and comprehensive changes in corporate strategies, structures, and management systems. This broad result suggests the diversity of definitions and interpretations in both the literature and practice. Torbert's (1989) definition offers a useful starting point, contending that a transformation alters goals, strategic types, structure, and assumptions. There is a need, however, to go beyond this definition, in order to offer additional insights into the features of a transformation that indicate what to look for in a renewed organisation.

Gardner (1965: 1-7), in writing about organisational self-renewal, refers to the avoidance of organisational decay and senility; regaining of vitality, creativity, and innovation; the furtherance of flexibility and adaptability; the establishment of conditions that encourage individual motivation, development, and fulfilment; and "...the process of bringing results of change into line with purposes." Along with the ideas about improved problem-solving and renewal processes this definition stresses the notions of purpose and direction. Argyris (1971) emphasises the need for organisational renewal and revitalising in his description of organisation development:

At the heart of organizational development is the concern for the vitalizing, energizing, actualizing, activating, and renewing of organizations through technical and human resources (p. ix).

Lippitt (1982) sees organisational renewal as

...the process of initiating, creating, and confronting needed changes so as to make it possible for organisations to become or to remain viable, to adapt to new conditions, to solve problems, to learn from experiences (p. xiv).

According to Collins & Silvers (1991: 54) “[...] Organizational transformation is:

1. a set of behavioral science theories, values, strategies, and techniques
2. aimed at the planned change of organizational vision and work settings.
3. with the intention of generating alpha, beta, gamma (A) and/or gamma (B) cognition change in individual organizational members, leading to behavioral change and thus
4. promoting paradigmatic change that helps the organization better fit or create desirable future environments.”

This definition introduces the notion of second-order change, which is also reflected in Nonaka's (1988: 57) definition of organisational self-renewal as

[...] a process of dissolving an existing organizational order and creating a new one. Order in an organization refers to the structural and cognitive order, which affects the pattern of members of the organizational activities, namely, the pattern of resource deployment, organizational structure, systems, processes, and cultures. There can be no self-renewal without dissolution and creation of order.

The magnitude of the change sought by transformation suggests the necessity of long-term commitment. The complex nature of organisations makes transformational changes very difficult and requires a prudent approach. If engaged in with too much urgency and with an even greater lack of advanced thought about process, corporate transformation is extremely risky and most likely doomed to fail. Therefore, organisational renewal will typically require a finely balanced pursuance of short-term as well as long-term change strategies. This was also a significant finding of the 'Sharpbenders' study (Grinyer, Mayes & McKiernan, 1988) in which the process of decline and recovery received detailed treatment. On the route to recovery, companies

do not take one set of actions. However, they tend to have an adaptive response to recovery where stage one actions focus on finance, minor product market initiatives and management changes. Stage two actions take place after 3 or 4 years and are aimed at sustaining the regained competitive momentum. These have been referred to as renewal actions in subsequent research (cf. Grinyer & McKiernan, 1994).

According to Haspeslagh and Jemison (1991),

Competition and other environmental changes naturally erode a firm's competitive advantages. Faced with a constant need to *renew* its competitive position, the firm seeks to add new capabilities or to change the product-markets where its existing capabilities are applied. These choices are not independent. Entry into new product-markets, which may be driven by the desire to exploit existing capabilities, usually brings with it the need for complementary new capabilities to compete effectively. Entry itself may add other new capabilities that can be deployed in one's existing product-markets or become the basis for further product-market diversification. (p. 24, emphasis in original)

This definition emphasises the need for a capabilities-based perspective of the firm. According to this view, every firm has a unique set of capabilities, which enable it to compete differently. This view allows for the distinction between core⁴ and secondary capabilities and for management to take into consideration of a variety of additional options for strategic renewal, including acquisitions, internal development, and joint ventures.

This addition is important because of the traditional tendency to focus on products or markets rather than on capabilities. Haspelagh and Jemison (1991: 24) emphasise that firms compete based on “[...] their relative ability to renew and deploy capabilities as much as they do on their ability to extract profits from product-markets.” The renewal of capabilities is therefore central to long-term competitive strength.

A transformation goes beyond fostering growth, which adds to existing capability by serving existing customers more efficiently or effectively. Transformation suggests moving toward a developmental organisation that engages in a continuous appraisal

⁴ Core capabilities are regarded to be central to the competitive advantage in the company's business domain.

of visionary possibilities and systematically integrates viable ideas into its repertoire of capabilities and other aspects of the organisation's strategy (Weisbord, 1988). For example, novel ways to meet the needs of a different set of customers would be integrated with current products or services, channels, capabilities and competencies that make up an organisation's strategy. Each successful integration provides a quantum-jump in the capacity of the organisation and its ability to cope with abrupt environmental shifts. The transformed organisation brings these new capacities to bear as services for clients or products for customers that can be internal or external to the organisation, turning upside down traditional notions, such as who is a customer or client.

To summarise, a transformation realises a vision that radically changes an organisation's products or services, customers, market channels, skills, sources of margin, competitive advantage, and persona - integrating these changes with core competencies and capabilities.

A successful transformation is one in which management has succeeded in institutionalising the behavioural change required for long-term financial success. Success depends not only on management's skill in leading a change process, but also how accurate the diagnosis is, which operational and strategic issues to attack, and on whether the new behaviours are appropriate for achieving the firm's objectives.

In essence, self-renewal stratagem focuses not so much on moving a company from its current state to a desired viable future state, but on enacting a long-term sustainable organisation.

1.2 Conflicting Schools of Thought

The literature on transformation defies easy summarisation because of the range of its definitions. The preceding discussion has already helped to shed some light on the nature of transformations. So far, this discussion has left some important issues untouched and the definitions themselves raise issues, which require further elaboration. This is important because understanding of the subject matter provides the foundation upon which any strategy seeking to renew an organisation will be built. The literature on the issue of organisational renewal is just as wide and varied as

the range of definitions. It is, therefore, difficult to appropriately structure the various strands.

The puzzle is that the close interest shown by academics and practitioners alike in organizational change has produced an apparent homogeneity of both theoretical vocabulary and applied approaches. Deeper analysis of the evidence which informs such thinking, however, would induce an opposite opinion. All is not homogeneous in the camp of change. Indeed, there are intense debates between virtually all who lay claim to being analysts of change, to the extent that many theories and much empirical evidence appear mutually exclusive. (Wilson, 1992: 4)

1.2.1 Diversity in Dimensions of Change

The theoretical approaches to organisational change in general and organisational renewal in particular tend to differ along dimensions such as content, level of abstraction, recommendation (prescriptive vs. descriptive), the cycle of change, the perspective, control, and the actors involved. Change strategies range from isolated, functional concepts that emphasise a particular aspect (e.g. leadership, technology etc.) to integrative approaches that consider a number of different variables such as culture, process, structure, context etc. Inherent in scientific inquiry is the attempt to develop models that are generally applicable. This often requires a trade-off between generality of the findings, which usually is manifested in form of an abstract model and their practical applicability in corporate settings. Many contributions are prescriptive and make recommendations in form of “to-do-lists” or “blueprints” to initiate and successfully implement changes. Most academic research focuses on the description of observations. Contributions that manage to strike a balance and incorporate both are rare.

The differences in positions regarding the cycle of change, control, and the role of agents are usually based on the adopted scientific view of organisations. The discussion in the following section attempts to highlight the commonly adopted paradigms and their differences in assumptions regarding the nature of organisations and the change process. Topically the literature on transformation and renewal and hence the proposed solutions are divided according to their view on

- the ability of the individual organisation to initiate changes and adapt to changing environmental circumstances and

- the extent and impact of change measures necessary to transform the organisation.

The view adopted with regard to an organisation's capacity to initiate transformational changes usually reflects the assumptions held with respect to managerial discretion, the ability of the firm's management to initiate and direct the outcome of change processes within the organisation. These differing views underlie much of the strategic management literature and it is therefore not surprising to find them present in this strongly related body of literature. According to their stance on the issue, these differing schools of thought are referred to as

- natural selection perspective
- institutional or paradigmatic perspective
- managerial choice or strategic intent perspective
- system dynamics perspective

In the following sub-section the main assumptions underlying each are described in more detail.

1.2.2 Organisational Change Capability: Competing Views

Surprisingly many writers on organisational transformation assume this important question already answered and that it requires no further comment. However, it is important to understand the ramifications of the assumptions adopted on this issue. Depending on the position taken, completely different conclusions about strategy, content and process of change initiatives are drawn.

These are at the core of two opposing traditions in the literature: one that sees organisations as relatively inflexible and the other that sees them capable of continuous adaptation. The first tradition is reflected in organisational psychology, population ecology theory and the research on institutionalisation (paradigm/ideology) in organisations. The second draws from the logical incrementalism, continuous improvement, and open systems views of organisations.

1.2.2.1 The natural selection perspective

This perspective on organisational change does not concede much importance to strategic choices and human creativity; indeed, it provides alternatives to models of managerial choice and planned change. The natural selection perspective has certain basic premises about change. First, change and development are functions of environmental changes. Second, the persistence of change has meaning only when viewed in terms of a population of organisations being differentially selected by the environment - after the selection has occurred, the organisation has adapted. Third, managerial choice, planning, and changing are viewed as unnecessary or misleading explanations for the process of adaptation.

Several authors have developed models that provide a post hoc explanation for organisational change and adaptation. Among these the contributions by Aldrich (1979), Hannan & Freeman (1977, 1984) and McKelvey (1982) have been the most influential in developing the natural selection perspective. A number of other researchers have empirically tested and extended the natural selection model, or have employed it in their modelling. Notable among them are Nielsen and Hannan (1977), Brittain and Freeman (1980), Carroll (1982), Padgett (1981), and Rundall and McClain (1982).

In his work Aldrich (1979) directly challenges Child's (1972) arguments on strategic choice and develops a natural selection model, which he presents as a powerful and researchable alternative. Specifically, Aldrich argues that there are severe constraints on managers' choices of new environments and on their abilities to influence their environments. Managers' perceptions of reality are homogeneous making truly novel strategic choices improbable. These and other limits on managerial choice suggest that explanations of the differential adaptation and survival of organisations must be sought elsewhere.

McKelvey (1982) presents an axiomatic model of evolution based on systematics (the science of classification) that explains change in terms of organisations adapting to changing environments. According to McKelvey, environments of organisations change. Organisations respond to environmental forces. Thus, organisations respond or adapt to changing environments. This adaptation to changing environments accounts for the evolution of organisations - the differences are incremental,

sometimes revolutionary changes in structures, processes, and competencies over successive generations. The specific course of organisational evolution and change is ultimately determined by characteristics of environments. In essence, adaptation to a changing environment explains organisational differences and, thus, change and evolution.

Perhaps the perspective that stresses the inert nature of organisations most, is the population ecology model developed by Hannan and Freeman (1977, 1984), in which adaptation to environmental change is seen to happen primarily at industry level, by a process akin to natural selection. "Population ecology theory holds that most of the variability in organisational structures comes about through the creation of new organisations and organisational forms, and the replacement of old ones" (Hannan & Freeman, 1984: 150). They further emphasise the importance of inertial forces, such as specialised assets and skills, internal political pressures and external legitimisation processes, in inhibiting the adaptability of any organisation (Hannan & Freeman, 1977). According to Hannan and Freeman the selection process tends to favour organisations whose structure is reliable. Reliability contributes most to ecological durability, however is inevitably accompanied by organisational inertia. The result is that structurally stable organisations have better survival chances than more fluid forms in the medium term, but the longer-term prospects for both are bleak.

To summarise, the above works exemplify different natural selection approaches to development and change. Hannan and Freeman (1977, 1984) predict the occurrence and change of structures based on changes in environmental niches. Aldrich (1979) develops a natural selection model in which change derives from variations in organisational forms. McKelvey (1982) presents an axiomatic model of evolution that explains change in terms of organisations adapting to changing environments.

All the above works downplay or eschew the importance of managerial choice, and all of them view the source of change as an inconsequential artefact of evolution. They take a broad macro-perspective by aggregating organisations into groups and populations.

Finally there are many shortcomings that can be criticised in population ecology (Astley, 1985; Young, 1988). Young (1988) has so far compiled the most comprehensive and fundamental critique of population ecology as developed by

Hannan and Freeman. Her critique mainly deals with three points: (a) the unclear definition of basic concepts (such as population/species, inertia, and change), (b) problems in the structure of the theory (e.g., its reasoning), and (c) methodological flaws.

There are also some problems with the applicability of the results. Population ecology research has focused mainly on changes within populations over relatively long periods of time. Hannan and Freeman (1989), for instance, investigate newspapers in the San Francisco Bay area from 1840 to 1975 (a range of 136 years) and American labour unions over their complete 150-year history (1836-1985). The question remains if the insights developed from such a sample over such a long period are relevant since many organisations have problems surviving for more than 50 years.

1.2.2.2 The paradigmatic perspective

The ideological or paradigmatic perspective emphasises institutional and cultural pressures and seriously questions the ability of organisations to adapt even when faced with potential demise (Sheldon, 1980; Brunsson, 1982, 1985; Starbuck, 1982; Pettigrew, 1987; Zucker, 1987; Johnson, 1988, Pascale, 1991). According to this perspective 'all organizations tend towards a paradigm - toward some perfect fit reflecting some idealized way of working which is cherished' (Sheldon, 1980: 62). Such paradigms⁵ provide a sense of shared certainty in the face of ambiguity, a stable resolution of political interests, and simply valued traditions. They are the products of both endogenous and exogenous forces (Pettigrew, 1987; Greenwood & Hinings, 1996) and develop at both organisational and industrial levels (Grinyer & Spender, 1979, Sheldon, 1980; Greenwood & Hinings, 1996).

⁵ Although often coined paradigmatic change a look a literature shows that there is no consensus on the semantic and operational definition of cognitive frames of reference often referred to as paradigms. Many variants appear in disciplines such as psychology, philosophy, linguistics and artificial intelligence, and their application in areas such as organisation theory, strategic decision-making and political science reflect this diversity. They are termed schemas (Bartlett, 1932), internal images (Boulding, 1956), paradigms (Kuhn, 1970), frames (Minsky, 1975), scripts (Schank & Abelson, 1977), templates (Pondy, 1984), cognitive maps (Axelrod, 1976), operational code (George, 1980), socially defined frames (Goffman, 1974), images (Morgan, 1986), models of reality (McWhinney, 1984), frames of reference (Shrivastava & Mitroff, 1983), assumptions (Mason & Mitroff, 1981) and recipes (Spender & Grinyer 1977; Spender, 1989; Grinyer & McKiernan, 1990).

The external environment is understood as ‘an ambiguous field of experience’ that has to be interpreted into sense-making patterns by organisational members (Smirnich & Stubbart 1985: 726). This interpreted -rather than the perceived- environment becomes the foundation for organisational action. The effects of this enacted view can be seen in the widely shared beliefs and strategic recipes that typically operate at industry level (Grinyer & Spender, 1979).

Paradigms also develop at organisational level. As Johnson (1988: 85) put it, the paradigm ‘is not just a system of core beliefs’, but is ‘preserved and legitimized in a cultural web of organizational action in terms of myths, rituals, symbols, control systems and formal and informal power structures which support and provide relevance to the core beliefs’. Brunsson (1982: 38) believes that such ideologies ‘tend to arise by themselves in organisations’, but recognises that they can also be ‘consciously moulded’ by key actors and groups.

Shared interpretations, beliefs or worldviews can be extremely resistant to change because ‘reality is bent to fit corporate taboos, not vice versa’ (Gilad, 1994: 36). Pettigrew (1987: 659) also points out that they tend to provide cultural legitimacy for ‘unobtrusive systems of power’, with powerful interests vested in their ongoing conservation. The organisation becomes unable to adapt and learn even in the face of its own potential demise (Sheldon, 1980). Hence, a transformation calls for new ways of thinking that alter taken-for-granted and often hidden organisational rules, which limit how people think about change (Fisher & Torbert, 1991; Pribram, 1983; Torbert, 1989; Wilber, 1983). To transform organisations must go beyond making efficiency improvements. To regain effectiveness requires fundamental changes in traditional practices and ways of doing business.

There are many problems inherent to this approach to transformation. First, there is a multitude of different approaches to these frames of reference. Moreover there is an operational problem in the fact that there is no agreement on the content and form that a successful paradigm should take. This also highlights the fundamental problem of being able to discern between right and wrong assumptions.

Another severe criticism with this perspective originates in the problem of identifying a collective paradigm and then empirically proving that (a) paradigms are actually

shared and (b) to what extent the shared views are directly responsible for the downfall of an organisation.

Also, the dynamism within a frame of reference is treated variously and often lost. For example, many consider frames merely as ‘formats’ rather than dynamic themes or ‘plots’ (Wilson, 1983), or as only ‘plans’ rather than also the ‘executors of the plans’ (Neisser, 1976). Thus, any study should have to carefully examine all those nuances, and to further assess their operational appropriateness for the tracking context.

1.2.2.3 The strategic choice perspective

To the “strategic choice” view as to the natural selection and the paradigmatic perspectives of organisations discretion is a non-issue, however, for completely opposing reasons. The paradigmatic perspective assumes that organisations have virtually no discretion because organisations are resistant to change and inert. The strategic choice view generally regards discretion to be abundantly available; hence organisations are capable of change if necessary. Managerial techniques and analytical tools do not aim at increasing discretion, but at better making use of it. Child (1972) coined the term “strategic choice”; however, the same ideas are also found in works by Chandler (1962), Ackoff (1970), Hofer and Schendel (1978), Andrews (1980), Ansoff (1987), Porter (1980, 1985). Despite heavy criticism, this approach to organisational adaptation still dominates the mainstream of contemporary management research.

At the basis of the strategic choice perspective is the belief in the power of individuals to steer organisational processes and to control the outcome of organisational initiatives (cf. Child, 1972; Christensen et al., 1987). This power stems from the formal position occupied within the organisation’s hierarchy as well as from the forcefulness of their personality and the persuasiveness of their vision. Effective leaders get other people to follow them (cf. Bennis and Nanus, 1985; Kelley, 1988). This is done by setting an appealing organisational direction, and aligning and motivating people to move together in that direction (cf. Kotter, 1990; Nanus, 1992). To proponents of this perspective, individual managers, especially the top management, can make a big difference. Organisational inertia (Hannan & Freeman,

1977, 1984; Rumelt, 1991) and strategic drift (Johnson, 1988) are not normal and inevitable conditions, but result from a failure of leadership.

Change initiatives may result directly top-down as well as bottom-up. However, leaders should always retain control over the direction of the organisation to avoid erratic behaviour (cf. Bourgeois & Brodwin, 1983; Quinn, 1980). Although some authors suggest that top management might delegate decision making powers to lower level managers, it still controls outcomes by setting clear goals, developing a conducive incentive system and fostering a particular culture (cf. Tichy & Devanna, 1987; Senge, 1990).

In conclusion, the strategic choice perspective holds that management can (and should) control the strategy process, and by extension, the strategy content (cf. Finkelstein, 1992; Hambrick & Mason, 1984). With respect to organisational renewal, leaders should strive to overcome organisational inertia and steer the organisation towards the desired strategic direction that will allow the organisation to regain competitive momentum. While population ecology underestimates organisational discretion, the strategic choice view arguably overestimates an organisation's discretion, and particular the role of management in triggering and controlling change initiatives.

1.2.2.4 The organisational dynamics perspective

An increasing number of contributions stress the role of organisational dynamics as the main levers of the renewal process. To proponents of this view, the ability of leaders to mould the organisation at will is more myth than reality (e.g. Chen & Meindl, 1991; Kets de Vries, 1994). The idea that managers make a difference, are in control, and can attribute to their own efforts (e.g. Calder, 1977; Sims & Lorenzi, 1992) is reflected in a simplified view of the organisation as mechanical system. The depiction of an organisation functioning as a simple 'cause-and-effect' control system -however seductive- rarely provides a satisfactory model.

To initiate change in a desired direction requires management to adopt a systems perspective and to develop an understanding of and use the dynamics inherent in social systems. Organisations are understood as complex systems made up of parts

existing in close interrelationship and mutual interdependence. Consequently, organisations can only be studied as wholes. The primary aim of organisations as systems is to ensure their own survival. Both formal and informal aspects of organisations are granted attention. Moreover, organisations are regarded as organic, open systems, having to act in response to environmental changes in order to maintain a steady state. In order to correct any malfunctions, the subsystems must be examined to ensure that they are meeting the needs of the organisation, and the organisation examined for a “fit” to its environment (Selznick, 1948; Parsons, 1956, 1957; Katz & Kahn, 1966). From this perspective management still plays an important role in the change process, its scope for intervention and control, however, are limited since the outcomes may be emergent and not desired.

Organisations are complex social systems consisting of interrelated parts in which leadership is an important factor, but nevertheless, one of many other variables contributing to the overall outcome. Its relative strength to influence may depend on a variety of other variables, their mutual relationship being determined by the complexity and structure of the system.

1.2.2.5 Conclusion

The perspectives presented in this section differ in their view of organisational discretion in initiating change. While the population ecology model and the paradigmatic attribute almost no discretionary latitude and therefore purport that organisations are incapable of change, both the strategic choice perspective and the system dynamics perspective are based on the idea of organisational adaptation to ensure long-term survival. Most contributions to organisational transformation still seem to favour the view attributed to the strategic choice perspective. However this perspective argues very much in favour of managerial control and is reminiscent of the mechanistic systems view. The organisation is viewed as an instrument designed to achieve the purposes of the owners or its management. It is constructed of parts, which are combined according to management principles that seek the achievement of maximum efficiency. Decision-making is assumed to be rational. Control is exercised through rules and a strict hierarchy of authority. Information is processed according to the arrangement of tasks and by exception reporting up the hierarchy. Strategic

renewal is rarely a top-down, mechanical process. In organisations of any complexity, strategic renewal is more typically organic and emergent in nature, with ideas and impetus coming from disparate sources throughout the system (Bower, 1970; Mintzberg, 1978; Burgelman, 1983; Mintzberg & Waters, 1985). This is evident in the descriptions of the transformation processes at Ford, Cadburys and countless other examples (Pettigrew, 1985; Child & Smith, 1987; Stopford & Baden-Fuller, 1990; Pascale, 1991). In sum, self-renewal is a process, whose pace, progress and content is determined by the system as a whole, rather than by any single individual, no matter how powerful.

1.2.3 Pervasiveness and Extent of Change

Organisations, it would seem, continually experience significant forces for change and continuity. How these forces get resolved remains one of the central concerns of all those interested in the processes of strategic change and transformation.

The opinions differ considerably with regard to the nature of effective change strategies. Although there are many differing views, they can be roughly classified into two diametrically opposed positions. The revolutionary perspective argues that quantum leaps characterise the strategic changes of successful organisations (Miller, 1990; Starbuck, 1973). Taking radical, comprehensive and swift action should push through transformational change. The other extreme argues that such change should be approached in an evolutionary manner, with an emphasis on permanent learning and continuous improvement. This point of view is commonly referred to as the incremental change perspective.

The disagreements between the two extreme points of view revolve around the magnitude, mainly described in terms of the scope and amplitude of the change initiatives and the pace of change, which is concerned with the speed and the timing of change initiatives (de Wit & Meyer, 1998). In the next two sections these issues will be explored, to set the stage for the further debate.

1.2.3.1 Incremental View

In the late seventies, the marked shift in emphasis from strategic planning to strategic management signalled the field's first real concern with process in general, and with the process of change in particular. The early conceptions of strategic management

and change were predominantly gradualist in orientation (Schendel & Hofer, 1979; Chakravarthy, 1982). The most influential of these theories, logical incrementalism, sees strategic management as a 'continuous, evolving, political, consensus-building' process 'with neither a finite beginning nor end' (Quinn, 1982: 623). It offers a prescriptive model that promises a relatively controllable and non-disruptive route to strategic renewal, even in the face of an unpredictable and turbulent environment. According to Quinn (1982: 613) logical incrementalism is an approach to strategic change that allows building a resource base so 'strong and flexible' that the enterprise can 'prosper despite all but the most devastating events'.

Critics have long since recognised a number of limitations with this original perspective. Due to the finite information processing capabilities of individuals and organisations (Simon 1955, 1956), all firms adapt to their 'perceived' environments with some degree of time lag and lack of precision (Smirnich & Stubbart 1985: 726). Adaptation, therefore, always involves some degree of experimentation and learning.

Quinn's conceptualisation of strategic change as an emergent process of purposeful experimentation and learning has been reflected in subsequent work (Mintzberg, 1987; de Geus, 1988; Senge, 1990; Waterman, 1994; Collins & Porras, 1996), and anticipated the more recent shift towards resource-based theories of strategic management (Wernerfelt, 1984; Foss, 1997; Mahoney & Pandian, 1992; Wiersema & Hansen, 1993; Hamel & Prahalad, 1994). The incrementalist perspective continues to have a strong influence in organisational studies (Singh et al., 1986). For example, the organisational development field still presents an 'ideology of gradualism', as Dunphy and Stace (1988: 317) have pointed out.⁶

Some have suggested that logical incrementalism does not really provide a strategic perspective on change, but merely a reactive one. Quinn (1982) has rejected this

⁶ Because of its approach to change the incrementalist approach is often seen to be synonymous with an Organisational Development approach (OD) as opposed to the Organisational Transformation approach (OT) which is often viewed as favouring drastic or radical change measures of revolutionary extent. OD often occurs in response to modest mismatches with the environment and produces relatively moderate adjustments in the segments where an alignment between organisation and environment is sought. This form of change initiative is seen to result in 'first-order changes' with correspondingly limited behavioural change. However, OD is triggered not only by current environmental mismatches but also by an organisation's desire to move towards future.

criticism, and argued that the process of logical incrementalism provides a 'purposeful, powerful management technique for integrating the analytical, behavioural, political and timing aspects of strategy formulation' (p. 614) offering a sensible way for dealing with bounded rationality, and with the political nature of strategic change in most organisations (March, 1962; Pettigrew, 1977; Murray, 1978; Narayanan & Fahey, 1982). This view of process was subsequently adopted in the work of those who tended to see strategies as created over time in a crafted but not fully pre-formulated fashion, rather than as point-in-time plans that are periodically reviewed and adjusted (Kotter, 1982; Mintzberg, 1987).

The main advantage of logical incrementalism is the adoption of a trial and error approach, which seeks to induce changes with prudence, i.e. seeks to control risk. A radical change initiative may result in possibly faster, more pronounced changes in behaviour, however, inevitably carries the much more increased risk of total failure. In addition, the management literature is placing increasing emphasis on the importance of the cumulative impact of incremental changes in the link between innovation and competitiveness (Reich, 1987; Kanter, 1988; Aoki, 1990). It also finds much resonance with the growing belief that successful strategies in dynamic environments are primarily based on core competencies rather than product-market positions (Prahalad & Hamel, 1990).

1.2.3.2 The Radical Change View

However, as a model of renewal in organisational contexts the gradualist perspective is far from universally shared. Mainstream thinking has since shifted towards a punctuated perspective, in which the process of organisational renewal is characterised by long phases of evolutionary change interspersed with short, sharp bursts of more revolutionary and disruptive transformation (Greiner, 1972; Miller & Friesen, 1980; Pettigrew, 1985; Tushman et al., 1986; Mintzberg, 1987; Johnson, 1990; Mintzberg & Westley, 1992). This perspective of renewal enjoys strong support in many fields of inquiry (Capra, 1982; Gersick, 1991), including the biological sciences (Gould & Eldredge, 1993), economic development (Schumpeter, 1934), philosophy (Kuhn, 1970; Tarnas, 1991), psychology (Peck, 1990; O'Neill, 1996), history (Toynbee, 1972; Schiesinger, 1989) and anthropology (Benedict, 1935).

According to advocates of the discontinuous change perspective, it is a common misconception that organisations can develop gradually encountering minimal friction. Most organisations are inclined to settle into a fixed way of working. This is evident in the adopted organisational structure, formal systems, standard operating procedures from which a distribution of power will emerge, and a corporate culture will become established. The stability of an organisation will be especially high if all of these elements form a consistent and cohesive configuration (Mintzberg, 1991). Moreover, if an organisation experiences a period of success, this usually strongly reinforces the existing way of working (Miller, 1990).

A level of stability is required for an organisation to function efficiently (March & Simon, 1958; Thompson, 1967). However, the downside of stability is inertia - the unwillingness and/or inability to change, even when faced with disaster. To overcome inertia, change measures must be radical and comprehensive. A co-ordinated assault is usually required to decisively break through existing organisational defences. As soon as the pressure ceases the organisation will solidify in a new form, inhibiting any further major changes. Strategic change is therefore cyclical, characterised by long periods of evolutionary change interspersed with shorter episodes of radical transformation. Constant upheaval would create prolonged confusion about tasks and authority, poorly structured internal communication and co-ordination, and a lack of clear standards and routines leading to widespread insecurity and conflicts. It is not surprising that most process models of renewal that incorporate the punctuated paradigm are variations of Lewin's (1951) field theory, which centres on a characteristic unfreeze-change-refreeze pattern (Wilson, 1992; Hendry, 1996).

The forces for continuity and inertia in organisations are quite prevalent and multi-faceted and have psychological, historical, structural, cultural and institutional dimensions. Several theorists have emphasised the strong influence of company history on future trajectory (Greiner, 1972; Kimberly, 1979). As Bocker (1989: 492) succinctly put it, the early patterns of organising tend to 'limit the range of strategic actions that firms are likely to consider'. Others have stressed political and cultural aspects in their explanations for the punctuated pattern (Pettigrew, 1985, 1987; Johnson, 1988, 1990). Resistance can also develop amongst the workforce due to the uncertainty and ambiguity that unavoidably accompany strategic shifts (e.g. Argyris,

1990; Pondy, Boland & Thomas, 1988). It is also common that individuals or departments resist change because they believe that their interests will be damaged (e.g. Allison, 1969; Pettigrew, 1988). However, change is often also impeded by the tenacity of organisational paradigms. Especially successful companies develop strong tendencies towards hubris and self-delusion, where the established business paradigm becomes increasingly 'sanctified by success and consecrated by conceit' (Heller, 1995: 12). This now widely recognised 'paradox of success' (Miller, 1990, 1994; Pascale, 1991; O'Neill, 1996) eventually leads to serious strategic drift (Johnson, 1988), and ultimately to humiliation and crisis. This pattern is not so much functional as historically inevitable, owing to the complex social nature of most organisations.

An inability to change can be caused by lock-in factors, such as fixed investments, inflexible standards and long-term commitments (e.g. Arthur, 1996; Ghemawat, 1991). Tushman et al. (1986: 39) see the long evolutionary periods of convergence as 'profoundly functional', allowing a company to 'build on its strengths' and to finesse them through continuous incremental improvements and consolidations. Frame-breaking change, on the other hand, is seen as 'quite dysfunctional when the organization is successful'. When such changes do become necessary, as a result of industry discontinuities or product lifecycle shifts, 'the more rapidly they are implemented, the more quickly the organization can reap the benefits of the following convergent period'. In a similar vein, Miller (1982:132) has argued that 'the functional aspects of resistance to change' have been generally ignored in organisational studies, and the desirability of piecemeal and incremental change overemphasised. For Miller, the ideal fit among strategy, structure and environment involves a consistent configuration. Within-configuration adjustments can be easily accommodated, but between-configuration transitions will be resisted for functional reasons until the case becomes almost overwhelming.

Many process explanations of the punctuated pattern centre on the conviction, borne out by empirical observation, that successful organisational renewal rarely takes place without some kind of crisis or jolt as a catalyst (Starbuck et al., 1978; Kanter, 1983; Pettigrew, 1985; Child & Smith, 1987; Johnson, 1990; Oliver, 1992). In their view, inertia is usually too strong to be overcome by determination alone. Organisations are capable of making minor changes when necessary, but avoid the pain of upsetting the

basic beliefs, processes, systems and power structures. For significant changes to take place, a crisis is needed - either real or induced. A major environmental jolt can be the reason for a sudden crisis (e.g. Meyer, 1982; Meyer, Brooks & Goes, 1990), but often a misalignment between the firm and its environment grows over a longer period of time (e.g. Johnson, 1988; Strebel, 1992). As tension mounts, the organisation becomes more receptive for painful changes. As long as the pressure persists, revolutionary change is possible.

Some authors taking this view argue that organisations should proactively seek the benefits of discontinuous change (e.g. D'Aveni, 1994; Hamel, 1996). Innovation is regarded by many as a key success factor in creating competitive advantage. Creating novel products, processes, and business formulas is inherently revolutionary because existing recipes must be discarded, before new methods can be adopted. The process of creative destruction (Schumpeter, 1950) is not orderly and protracted, but disruptive and intense, making the rapid implementation of system-wide change is an essential organisational capability.

It is rarely easy for top management to overcome these conservative tendencies while an organisation remains successful. According to Pettigrew (1987: 665) this should not surprise, because in non-crisis situations most leaders 'do not have sufficient leverage' to break through such a pattern of inertia. However, in many cases the problem is further exacerbated because those with the most power to change the organisation are often among the last to recognise the need for transformation. Experience shows that too often the tendency towards hubris becomes most pronounced at the top. According to Heller (1995: 15), very few executives have 'the courage or the common sense to dismantle the apparatus which establishes their own importance'.

However, the cyclical pattern also bears the potential for dysfunctionality. The evolutionary phase can 'forestall expensive reversals' and avoid 'hair-trigger adaptiveness', but it can also lead to deterioration in performance as a result of 'sluggish adaptation' (Miller & Friesen 1980: 611). On the other hand, many revolutions do not bring renewal, but can 'reverse a perfectly good strategy or structure', because of overreaction or over-zealousness. As a result many of these costly transformations 'never pay off' (p. 611).

1.2.3.3 Towards a less Disruptive Pattern of Strategic Renewal

In the discontinuous change perspective, revolution demands comprehensive action and the scope of change must be broad. In the continuous change perspective, evolution demands a high number of incremental adjustments to be made over a prolonged period of time. Therefore, while the accumulated changes might be broad in scope, the scope of each individual change is rather narrow.

The two perspectives also express different opinions with respect to the amplitude of change initiatives. From the discontinuous change perspective organisational transformation demands a radical departure from the present situation. The continuous change perspective propagates development out of the present situation by means of moderate steps - the amplitude of changes sought is low in comparison to the revolutionary perspective.

The two perspectives adopt opposing viewpoints regarding the pace of change. The pace of change is concerned with the speed and the timing of change initiatives. The revolutionary change perspective advocates swift action within a short span of time. The organisation then settles down until the next transformational change effort is needed. This results in an unsteady tempo of change. The incremental change perspective advocates a constant rate of change that is maintained indefinitely, without interruption.

There are also differences regarding the timing of change programmes. Supporters of the discontinuous change perspective are inclined to view all strategic changes as highly urgent that need to be effected as soon as possible- the faster a change is pushed through, the sooner the organisation can reap the competitive benefits. If a strategic change is a proactive innovation, then a rapid transformation can result in a major lead over rival firms. If the strategic change is a reaction to an organisational crisis, then a rapid turnaround is highly advantageous to avoid further decay. Incrementalists tend to emphasise the need for persistent change. Change initiatives rely on processes with gradual effect, such as learning, for their success. Therefore, enough time should be taken to gradually improve, learn and adapt. Crises requiring immediate action should be avoided, where possible, by maintaining a flexible and proactive stance.

To date the weight of empirical evidence would seem to suggest that the punctuated pattern is endemic, if not universal. Must this pattern of renewal persist indefinitely,

or will it change with further process insight and/ or in new contexts? Where it does persist, can its effects be mitigated so that in future organisational renewal need not be so disruptive?

Although recent academic research has focused on the effectiveness of the various approaches and has moved to link them to the subsequent performance improvements it seems that this discussion is ill directed. The change initiatives need not to be mutually exclusive but must be viewed as the extremes of a dichotomous scale.

Change is triggered in companies because actual or anticipated performance falls below a level that is regarded as acceptable. (Grinyer, Mayes & McKiernan, 1988: 13)

The choice of change measures and their relative impact on the organisation will depend on the actual performance level in comparison with an accepted level of performance of the organisation. An organisation in crisis will be mentally susceptible and prepared to experience the pain resulting from radical measures and the risk they carry mainly because it will have no other option and will need to move fast in order to avoid failure. In order to push the organisation harder some companies choose to create a permanent sense of crisis with the aim of keeping the organisation poised.

A strategy that is based on the idea of revolution as the necessary trigger for renewal bears substantial risk. Revolution not only causes unnecessary disruption and dysfunctional crises, but also is the substitute of diligence. If organisations do not have the stamina to continuously improve themselves, quick fix discontinuous change can be used as a short-term remedy. Where organisations do not exhibit the drive to permanently upgrade their capabilities, revolutionary innovations can be used as the short cut to renewed competitiveness. In other words, the lure of revolutionary change is that of short-term results (Imai, 1986). There are also major problems attached to such an approach, which leaves the question if a crisis can be artificially induced to trigger desired renewal efforts and as such offers a viable transformation strategy. These problems are mainly rooted in the observation that prolonged decline is usually treated in stages (Grinyer, Mayes & McKiernan, 1988). First, there is a problem of identifying the organisational situation as a crisis. This is based on the assumption that the organisation is most likely to initially confront what will become a prolonged decline as if it were merely an aberration. The decline in performance is ignored or

denied. Second, when the facts of decline are evident, it will be treated as temporary crisis. However, as the situation worsens a variety of side-effects such as increased conflict, increased politicking, increased resistance to change, and a drop in employee motivation and morale reinforce the downward trend and make effective crisis management extremely difficult. Timing is an important aspect for the success of revolutionary change methods.

By abruptly and dramatically making major changes, managers hope to rapidly book tangible progress - and instantly win recognition and promotion. However the scale and scope of the changes necessary for organisational transformation make this an extremely risky approach. In their study (Grinyer, Mayes & McKiernan, 1988) found that the engagement in 'big projects that failed' was one of the most frequent causes of organisational failure.

Nevertheless, for many researchers the role of crisis remains central to successful organisational self-renewal, because higher order learning requires a degree of unlearning before it can be truly transcendent.⁷ However, they believe that the required crisis need not always be so painful, and that the process of renewal can be managed in a much less reactive way than has been the common experience to date. For de Geus (1988), for example, the secret lies in discovering how to institutionalise learning in organisational settings. Senge (1993a: 150) suggests that the key to non-disruptive renewal lies in the capability of an organisation to trigger its own higher order learning through the generation of 'creative tension'. This is based on his belief that there are 'two great energies of change in human affairs: fear and aspiration' (Senge, 1993b: 5). Aspirational energy can be generated by the development of a future vision that raises the horizons of the firm well beyond its current reality.

The setting of goals that stretch a company's resources and challenge its resourcefulness is one way to generate creative tension and transcendent learning

⁷ Learning goes hand in hand with unlearning - changing the cognitive maps shared within the organisation (McCaskey, 1982). In this respect, it is argued that an atmosphere of crisis actually inhibits continuous change. Crisis circumstances might lower people's resistance to imposed change, but it also blunts their motivation for experimenting and learning, as they brace themselves for the imminent shock. Crisis encourages people to seek security and to focus on the short term, instead of opening up and working towards long-term development (Bate, 1994).

(Ackenhusen & Ghoshal, 1992; Bibb, 1994; Brown, 1994; Nonaka, 1988; Hamel & Prahalad, 1993). Creative tension and organisational crises can also be deliberately generated through ways that help to 'make the status quo seem even more dangerous than launching into the unknown' (Kotter, 1995: 60). The imaginative use of scenario techniques (de Geus, 1988) or the benchmarking of best practice (Pascale, 1991) are prime examples of this approach. Others go even a step further and suggest that the generation and maintenance of such tension should be made a central element of the value system and culture of the organisation. Such approaches are evident in the deliberate attempts at Intel and Cola Coca to legitimise the ongoing generation of creative disharmony and encourage individuals and groups to embrace it (Schlender, 1995; Handy, 1995).

Firms, which actively manage the selection process of the transformation, may thus embed the very processes, which would increase opportunity capture and reduce the need for traumatic transformations. By embedding processes, which improve opportunity, capture and adaptation in the organisation fewer major transformations will be required for the long-term survival of the firm. Following the work of Tushman (1985) and others (cf. Gersick, 1991) working in the punctuated equilibrium paradigm, organisations which need more transformations to adapt to environmental or competitive change are at more risk of failure. The initial thrust into transformation can be conceptualised as a risky variation generation phase, followed by reduction of variation through selection and retention. Avoiding the risky survival-threatening phase is clearly desirable, although an organisation that no longer has viable opportunities may have no other choice.

1.3 Organisational Decline and Failure

How an organisation can develop the capability of continual self-renewal and avoid failure over time is the aim of this research. In order to develop possible solutions, it therefore, seems important to initially gain an understanding of causes of decline and failure of organisations.

The research on organisational decline has gained momentum during the past 20 years (see reviews by Greenhalgh, 1983; Wetton, 1987; Cameron et al., 1988; Sutton, 1990; McKinley, 1993; Neumair, 1998; McKiernan, 2003). Since its labeling as a neglected

topic (Wetton, 1980), decline has been receiving increased theoretical and empirical attention. Although its definition varies among studies, it is generally viewed as the deterioration of an organisation's adaptation to its domain and as a decrease in internal resource munificence (Cameron et al., 1988: 6; D'Aveni, 1989; Freeman & Cameron, 1993: 13).

Decline is a natural *process*, observed in both biological and organisational systems. In nature failure is synonymous with death and considered a natural *event*. There are no exceptions to biological failure. Living systems are born, mature, age, and die; death cannot be avoided. In organisational systems, however, failure is not as certain or regular.

[...] whereas eventual ageing and death is coded into the genetic structure of all complex biological organizations, this is not necessarily true in the case of social organizations, the latter being, theoretically at least, capable of almost continual self-renewal. (Boulding, 1970: 8)

The literature on organisational decline has derived most of its conceptual foundations from three theoretical strands. One is the organisation-environment literature (Lawrence & Lorsch, 1967; Meyer, 1978; Aldrich, 1979) and, in particular, the resource dependence view (Pfeffer & Salanick, 1978). A second is the crisis-management literature (Smart & Vertinsky, 1977; Starbuck, Greve & Hedberg, 1978; Milburn, Schuler & Watman, 1983) and a third is the uncertainty literature (Simon, 1962; Thompson, 1967; Cohen & March, 1972). This chapter focuses particularly on recent research concerned with identifying the processes responsible for organisational decline (e.g. Miller & Friesen, 1984; Tushman, Newman & Romanelli, 1986; Miller, 1990, 1993; Grinyer & McKiernan, 1994a, 1994b). This stream of research provides evidence that organisations inadvertently institutionalise destructive forces that, although they initially may be responsible for their success, cause an organisation to ossify and lose its capability to anticipate or respond to major challenges created by environmental turbulence over time eventually leading to decline and ultimately failure of the organisation.

1.3.1 Reasons for Corporate Failure

Corporate failure and decline are not synonymous terms. A private sector, profit-seeking, organisation is classified as a failure if it ends up in liquidation and is closed down. A similar company might be unsuccessful and in decline but able to avoid failure by taking appropriate strategic action. While decline refers to the process of some form of organizational deterioration, failure refers to a system's state usually resulting from prolonged organizational decline.⁸

The concept of organisational decline is fairly ambiguous since its effect could range from slow-growth or decrease in market shares (Freeman & Cameron, 1993) to a total collapse and closure (Sutton, 1987). In fact, much of the definition of decline depends on the perceptual cognition of decision makers and key exchange partners. Tainted organisational image (Sutton, 1990), interpretation processes (Ford & Baucus, 1987; Jackson & Dutton, 1988) and various cognitive failures (Weitzel & Johnson, 1989) in conjunction with the time lag between explanatory events all shape the perception and definition of organisational decline making it extremely difficult to identify probable causes.

Researchers have claimed that successful organisations are in decline and eventually fail because they have lost their edge (cf. Peters & Watermann, 1982; Weitzel & Jonsson, 1989). Initial signs of stagnation and decline such as inconsistent product quality, slow response to customers, lack of innovative, competitive products, uncompetitive cost structure, inadequate employee involvement, unresponsive customer service, and inefficient resource allocation are generally interpreted as 'temporary' or regarded 'insignificant'.

Even if alternative courses of action are formulated to avert the process of decline, these usually have their origins in once successful routines or strategies, e.g. shifting the emphasis of their strategy to be more innovative; reallocating resources to core businesses; or focusing on operational improvements in quality, customer

⁸ It is furthermore essential to distinguish between symptoms and causes of decline. Symptoms of decline are not the causes of failure but indicators that a company might be heading for failure.

responsiveness, and costs. Almost, without exception, these solutions fail to reverse decline beyond the short term. The causes of decline seem to be rooted much deeper.

The basic reason these programs fail is that they do not address the cause of the problem and in this respect must be seen as a 'quick-fix' or as a 'piecemeal solution' when considering the complex nature of the problem (Kilmann, 1984). The employed solutions are programmatic in nature and easily copied; the long-term competitive position of the organization is not altered.⁹

Alternative strategies and measures are virtually without chance since there is a tendency in the affected organizations to perceive crises as originating from adverse environmental conditions, resulting from environmental threats as much as from defects within the organisation itself (Starbuck et al., 1978).

For example, organisational perception may become highly selective. Decisions about relevancy or irrelevancy of an issue are made implicitly. As a result organisations interpret and enact their environments and initiate changes in accordance with dominant assumptions, beliefs, values (paradigm) that no longer adequately assess the situation.

Moreover, past organisational practices and programs provide the basis for incentives and promotions and, hence, obstruct any new orientation. Organisational traditions often represent decisions of the dominant coalition. Past successes, attributed to these decisions, serve to legitimise executives' continuing tenure and are instrumental in the allocation of resources. Alternative approaches would necessitate breaking the power base.

The literature on organisational decline has coined the terms of 'convergence', 'inertia', 'momentum', and 'simplicity' to describe such notions in organizational behaviour. In the following these different theories of decline are outlined with the aim of exploring the process of decline and to detect elements of rigidity or adaptation in them.

⁹ for a more detailed discussion of this see Grinyer, P. & McKiernan, P. (1994)

1.3.1.1 Convergence

The concept of convergence was developed by Tushman and Romanelli (1985) and together with Newman (1986). Based on their research they propose that organizational evolution is typically marked by relatively long “[...] periods of incremental change, or convergence, punctuated by discontinuous changes [...]”. Discontinuous or “frame-braking” change involves simultaneous and sharp shifts in strategy, power, structure, and controls.” (Ibid.: 707).¹⁰ Phases of convergence entail a considerable increase of consistency of organisational activities with strategy, as the following definition reveals:

Convergence is defined as process of incremental and interdependent change activities and decisions which work to achieve a greater consistency of internal activities with a strategic orientation, and which operate to impede radical or discontinuous change. (Tushman & Romanelli, 1985: 178)

According to Tushman and Romanelli, organizations typically evolve by alternating between two modes of behaviour. During long, stable periods of an organisation’s lifespan, labelled convergence, change is restricted to incremental adjustments that consolidate already chosen strategic orientations. Periods of convergence are characterised by selection and reinforcement of processes to which past successes have been attributed. The organisation builds efficiency by initially narrowing on a limited number of processes and then by standardising and formalising these. The organisation experiences revolutionary shifts only in relatively infrequent and short periods of dramatic changes, called reorientation or recreations.

Organizations evolve through convergent periods punctuated by reorientation (or recreations), which demark and set bearings for the next convergent period. Convergent periods refer to relatively long time spans of incremental change and adaptation. Convergent periods may or may not be associated with effective performance. Reorientations are relatively short periods of discontinuous change where strategy, power, structure, and controls are fundamentally transformed towards a new coalignment. (Tushman & Romanelli, 1985: 171)

¹⁰ The punctuated equilibrium model of organisational change is quite influential in management thought and is advocated by a number of organization researchers (cf. Gersick, 1991; Greiner, 1972).

Others have developed both theoretical frameworks and provided empirical evidence that lend support to the proposition that organisations change strategic orientation through such rare transformative events (cf. Kuhn, 1970; Miller & Friesen, 1980; Greenwood & Hinings, 1988; Gersick, 1991; Amburgey, Kelly & Barnett, 1993).

As long as the organisation does not change its strategic orientation, inertia builds up over time through ongoing social and structural processes, “[...] as webs of interdependent relationships with buyers, suppliers, and financial backers strengthen, and as commitments to internal participants and external evaluating agents are elaborated into institutionalised patterns of culture, norms and ideologies, the organisation develops inertia.” (Tushman & Romanelli, 1985: 177)

Convergence may also be driven by the need of organisational activities to comply with organizational norms and belief systems to establish legitimacy. While such consistencies may become key sources of success, they also entail the seeds of failure if environments shift. The longer and more pronounced the convergent period, the greater the internal forces for stability. The momentum towards convergence is particularly prominent in successful organisations as well as in organisations that are shielded from competitive forces, for example by operating in regulated markets. The phases of reorientation regularly emerge from exogenous technological breakthroughs by new firms often causing incumbent firms to fail (Tushman & Anderson, 1986).

Against this general backdrop, their articles focus on the underlying reasons for this typical pattern in organizational evolution. In the traditional mode of low-intensity and moderate-intensity competition, firms must develop certain unique and difficult-to-transfer routines as a part of their core competence. Their repositories of routines specify behaviour that is appropriate and a search process for new ideas that are reasonable and consistent with prior learning (Nelson & Winter, 1982). Competition for rents depends on innovations in routines that are organisationally embedded. Such innovations tend to be incremental and sufficiently infrequent that specialization is both feasible and desirable.

Through the repeated process of selection and reinforcement, the organisation increases the consistency of its decisions. Standardisation and formalisation of organisational processes generate consistency and efficiency by establishing routines

and avoiding repeated renegotiation and confirmation. As a result, the organisation develops a set of highly specialised rules and routines. In the short run, the establishing focus on limited set of processes and rules may prove successful.

Teece (1984: 106), however, has argued that such limited repertoire of available routines severely constrains a firm's strategic choice. Although this reduction of choice is a necessary condition for the development of a core competence, Leonard-Barton (1992) suggests that in competitive environments, a core competence may have the effect of being a core rigidity; firms develop rigidities together with highly specialised resources to enhance profits at the cost of reduced flexibility. Alternate or conflicting information is systematically neglected and the organisation loses its explorative capability and becomes unable to innovate. If the organisational environment changes, a gap emerges between internal and external consistency. Johnson (1988, 1992) labelled such divergence of internal alignment and external realities 'strategic drift'. Similarly, Levitt and March (1988: 322-323) call the gap between internal logic and external realities the 'competency trap'. March (1991: 73) suggests that organisations engage in convergent processes the "returns from exploration are systematically less certain, more remote in time, and organisationally more distant from the locus of action and adaptation."

Similarly, Utterback and Abernathy's (1979) model posits that a firm, which pursues the evolution of its processes and products to the extreme, may find that it has achieved the benefits of high productivity only at the cost of decreased flexibility. Concurrently, they lose the capability to create products and services that are genuinely innovative (Hamel & Prahalad, 1994: 99-102; Christensen & Bower, 1996). Apart from a decrease in internal innovativeness, the company may even lose its ability to profit from outside inventions as it becomes detached from realities of the market (Tushman & Anderson, 1986).

In the worst case, organisations become locked into these self-imposed routines eventually causing the organisation to decline and ultimately to ossify (Arthur, 1984, 1989). In face of decline, management may have to change its current strategies (Harrigan, 1985), apply new technologies, or fundamentally renew its products. The necessary responses may also be external, for example influencing customers through

advertising and promotions (Mascarenhas, 1982), creating new product market combinations (Krijnen, 1979), using market power to deter entry and control competitors (Porter, 1980), or engaging in political activities to counteract trade regulations. New values and norms are necessary and past experience may not provide any advantage (Newman et al., 1972).

Organisations suffering from convergence, however, reinforce existing routines, since these routines have been the source of past successes and are sanctified by the dominant coalition whose power and reputation are based on the former success of these routines and are consistent with rules, assumptions, and beliefs. Silence of dissenting or doubtful members is perceived to mean that there is virtual unanimity in the thinking of the group. Furthermore, each strengthening of a certain rule or routine increases the likelihood of rewards for engaging in that activity, thereby further increasing the assignment of past usefulness of that rule or routine to the system. Rather than fundamentally changing the strategic orientation, convergent organisations will opt for cost and capacity reduction, measures, which are still consistent with the established strategy.

Organisations suffering from convergence are not “complacent” or “inert”; in fact, they embellish specific behaviour by engaging in a vicious cycle of selection and reinforcement. As they converge, they increasingly compromise their competitive repertoire and gradually lose their capacity to innovate and change.

1.3.1.2 Momentum

Miller and Friesen (1984) developed and tested the idea of *momentum* as a source for the failure of organisations over time. Their research is based on a series of studies covering the development of 40 well-known companies in diverse industries for a period of at least 20 years.

An examination of corporate histories revealed that this could be explained by the reluctance to tamper with established views and ideologies; the narrow models of reality of executives; and the integrity of configurations among environmental, organizational, and strategy-making variables. (Miller & Friesen, 1984: 263)

The term “momentum” is rooted in their earlier research on “organisational archetypes” (Miller & Friesen, 1977).¹¹ They found momentum to coexist among many variables of strategy and structure simultaneously. The presence of a continuous link for one variable, which could be significantly associated with continuity in many other variables led them to conclude that momentum must be regarded as a pervasive phenomenon.

Momentum can be defined as the tendency to extrapolate previous directions of evolution in the strategy and structure of an organisation. Organisations evolve “[...] consistently in accordance with a perspective, strategy, ideology, and mission of their own —concepts that are manifested by an integral alignment or configuration among environmental, organizational, and strategic variables” (Miller & Friesen, 1984: 264). Because of such bias in their direction of development, the organisations’ basic configuration (i.e., archetype, quantum stage, gestalt) becomes self-sustaining and may remain unchanged for a relatively long time. For example, entrepreneurial firms may become excessively entrepreneurial once they begin to move in that direction, just as mechanistic bureaucracies may become excessively risk averse and rigid.

Miller and Friesen (1984: 1-9) argue that - despite an infinite number of possible arrangements of variables such as organisational structures, production systems, information processing procedures, strategies, and environments - only a small number of extremely common and sometimes considerably different configurations emerge. This small number of organisational archetypes encompasses the vast majority of all organisations.

Building on this earlier research, Miller (1990) distinguishes four basic configurations of successful organisation and corresponding trajectories of momentum. These basic configurations are labelled craftsman, builder, pioneer, and salesman to indicate the dominant driver generating momentum.

The *craftsmen* companies pursue quality leadership. To enforce this primary objective craftsmen companies rely on an orderly structure. Over time, momentum drives these

¹¹ In their later work, these archetypes are alternately referred to as “quantum states” (Miller &

companies along a *focusing trajectory*. Perfection of products and services increasingly overrides all other organisational goals leading to obsession with detail and limiting the organisation's scope. In these 'tinkering' companies, an extremely rigid structure has gradually replaced the former orderly structure. The organisation constantly searches for new ways of perfecting/ refining their products and services regardless of their value to the customer. Miller (1990) cites Texas Instruments, Digital Equipment, and Caterpillar as examples for this phenomenon.

Builder companies are successful growers. Based on their entrepreneurial culture and a divisional structure all goals are increasingly aligned towards growth. Momentum turns these companies into impulsive, greedy imperialists. Following a *venturing trajectory*, the compulsive quest for expansion coupled with a gambling attitude leads to high-risk ventures based on limited or unreliable information. This expansion into new and different fields of commercial activity is increasingly reflected by the company's fragmented structure. Eventually this kind of organisation becomes unmanageable. Due to the high-risk exposure, even small environmental disturbances may suffice to cause failure.

The *inventing trajectory* converts *pioneers* into escapists. The survival and success of the pioneer company has been guaranteed by its continuous innovation, a culture characterised by the prevalence of the R&D department, and a structure that can be described as organic. Momentum drives pioneer companies to utopian escapists, run by cults of "chaos-loving scientists" (Miller, 1990: 4) who spend their time in the exploration of hopelessly grandiose and futuristic inventions that, however, lack a market.

Finally, there is the *decoupling trajectory* transforming *salesmen* companies (companies with a strength in marketing, a prominent brand name, and access to a wide range of markets) into drifters. Drifters devote too much time to searching for new markets for their given products and for ways to market their products and services. Thus, figures from marketing (above all market share) dominate organisation's awareness at the cost of an occupation with things such as profit

margins, quality, logistics, etc. As a result of the momentum gained from their past success, drifters are paralysed by their now oppressively bureaucratic structure and an insipid and political culture.

Companies suffering from momentum compulsively reinforce certain behaviour patterns because of the initial success attributed to them. Thus, rules and routines determining search behaviour and confirming the relationship are established. Over time, the “tried-and-true” recipe (Miller, 1990: 16) becomes institutionalised. As a result, the means for success become ends in themselves. This leads companies to become obsessed with focusing (tinkerers), or venturing (imperialists), or inventing (escapists), or decoupling (drifters). “Momentum is the result of amplifying existing strengths and it leads to vicious circle of excess” (Stacey, 1993: 104). These reinforcing feedback loops will lead to either convergence or divergence of organisational activity. Permanent excess of one set of forces at the expense of the other will ultimately lead the organisation to fail. Successful companies are especially susceptible to momentum, leading Miller (1990) to use the label ‘Icarus paradox’ for this phenomenon.

1.3.1.3 Simplicity

In his article *The Architecture of Simplicity*, D. Miller (1993) identifies the organisational drive towards simplicity as one of the major reasons of failure. According to Miller particularly successful organisations are susceptible to fall into this trap.

Miller (1993: 117) defines the general notion of simplicity “[...] as an overwhelming preoccupation with a single-goal, strategic activity, department, or world-view - one that increasingly precludes consideration of any others.” Sources of simplicity can be externally or internally linked to the organisation and are generated in a variety of ways by employing managerial, cultural, structural, and process factors. It is also attributed to both the complementary way in which these factors configure and the paradox that although simplicity may trigger ultimate failure, it can bring about initial success.

Miller identifies a variety of causes for an organisation's inevitable tendency towards simplicity over time. First, individual managerial, cultural, structural, and process factors provoke simplicity. Such factors include organisational learning; the "natural selection" of values, heroes, and skills; and confining programs and routines. Secondly, these factors tend to interact and are presumed to be mutually reinforcing, generating increasingly pure and simple corporate configurations. Over time such configurations increasingly become aligned with a single dominant theme and less tolerant of deviation or variation. Since these sources of dangerous simplicity may underlie initial success, they are very hard to combat, since it is difficult to distinguish between "[...] the concentration and passionate dedication so necessary for success and the competitive advantage and the simplistic fixations and extremes that lead to failure." (Miller, 1993: 119)

Miller proposes in successful organisations, managerial world views will become more homogeneous and will focus on even fewer objectives, issues, and cues from the environment. Through experience, managers develop 'lens-like cognitive structures' which dictate what is perceived or ignored as well as any subsequent interpretation. If accompanied by success, managerial learning will be biased towards maintaining existing categories, eventually resulting in a simpler, more consistent worldview. In the face of failure, executives employ defences mechanisms making double-loop learning unlikely, e.g. by rationalising problems as aberrations, as temporary, or as beyond management's control, or by attributing organisational success to their own actions and absolving themselves of responsibility for any failures. Overconfidence in a single (successful) way of conducting business may also make intolerant of any opposing view. Initial failures, induced by this one-sided emphasis, lead the managers to embrace even riskier projects (Grinyer & McKiernan, 1994).

Natural selection of cultural values will make an organisation become more homogeneous by reducing sub-unit differentiation. Particular goals and values that dominate in organisations will result in the dominance of those departments within the organisation that best embody these goals and values as resources, power (via promotions), prestige will be channelled there over time. This increasing dominance of a single department creates a monolithic culture. The skill set of the organisation will tend to narrow as successful organisations come to concentrate on those skills

that are required to implement their current strategies and those corresponding to the knowledge of only the most esteemed managers and departments. As secondary skills are lost, because the practitioners of such skills fail to gain sufficient power or respect, the strategy becomes increasingly constrained.

Structure profoundly channels both managers' perceptions and the way in which they make decisions. Programmes and routines restrict perceptions and activities and reinforce existing policies by recognising only recurring and anticipated problems, suggesting only conventional courses of action, and implementing only traditional solutions.

The organization sets up behavior programs that promote habitual responses to expected queues. [...] Because situations appear equivalent as long as they can be handled by the same programs, programs remain in use long after the situations they fit have faded away. [...] Continued success in incubates potential failure, by increasing an organization's dependence on its programs. (Starbuck & Hedberg, 1977; 250)

Power will usually gravitate towards departments and individuals that have been identified with past successes; it will recede from others (Pfeffer, 1981). Successful strategies bring respect and influence to those who develop them. Hence, managers have an incentive to concentrate only on the strategies that reward them, to reinforce only the goals that they believe in, and refined only the structures that consolidate their power (Milliken & Lant, 1991). The resulting concentration of power aligns organisational strategy ever more tightly with the values and interests of the dominant coalition (Pettigrew, 1973).

Process factors are in many ways a function of the managerial, cultural, and structural factors already discussed. Miller highlights three processes: skewed learning, pre-programmed decision-making and environmental enactment. Through selective reporting and implicit standards, information systems increasingly mirror established perspectives, goals, and values. By filtering what managers attend to and conceding external change, they reinforce the uniformity of perceptions and the complacency that eventually breed cultural and strategic simplicity.

These conditions shape managerial conditions; they reduce the incentive to search for different ways of doing things or contribute to an ignorance of competitive

alternatives (Walsh, 1995). As a result, the set of actions used to compete becomes very skewed and limited (Miller, 1990, 1993; Pascale, 1990; Stacey, 1992).

Furthermore, organisations are subject to pre-programmed decision-making. Most activities do not take place in response to problems, but rather because policies, strategies, and programs automatically generate particular actions (March, 1981). Finally, there is a natural tendency in organisations to create and constitute the environment to which they react. This reasserts the argument that the organisation is moulded, managed, and changed via mental constructs. By fine-tuning strategies and structures to cope with external forces, organisations are not so much adapting as honing, refining, and focusing themselves according to their pre-confined interests and worldviews. This process of enactment applies equally to the environment. Applying the concept of autopoiesis, Morgan suggests that organisations “[...] are always attempting to achieve a form of self referential closure in relation to the environment, enacting their environment as projections of their own identity or self-image” (Morgan, 1986: 240). Both organisation and environment are phenomena “[...] tied to processes of attention, suggesting that unless something is attended to, it doesn't exist” (Weick, 1979: 28).

To conclude, the central tenet of Miller's simplicity theory is “[...] that over time most successful organisations become simpler, not more complex” (Miller, 1993: 134). Strategies turn into specialised recipes, cultures narrow to mirror the views and practices of a single group, and routines and systems become more focused. All of these trends interact to produce tight configurations. Ultimately, these configurations become distended, exaggerated, and lacking in richness and subtlety, so that surprise and randomness, the sources of much knowledge, are lost. Activities become more thematic, more specialised and uniform. As ‘opposition’ is increasingly choked and conformity and myopia grow, flexibility will decrease, learning and adaptation will become obstructed.

Simplicity in managerial worldviews, goals, culture, strategy and skills will promote the use of more inertial routines, systems, and processes. These in turn reinforce simplicity in the former.

[...] organisations keep recreating themselves in their own images. They determine their futures according to the world views and programs of their pasts. [...] they are driven by a central theme that orchestrates strategy, structure, and culture [...] [which] reinforce each other. The result: over time, many successful companies fixate only on their core practices and propensities. They become largely autonomous closed systems that move inexorably toward narrowness, conformity, and excess. (Miller, 1996: 130)

Untested such overall self-alignment results in competitive simplicity with profound consequences for an organisation's ability to effectively deal with the challenges it faces (Miller, 1990, 1993; Pascale, 1990). While it may, initially, allow firms to develop distinctive core competences (Prahalad & Hamel, 1990) and economies of concentration (Chandler, 1992) it will eventually cause Ashby's (1956) law of requisite variety to be breached: the organisation's competitive arsenal gets too narrow to address the range of market challenges, a danger that is especially relevant in intensely competitive industries (Miller, 1993).

Through systematic selection and excessive refinement of tried-and-tested, (perceived to be) successful solutions organisations focus more narrowly on a particular theme, activity, or issue thus reducing complexity of worldviews, goals, strategies, cultures, and processes eventually leading to lower organisational performance, especially in competitive and changing environments.

1.3.1.4 Inertia

Inertia is resistance to change, or, at least, resistance to changes that run counter to a fundamental existing operation. "In absence of other forces inertia describes the tendency to remain with the *status quo* and the resistance to strategic renewal outside the frame of current strategy. In the presence of other forces, factors of inertia will strongly channel renewal efforts even if they cannot quell them entirely" (Huff, Huff & Thomas, 1992: 56). Hence, inertia describes a process that is related, but different from, the previously discussed notion of simplicity, since inertial structures, processes, or systems are not necessarily simple. It also differs from the notions of convergence¹² and momentum¹³. Under the influence of momentum and convergence,

¹² The tendency to extend or refine an existing strategic orientation.

companies still remain highly active as strategy-making processes are taken to extremes. An organisation suffering from inertia is marked by inactivity or passivity despite having sufficient resources and discretion to initiate the necessary changes.

Hannan and Freeman (1984) claimed that inertial programs and routines increase an organisation's reliability of functioning but suggest that over time organisational inertia will grow and limit its capacity to change. Success induces organisations to converge on and adhere to established themes and practices. Changing strategy, structural forms and supporting administrative procedures is difficult, costly, risky, and time consuming. Existing successful strategies and structures are refined and normally only departed from under the duress of crisis. However, an organisation's initial unwillingness to act becomes an inability to act as the organisation competitive position is increasingly compromised and eventually declines.

There is no simple theory of inertia as its causes are multiple and varied (Rumelt, 1995). Managerial learning and attributions, self-perpetuating power structures, and the effect of slack resources are all deemed sources of inertia as they serve to reinforce the status quo and quell change efforts (Miller, 1994).

To be successful companies need to learn what works well and incorporate this into their operations. Using feedback from the market the initially organization engages a screening process to select what works. Once organizational effectiveness has been established, the organization engages in an eternal quest for increased efficiency. Initially, implementing a strategy requires some level of commitment. Over time more detailed and routinised policies and procedures are developed to increase reliability and result in a process of institutionalisation. Effective policies and routines are adopted and continually refined, as the firm increasingly gets better at accomplishing its mission. Over time this process results in structural inertia.

Older, larger firms develop structural and cultural inertia [...]. As companies grow, they develop structures and systems to handle the increased complexity of the work. These structures and systems are interlinked so that proposed changes become more difficult, more costly, and require more time

¹³

The tendency to extrapolate previous directions of evolution in strategy and structure.

to implement, especially if they are more than small, incremental modifications. This results in *structural inertia*-a resistance to change rooted in the size, complexity, and interdependence in the organization's structure, systems, procedures, and processes. (Tushman & O'Reilly, 1996: 18)

Under conditions of satisfactory performance the assumptions underlying the organisation's strategy are devoted less and less attention. A smoothly functioning strategy is, therefore, likely to channel managerial perception in such a way that the effectiveness of the strategy remains unquestioned (Johnson, 1988). Since the strategy is perceived to satisfactorily meet the current conditions of the environment, it is further enacted. With the further enactment even individuals who are not completely convinced of the strategy's benefits find ways to accommodate themselves (for example out of self interest) to the confines of current ways of doing things. Gradually this process leads to an adoption of the strategy as a new paradigm and to cultural inertia.

As organizations get older, part of their learning is embedded in the shared expectations about how things are to be done. These are sometimes seen in the informal norms, values, social networks and in myths, stories, and heroes that have evolved over time. The more successful an organization has been, the more institutionalized or ingrained these norms, values, and lessons become. The more institutionalized these norms, values, and stories are, the greater the cultural inertia-the greater the organizational complacency and arrogance. In relatively stable environments, the firm's culture is a critical component of its success. Culture is an effective way of controlling and coordinating people without elaborate and rigid formal control systems. Yet, when confronted with discontinuous change, the very culture that fostered success can quickly become a significant barrier to change [...] Cultural inertia, because it is so ephemeral and difficult to attack directly, is a key reason managers often fail to successfully introduce revolutionary change-even when they know what is needed. (Tushman & O'Reilly, 1996: 18-19)

Current performance problems are associated with internal inconsistency in strategy, structure, culture, and people. Achieving congruence between these factors becomes overriding importance. Changes are directed at system refinement and marked by short-term considerations and have the objective of achieving perfect fit between these components. With increasing duration this process has far-reaching consequences for the organization's ability to change.

Over time the forces of inertia increasingly gain in strength and bind the organisation to one strategy. The organization engages in processes of continuous improvement. Only minor interventions are initiated in order to minimise risk, costs, and stress and to keep the uncertainty within tolerable limits and the change controllable.

Resistance to further frame changing renewal within the organisation increases, as the abandonment of increasingly complex current activities and discovery of alternative procedures for meeting internal and external demands are regarded as time consuming. Frame changing efforts would subject the organisation to the inefficiencies and uncertainties of a new strategy, and require new contracts among established and important agents. As current commitments become less easy and more risky to change, managers are more motivated to work within the existing frame. Eventually the framework becomes independent of the coming and going of individuals.

Unless these inertial forces are overcome the organisation will be doomed to failure if the environment changes in such a way that the strategy and operational paradigm is no longer effective.

1.3.2 Overcoming Forces of Decay

The outlined research in this section shows the importance of the past performance in the way an organisation evolves, makes decisions, and adapts to its environment. It also shows that the paradigm embraced by an organisation is central to the failure to adapt to its environment overtime. Although, it does not necessarily follow that changes in the environment go unnoticed, it is evident that managers fail to associate these trends with a larger shift in the environment. Success-proven and therefore dominant paradigms lead managers to blame external forces, such as increased competition or governmental regulations, for lacking success in the company's performance.

These findings further suggest that without some decisive effort to break the vicious circle of inherent destructive forces most organisations are not sufficiently equipped to trigger successful renewal. Historical accounts clearly show that organisational failure is almost inevitable unless something is actively done to delay or avoid it. The

solutions employed to reverse decline remain consistent with the assumptions that underlie the embraced paradigm. In this respect proposed solutions often only treat symptoms or may even aggravate the situation by reinforcing solutions associated with past successes. In the following section organisational characteristics that are deemed important for keeping up a steady pace of change are discussed.

1.4 Attributes of the renewed organisation

Like treatments of strategy, the transformation literature tends to mix “what” and “how.” The nature of a transformation is revealed by its features (the what). In this section the features of a realized vision are looked at to address the question: what is the outcome of a transformation? In the sections that follow, aspects of creating a transformation (the how) will be considered.

An increasing body of literature therefore suggests that organisations have to become different by transforming themselves. Current literature emphasises customer focus, swiftness, flexibility, innovation, knowledge use, learning and vision. Radical change transforms an organisation by providing greater variety, more skill, and increased ability to serve its customers in new and different ways, which allows the organisation to cope more effectively with its changed world (Pauchant & Mitroff, 1992; Senge, 1990). The debate on what transforming organisations should strive for usually takes a structural approach (focusing on some ideal type form) or a paradigmatic approach (focusing on different norm and values). Both are suggested to equip the organisation with the necessary flexibility to survive and prosper in current and future adverse conditions of environmental turbulence. However, while there is general agreement in the literature that organisations need to embrace changes that ultimately transform the organisation it is far from clear what shape (paradigm, structure, processes etc) the organisation should aim for. These will, however, be closely linked to the attributes that such an organisation should feature. In this section the main attributes associated with transformed organisations are outlined. Possible solutions to create these are also discussed.

1.4.1 The Transformational Paradigm

The set of beliefs, attitudes, expectations, assumptions, and values that determines how people construct their own personal reality is called a paradigm. A dramatic shift in the way a collection of people constructs its personal realities is called a paradigm shift.

Figure 1-1: Major societal paradigm shifts

Agricultural Revolution (up to 1890)	Industrial Revolution (1890-1960s)	Post-industrial Revolution (1960s-?)
importance of traditional religion	beginning decline of formal religion	belief in spiritual values (not necessarily affiliated with formal religion)
family farms sparse population patterns	urbanisation	
prominence of self-sufficiency and individualism	emphasis on mass production and materialism	importance of job satisfaction/ growth of 'self-actualisation'
limited education and sophistication of populace	rationalism complex phenomena can be explained with a set of mechanical laws clear relationships between variables (cause and effect) the machine model as dominant metaphor in scientific inquiry	systemic view in scientific inquiry holism as opposed to reductionism complexity/ mutual dependence of variables organic models as dominant metaphor
survival orientation	scientific management/ growth of bureaucracy belief in scientific inquiry as engine of technological advancement	redefinition of social responsibility of business growth of "technological assessment" rise in ecological consciousness
traditional values of ethics, co-operation and teamwork	control in organisations based on authority and hierarchy	concern for equitable distribution of power/ justice beginnings of sapiential authority supplanting formal authority
distinctions between men's and women's roles	still relatively great distinctions between men's and women's roles	exploration of identities and roles of men and women
folk medicine	'modern' medicine	modern and alternative medicine

Thomas Kuhn (1970) argues that a paradigm begins to break down when it simply does not work anymore to describe or operate in current reality. Upset and discomfort mark the period of the shift. A look at history shows that sooner or later all paradigms do shift because they are only partial definitions of a complex dynamic reality and, as such, will always be superseded by what is seen as an updated version.

History demonstrates that at certain points in time, massive shifts in people's worldviews have occurred. Columbus undertook his voyage based on the frame-breaking idea that the world was not flat, but round. Eventually, that recognition created massive changes in people's perception of reality - the scientific reality in particular. Of similar impact was the radical view promoted by Copernicus that the Earth revolves around the Sun, and not the other way around.

Many researchers are convinced that the world is currently in the midst of a paradigm shift and that this accounts for the environmental turbulence that organisations are experiencing (Handy, 1990; Naisbitt, 1982; Toffler, 1982). In *'The Third Wave'*, Alvin Toffler describes the current shift in great detail. Figure 1-1 presents a summary of the features of each of the three major paradigm shifts that have taken place in Western societies.

Traditional management and organisation theory - based mainly on the work by Weber, Taylor and Fayol - underlie a series of assumptions, which reflect the dominance of Newtonian principles in scientific inquiry as well as the societal role of the corporation during the industrial revolution:

- Most humans want the same things out of life. Economic success enables the satisfaction of individual needs and is the ultimate goal of labour; therefore, the most effective way to motivate is through economic reward.
- Competitive advantage is derived from economies of scale. Hence, the bigger the company, the better, stronger, and more profitable it will be.
- Labour, raw materials, and capital, not land, are the primary factors of production.
- The production of standardised goods and services is more efficient than customised production.
- The most efficient organisational form to organise and direct the productive activities is a bureaucracy. Strict role requirements, clear lines of authority and responsibility, as well as formalisation of rules, regulations, policies, and procedures emphasise control and regulation. Organisational sub-units have a

permanent, clearly defined role in a hierarchy - in effect, an organisational mechanism for regulating information flows and standardising decision-making.

- Technological advances help standardise production and bring “progress.”
- Efficiency of the firm is based on routine, repetitive, and standardised work-flows.

According to many authors, it is becoming increasingly obvious that these attitudes, beliefs, values, and assumptions are out of step with the competitive requirements of the twenty-first century. They suggest that in order to compete successfully in the next century organisations need to replace these outmoded ideas. In an organisational context the necessary paradigm shift marks a transformation of values and assumptions:

From	To
“Either/ or” decisions	“And” conclusions
Command and control	Coaching and teamwork
Making products “for”	Creating value “with” customers
Satisfying requirements	Exceeding expectations
Efficiency	Effectiveness/ opportunity-seeking
Financial measures as drivers	Financial measures as passengers
Functional excellence	Distinctive competency
Cost cuts	Capability enhancement
“Flavor of the month” programs	Sustained change
Bureaucracy	Vision
Complacency/ reaction	Urgency/ proaction

Figure 1-2: New Wave Paradigms

Source: Vollmann, T. E. (1996) *The Transformation Experience*, Boston, Ma: Harvard Business: p. 32

forcing organisations to fundamentally reassess their decision-making patterns and operational routines. According to Vollmann (1996), the most important part of the paradigm-shift is the rejection of “either/ or” decisions, which “are so deeply

embedded in the corporate mind-set that they are taken as common sense, as ‘business reality’. For an enterprise to be dominant the trade-off mentality needs to go.” (p. 32).

Arguing in a similar vein, Henderson (1991) identifies six basic dimensions that this current shift will affect. According to her the organisational reality will be marked by:

Interconnectedness	requiring co-operation at every system level and the adoption of living systems policy models
Redistribution	recycling of all elements and structures leading to justice, equality, balance, reciprocity, sharing
Change	focus on irreversible phenomena as well as traditional reversible models, evolutionary view, macroscopic time/ space, change as fundamental, certainty as limited. Redesign of institutions, perfecting means of production, changing paradigms and values
Complementarity	replaces ‘either/ or’, dichotomous logics and re-frames with meta-logic of ‘yin-yang’; ‘win-win’ rather than zero-sum games. Unity and diversity, marking the shift from ‘either/or’ to ‘both/and’ logic
Heterarchy	networks and webs, intercommunication rather than hierarchies; many interactive system variables; self-organisation, autopoiesis, mutual causality distributed networks and intelligence, no rigid organisations or hierarchies
Indeterminacy	many models, viewpoints, compromise, humility, openness, evolution, ‘learning societies’
Uncertainty	from static, equilibrium, and mechanistic models to probabilistic, morphogenetic, oscillating and cyclic models. Biological view of self-organising, self-replicating, self-referential systems

Figure 1-3: Values of the Post-Cartesian Worldview

Source: Henderson, H. (1991) *Paradigms in Progress: Life beyond Economics*, Indianapolis: Knowledge Systems: pp. 52&66.

Although many of the solutions and ideas postulated by the transformation literature conform to the values espoused in the above tables these are far from universally shared and there is no guarantee that the adoption of these values actually will actually lead the organisation to success.

1.4.2 Organisational Form

Organizational structure comprises not only the actual distribution of responsibilities and authority among the organization's personnel (basic form), but also the planning and control systems and the process regulations of decision-making, coordination, and execution. Corresponding to the opportunities for adaptive capabilities the research into these mechanisms of organisational design has led to the definition of ideal type organisational forms of two general types: mechanistic and organic (Burns and Stalker, 1961).

If organisations are operating in increasingly unpredictable global and national markets, then their ability to manage change becomes increasingly central to their competitive position and ultimate survival. Faced with these changes, organisations either become more adaptive, flexible, and anticipative, or they become rigid and stagnant, reacting to change after the fact, often when it is too late.

Current literature emphasises customer focus, swiftness, flexibility, innovation, knowledge use, learning and vision. Traditional organisational forms often equated with the mechanistic model are regarded as synonymous with an absence of such characteristics (Camillus, 1993). High centralization of power, controlled communication, high formalization of job descriptions result in highly regulated processes through elaborate planning and control systems, specialization of tasks, and high degrees of standardization and formalization in turn reducing the levels of participation and delegation. Only minor incremental changes are possible in such a highly formalized and centralized structure (Cohn & Turyn, 1984).

The current trend to wider and flatter structures marked by increasing empowerment, job enrichment and participation suggests a shift from more mechanistic to more organic settings (Galbraith, 1995). The flatter hierarchies lead to faster decisions, leaders who are in touch with organizational members, and lower overhead numbers.

Recent theoretical development and empirical experimentation have begun to recognise the importance of the relationship between internal structural context and the capacity for self-renewal, and to see this link primarily in the degree of coupling between the whole and the parts. According to early indications from this research loose coupling presents the most favourable context for self-renewal, where the nature

of such coupling is defined as one which displays ‘both the responsiveness of the whole and the distinctiveness of the parts’ (Spender & Grinyer, 1996). They have also begun to focus more attention on the endogenous pressures for de-institutionalisation, since such a process is necessary for radical renewal within this theoretical perspective (Oliver, 1992).

In response to firms’ need for both alternatives, many scholars have speculated on the possibility of an oscillating organizational mode in line with the ideas of Burns and Stalker (1961), who described a process in which the organization is sequentially being manipulated into the loose, open diverse state that stimulates proposal of radical innovations and then back into the tight homogeneous state that enhances adoption of incremental innovations. In Weick’s terms (1982), loose coupling is the source of adaptability to exploit future opportunities in organizations, whereas tight coupling is the source of adaptation to exploit present opportunities. Loosely structured, decentralized, complex, and heterogeneous organizations enhance radical innovation, but inhibit incremental innovation. On the other hand, tightly structured, centralized, highly formalized, homogeneous organizations facilitate incremental innovation (Duncan, 1976; Cohn & Turyn, 1984; Shepard, 1967). Duncan (1976) referred to the bifurcated organization as the ambidextrous organization, which is able to shift its technology, structure, and culture as it moves through various stages of innovation, while Shepard (1967) called it the two-state organization. Large capital-intensive corporations such as DSM Chemicals, Shell, and Unilever, which operate in cyclical industries, are still successful because they have managed to alternate cycles of convergence (centralization and formalization) with cycles of divergence (decentralization and autonomy).

Others (cf. Gresov, 1984) have argued for a simultaneous balancing of these two organizational modes. For example, an organization can choose to compensate for the proven adoptive incremental capacity of its mechanistic structure by encouraging and promoting cultural heterogeneity, if, on the other hand, an organization wants to compensate for the proven radical adaptability of its organic structure, it can seize upon the various devices used to solidify and extend a more homogeneous cultural pattern. Some large corporations have developed structures and cultures to achieve this balancing act. HP and Motorola, for example, are pursuing structures and cultures

that are more focused on building new competences. These companies decentralize decision-making at the team and divisional level, and encourage spin-off projects. In addition, they constantly seek ways of making their current technology obsolete in order to push the innovation envelope of their assets. For example, products introduced or substantially modified in the past two years represent 70 per cent of HP's sales.

Weick (1982) suggested that the firm may also simultaneously express the two organizational modes (loose and tight coupling) in different portions of the system. The simultaneous expression of the two necessities results in organizational asymmetry (Fast, 1979). In almost every diversified firm, one sees examples of asymmetry. For example, at the simple level, there is the asymmetry between high growth businesses and older, mature operations. More deliberate ways to create asymmetry are various modes for innovation, such as joint ventures (Powell, 1987), skunk works (Peters & Waterman, 1982) or internal corporate venturing (Fast, 1979, Burgelman, 1983). More extreme examples of simultaneous structures are the alloplastic organization (Nicholls, 1980) or the hypertext form (Nonaka, 1994). Based on successful Japanese companies, the hypertext organization is a parallel structure that combines the efficiency and stability of a hierarchical bureaucracy with the dynamism of the flat, cross-functional task force. For instance, Sharp has a hierarchical business layer, but the company exploits its project-team layer, which is a completely independent, parallel structure when it comes to new-product development.

Meanwhile, the most radical practice-led experiment in recent times, the move towards federalism in corporations like ABB and IBM, is an indicator of the growing support for the self-organising systems perspective among leading practitioners (Handy, 1992; Bartlett & Ghoshal, 1993). Federalism not only reflects the self-organising systems perspective in the relationship that it fosters between the whole and the parts, but also in embracing by design the generation and management of paradox, diversity and internal dialectical tension that are increasingly being recognized as essential preconditions for higher order learning in organisational contexts (Pascale, 1991; Bahrami, 1992; Handy, 1992; Tushman & O'Reilly, 1996; Winfrey et al., 1996).

The image of organizations as self-designing systems blends the image of repository with that of culture.

Self-designing knowledge work systems are thinking and learning organizations that have well-developed self-diagnostic capacities, allowing them to question their governing assumptions and reassess their relationship to changing environmental demands. ... Knowledge work organizations 'learn how to learn' by maintaining processes that critically examine key assumptions, beliefs, tasks, decisions, and structural issues. (Purser & Pasmore, 1992: 55)

The suitability of self-designing systems for learning is evident in Metcalfe's observation that, in a self-designing organization, 'routine interaction with the task environment should generate information about ways to improve performance' (1981: 503). Routines are usually treated as collective activities that encode rather than generate improvements. Self-designing organizations use routines consisting of small continuous changes in the interest of frequent, adaptive updating rather than less frequent convulsing and crisis.

Continuous updating results from a combination of continuous redesign, under-specified structures, reduced information filtering, intentional imbalance, and cultivation of doubt. Continuous redesign consists of discarding, even adequate old methods in order to try new ones, looking upon each development as an experiment that suggests new experiments' (Hedberg et al., 1976: 45). As Torbert (1987) suggests, self-designing systems gain their identity from their capacity to restructure. Under-specification of structure encourages both heightened sensitivity to local conditions and continuous mutual adjustment as learning and knowledge keeps changing among interdependent individuals. Self-designing systems intentionally try to undermine the seduction of Miller's (1993) architecture of simplicity by creating structures that do less filtering and less uncertainty absorption, by replacing specialists with generalists so that specialist labels do not dominate perception, and by flattening hierarchies to put more people closer to the action. Intentional imbalances, instituted in the belief that low contentment sharpens perception, are a signature of such systems:

Ambiguous authority structures, unclear objectives, and contradictory assignments of responsibility can legitimize controversies and challenge traditions. [...] Incoherence and indecision can foster exploration, self-

evaluation, and learning. Redundant task allocation can provide experimental replications and partial incongruities can diversify portfolios of activities' (Hedberg et al., 1976: 45).

Self-designing systems are also characterised by the institutionalization of doubt (Weick 1979). Organizational repositories are flawed sources of guidance, both because storage is imperfect and because retrieval is an act of reconstruction. Even worse, organizations face a chronically 'novel present'. To rely on a repository of built-up knowledge is to rely on approximations rather than certainties. To underscore the approximate character of prior learning, self-designing systems apply lessons of the past while simultaneously questioning their relevance.

As culture is explicated, people see more clearly the learning that has already taken place. Once they see past learning more clearly, they are in a better position to retest, modify, and/or reaffirm it. The self-designing organisation

[...] acts when individual members, functioning as agents of the collectivity, carry out their parts of the larger task system. Like the individual craftsman, the collective has a theory-in-use implicit in the norms, strategies, and assumptions that govern its regular patterns of task performance. As in this case, their theory-in-use may be inferred from the evidence of intelligent action, especially from the detection and correction of errors. But in their case, intelligent action depends on a continuing mutual adjustment of individual behaviours, one to another. Their organizing depends, in turn, on each person's image of the larger system. In this sense, the organization exists in its members' heads. But the members also have access to external maps, memories, and programs, which they must continually complete through mutually adjusted actions. (Schon, 1983a: 118)

In the notions of organizations as self-designing systems is based on the explicit notion of juxtaposition, the individual against the organization, the present against the past, the new against the routine. To make this self-design a possibility, organization must be reduced and doubt and curiosity must be cultivated.

To conclude, self-design involves arranging and patterning, linking and decoupling sets of elements to change the consequences from those currently occurring. Furthermore, self-designing systems must contain provisions for and support of the continuous evaluation of ongoing designs. Finally, issues of self-design typically focus, not on the designs themselves, but on the processes responsible for the designs. Emphasis is on processes that reflect the need for and create alternative arrangements of people and activities. The qualifier self identifies the location of these processes;

they are in the hands of insiders (the people who will do the work) rather than outsiders (Weick, 1979).

The actual structure determines the potential for operational and strategic flexibility within the organization. The levels are however affected differently. When only operational flexibility is required, the need for structural flexibility is minimal. Operational flexibility can therefore be found in a mechanistic structure with a low potential for flexibility. On the other hand, strategic change and long-term survival necessitate structural flexibility, and it can therefore be developed only in an organic structure with a large potential for structural flexibility.

1.4.3 Drivers of Renewal

In the preceding section the attributes of a transformed organisation were looked at. In the sections that follow, aspects of creating a transformation (the how) are discussed. A lot of research in management has devoted its attention to factors that drive success. In the current literature learning, creativity, innovation, entrepreneurship and intrapreneurship and change of paradigm are postulated as the factors that drive renewal. In contrast declining organisations are regarded as having succumbed to the high number of control processes such as standardisation and formalisation. These 'drivers of renewal' are discussed in turn and in more depth in the following sections.

1.4.3.1 Learning

As a result of the pioneering work conducted by Argyris and Schön (1978) the challenge of developing capacities for organisational learning has been brought to the forefront of management attention. Organisational learning "[...] describes a process, linked to individual learning, whereby organizations acquire skills and experience." (Espejo et al., 1996: 147). Many have come to view the ability to learn as a key priority in designing and managing organizations and as an important source of sustainable competitive advantage that can deal with the challenges of a turbulent world (e.g. Burgelman, 1990; Senge, 1990; Stata, 1989; Adler & Cole, 1993). The idea of creating "learning organizations" has now firmly established itself at the heart of future research on strategic renewal.

Most definitions of organisational learning entail cognitive and behavioural aspects. The cognitive aspect is generally concerned with the attaining of knowledge, understanding and insights. Changes in behaviour can be effected directly by “[...] improving actions through better knowledge and understanding” (Fiol & Lyles, 1985: 803) or indirectly “[...] by encoding inferences from history into routines that guide behavior” (Levitt & March, 1988: 320).

Common explanations of the need to learn are the requirement for adaptation and uncertainty reduction as well as improved efficiency. The research contributions broadly fall into prescriptive and descriptive categories. The prescriptive approaches are action-oriented and emphasise the aspect of how organisations should learn. The descriptive stream is mainly concerned with the aspect of how organisations learn, placing the emphasis on determining whether learning has actually occurred in an organisation (Tsang, 1997).

There is a close relationship between individual learning within an organisational context and organisational learning since any organisational learning requires individual learning as a basis.

Individual learning comprises the attainment of knowledge (conceptual learning) and skills (operational learning) and enhances the individual’s capability for effective action (Espejo et al., 1997; Kim, 1993). Kofman (1992) distinguishes four stages (observe, assess, design and implement) of the individual’s learning process. According to Kofman (1992) the observation of events or experiences is reflected upon and conclusions or hypotheses are derived. These give rise to concepts and models of individual realities, which provide a frame of reference for future observations and experiences. Repetitions of this cycle test adopted concepts against reality and may lead to iterative modification or abandonment/ replacement of existing concepts.

It is commonly agreed that learning by organisations is multi-dimensional, more complex and dynamic than -and in some aspects fundamentally different from- learning by an individual.

Although organizational learning occurs through individuals, it would be a mistake to conclude that organizational learning is nothing but the

cumulative result of their members' learning. Organizations do not have brains, but they have cognitive systems and memories [...] Members come and go, and leadership changes, but organizations' memories preserve certain behaviors, mental maps, norms, and values over time. (Hedberg, 1981: 3)

According to Argyris and Schön (1978) organisational learning is the result of actions by individuals based on sharing mental models. This construction allows individuals to learn independently of the organisation. To the extent that individual mental models are integrated with the organisation's repository of shared mental models they are capable of influencing organisational action and hence affect organisational learning.

Most concepts of organisational learning have adopted the distinction already made in earlier literature between lower and higher orders of learning in organisational contexts (Ashby, 1956; Haberstroh, 1965; Shepard, 1965; Argyris, 1977; Argyris & Schön, 1978). The main focus is on how learning and reasoning processes affect first- and second-order change.

In organizational single-loop learning, the criterion of success is effectiveness. Individuals respond to error by modifying strategies and assumptions within constant organizational norms. In double-loop learning, response to detected error takes the form of joint inquiry into organizational norms themselves. [...] In both cases, organizational learning consists of restructuring organizational theory of action (Argyris & Schön, 1978: 29).

Particularly this self-questioning ability, enabling to detect and correct errors in operating norms and thus influence the standards that guide their actions, characterises the activities of systems that are able to learn to learn and self-organise. This essential difference has led to the distinction between "single-loop" (the process of learning) and "double-loop" learning (the process of learning to learn).

The assumption underlying much of the research on renewal to date is that lower and higher levels of learning in organizations are qualitatively distinct. This qualitative distinction is inherent in those explanations of the punctuated pattern based on the concept of renewal as a paradigm shift. Lower order learning is regarded as adaptive, and equated with 'within-paradigm refinement' and gradual change. In contrast, strategic renewal is seen to involve learning of a higher order and more generative nature, which is associated with transcendence and paradigm shift. For many

practitioners and theorists, this notion of higher order learning should be seen as the very essence of the strategic management process (de Geus, 1988; Hamel, 1996; Pascale, 1991; Senge, 1990).

It is also inherent in the distinction made by learning theorists between exploitative (low level) and explorative (higher level) learning, and the belief that these two types of learning tend to be self-reinforcing and mutually at odds with one another (March, 1991; 1996). The notion of strategic renewal as a process of higher order learning is conceptually and empirically attractive, and the ideas that flow from it, like 'creative tension' and 'aspirational crisis', are novel and exciting. However, Argyris and Schön (1978: 25) have always believed that this distinction should be taken as a 'less binary one than might first appear'.

Single-loop learning -developing an ability to scan the environment, set objectives, and monitor the general performance of the system in relation to these objectives- is often institutionalised in the form of information systems designed to keep the organisation under control. Budgets and other management controls often maintain single-loop learning by monitoring expenditures, sales, profits, and other key performance indicators ensure that organizational activities remain within established limits. While most organisations are proficient at single-loop learning, the ability to achieve proficiency at double-loop learning often proves more elusive.

Buried deep in organizations is the capacity to be overprotective and anti-learning and to be unaware that this is the case-and to do all this precisely when organisations need the opposite capacity. That is, when the problems are tough and are also embarrassing or threatening. (Argyris, 1990: 60)

To initiate double-loop learning organisations need to transcend the constraints inherent in single-loop processes. As a prerequisite mental models need to be shared and (at least to certain degree) need to be made explicit. Further, obsolete conceptual and operational knowledge and skills need to be detected and modified. The process of double-loop learning stresses that the need for unlearning (i.e. being able to leave acquired skills and concepts behind) is just as important as the process of learning itself (Hedberg, 1981).

Individuals bring to the learning situation biases, beliefs, and theories that significantly influence how problems are solved and choices are made. Furthermore, these may also be relatively independent of and in conflict with the organisation's requirements. Shared mental models necessarily reflect these individual beliefs, values and norms. Since organisations can create conditions that may significantly influence what individuals perceive as the problem, design as a solution, and produce as action to solve the problem this process is also characterised by mutual causality. Initiating collective second-order change is therefore particularly difficult.

Although some organisations have been successful in institutionalising systems that review and challenge basic paradigms and operating norms, most fail to do so. This failure is especially evident in bureaucratised organisations, whose fundamental organising principles often operate in a way that actually obstructs the learning process.

Where hierarchical and horizontal divisions are particularly strong, information and knowledge rarely flow in a free manner. Different sectors of the organization thus often operate on the basis of different pictures of the total situation, pursuing subunit goals almost as ends in themselves.

The existence of such divisions tends to emphasize the distinctions between different elements of the organization and fosters the development of political systems that place yet further barriers in the way of learning. The bounded rationality inherent in organizational design thus actually creates boundaries! Employees are usually encouraged to occupy and keep a predefined place within the whole, and are rewarded for doing so. Situations in which policies and operating standards are challenged tend to be exceptional rather than the rule. (Morgan, 1996: 88-89)

Barriers to double-loop learning can also be created by processes of bureaucratic accountability and other systems for rewarding or punishing employees. Argyris and Schön suggest that people often engage in "defensive routines" designed to protect themselves and their colleagues when they feel threatened or vulnerable. They find ways of obscuring or burying issues and problems that will put them in a bad light and of deflecting attention elsewhere. They become skilled in all kinds of impression management that can make situations for which they are responsible look better than they actually are. They often ignore or fail to report deep-seated problems and often

“hold back” or dilute other bad news, giving senior managers rosy pictures of a situation or telling them what they think they would like to hear.

Argyris and Schön suggest that such problems are systemic and universal. They are found in many different kinds of organizations and transcend cultural boundaries. The “defensive routines” they express seem to be learned early in life and hinge on various kinds of face-saving processes through which people seek to protect themselves and others from embarrassment or threat. In organizational contexts, formal structures, rules, job descriptions, and various conventions and beliefs offer themselves as convenient allies in the process of self-protection and are used both consciously and unconsciously for this purpose. Defensive routines can also become a central part of the culture of an organization, generating shared norms and patterns of “groupthink” that prevent people from addressing key aspects of the reality with which they are dealing.

Wealthy and successful organisations can afford to explore their environments and experiment with innovative actions, but few appear to do so. Instead, success reinforces current behaviors and makes organizations less inclined to try new strategies. The resulting organizational inertia may well be so large that it threatens organizations’ survival when environmental conditions change irreversibly (Hedberg et al., 1976).

Recent examinations of learning as an adaptive process have also raised questions about the self-limiting aspects of learning (Sitkin, 1992; Levinthal & March, 1993).

The effectiveness of learning in the short-run and in the near neighbourhood of current experience interferes with learning in the long run and at a distance. Knowledge and the development of capabilities improve immediate performance, but they often simultaneously reduce incentives for and competence with new technologies or paradigms. Learning has its own traps. (Levinthal & March, 1993: 97)

Given all these potential pathologies, it is not surprising that so many organizations find difficulty in learning and evolving in a fluid way. Most organizations seem to have severe learning disabilities (Senge, 1990). Organisational change is a learning process affected by the organisational and environmental conditions as well as by the

individual's mental models and actions. However the awareness of a problem is often the first important step toward a solution.

The creation of double-loop learning and emergent forms of organization depend on an ability to transcend the constraints of the single-loop processes and defensive routines that tend to tie an organization to the past. Part of the challenge hinges on adopting an appropriate management philosophy that views and encourages the capacity of double-loop learning as a key priority. It also rests in encouraging organisational principles and designs that can support the organisation to develop an ability to question, challenge, and change operating norms and assumptions and ultimately allow an appropriate strategic direction and pattern of organization to emerge. Organisational double-loop learning is based on institutionalising sub-systems that systematically promote the ability to

- Scan and anticipate trends that lead to change in the wider environment
- Seek opportunity and develop new knowledge through experimentation
- Share and explicate (disseminate and discuss) experiences and new insights
- Take risks and learn from failure

The task of realising these characteristics in practice, of course, is difficult and very much still in progress. Many organizations are struggling to find ways of breaking free of traditional modes of operation to enhance continuous learning. However, the above guidelines provide clear indications of the direction in which to move.

The importance of this perspective lies in the emphasis of the learning aspects of initiating and managing second-order change. Individuals have the capacity to learn and through interaction with other organisation members have the possibility to radically change their organisations.

Many contributions place the notion of organizational learning at the heart of future research on strategic renewal. Firstly, the notion of learning is inherently dynamic. As such it promises to be a more fruitful basis on which to develop theories of strategic

management for non-equilibrium conditions than that offered by more traditional, and more static, planning or decision-making approaches (Dodgson, 1993).

Furthermore, the notion of learning provides the basis for theories of change at both organizational and industry levels that are inherently integrative. Learning enables to quite smoothly incorporate the dynamic interplay of human will, historical chance and contextual influence, and thus avoids the kind of voluntarist-determinist distinction that traditionally has tended to polarize perspectives on change in the organizational analysis and related fields (Pettigrew, 1985; Burgelman, 1991; Leavy and Wilson, 1994; Nelson, 1995). Furthermore, the notion of levels of learning may offer a conceptual bridge between the gradualist and punctuationist perspectives on renewal, with the potential for future synthesis, whether partial or complete.

Any optimism about the potential of this approach to help enhance the capacity of complex organizations for self-renewal must, however, also be tempered with some caution. Despite many advances the field, organisational learning is still in its infancy. In particular the currently limited understanding of its role in the organisational renewal process and its linkage with other processes, such as creativity and innovation, described in this section needs to be recognised. Through isolated use the concept of learning is in danger of suffering the fate of many management fads, where 'all too quickly' rigorous and patient research is overtaken by 'evangelism and commercialization' (Hawkins, 1994: 71). The true potential of learning lies not in isolation but in the synergetic interplay with these other concepts.

There is the temptation to consider all learning as virtuous. Levitt and March (1988: 335), however, warn that in organizational settings 'learning does not always lead to intelligent behaviour', and 'the same processes that yield experiential wisdom' may also produce 'superstitious learning, competency traps, and erroneous inferences'.

Beyond the general concept those situations and processes must be identified and systemically organised that lead to virtuous learning. Viewing the role of firms as coordinated learning institutions leads to a consideration of organisational structure and strategy. Complex organisations are characterised by a multiplicity of learning processes; each individual and each group within the organisation have their own knowledge base and their own learning capabilities. The structure of the organisation

defines the way in which these processes interact (Chandler, 1990), and gives rise to the organisational learning process resulting from these interactions. It should be clear that learning itself depends on a working environment that allows for experimentation and failure.

A final remark should caution any over-enthusiasm of organisational learning as the key to an effective renewal strategy. A critical factor is that organisational learning reduces the dependence of the organisation on the individual, which may be a potential source for conflict. Learning ultimately relies on a voluntary contribution of the individual. Organisational learning can therefore be encouraged but not enforced. Although other processes heavily depend on the organisation's ability to learn, one has to recognise the limits of this tool as the sole strategy for triggering renewal. Ultimately organisational learning is only feasible as a long-term strategy.

1.4.3.2 Creativity

Creativity and innovation are by no means new topics in the literature of management in general and strategic management in particular. It has long been recognised that creativity is a prerequisite for innovation.

Ohmae (1982: 4) draws attention to both the need for creative strategic thinking and its relation with analysis:

Successful business strategies result not from analysis but from a particular state of mind. In what I call the mind of the strategist, insight and a consequent drive for achievement, often amounting to a sense of mission, fuel a thought process which is basically creative and intuitive rather than rational. Strategists do not reject analysis. Indeed they can hardly do without it. But they use it only to stimulate the creative process, to test the ideas that emerge, to work out their strategic implications, or to ensure successful implementation of high-potential wild ideas that might otherwise never be implemented properly. Great strategies, like great works of art or great scientific discoveries, call for technical mastery in the working out but originate in insights that are beyond the reach of conscious analysis.

The human capability for creative thinking, creative behaviour, and innovation is a major source of organisational change. The source of the change is in the system and in the unique capabilities of people to be innovative and creative. Transformation is a process of metamorphosis. This move is fuelled by the creative act. The creative process is at the very core of transformation (Markely, 1976).

As an overall context of a definition of creativity, Whitehead (1968) suggests that creativity is the actualization of potentiality, and the process of actualization is an occasion of experiencing creativity. Viewed in conjunction, they carry the creative act.

Creativity (Barron, 1988: 80) is “essentially the ability to bring something new into existence purposefully. [It] is seen to be in the service of increased flexibility and increased power to grow and/or survive.” According to Barron (1969), there are no limits to the areas in which creative responses can manifest themselves. The defining properties of creative products and processes are their originality, validity, adequacy to meet needs and aspirations, as well as their aesthetic quality or elegance. “The emphasis is on whatever is fresh, novel, unusual, ingenious, divergent, clever, and apt” (p. 20).

Creativity implies novelty and innovation (Harman, 1984). Studies in the fields of motivation and learning have disclosed the power of novelty as an inducement to action. In human experience, there is tension between maintaining equilibrium, security, and stability and seeking and creating new possibilities. This tension is manifested in such dualities as rationality and intuition, conformity and nonconformity, complexity and simplicity, certainty and uncertainty, and convergence and divergence. Convergent thinking tends to use rationality to focus down to a single goal. Divergent thinking, drawing on a richness of creative ideas and original thinking, is characterized by moving away from set patterns and goals. “While both convergent and divergent thinking are involved in creative activity, it is divergent thinking that especially characterizes that which is most widely recognized as creative” (p. 51).

Jones (1972: 7) suggests:

Creativity is a combination of flexibility, originality and sensitivity to ideas which enable[s] the thinker to break away from the usual sequence of thought into different and productive sequences, the result of which gives satisfaction to himself and possibly to others.

In human life and in society there is a tendency toward an urge to expand, extend, develop, mature, and to express and activate all capacities. This tendency may be deeply buried under encrusted defences of the familiar. Still, it exists in every person

and awaits the proper conditions for its release and expression. The primary motivation of the release of creativity is in forming new relationships with the environment and in aspiring to personal fulfilment.

Rogers's (1961) definition of the creative process is as follows:

It is the emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and materials, events, people, or circumstances of his life on the other. The mainspring of creativity appears to be man's tendency to actualize himself, to become his potentialities. (pp. 350-351)

However, most theorists and researchers adopt a creativity definition focused on the product: "novelty that is useful" (Stein, 1974). Creativity needs to be taken in context. Almost everyone has a creative spark within, but this may not occur in an organisational context. The so-called creative person has the ability to harness the creative potential in an occupational context. Of course, the degree of creative ability varies from person to person, and the highly creative individual may be in the minority. Although those with a high level of creativity may produce more and better ideas and concepts, it is possible to harness the latent creativity of the less well gifted. Individually few of the many innovations that may result are likely to be of major strategic value, the cumulative organisational impact of many small innovations, however, can be significant.

The various realms of creativity are explored next, including the meaning and characteristics of creativity, the conditions of creativity and ways of fostering it, the barriers and blocks to creativity, and misconceptions about creativity. The final section reflects upon these realms and explores their relevance to renewal efforts in organisations.

New creative ideas emerge as a play of the mind (Bohm & Peat, 1987). Failure to appreciate the creating role of this play is a major block to releasing creativity.

Within the act of creative play, fresh perceptions occur which enable the person to propose a new idea that can be put forward for exploration. As the implications of this idea are unfolded, they are composed or put together with other ideas. Eventually, the person supposes that these ideas are correct. (p. 48)

From this process of propose, compose, and suppose, new perceptions emerge through the creative play of the mind. Bohm and Peat (1987) further suggest that

communication is as essential to the creative act as is perception through the mind. Indeed, within this context, perception and communication are inseparably related, so that creation arises as much from the flow of ideas between people as in the understanding of the individual alone. [...] Indeed, it is not possible to consider any fundamental separation between the mind's perception and communication; they are an indivisible whole. (pp. 63, 70)

Rogers (1961), in exploring the nature of creativity, says that “the very essence of the creative is its novelty, and hence we have no standard by which to judge it. Indeed, history points up the fact that the more original the product, the more far-reaching its implications” (p. 351). The genuinely significant creation is most likely to be seen first as erroneous. Later it may be seen as obvious and self-evident. Still later, it receives an evaluation as a creative contribution. The individual creates primarily because the creative act is satisfying; it is felt to be self-actualising.

An accurate description of the creative act cannot be provided until it occurs (Rogers, 1961). The creative act is a natural behaviour that has a tendency to arise in humans when open to all inner and outer experiences. It also requires trying out all possibilities and all manners of relationships. The possibilities that most effectively meet inner needs, or that form a more effective relationship with the environment are selected.

Creativity is a function of interaction of knowledge and imagination (Parness, 1972). “Without knowledge, there can obviously be no creativity” (Parness, 1972: 194). What this statement means is that creativity is the innovative, novelty-creating use of knowledge and without its dynamic use in the course of the creative act, our effort will not be productive.

Rogers (1961) proposes a set of inner conditions that he associates with the creative act.

1. **Openness to experience** as opposed to defensiveness, in which creation experiences are prevented from coming into awareness. The lack of rigidity and the permeability of boundaries in concepts, beliefs, and perceptions allow to receive conflicting information.

2. **Internal locus of evaluation.** The value of what is created is established not by outsiders but by the one who creates.
3. **Ability to play with elements and concepts.** This condition is associated with openness and lack of rigidity. It refers to the ability to play spontaneously with ideas and relationships, make impossible juxtapositions, make the given problematic, translate one form to another, and transform into improbable equivalents. This generates a host of possibilities from which eventually one or two creative forms or processes with unique and novel qualities and value will emerge.

By the very nature of the inner conditions described above, it should be clear that those conditions cannot be forced. Maslow (1943) argues that the greatest (and healthiest) contribution to creativeness may be expected from people who have reached the self-actualisation stage: that is, their physiological, safety, love and esteem needs are already met.

Rogers (1961) proposes two categories of external conditions that might foster and nurture creativity: safety and freedom. Psychological safety is generated through unconditional acceptance and the absence of external evaluation. These processes provide the safe climate necessary for individuals to freely express themselves in varied and novel ways. Psychological freedom fosters the individual's freedom or symbolic expression and creativity. It nurtures freedom to think and to feel (Rogers, 1961). It fosters the openness, and the playful and spontaneous juggling of perceptions, concepts, and meaning, which are part of creativity" (p. 358). Permission to be free also means that one is responsible. This type of freedom, coupled with responsibility, "fosters the development of a secure locus of evaluation within oneself, and hence tends to bring about the inner conditions of constructive creativity" (p. 359).

Bohm and Peat (1987) also identify a range of conditions that block creativity. One is the common tendency toward the unconscious defence of ideas "which are assumed to be necessary to the mind's habitual state of comfortable equilibrium" (p. 50). There is a tendency to impose and cling to familiar ideas, even when there is evidence that they may be false creating the illusion that no fundamental change is needed. In taking familiar ideas and concepts for granted, the mind defends itself against the

disturbance of novelty and what is different and maintains its “fixed position in situations that call for fundamental change” (p. 53).

Creativity is a natural and powerful potential of human beings. However, it is often suggested that prevailing educational systems manage to eradicate this. The search for “a single right answer,” is the best example of this. This is indicated from an early age by praise and disapproval, and by expectation of conformity. Bohm and Peat also explored in depth research findings that suggest that creativity is incompatible with external rewards and punishments.

The reason is clear. In order to do something for reward, the whole order of activity, and the energy required for it, are determined by arbitrary requirements that are extraneous to the creative activity itself. This activity then turns into something mechanical and repetitious (p. 231).

As a result, the intense passion and vibrant tension that goes with creativity dies away. In essence, the reward of creativity cannot be anything else but the creative act. When creativity is subservient to external rewards, the whole act withers and degenerates.

Various misconceptions also hinder and block creativity. One is the widely held assumption that creativity is necessary only in specialised fields such as art or literature (Bohm & Peat, 1987). This suggests that ordinary people, groups or organisations collectively, and society in general, cannot be creative. Strongly related are the misconceptions that creativity is the privilege of the genius and “marked for emergency only” (Harman, 1988). In much of the literature on creativity the assertion is made that “one must strain to try to solve the problem with the conscious mind first, and absorb a great deal of information about it before the behind-the-scene creative mind should go to work” (Harman, 1988: 79).

Creativity plays a vital role in the renewal process of organisations. This is expressed implicitly in many studies on creative thinking and creative problem solving (Adams, 1974; Markley, 1976; Watzlawick et al., 1974). The many studies in this field emphasise two important aspects of second-order change. The first is that in order to pass through or reach second-order change, one has to deliberately set aside the assumptions that are conventionally made about reality, and engage in techniques,

activities, and processes that open up one's self to different or new perceptions of reality (de Bono, 1971).

The second aspect is that the process of creativity involves higher states of consciousness and, in many cases, the use of intuition, imagination, and visioning (Adams, 1974). From this perspective, the organisation's rules and basic assumptions are an inseparable part of the organisation's problems. Watzlawick et al. (1974), for example, argue that second-order change is "[...] an invention outside the logical process [...] a central act of imagination" (p. 23).

The difficulty for organisations in harnessing this latent potential lies in the fact that creative output relies heavily on a voluntary contribution by the individual. The possibility to foster creativity with rewards and incentives is very limited. The need for an organisational climate that fosters creativity is important. The main task of management must be to create such an organisational environment in which the creative mind can prosper.

One of the reasons behind the need for a sympathetic climate is that the creative process is not completely logical. Although parts of the process can be directed so that the mind is focused on a specific problem area, the solution cannot be guaranteed. Indeed, it is uncertain whether an idea of any value will emerge at all. Motivation and the encouragement of creativity are important elements in the process, and will not occur in a hostile environmental climate.

The preceding statements about blocks and hindrances of creativity, and misconceptions about them, imply the necessary remedies. A further mitigation is the promotion of the internal and external conditions of creativity, which have already been touched upon but will be treated in more detail as part of the case study chapters.

1.4.3.3 Innovation

The term “innovation” has become ubiquitous. This is true in both a literal sense and a figurative sense. Literally, it is impossible to read business journals or newspapers, attend business conferences, or read annual reports without constantly hearing about the importance of innovation. Figuratively, it is impossible to escape the reality that corporations must be innovative in order to survive. Domestic and international competition, changing government regulations, and rapidly shifting market conditions demand constant and radical innovation.

Innovation is regarded as a focal point of an organization's strategy and a crucial element for its long-term strength and survival (Tushman, Anderson 1997). Organizations adopt innovations to introduce changes in their outcomes, structures, and processes in order to maintain or improve their level of performance or effectiveness. These changes can be the direct result of managerial choice or can be imposed by external conditions. For instance, a performance gap perceived by top executives of an organization creates a need for change, which in turn stimulates the adoption of innovation to reduce the gap (Zaltman, Duncan, Holbek 1973). Similarly, environmental change or uncertainty creates a need for change in the strategy and/or structure of an organization. This, in turn, provides the impetus for the introduction of innovations (Damanpour, Evan 1984). Regardless of the origin of organizational change (internal or external), innovation is a means of creating change to ensure adaptive behavior.

Innovation is built on creative ideas as the basic elements. Organisational innovation is the successful implementation of creative ideas within an organisation. Within this definition, the ideas in question can be anything from ideas for new products, processes, or services within the organisation's line of business to ideas for new procedures or policies within the organisation itself. The term ‘implementation’ is used broadly here, to encompass elements of developing ideas and putting them to use. This definition is similar to many existing definitions of innovation, but with some points of distinction. Some definitions of innovation are quite close to definitions of creativity; they focus on the production of ideas, rather than the implementation. For example, Drucker (1985) defines systematic innovation as “the

purposeful and organized search for changes,” while Zaltman, Duncan, and Holbeck (1973) define it as “any idea, practice, or material artefact perceived to be new by the relevant unit of adoption.”

However, most current definitions of innovation do include the development and implementation of new ideas. Van de Ven (1986) is quite explicit about the role of both the individual and the organisation:

innovation is ... the development and implementation of new ideas by people who over time engage in transactions with others within an institutional order (p. 590).

Kanter (1983) defines innovation as “the process of bringing any new, problem-solving idea into use [...] Innovation is the generation, acceptance, and implementation of new ideas, processes, products, or services.” Each of these latter definitions of innovation (Kanter, 1984; Van de Ven, 1986), like those of other theorists (Myers & Marquis, 1969; West, Farr, & King, 1986; Zaltman et al., 1973) implicitly or explicitly include the notion of creative (novel and useful) ideas being successfully implemented by a larger group.

Innovation and new product development are crucial sources of competitive advantage and regarded as levers through which firms can reinvent themselves. There is a growing literature on the competitive importance of innovation and the linkage between innovation and organisational renewal across industries and countries (Schoonhoven et al., 1990; Morone, 1993; Hamel & Prahalad, 1994; Burgelman, 1994; Brown & Eisenhardt, 1995; Henderson & Clark, 1990; Rosenbloom & Christensen, 1994; Utterback, 1994; Jelinek & Schoonhoven, 1990; Tushman & Anderson, 1986)

Because of its important role for organizational adaptation, its perceived effectiveness, and its contribution to organizational performance, innovation has been studied widely by researchers in a variety of fields. A dominant feature of these studies, however, has been the inconsistency of their findings. Downs and Mohr (1976), in their critical review of innovation research, stated that extreme variances have occurred regularly among the findings of innovation studies, and that the variation of results is beyond interpretation, and findings have not been cumulative. In a more recent review, Wolfe (1994) expressed the same concern and stated that,

perhaps, the most consistent result of innovation studies is that the results are inconsistent. In an attempt to remedy the instability in the results of innovation research, researchers have developed intermediate or sub-theories of organizational innovation. The majority of these theories are based on differentiation between types of innovation.

The distinction between innovation types is considered necessary because neither do all types of innovation have identical attributes, nor do they relate equally to the same predictor variables (Damanpour 1987). Further, the process of adoption or implementation of different types of innovation in organizations is not identical, some follow a top-down process, others a bottom-up process (Daft 1978). Thus, a study of one type might produce results different from a study of another type (Daft, Becker 1978). Researchers have primarily examined differences between administrative and technical innovations (Daft 1978; Damanpour 1987; Kimberly, Evanisko 1981), product and process innovations (Barras 1986; Damanpour, Gopalakrishnan, 1998b; Utterback, Abernathy 1975), and radical and incremental innovations (Dewar, Dutton 1986; Ettlie, Bridges, O'Keefe 1984; Nord, Tucker 1987). The human capability for creative thinking, creative behaviour, and innovation is a major source of organisational change. This perspective is the most compatible with the strategic choice, or management, perspective. The source of the change is in the system and in the unique capabilities of people to be innovative and creative.

Kirton (1980), for example, has developed a theory of change and innovation. He argues that individuals have characteristically different styles of creativity, problem solving, and decision-making. Adapters tend to operate cognitively within the confines of the appropriate, conceptually accepted paradigm within which a problem is generally initially perceived. Innovators, by contrast, are more liable to intuitively treat the enveloping paradigm as part of the problem. Presumably, the proportion of innovators will affect whether and how quickly organisations can change.

The most prominent distinction between innovation types discerns product and process innovations. Product innovation is defined as new products or services introduced to meet an external user or market need, and process innovation is defined as new elements introduced into an organization's production or service operations (e.g., Input materials, task specifications, work and Information flow mechanisms,

and equipment) to produce a product or render a service (Ettlie, Reza 1992; Knight 1967; Utterback, Abernathy 1975). Product innovations have a market focus and are primarily customer driven, while process innovations have an internal focus and are mainly efficiency driven (Utterback, Abernathy 1975). Hage (1980) makes a distinction between output innovations, which are the new products and services that a specific organisation produces within a year relative to its size, and process innovations, which are new throughput technologies, processes, and procedures. He defines second-order change as radical innovation in input-output and technology.

The distinction between product and process innovations is important because their adoption requires different organizational skills: product innovations require that firms assimilate customer need patterns, design, and manufacture the product; process innovations require firms to apply technology to improve the efficiency of product development and commercialization (Ettlie et al. 1984). Patterns of adoption of product and process innovation have more widely been studied at the industry than the firm level of analysis.

Some scholars write on specific stages of innovation (Daft 1978); others study the effects of individual, organisational, and contextual variables on innovations and change. Kimberly and Evanescio's (1981) and Moch's (1976) studies show that organisational variables such as size, specialisation, functional differentiation, and decentralization affect an organisation's innovation and, hence, its capacity to radically change itself.

To summarise, innovation is a means of helping organizations adapt to external and internal changes. Organizations need to manage the adoption of innovation successfully over time in order to survive, compete, and prosper in the technological, commercial, and social environments. Creativity and innovation are important driving forces in the second-order change process. They are characteristics of human behaviour in organisational settings. The main focus of these studies is on intra-organisational processes, and their effect on the environment and society. Like the previous perspective, this one takes a more voluntaristic standpoint, seeing change as dependent mainly on the behaviour of the organisation's leadership and members.

1.4.3.4 Entrepreneurship and Intrapreneurship

Entrepreneurship is a concept that has been discussed for many years (Carland, Hoy & Carland, 1988). In this century, there has been considerable discussion over the exact definition of entrepreneurship although there is general agreement that entrepreneurs perform the function in society of identifying opportunities and converting them into economic value (e.g. Schumpeter, 1934; Gartner, 1988; Carland, Hoy & Carland, 1988; Gartner, 1990; Baumol, 1991). Much of the argument over the definition of entrepreneurship revolves around the factors considered necessary for entrepreneurship to take place and, subsequently, what constitutes an entrepreneur.

While definitions are important for communication, arguments over what is and what is not entrepreneurship should not get in the way of understanding the entrepreneurial phenomena. Rather than attempting to adjudicate between the differing views of entrepreneurship or putting forth a new definition of the subject, it is more useful to focus on the process that produces entrepreneurial results.

Entrepreneurship is a process that takes place in different organisational and environmental settings, causing changes in the economic system through innovations brought about by individuals who generate or respond to economic opportunities that create value for both these individuals and society. The factors that are most commonly cited as requisites of entrepreneurship are:

1. An individual or group
2. Actions resulting in choice and implementation
3. Opportunity and innovation
4. Risk

Three conditions are necessary for entrepreneurship to occur: (1) an individual, (2) who performs an act (3) that involves an innovative element. Disagreements commonly exist regarding (a) the nature and extent of the innovation necessary and (b) whether the creation of an economic entity must be regarded as necessary condition of entrepreneurship.

Prior to discussing the nature of the process itself, it is useful to examine the other components of above characterisation. The debate regarding the nature and extent of innovation necessary to the entrepreneurial process hinges on the earlier discussion regarding the difference between first- and second-order change. The former is usually characterised by incremental changes or innovations and can be associated with the concept of entrepreneurship manifest in the work of the Austrian school; the latter is marked by radical change and innovation and is reminiscent of the Schumpeterian concept of entrepreneurship.

Drawing upon the work of Kirzner (1973) of the neo-Austrian school, the entrepreneur exploits opportunities provided by the existence of profitable mismatches of knowledge and information. In this process akin to arbitrage the ability to correctly anticipate market imperfections and imbalances is paramount. In order to secure the first-mover advantage it is imperative to increase knowledge about the situation, to develop and employ appropriate routines to reduce uncertainty to a minimum, and to enable the organisation to operate as efficiently as possible. As a result, the organisation becomes very concerned with 'doing things right' and increasingly seeks stability and equilibrium. Decision-making is based on formal planning, analysis, and evaluation. The entrepreneur acts only when the risks attached to an opportunity have been sufficiently assessed.

According to Hisrich and Peters (1989) the development of innovations requires a style of entrepreneurship capable of 'breaking new ground', pioneering new fields, promoting radical diversification efforts and innovations, and partially or completely transforming the organisation, its products, its technology, and its markets in the process. These activities are characteristic of Schumpeter's approach to entrepreneurship (Schumpeter, 1937) and lead to 'the discovery of an intertemporal opportunity that cannot, even in principle, be said to actually exist before the innovation has been created' (Kirzner, 1985: 85). Owing to the inherent uncertainties, entrepreneurs will tend to act despite an inability to completely assess the risks associated with an opportunity. In addition to technical skills and expertise Schumpeter's approach stresses the importance of exercising choice. In undertaking innovation,

[...] action must be taken without working out all the details of what is to be done. Here the success of everything depends upon intuition, the capacity of seeing things in a way which afterwards proves to be true, even though it cannot be established at the moment, and of grasping the essential fact, disregarding the unessential, even though one can give no account of the principles by which this is done. (Schumpeter, 1934: 85)

These opposing views are reconciled by the fact that incremental advances often provide the necessary ground-work and the basis for more radical innovations, which in turn increase the scope for an incremental approach in order to effectively exploit the resulting opportunities. Both modes are needed to ensure long-term viability of an organisation (Volberda, 1998).

The creation of a new organizational entity is not a necessary condition of the entrepreneurial process but rather something that often occurs, for practical reasons, in the form of a new venture or a new unit within an existing organization. More recently the term ‘intrapreneur’ has been used to distinguish managers faced with the task of infusing existing organisations with entrepreneurial drive from the term ‘entrepreneur’, which is often used synonymously for owners or founders of the organisation and is very much a 19th century construct (Lombriser & Ansoff, 1995). Popularised by the work of Pinchot (1986) intrapreneuring has inspired the minds of many management thinkers as a way of stimulating innovation and creativity while keeping a measure of corporate control. The basic construct involves the creation of a new venture (“spin-off”) within an existing large company and has the task of developing and marketing a new product. This construct has the advantage of the financial backing of the large corporation, while retaining the advantages such as freedom and flexibility inherent to smaller organisations.

Criticisms of this original approach emphasise that it is doubtful whether real entrepreneurial risk-taking can be genuinely encouraged while the financial control remains with the headquarters.

Building the entrepreneurial corporation does not require the creation of a society of independent entrepreneurs held together by a top management a combination of a bank and a venture fund. It demands instead the shaping of a strong entrepreneurial process to drive the company’s opportunity-seeking externally-focused ability to create and exploit avenues profitable growth. It is this integrated entrepreneurial process that brings the large company advantages to the front-line entrepreneurs and distinguishes the

entrepreneurial corporation from the myths of internal venturing and 'intrapreneurship' that have already been debunked in practice. (Ghosal & Bartlett, 1995: 145)

Moreover, political conflicts between the parent company and the subsidiary can be expected. Although the parent company may be patient regarding initial success, it is foreseeable that fiscal pressures will mount, particularly if the parent company itself is faced with pressures resulting from decline, where budget-cutting may be necessary.

Recent approaches highlight the role of entrepreneurial process -with its emphasis on choice and decision-making, initiative and action, time and speed- as the key to survival in the dynamically changing world. From this perspective the organisation's management serves a pivotal function as facilitator and role model, the original idea of the entrepreneur being transformed to emphasise entrepreneurship as a defining characteristic of the renewed organisation.

According to Ghosal and Bartlett (1995: 145) "[the] large entrepreneurial corporation is [...] built around a core entrepreneurial process that drives everybody, and everything the company does." This core entrepreneurial process involves (1) creating and pursuing opportunities, (2) reviewing, developing and supporting initiatives, and (3) establishing strategic mission and performance standards.

Similarly, Lombriser and Ansoff (1995) stress the need for combining strategy development with capability development. Strategy development comprises three distinctive phases. Initially a need or opportunity for change is perceived. This is followed by the development of an appropriate plan "which culminates in launching new products/ services and/ or entering (abandoning) new (old) markets" (Lombriser & Ansoff, 1995: 96). This is accompanied by the development of capabilities, which also serve to support the strategy development. Capability development involves building organisational competence, creating a change supporting culture and the management of resistance to change.

Key instruments of the capability development are vision, shared models of success, and reward and incentive systems. These stimulate creative and mutually supportive changes in products/ services and skills that are ultimately sources of margin and create competitive advantage. The ability of organisations to enact their environments

coupled with the inability to forecast makes the element of vision particularly attractive to proponents of corporate entrepreneurship. It offers a guiding idea or goal that establishes focus and creates a collective understanding of what the organisation might aspire to.

Entrepreneurship is a key process in the organisation, and long-term growth requires that other systems and activities be configured to support this central process. According to Muzyka et al. (1997), entrepreneurial processes enable an organisation to:

- Create (or recognise) and develop an opportunity.
- Evaluate its desirability-its economic potential and the personal and financial risks involved.
- Marshal the resources needed to exploit it, including but not limited to the financial, managerial, technical and physical resources.
- Possess the will or tenacity to see the innovation through and the leadership to develop necessary support.
- Manage the launch, including competitive and cooperative relationships and networks.
- Manage the downstream realization of the value of the opportunity including creation of value.
- As the organization grows, ensure that individuals throughout the organisation are able to repeat the process to realize opportunities by providing appropriate organizational structures, processes and behaviours.

In order to be entrepreneurial, a corporation must, by definition, permit individuals and teams throughout the organisation to recognise and capture opportunity. Furthermore, the organisation must be appropriately focused on value creation (vs. product and/or profit delivery) and regard the processes that bring together technological innovations and customer needs as fundamental to the organisation. As part of capturing opportunity the organisation must not punish creative failures but instead encourage individuals to act and take risks. (Muzyka et al., 1997: 11)

In addition, the leadership of the organisation should strive to ensure that other potential entrepreneurs understand how to undertake this process. Most companies were once entrepreneurial. However, through attempts to “systematise” or “streamline” (bureaucratise) organizational processes this entrepreneurial process has often become blocked or diverted. These efforts usually focus the organization not on broader opportunity, but on current technologies or product-markets served, therefore ensuring stagnation and the later need for transformation.

To summarise, the above studies exemplify the perspective that emphasises the importance of management behaviour in the process of second-order change. This perspective takes a proactive stance by emphasising the role of management behaviour in initiating and managing first- and second-order changes, in order to gain advantages over their competitors and to achieve a better adaptation to the changing environment. The source of change lies within the organisation and is triggered by management behaviour, decision-making processes, choice, and strategic planning and vision.

1.4.3.5 Changing the Paradigm

Since stability is at least as much a phenomenon observed in organisations as change, it is important to understand some of the sources of this stability. This is the emphasis of the theories to be described in the following sections -how the socially constructed sets of meanings that emerge, affect and constrain behaviour, even as they, at one point, emerged from behaviour themselves.

Sproull (1981) has explained clearly how shared understandings develop and come to take on a life of their own, constraining subsequent action and the development of meaning:

People who talk together come to share the same verbal categories and explanations. This has a convincing effect that results from two processes. One is the sharing of taken-for-granted assumptions, a consistency process. The second is the accumulating of meaning within and across conversations, a continuity process. People cannot constantly interrupt each other to ask, What do you mean by that? They must assume they share the same meanings for at least some of the words they use. As these assumptions persist from conversation to conversation, meanings become socially objectified (Sproull, 1981: 207).

These socially objectified, typified meanings and action patterns then serve to constrain subsequent behaviour.

There are several implications of the paradigmatic view of organisations. First, Kuhn (1970) has argued that in science paradigms seldom evolve over time; rather, old paradigms are virtually replaced in toto by new paradigms in a fashion that is more revolutionary than evolutionary. This is because an organisational paradigm, once in place, tends to turn the organisation into a closed system. As mentioned earlier a paradigm is not just a view of the world; it embodies procedures for inquiring about the world and categories into which these observations are collected. Thus, paradigms have within them an internal consistency that makes evolutionary change or adaptation theoretically nearly impossible.

The process of abstraction and simplification enables “a world” to be constructed and given meaning, but in a way which tends to result in a viewing of the construction as the only possible world. The whole transaction has a tendency to become self-fulfilling. [...] The particular is made general and becomes accepted to the extent that the access to the totality of the larger world, in the shape of possible alternative views, is blocked. Perspectives tend to become ossified (Golding, 1980: 763).

Research further indicates that the substance of paradigms is created from three sources:

- Heredity: There is some evidence that certain patterns of thoughts and feelings are inherited.
- Social learning: Through interactions with others, members of the society learn what is deemed as acceptable and unacceptable behaviour.
- Race memory or imprinting: Some scientists believe that memories of the history of the human race are embedded in DNA

Perception is not a passive process. As a result the socially constructed sets of meanings that emerge affect and constrain behaviour can emerge from the behaviour itself. Not only is the environment interpreted through the paradigm, but the paradigm, through the power of the human mind, actually becomes self-fulfilling. Self-fulfilling prophecies can be created in at least two mutually reinforcing ways. The “law of attraction” states that individuals inevitably drawn to people and circumstances that harmonise with their own dominant thoughts and beliefs.

According to a second hypothesis human perception is limited by the paradigm, allowing to “see” only what fits the parameters of the paradigm, and preventing from seeing what does not. Psychologists call this ‘selective perception’ since data that might conflict with a given model of reality are selectively screened out. Many studies in cognitive psychology have illustrated this phenomenon. Besides self-fulfilling prophecies and selective perception, there is a third way through which personal paradigms are reinforced: the self-limiting belief. Most people have some judgements or beliefs about who they are or what they can do or what they can become. These beliefs form a limiting self-image that is hard to overcome.

That the framework of an individual’s beliefs, attitudes, and values determines what he or she perceives is also shown in the study of language. Language provides an excellent representation of an individual’s personal paradigm. As Ludwig Wittgenstein, one of 20th century’s most influential philosophers, noted, “The limits of my language mean the limits of my world.”¹⁴

A paradigm tends to become explicit only when the need for a new perspective arises through increasing dysfunction in the prevailing paradigm. “The prevailing myth is the one that presently guides the behavior of individuals at the same time that it justifies their behavior to themselves” (Jonsson & Lundin, 1977: 163). This self-protective nature of paradigms, and the trauma associated with their change, naturally leads to the question of the conditions under which paradigms change. One theory holds that change comes through the acquisition of information that indicates that the current approach is not working.

All new information tends to be incorporated into the viewpoint of the paradigm and tends to be distorted to fit the existing assumptions and expectations. This is also true when the early signs begin to emerge that a paradigm is not working. However, when sufficient anomalies or “exceptions to the truth” build up, cynicism and depression

¹⁴ There is an implication in this that, until a person has a name for something, that thing does not exist for that person. For example, research has shown that if someone sees a colour for which he or she has no name, the individual’s mind stores the colour for a mere few moments and can identify it again only if it is seen again almost immediately. On the other hand, a person can identify colours for which he or she has names even after long periods of not seeing the colour. The conclusion to be drawn from this is that people store colours in their minds not as colours, but as verbal labels for colours.

arise around the old paradigm allowing individuals to distance themselves from the old paradigm and begin to search for an alternative. When even those people thoroughly invested in the old paradigm can no longer deny its inapplicability, the stage is set. Through the articulation of the new paradigm, a new vision or a new metaphor the shift occurs. This suggests that paradigmatic change is triggered through the acquisition of information that indicates that the present technology is not working implying that information is critical in the change process.

The second insight gained by research suggests that paradigms do not change all at once in a profound way, at least initially.

The process begins at the periphery, with information indicating failure to meet some acknowledged, limited goal of the system. This is interpreted as indicating some specific flaw in design or implementation has retarded the success of an otherwise viable system. [...] The action taken is not radical, but is rather a conservative attempt to preserve the system with the least possible increment of change. The corrective measures [...] have the unanticipated consequence of raising some new ambiguity about the system [...] Another flaw is perceived, and further corrective action is taken. [...] An elaborate feedback loop develops, which results in stripping away the layers [...] one by one [...] in this model the ground is prepared for a radical reconceptualization of the field through a transitional process in which conservative attempts to protect the system have the unanticipated consequence of undermining it (Rounds, 1981: 10 cited in Pfeffer, 1982: 229-230)

Paradigms are outmoded in gradual fashion and eventually are replaced because the underlying social theory and values shift, not because one sees changes in technology or knowledge that produce failure in a technical or technological sense.

Two points deserve emphasis. As mentioned earlier the perspective emphasises the relatively closed-system, non-adaptive nature of organisations. It provides another alternative explanation on why selection processes, rather than adaptation, may be critical to understanding organisational change. The system becomes closed because bounded rationality requires a simplification of the informational environment in which the organisation makes decisions. Furthermore, because the system consists of the experience of many persons, it is in principle impossible for any individual to understand fully why all of the programs are the way they are, or the basis for each of the multitude of past decisions that fixed them in their present form. Second, the perspective emphasises the unfolding, processual nature of change. Meanings are not

questioned and overthrown all at once. Rather, actions are taken, often within the dominant paradigm, to solve some small problem, which in turn lead to other problems, other actions, and finally, the unravelling of the old system of meaning and its replacement with an alternative paradigm. The role of information in this process is more to serve as an arguing point and to provide data around small problems. There is little indication that the paradigm itself is suddenly overthrown through the appearance of new, important and relevant facts.

1.4.3.6 Control

In order to maintain viability and development, an organization must control itself. Control is the process by which a system realizes its vision and goals, in constant adaptation to its environment and requires that separate elements or subsystems are brought together both spatially and temporally, so that the total system functions in an integrated and co-ordinated manner. Control in organizations is achieved in many ways, ranging from direct surveillance to reporting systems to social and cultural controls. Centralization of decision-making, specialization of roles and tasks, standardization and formalization of rules and procedures, internalisation of norms and values, and the formalization of the communication network are the control methods most often considered by organizational theorists and practitioners.

The role of management control systems in organisational change in general and organisational renewal in particular is the subject of some debate. Control systems can reinforce existing rationales for action seriously limiting the organisation's response repertoire in face of environmental turbulence. Designed to ensure that problems or errors of environmental fit are detected, they limit organisations to reactive, passive change. However, by providing the necessary information and making problems visible, control systems can play an important proactive role in generating organisational change and learning.

Controlling the ongoing operations of any business and, at the same time, allowing sufficient innovation to adapt to changing markets is one of the basic challenges of management. The difficulty of striking the appropriate balance becomes particularly evident in this section.

Defining Control

Rathe (1960) noted some fifty-seven connotations of the term control. Control is often equated with submission, i.e. subjugation to power, authority or influence and associated with hierarchical arrangement causing confusion.

It is the function of control to bring about conformance to organizational requirements and achievement of the ultimate purposes of the organization. The coordination and order created out of the diverse interests and potentially diffuse behaviors of members is largely a function of control. It is at this point that many of the problems of organizational functioning and individual adjustment arise. (Tannenbaum, 1968: 3)

Control provides a link between the inputs, processes of conversion, and the outputs of the organization. Control attempts to continually adjust the conversion processes of the organization to achieve the desired output. Control is simply the process by which a system realises its vision and goals, in constant adaptation to the milieu in which it is embedded. To do this, information on the degree of goal achievement at any given time is needed. Desirable patterns include not only goal-oriented activities but also patterns of unanticipated innovation. Control systems must accommodate for intended as well as emergent strategies.

Control systems are information-based. Information can be used for various purposes: to signal opportunities, to communicate plans and goals, to monitor the achievement of plans and goals, and to keep informed and inform others of emerging developments, to coordinate and regulate operating activities (e.g., quality control procedures for repetitive operations). These information-based systems become control systems when they serve to maintain or alter patterns in organizational activities and behaviour. Since control systems are based on feedback they provide a lever to dampen or reinforce effects.

Basic control constructs

In cybernetics the key concept underlying coordination and control is information. The information flows from a source to a receptor via a central integrating mechanism to the controlled element or effector comprising a control signal or message.

However, in an organisation information, communication, and control messages cannot flow one way. The central integrating mechanism must know the effects of its control messages. This knowledge is provided by feedback. Information about the effects of the control messages is fed back to the central integrating mechanism (Espejo et al., 1996).

- **Feedback Controls**

There are two types of feedback, positive and negative. In positive feedback, system output reinforces system input resulting in growth or decay. Systems dominated by positive feedback can become extremely unstable.

In negative feedback, an attempt is made to bring system output in line with system input or desired system output. An integrating mechanism compares the actual output with the input or desired output. Negative feedback is the most important means of regulation and control. It is often said that negative feedback produces goal-seeking behaviour. This means that negative feedback corrects for any deviations from a desirable level.

Desirable is not synonymous with stable. Correctly applied negative feedback is associated with steering the system in space and time toward the achievement of its goal. Incorrectly applied negative feedback can result in over-control, delayed control, or unsteady control and bring the system to a halt or produce oscillations and, as with positive feedback, dangerous instability.

The sources of control information allow for a further classification of control types. If the information comes from examining output, it is a feedback control. If the information comes from inputs, it is classified a feed-forward control.

The essential difference between feedback and feed-forward is the time frame of the measurement. Feedback is information provided to a unit on the nature of its outputs constituting a self-correcting mechanism based on historical values. In an organisation such systems are typically financial and budgeting systems. Feed-forward or pre-control concepts are input-focused and therefore provide a measure of expected or future performance and are often termed planning systems (Espejo et al., 1996).

One of the most desirable aspects of feedback is that it provides a fairly reliable source of information since it is based on past performance. In contrast, feed-forward

relies on a predictive model of some sort. The advantage of feed-forward is clear; it prevents deviation in output by prediction of output variations through monitoring of systems inputs. However, the reliability of feed-forward information is dependent on the explanative power of the underlying model. Usually this means that feedback measurements will be inherently more reliable.

Since the measurement of feedback relies on past output, there will be a time lag between the occurrence of an event and its detection.

Unfortunately, a feedback loop must sense some error or deviation from desired performance before it can initiate a correction. This is, of course, after the fact. Moreover, since correction takes some time to become effective, the deviation tends to persist. The costs incurred in many cases increase directly with the duration of the error. (Koontz & Bradspies, 1972: 29)

This implies two things for an organization using feedback for control. First, a short feedback loop is preferable to a long loop, given the same cost. Second, even if the feedback cycle were shortened to the point of being able to obtain instantaneous feedback, or real-time operations, the adjustment time will still incur a time delay.

- **Feed-forward Control**

Unlike feedback, feed-forward monitors the input into the process rather than output eliminating the delays encountered with a feedback system.

Feed-forward control aims at meeting the problem of delay in feedback systems by monitoring inputs and predicting their effects on outcome variables. In doing so, action is taken, either automatically or by manipulation, to bring the system output into consonance with the desired standard before measurement of the output discloses deviation from standard. (Koontz & Bradspies, 1972: 29)

The effectiveness of feed-forward control depends on (1) a good measure of inputs and (2) an understanding of the effects of resource variations. This first element is often difficult to establish and/or fraught with uncertainty, for example consumer demand. The second element requires a good understanding of the organization's processes and how they are integrated. Thus, feed-forward effectiveness will depend on the ability to measure input variations and to predict their effects.

The weakness of feedback –time lag- is the strength of feed-forward. Similarly, the weakness of feed-forward -unreliable information- is the strength of feedback. Thus, the two information-gathering systems complement each other, and are generally used accordingly. Both feedback and feed-forward collect information for control and thus share many of the same organizational problems. Goals must be clear so that the proper information can be gained. The information that is collected must translate into meaningful standards for the operating units.

- **Mechanisms of Control**

Controls mechanisms are ubiquitous and often deeply woven into the organisational fibre making their identification very difficult. They are often established through structural design elements, which have already been briefly discussed in connection with organisational forms. Control mechanisms however can also be provided by norms and belief systems, which may not conform to organisational needs. Organisational ability to influence or employ these in a desired fashion is limited if not impossible.

Control measures can be aimed at influencing either the output or the process by which the output is achieved (Mintzberg, 1979). Process control comprises both regulation of behaviour and task. Any extensive control system makes use of both types because controls on either output or process alone are not likely to provide adequate control. For example, placing controls solely on processes may not ensure the desired output, and merely emphasising output controls may lead to inefficient processes.

Incompatibility of process with output controls can cause serious problems. For example measures aimed at regulating behaviour may make it difficult or even impossible to meet set quality or quantity standards. Therefore, control measures need to be carefully considered and balanced.

Regulation of Tasks

The first basic organising decision concerning the regulation of the process is the degree of task specialization or division of labour. In this respect a horizontal component concerned with the breadth and scope of work, and a vertical component

concerned with the 'depth' or the degree of control over the work can be distinguished.

- **Horizontal specialization**

Horizontal specialization is the predominant form of division of labour, dividing the work into many specialized tasks, in which often only a few basic operations have to be performed. Work consisting of few basic operations together with short cycle times results in a narrow scope of tasks which increases the repetition of work, thereby facilitating learning by doing, development of specialized equipment and tools, and savings in time which was otherwise lost in switching tasks (Mintzberg, 1979: 72). However, this often creates more problems than it solves. Horizontal differentiation increases a firm's potential for misunderstanding and disagreement as a result of increased interdependence combined with conflicting goals and priorities of isolated units. It can be assumed that the separate parts will come into conflict over scarce resources and difference in goals, status, or time orientation. When the separate parts do not work together as a coherent whole, waste, conflict, and low output result. To avoid sub-optimisation some mechanisms must be in place to ensure unity of effort. This requires increased efforts towards integration through coordination and communication. Not surprisingly, reaction times increase when there is high horizontal specialization. Moreover, these narrow tasks suppress self-initiative, which often goes together with decreasing motivation.

- **Vertical specialization**

This separates the performance of the work from its control or administration (Mintzberg, 1979: 71). The control is often passed to a manager with the overview necessary to coordinate the work, or the control is laid down in rules and procedures. Vertical specialization eliminates intrinsic self-control within tasks and replaces it with extrinsic control. It results in a separation of thinking and doing; extrinsic management tasks are created in the form of supervisors or rules or procedures, while only simple tasks remain. Consequently, the scope for judgement and the opportunities for setting priorities are strongly diminished.

To conclude, high degrees of horizontal and vertical specialization impede change and renewal processes, thereby limiting any potential for flexibility. By contrast, redundancies in functions (Trist, 1981) create an understanding of the essential

considerations and constraints of all aspects of change and renewal in addition to those immediately needed to perform the individual task. Redundancies in functions enable to 'think globally, while acting locally' providing a potential for coherence and change within an organization (Van de Ven, 1986).

Regulation of behaviour

Behaviour is subject to intrinsic and extrinsic control mechanisms. Intrinsic mechanisms that influence work behaviour are for example insight, habit, beliefs, education, knowledge and skills. Extrinsic mechanisms can be formal or informal and are inherently manipulative having either a restrictive or supportive effect. Extrinsic controls attempt to directly or indirectly influence individual behaviour through insight, discussion, training, orders (based on authority), or official rules such as standard operating procedures. Extrinsic controls can also reflect conforming to group-norms or be the result of peer-group pressure.

By controlling the behaviour the organisation aims to achieve a desired output. To make individual behaviour more predictable and reduce the amount of direct intervention organisations formalise and standardise rules.

- **Standardisation**

Standardization is "any procedure that occurs regularly, is legitimized by the organization, has rules that cover circumstances, and apply invariably." For certain regularly occurring events, pre-programmed behaviour is prescribed. Consequently, the behaviour of participants is predictable: workers know what to do, and they can react very quickly. Indicators of standardization are the degree to which the contents of the work are specified or programmed (process standardization) and/ or the degree to which results of the work, such as products or performance, are specified (standardization of output). Process standardization limits the organizational participants scope to manoeuvre; output standardization determines the interfaces among tasks. Compared to standardization of process, it leaves some more room to manoeuvre: only the result is specified, but not how the result must be achieved.

Standardization facilitates the development of specialized routines¹⁵ but generally inhibits the creation of dynamic capabilities. In the case of both process and output standardization, the potential for flexibility is therefore extremely low.

Although the two types are not substituted for each other, they are often used independently. A study by Ouchi and Maguire (1975) indicated that the greater the superior's knowledge of the subordinate's tasks, the greater the tendency to use behavioural control. Output controls become more important and increase in use with the level of organizational hierarchy. Furthermore, subordinates tended to use the same control method as their superior. If the subordinate thought that the superior did not know the specifics of the operation, the subordinate would provide him with output data rather than behavioural data.

- **Formalisation**

Formalisation describes the extent to which programmed behaviour is described and prescribed. It reflects the degree to which rules, procedures, instructions, and communications are laid down in written documents (Pugh et al., 1963; Khandwalla, 1977). Most definitions of formalisation emphasise written systems. Jerald Hage (1965: 295) notes:

Organizations learn from past experiences and employ rules as a repository of that experience. Some organizations carefully codify each job, describing specific details, and then ensure conformity to the job description. Other organizations have loosely defined jobs and do not carefully control work behavior. Formalization, or standardization, is measured by the proportion of codified jobs and the range of variation that is tolerated within the rules defining the jobs. The higher the proportion of codified jobs and the less the range of variation allowed, the more formalized the organization.

For some structures, standardization goes together with formalization of behaviour. Frequently, standardization and formalization are mistaken for each other. There is, however, a sharp distinction between the two. Not everything that is standardized in

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According to Mintzberg (1979), education and training are forms of standardization of inputs or skills that achieve indirectly the control and coordination of work that standardization of work processes or of work outputs achieves directly. On the job, professional or craft workers appear to be acting autonomously, but they are in fact guided by trained skills and acquired knowledge. This insight highlights the link between control and learning.

the organization is based on written documents. Often, standardization is derived from certain unwritten habits and traditions. Thus, formalization always requires standardization, but standardization does not have to result in formalization (De Leeuw, 1986).

Formalisation is used especially when tasks require precise, usefully predetermined coordination. Moreover, it is often used to ensure fairness to clients and to abandon favouritism. Major indicators of formalization are:

- specifications related to the job itself in the form of formal job descriptions. De Leeuw (1986: 258) points out that in highly formalized structures, these job descriptions primarily describe the tasks in terms of activities to be performed (means) instead of their function in terms of the contribution to the organizational goals (results);
- specifications attached to the work itself in the form of instructions which regulate the work flow;
- specification of rules which apply to all situations, all jobs, all work flows, and all workers.

Behavioural control through formalisation and standardisation has both anticipated and unanticipated outcomes. First, the number of personalised relationships between organisational members is reduced. Control leads to an emphasis on reliability of behaviour. Management wants employees to be predictable and accountable so standard operating procedures are institutionalised and constantly checked for compliance. Finally, the organisation increasingly uses categorisation as a decision-making technique. Situations are placed into the first category (of a relatively small number of categories) that seems to apply. A relatively narrow range of alternative solutions to problems is the result.

Crozier (1964) described how these formalized structures result in paralysed organizations. In these structures, organisational members comply with rules as a purposeful action. Confronted with non-routine change, the dominance of rules forces participants to adopt risk-averse behaviour in which they hide behind so-called object rules and procedures. In addition, Crozier showed that formalization leads to

communication rigidities as a result of peer-group pressures within each hierarchical level. Consequently, deviant impulses are sanctioned, with the effect that each level or unit is focused on its own goals at the expense of the broader goals of the organization.

Just like standardization, formalization limits flexibility potential. It strongly reduces the perceptible variety of stimuli in the environment (Beer, 1985), thereby reducing the viability of the system. Under it, every member of the organization is totally deprived of initiative and completely controlled by rules imposed from the outside. Formal rules and procedures may lead to rigid behaviour for example when dealing with clients and customers by organisational members. The emphasis on routine, formal rules and procedures may lead to organisational resistance to change.

An overemphasis on form rather than substance ultimately leads to goal displacement. Following the organisations rules and regulations becomes so important to members - because their evaluations are based on how well they follow them - that they focus their behaviour on complying with the rules rather than striving to reach organisational goals. "Adherence to the rules, originally conceived as a means, becomes transformed into an end in itself." (Merton, 1957: 199)

Adherence to the rules is also caused by

[...] the growing gap between the rights of authority (to renew, to veto, to affirm) and the specialized ability or skill required to solve most organizational problems. The intellectual, problem-solving content of the executive offices is being increasingly diverted to specialists, leaving hierarchical rights (and duties) as the principal components of executive posts. Persons in hierarchical positions are therefore increasingly dependent upon subordinate and non-subordinate specialists for the achievement of organizational (or unit) goals. (Thompson, 1961: 156-157)

Qualified professionals bring their own behaviour standards with them. According to Hall (1982: 108)

The presence of organizational guidelines (formalization) is thus a duplication and probably perceived as less valid than are the norms of the profession involved. For professionals, therefore, the greater the degree of formalization in the organisation, the greater the likelihood of alienation from work.

Formalization is harmful when it inhibits human development and interaction. Organisations relying extensively on rules, regulations, and other formalization devices may restrict input or raw materials and labour power and ignore inputs such as people's lives and needs and the organisations need for social and public support.

The aforementioned also serve to highlight the danger inherent to behavioural control to reinforce and intensify the use of controls ultimately locking the organisation so rigidly into rules and regulations that it is incapable of change and response outside pre-defined categories.

Control Specificity

Drawing on the discussion so far it seems that as organisations grow in size they inevitably become more complex and inevitably more bureaucratic. Jobs are divided up among organisational members, guidelines are specified in the form of rules, regulations, policies, and procedures, and authority relationships are de-lineated. The economies and efficiency resulting from horizontal and vertical differentiation place an increasing burden on the organisation to integrate their activities through co-ordination and conflict-resolution. The reinforcing effect of feedback coupled with the complexity of organisations makes it difficult to strike the right balance and avoid over- or under-control. Under-control can result in cost overruns, inadequate output in quantity or quality as well as in an inability to adjust to change. Over-control can be responsible for problems such as excessive paperwork, high control costs, low productivity, and a lack of innovation (Turcotte, 1974). In face of turbulent environments most organisations however have the problem of over-control.

Planning and control systems are usually custom-designed; thus, only the most general guidelines can be applied when discussing how specific the controls should be.

Elaborate planning and control systems focus efforts in prescribed areas and limit the self-control of organizational units and participants (Van de Ven, 1986). Usually, such systems are oriented to specifying activities that will take place in the form of programmes, schedules, and operating plans. However, by implementing comprehensive planning and control systems an organisation may lose its potential for

change. A necessary redirection of the firm's strategy may be very difficult in terms of costs and required time since the planning and control systems have been set firmly in support of the current strategy (Bourgeois & Brodwin, 1984). In this situation, existing planning and control systems only stimulate repetitive use of procedures, which may have little to do with future success (Starbuck, 1983).

In contrast to such elaborate systems, non-comprehensive planning systems encourage self-initiative and allow fast, low-cost actions in order to offset threats or take advantage of new opportunities. While elaborate systems are either concerned with input or means-oriented, rough planning and control systems are more focused on overall performance. Instead of seeking to regulate specific actions, they leave some space for ambiguous information and necessary experimentation and intuition. This freedom facilitates the creation of original solutions for new problems.

Some major indicators of the flexibility potential of planning and control systems are:

- regulation of goal and priority setting; in the case of top-down planning focused on short-term, quantitative goals, the potential for flexibility is seriously limited. Top-down decision-making ignores the contributions of lower levels that are not in line with higher-level goals. In addition, the focus on hard quantifiable data of elaborate planning and control systems leads to disjointed and fragmented insights. Consequently, long-term, soft, qualitative information, which cannot be sliced into small pieces, is ignored. Therefore increased quantification of planning and control harms flexibility potential (Lenz and Lyles, 1985);
- internal programming of planning and control; loose planning systems, which are open to a wide spectrum of information, encourage fresh insights into emerging problems. Frequently, this looseness is regarded as inefficient and steps are taken to improve the administrative efficiency of the system by making the process more routine and predictable (Lenz and Lyles, 1985). One might think of standardized data inputs, rigid formats of planning documents, or timetables for data preparation. Owing to this increased structuring, the time devoted to creative thought is inevitably reduced. Consequently, the flexibility potential diminishes;

- progress control and evaluation of results: such controls track performance against the desired ends and provide the feedback necessary to gauge and evaluate results and take accurate actions, if needed. They can be very useful. However, the models and techniques used may become the dominant framework for defining and evaluating planning and control issues. Thus, emerging, ill-defined issues that often prove important may not be detected because they either do not correspond to variables in the model or fall outside the scope of the analytical tool. Such deterministic thinking obstructs the flexibility potential of the actual structure.

This suggests that it may make sense to compare the costs of control with the benefits likely from the control. This can be a complex matter, since a manager or administrator may deal not only with specific controls but also with entire control systems. Behavioural controls cut down on the flexibility of the process because certain behaviours are mandatory. Thus, in programs that require great creativity, rather general output controls should be used.

Conclusion

Control and planning are fundamental processes in any organisation. The conventional application of these to improve efficiency and stabilise give them converging effect in the organisational setting. Although some accounts of management theory have now recognised this effect and advocate the use of control levers to balance opposing forces of opportunity and focus, these are still rare.

The traditional approach to control divides the organization into groups, hierarchical levels, and various management tasks. Planning and control systems and process regulations are developed to solve the residual interdependencies. In essence, planning and control systems regulate various aspects of structure, such as the allocating of resources, the training and development of personnel, and the gathering of information. In this connection, planning systems identify the issues that become candidates for managerial scrutiny, while control systems specify the times for review and discussion of progress against objectives.

Uniting these functions in the same hands, increasingly abolishes the historical separation between the functions of execution and control, characteristic of the age of

mass production. In today's organizations, the functions of management are increasingly decentralized or distributed across the whole system emphasising a shift towards empowerment, job enrichment, employee participation and self-control.

Management control systems can be designed and used to be proactive rather than reactive with respect to change, and to promote organisational learning, by fitting the management control system to the constructs associated with organisational learning. There are four major constructs associated with organisational learning: knowledge acquisition, information distribution, information interpretation and organisational memory. There are features of management control system design and use, which fit each of these constructs, and appropriate system design can assist organisations to learn and survive during a period of environmental change.

Simons (1995) suggests that four key constructs must be analysed and understood for the successful implementation of strategy: core values, risks to be avoided, critical performance variables, and strategic uncertainties. Each construct is controlled by a different system, or lever, the use of which has different implications. These levers are:

1. beliefs systems, used to inspire and direct the search for new opportunities;
2. boundary systems, used to set limits on opportunity-seeking behavior;
3. diagnostic control systems, used to motivate, monitor, and reward achievement of specified goals; and
4. interactive control systems, used to stimulate organizational learning and the emergence of new ideas and strategies. (Simons, 1995: 7)

Implementing strategy effectively requires a balance among the four levers of control. This balance permits the simultaneous management of strategy as plan, pattern, position and perspective.

1.5 Literature Review: Summary and Conclusion

Firms compete based on their relative ability to renew as much as they do on their ability to extract profits from product-markets. Historical accounts clearly show that organisational failure is almost inevitable unless something is actively done to delay or avoid it. Organisations must therefore constantly innovate, learn and adapt. Organisational renewal is central to long-term competitive strength by realising a vision that radically changes an organisation's products or services, customers, market channels, skills, sources of margin, competitive advantage, and persona - integrating these changes with core competencies and capabilities.

Organisational renewal is rooted in individual talent and systematic management processes. Accordingly organisational renewal can be perceived as a managerial task as well as an organisation design task. Organisational renewal involves changes in the nature of organisational activities. By definition, the issues and difficulties surrounding organisational renewal are unstructured and non-routine since the organisation faces unfamiliar changes with far-reaching consequences which are -- because of the inherent complexity and the time-frame involved -- often counter-intuitive in development. They also appear paradoxical.

To survive and prosper organisations need to explore new opportunities effectively as well as exploit those opportunities efficiently, to change their strategic focus easily as well as develop some strategic direction, and to change their dominating norms and values as well as correct deviations from essential norms and values. As organisations become successful and grow they have to become more bureaucratic to maintain control, yet bureaucracy lessens individual initiative and hampers the effectiveness and efficiency of decision-making.

These paradoxical requirements imply that balances must be struck if organisations are to remain vital. How can firms reconcile the conflicting forces for change and stability? How can organizations operate efficiently and continuously adapt to maintain effectiveness? Rather than finding the appropriate technology, structure, or culture to encourage innovation, the central question is how to manage the seeming

paradox of organizing, typically manifested in mixed messages and system contradictions.

The literature review highlights the fragmentation of research efforts and the limitations of insular solutions to alleviate existing paradoxes. According to Volberda (1998) most sub-theories within the field of management and organisation science, such as organizational learning, and innovation and entrepreneurship emphasize either preservation or change. Similarly, Van de Ven and Poole (1988) argue that within management and organisation science, there is pressure to elevate one term and to subordinate the other. Bouchikhi (1998) notes that theories often downplay complexity of the subject matter. Most theories within the field favour either/ or approaches such as contingency theories in which the impacts of organic versus mechanistic structures are distinguished or in which organizations are categorized as stable or in flux and basically revoke the paradox's contradictory element. They escape the challenge of including both extremes and, hence, have limited explanatory potential.

However, the existing tensions and contradictions between the outlined recent developments and findings in the various fields provide important opportunities for developing a better and more encompassing understanding of organisational renewal. Thus, instead of suppressing or dismissing the apparent paradoxes deduced from a comparison of one-sided theories, these opposing positions form a basis for a theoretical, dialectical discourse, which is potentially richer than either theory by itself.

Whereas logical paradoxes generally exist in a timeless, abstract mode, organizations are subject to temporal and spatial constraints. Accordingly, Poole and Van de Ven (1989) propose four generic ways (opposition, spatial separation, temporal separation, synthesis) for dealing with paradoxes of organisation and management science. A paradox can (1) be accepted and used constructively (opposition), (2) be resolved by clarifying levels of reference (spatial separation), (3) be resolved by taking time into account in exploring when each contrary assumption or process exerts a separate influence (temporal separation), and (4) be dissolved by introducing new concepts

which either correct flaws in logic or provide a more encompassing perspective (synthesis).

To effectively generate better understanding of organisational renewal there is a clear need for integration and synthesis of various findings within a more holistic framework. Ideally such an integrative framework of organizational renewal should (1) include the contradictory attributes of the drivers for preservation and progress, (2) provide a more comprehensive view by acknowledging the co-existence of the competing interpretative perspectives, (3) allow to synthesize the often contradictory findings and conclusions espoused by the outlined individual research strands such as entrepreneurship, innovation, learning or control, and (4) incorporate relevant temporal and spatial organisational aspects.

Conceptualizing paradox entails building constructs that accommodate contradictions. The complex and paradoxical nature of organisations and the particular interest in transformation and change processes advocates the use of systems theory and its many derivatives. Organizational renewal appears to inherently juxtapose tensions between preservation and progress. Developing a framework that meets these aforementioned requirements in which dynamic and opposing forces coexisting within organizations are accented, is subject of the following chapter.

Chapter

2

**ORGANISATIONAL RENEWAL:
PROCESS DESIGN**

Theoretical Framework

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2. Developing the Theoretical Framework

2.1 Introduction

In order to understand the secrets of organisational change in general and renewal in particular the generative processes that link implicate and explicate orders need to be understood. It is aim of this chapter to provide the theoretical foundation for understanding the logics of organisational change by exploring such processes.

The answer to the question what governs the evolution of a social system must be sought in the dynamics underlying its behaviour. Understanding the dynamics of ossification and decline in organisations provides the key to solutions that sustain vitality and superior performance in organisations. Developing such understanding of an organisation can be established with a meta-theoretical approach (McWhinney, 1992).

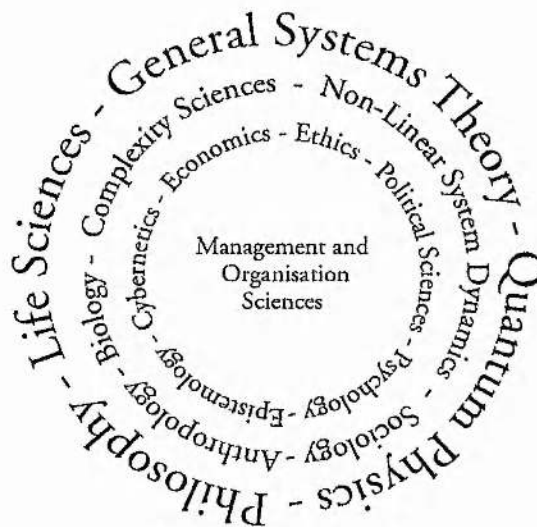


Figure 2-1: Meta-system of Management and Organisation Sciences

Source: Developed by the Author

Accordingly the development of rules governing the behaviour of organisations can be sought on and derived from a higher theoretical level or order.¹⁶

In the case of complex social (and in many aspects non-physical) entities such as organisations establishing such meta-theoretical view is quite difficult. Like most social sciences, organisation theory and management theory lack the clinical exactness of description normally associated with the physical sciences. This has led to the widespread use of metaphors in organisation analysis. In a similar vein, Tsoukas (1991) has argued for a cross-discipline, structured and more rigorous use of metaphor within organisational thinking. He demonstrates that knowledge is often stratified, and that a disciplined imagination is required to reach the lower levels:

Mechanisms responsible for experienced events are sought at increasingly deeper strata. In the very beginning of such a 'drilling' process of knowledge acquisition, metaphors may provide the initial insights leading to the hypothesis of plausible causal mechanisms. At subsequent strata, however, metaphorical insights and analogical reasoning need to be transformed into a literal language that expresses real mechanisms and identities. (Tsoukas, 1991: 572)

Individual metaphors can be a very powerful catalyst for change due to the vivid mind pictures they create - capable of dramatically highlighting inadequacies of the old and the advantages of the new much faster than persistent logical argument:

The act of creative perception in the form of a metaphor [...] involves an extremely perceptive state of intense passion and high energy that dissolves the excessively rigidly held assumptions in the tacit infrastructure of commonly accepted knowledge. (Bohm & Peat, 1987: 17)

Morgan (1980, 1981, 1983, 1986, 1996) has used metaphorical thinking extensively in his analysis of organisations. Drawing from a range of subject domains as varied as political science, biology, psychiatry and cybernetics he explores various facets of

¹⁶

A metasystem is a system over and beyond a system of lower logical order, and therefore capable of deciding propositions, discussing criteria, or exercising regulation. The emphasis is on logical order not on seniority in the sense of command. The set of assumptions presupposed by any more or less formalized body of assertions, in particular the concepts implied by the vocabulary in which it is expressed and the rules of inference and recursion by means of which one assertion in the system is derived from another. The idea is a generalization of that involved in the selection of features of deductive systems for investigation that is characteristic of axiomatics or meta-mathematics.

organisational life through an assortment of metaphors and pictures as “machines,” “organisms,” “brains,” “cultures,” “political systems,” “psychic prisons,” “flux and transformation,” and “instruments of domination,” and makes the point that these eight are only a selection of those possible.

Frequently, the discussion ranges well beyond the confines of organization theory, for the metaphors and ideas considered are drawn from diverse sources [...] it is important to understand that the mode of analysis developed here rests in a *way of thinking* rather than in the mechanistic application of a small set of clearly defined analytical frameworks. (Morgan, 1986: 16; emphasis in original)

There are many different metaphors that can be used to look at organizations, each of which yields an alternative understanding of their character and functioning. The methodological approach taken and the measures recommended will naturally reflect the metaphorical view adopted. This makes it necessary to consider the suitability of a particular image to provide meaningful answers.

Organisational renewal is centrally concerned with changes in structures and processes of an organisation as well as in the attitudes of its members. This requires the adoption of an approach that allows capturing the complexity of organisational dynamics and necessarily extends beyond the traditional view of organisation as a closed, machine-like system. This discussion is also central to the complexity sciences and may be the central issue confronting contemporary science.

Eighteenth-century science, following the Newtonian revolution, has been characterized as developing the sciences of organized simplicity, nineteenth-century science, via statistical mechanics, as focusing on disorganized complexity, and twentieth- and twenty-first-century science as confronting organized complexity. (Kauffman, 1993: 173)

Metaphorical application suggests that social systems in general, and social organizations in particular, would appear to be prime examples of organized complexity. Novel insights into systems behaviour provided by the concepts of autopoiesis and complex adaptive systems have emerged in the past two decades. Their metaphorical transfer to organisations seem to be particularly useful to this discussion as both fields are immediately concerned with understanding of change

and transformation processes in systems.¹⁷ It seems reasonable that insights from the complexity sciences should be examined with the goal of furthering understanding how complex systems such as organizations change and transform over time.

2.2 Systems Theories

Various strands of management theory unite in treating organisations as if they were machines. Probably, the three most influential are administrative management theory (e.g. Fayol, 1949), scientific management (e.g. Taylor, 1947) and bureaucracy theory (Weber, 1947). By putting together these three strands, it is possible to give a general account of the machine model. The organisation is viewed as an instrument designed to achieve the purposes of the owners or its management. It is constructed of parts, which are combined according to management principles that seek the achievement of maximum efficiency. Decision-making is assumed to be rational. Control is exercised through rules and a strict hierarchy of authority. Information is processed according to the arrangement of tasks and by exception reporting up the hierarchy. The apparent limitations of this mechanistic view have led to its replacement with the organic view (Atkinson, 1984).

This view has been especially pronounced among advocates of the systems perspective in organisation theory (Kast & Rosenzweig, 1970; Katz & Kahn, 1966&1978; Lawrence & Lorsch, 1967; Rothlisberger & Dickson, 1939; Stogdill, 1959). Organisations are portrayed as complex systems made up of parts existing in close interrelationship. Consequently, organisations can only be studied as wholes. The primary aim of organisations as systems is to ensure their own survival. Both formal and informal aspects of organisations are granted attention in the organic model. Moreover, organisations are regarded as open systems, having to act in response to environmental changes in order to maintain a steady state. In order to correct any malfunctions, the subsystems must be examined to ensure that they are

¹⁷ It is important to note that all of these concepts are simply understood and used as metaphors to generate alternative views and develop additional understanding of the functioning of organisations. The direct transfer of any of the listed concepts to the domain of organisations involves serious problems of ontological commitment and requires an in-depth discussion of the individual concepts beyond the scope of this research.

meeting the needs of the organisation, and the organisation examined for a “fit” to its environment (Selznick, 1948; Parsons, 1956, 1957; Katz & Kahn, 1966).

2.2.1 Criteria of Systems Thinking

Before the 1940s, several scientists had used the terms ‘system’ and ‘systems thinking’, but it was Bertalanffy’s concepts of an open system and a general systems theory that established systems thinking as a major scientific movement.¹⁸ With the subsequent strong support from cybernetics, the concepts of systems thinking -such as thinking in terms of connectedness, relationships, and context- and systems theory became integral parts of the established scientific language and led to numerous new methodologies and applications such as systems engineering, systems analysis, systems dynamics.

In following sections the key characteristics of systems thinking are summarised.

2.2.1.1.1 Networks – Webs of Interdependence

The first, and most general, criterion is the emphasis of the whole. Organic systems are integrated. Their essential, or ‘systemic’, properties are properties of the whole, which none of the parts have. They arise from the ‘organising relations’ of the parts. These systemic properties are destroyed when a system is dissected into isolated elements. Hence, the behaviour of the whole cannot be analysed in terms of the properties of its parts. The properties of the parts can be only understood within the context of the larger whole requiring ‘contextual’ thinking.¹⁹

Systems are composed of several sub-systems, which are in interaction with one another while at the same time part of an identifiable whole. This allows shifting back and forth between levels of differing complexity. At each level observed phenomena exhibit ‘emergent’ properties that do not exist at lower levels.

The shift from the parts to the whole can also be seen as a shift from objects to relationships (Capra, 1996). The realisation that objects themselves are networks of

¹⁸ See Bertalanffy (1940) for his first discussion of open systems, published in German, and Bertalanffy (1950) for his first essay on open systems in English, reprinted in Emery (1969).

¹⁹ This key characteristic of the systems approach has a profound influence on mode of scientific inquiry on methodological, theoretical, and meta-theoretical levels.

relationships, embedded in larger networks places primary importance on relationships between the objects and secondary importance on objects themselves.²⁰

2.2.1.1.2 Entropy

According to the 2nd law of thermodynamics, the law of the dissipation of energy²¹, there is a trend in physical phenomena from order to disorder. Any isolated, or 'closed', physical system will proceed spontaneously in the direction of ever-increasing disorder.

To express this direction in the evolution of physical systems in precise mathematical form a new quantity called 'entropy'²² was introduced. According to the second law, the entropy of a closed physical system will keep increasing, and because this evolution is accompanied by increasing disorder, entropy can be understood as a measure of a system's closeness to equilibrium or as a measure of a system's disorder.

The law states that the entropy of an isolated system can never decrease; some mechanical energy is always dissipated into heat that cannot be completely recovered. Thus, when an isolated system achieves maximum entropy, it can no longer change. This introduced the idea of irreversible processes into science. This was in sharp contrast to Newtonian science of eternal, reversible trajectories.

²⁰ This approach to scientific inquiry also concerns the notion of scientific objectivity. The systems approach assumes that epistemology - understanding of the process of knowing - is an integral part of any scientific theory implying that scientific descriptions are subjective. Moreover, science can never provide any complete and definitive understanding of a particular phenomenon since all scientific concepts and theories are limited and approximate.

²¹ Thermodynamics is a field of physics that describes such qualities of matter as temperature, pressure, and volume. Further variables are energy, heat, and work. When a physical system moves from one state of equilibrium to another, a thermodynamic process is said to take place. The laws of thermodynamics were discovered in the 19th century through painstaking experimentation. The laws of thermodynamics are based on a precise definition of temperature and the statement that when two systems are in equilibrium with a third, the first two systems must be in equilibrium with each other. Temperature is defined as this shared measurable quality. The 'first law of thermodynamics' is the law of the conservation of energy. It states that energy cannot be created or destroyed, and therefore the amount of heat transferred into a system plus the amount of work done on the system must produce an equal increase of energy in the system. The second law (see above) implies the existence of an temperature scale that includes an absolute zero of temperature. The third law of thermodynamics states that absolute zero can be approached, but never be fully reached.

²² The term represents a combination of 'energy' and *tropos*, the Greek word for transformation, or evolution.

The concept of entropy also confronted the evolutionary thinking among nineteenth-century biologists, who had observed that the living universe evolves from disorder to order, towards states of ever-increasing complexity eventually leading to two diametrically opposed views of evolutionary change - that of a living world unfolding towards increasing order and complexity, and that of an engine running down, a world of ever-increasing disorder.

Bertalanffy could not resolve this dilemma, but he took the crucial first step by recognising that organisms are open systems that cannot be described by classical thermodynamics. He called such systems 'open' because they need to feed on a continual flux of matter and energy from their environment to stay alive:

The organism is not a static system closed to the outside and always containing the identical components; it is an open system in a (quasi-) steady state [...] in which material continually enters from, and leaves into, the outside environment. (Bertalanffy, 1968: 121)

Unlike closed systems, which settle into a state of thermal equilibrium, open systems maintain themselves in a state far-from-equilibrium characterised by continual flow and change. To describe such a state of dynamic balance Bertalanffy coined the German term *Fliessgleichgewicht* ('flowing balance').

According to Bertalanffy, classical thermodynamics is inappropriate to describe open systems since entropy may decrease in organisms allowing for a transition towards higher order, heterogeneity, and complex organisation. The general trend of events in physical nature towards states of maximum disorder and levelling down of differences postulated with the second law of thermodynamics need not apply.

The theory of open systems resolves this apparent contradiction between entropy and evolution. In all irreversible processes, entropy must increase. Therefore, the change of entropy in closed systems is always positive; order is continually destroyed. Open systems, however, not only produce entropy due to irreversible processes, but are also able to import entropy, which may well be negative. Thus living systems can avoid the increase of entropy, and may even develop towards states of increased order and organisation (Bertalanffy, 1968: 40).

2.2.1.1.3 Feedback

One of the major contributions of cybernetics was the concept of feedback. A feedback loop is a circular arrangement of causally connected elements, in which an initial cause propagates around the links of the loop, so that each element has an effect on the next, until the last ‘feeds back’ the effect into the first element of the cycle. The consequence of this arrangement is that the input is affected by the output, which results in self-regulation of the entire system, as the initial effect iteratively modified. Feedback is the ‘control of a machine on the basis of its actual performance rather than its expected performance’ (Wiener, 1950: 24). In a broader sense, feedback has come to mean the conveying of information about the outcome of any process or activity to its source.

From the very beginning cyberneticists were aware that feedback is an important concept for modelling social systems.²³

It is certainly true that the social system is an organization like the individual, that is bound together by a system of communication, and that it has a dynamics in which circular processes of a feedback nature play an important role. (Wiener, 1948: 24)

Two kinds of feedback are generally distinguished: self-balancing (or ‘negative’) and self-reinforcing (or ‘positive’) feedback. Examples of the latter are the commonly known as vicious or virtuous circles. It is in the positive feedback form that one finds the forces of instability and growth. It is in the negative feedback, or goal-seeking, structure of systems that one finds the causes of stability and preservation but also of decline.

To avoid confusion it may be worthwhile to explain the technical meanings of ‘negative’ and ‘positive’ in this context. A causal influence from A to B is defined as positive if a change in A produces a change in B in the same direction, i.e. an increase of B if A increases and a decrease if A decreases. The causal link is defined as

²³ Throughout the history of the social sciences, numerous metaphors have been used to describe self-regulatory processes in social life. The best known, perhaps, are the ‘invisible hand’ regulating the market in the economic theory of Adam Smith or the interplay of thesis and antithesis in the dialectic of Hegel and Marx. The phenomena described by these models and metaphors all imply circular patterns of causality that can be represented by feedback loops, but none of their authors made that fact explicit (Richardson, 1992: 59ff).

negative if B changes in the opposite direction, decreasing if A increases and increasing if A decreases.

Systems can be classified as 'open' systems or 'feedback' systems. An 'open' system is one characterised by outputs that respond to inputs but where the outputs are isolated from and have no influence on the inputs. An open system has no awareness of its own performance. In an open system, past action does not control future action. An open system does not observe and react to its own performance.

A feedback system, which is also called a closed system, is influenced by its own past behaviour. A feedback system has a closed loop structure that brings results from past action of the system back to control future action. One class of feedback system – negative feedback – seeks a goal and responds as a consequence of failing to achieve the goal. A second class of feedback system – positive feedback – generates growth processes wherein action builds a result that generates still greater action.

Whether a system should be classified as an open system or a feedback system is not intrinsic to the particular assembly of parts but depends on the observer's viewpoint in defining the purpose of the system.

A broad purpose may imply a feedback system having many components. Each component can itself be a feedback system in terms of some subordinate purpose. One must then recognise a hierarchy of feedback structures where the broadest purpose of interest determines the scope of the relevant system.

One of the most important aspects of the studies of feedback loops is the recognition that they depict patterns of organisation. The circular causality in a feedback loop does not imply that the elements in the corresponding physical system are arranged in a circle. Feedback loops are abstract patterns of relationships embedded in physical structures or in the activities of living organisms, distinguishing the pattern of organisation of a system from its physical structure (Capra, 1996).

From this section it should also be clear that neither the closed nor the open system metaphor are capable of fully explaining organisational behaviour. Organisations can be both. This seemingly obvious discovery, however, is the result of recent scientific research and focus of the following sections.

2.3 Self-organising systems

For many researchers even further insight into the renewal process will come through the overall perspective of the firm as a self-organising system (Nonaka, 1988; de Geus, 1988; Senge, 1993a).

In contrast to the classic machine model, self-organising systems are expressly seen to be more than the mere assembly of its constituent parts; the parts are seen as systems within systems, with some scope for autonomous behaviour; and the functionality of the overall system is maintained, even while subsidiary systems undergo renewal. As Capra (1982: 290) put it, the distinguishing characteristics of self-organising systems are the ability 'continuously to renew and recycle their components while maintaining the integrity of their overall structure', and 'to reach out creatively beyond physical and mental boundaries in the processes of learning, development and evolution'.

Furthermore, one should be careful with respect to the term itself. Over the years, the term 'self-organization' has been used to refer to a variety of distinct systemic attributes such as:

- self-creation - the notion that a given system's origin is somehow determined by its character or the specific circumstances in which it occurs.
- self-configuration - the notion that a given system actively determines the arrangement of its constituent parts.
- self-regulation - the notion that a given system actively controls the course of its internal transformations, typically with respect to one or more parameters.
- self-steering - the notion that a given system actively controls its course of activity within some external environment or a general set of possible states.
- self-maintenance - the notion that a given system actively preserves itself, its form, and / or its functional status over time.
- self-(re-)production - the notion that a given system generates itself anew or produces other systems identical to itself.

- self-reference. - the notion that the significance of a given system's character or behaviour is meaningful only with respect to itself.

These nuances are not mutually exclusive, and authors have invoked them in varying 'mixtures'. Any approach to treating enterprises as self-organizing entities should, therefore, consider which (or how many) of these connotations are being addressed, as well as what feature(s) of the given system are being addressed as 'self-organizing' (Whitaker, 1995).

The first part of this section attempts to gain some insights of chaos and complexity theory, with a view to explaining how ordered patterns of activity could emerge from spontaneous self-organisation. The second draws on the theory of autopoiesis, an interesting perspective that sheds a different light on the relationship between systems and their environment. Together these perspectives offer a metaphorical frame for explaining how the explicit reality of organisational life is formed and transformed by underlying processes that have an order or logic of their own. They also extend and compliment the related systems and cybernetic ideas discussed earlier, which suggest that change is enfolded in the strains and tensions found in circular relations. The findings from these different fields are combined to suggest that change is the product of tensions between dynamic opposites.

2.3.1 Models of Self-Organisation

The idea of self-design and self-organisation is not new to management. However, the use of traditional approaches to the explanation of organisational change and transformation processes proved unsatisfactory in guiding both research efforts and applied management practices. Recent research findings from other fields such as chemistry, mathematics and biology have renewed the interest in this phenomenon.

These research findings provide support for the organisational adaptation position, through the discovery of evolutionary drivers existing within self-organising systems. Of particular importance to this study is the experimental indication that self-organising systems play a conscious role in their own evolution. It is proposed that similar mechanisms or processes operate in organisations allowing the individual organisation to choose among alternative evolutionary paths and pro-actively adapt.

2.3.1.1 Theories of Complexity

The complexity sciences represent an attempt to understand dynamic systems phenomena. Although the various approaches have developed in different disciplines they are united in their attempts to describe and understand the behaviour of complex, dynamic systems. As these various approaches are relatively new and have developed in different disciplines their relationship to one another is not generally understood nor fully appreciated. So far no general theoretical approach has succeeded in integrating the perspectives (van de Vliet, 1994; Kauffman, 1991). A unifying theme is a focus on systemic change, an attempt to understand the temporal behaviour of both spatially simple and complex systems. However, combining insights gained from individual approaches with their emphasis on non-linearity, unpredictability, and uncertainty raise questions about the relevance of the fundamental assumptions of linearity, predictability, and certainty that are key elements of the Newtonian paradigm. These assumptions, which form the foundation of much of the “traditional” natural and physical sciences, have been imported into and underlie much of contemporary social science research. Stacey (1994, 1995) identifies three assumptions underlying many approaches to the management of change, or ‘central evolutionary and transformational processes’, which reflect to Newtonian physics and Darwinian evolution:

- Clear-cut connections exist between cause and effect, therefore, managerial actions can lead to predictable outcomes;
- Successful systems are driven by negative feedback processes toward predictable states of adaptation to the environment;
- The dynamics of success are therefore assumed to be a tendency toward equilibrium and thus stability, regularity and predictability.

Beyond this admittedly broad area of convergent interest, however, much variation and uncertainty is attached to the usage of these perspectives. In addition to problems associated with content and terminology specific to the particular discipline from which each of the perspectives emerged, differences in the type of change under examination accounts for much of the confusion and difficulty in definition. Systemic change may be either gradual, incremental, and evolutionary or sudden, discontinuous, and revolutionary. Unfortunately, theoretical approaches utilised by organizational researchers often tend to emphasise either one or the other mode of

change (e.g., evolutionary versus revolutionary change) as the sole explanation of the observed dynamics, resulting in an “either/or fallacy” (Kauffman & Oliva, 1994: 207). The complexity sciences attempt to overcome this problem by focusing on the interplay between gradual and sudden changes in organizational and system trajectories. Moreover, systems have both temporal and spatial dimensions. The complexity sciences emphasize the importance of temporality, which has often been ignored in organisational research. It is this interaction between spatial and temporal characteristics that have significant effects for the system’s trajectory (Wilkinson, 1990).

In its modern usage, ‘complexity’ can be defined as the quantity of regularities or patterns that can be observed in a body of information. That is, while patterns in both completely random and completely ordered information can be described using very few statements, in the zone between order and disorder, many regularities can be observed and described. In this zone, the degree of “complexity” is significant.

Systems exhibiting such complexity are referred to as ‘complex systems’ and fall into two categories. Complex deterministic systems tend to be physical systems with constant parameters, and their study is generally referred to as chaos theory (Lorenz, 1963; Nicolis & Prigogine, 1977). Lorenz describes these systems as “a restricted set of phenomena that evolve in predictably unpredictable ways”. Examples could include patterns of smoke rising, or the formation of snowflakes. Complex adaptive systems are probabilistic rather than deterministic, and include agents or lower-scale systems, which interact, learn and modify their behaviour over time. Factors such as non-linearity and positive feedback can magnify apparently insignificant differences in initial conditions to lead to huge consequences, meaning that long-term outcomes for complex systems are unknowable.

Though there are multiple approaches to the study of complex systems, the following section will be limited to five relatively well-defined perspectives. A brief introduction to each is provided. As it seems that adaptive rather than deterministic systems have more immediate implications for organisations, this particular approach and its findings are emphasised.

2.3.1.1.1 Dissipative Structures

Based on the Nobel-prize winning work of Belgian physicist Ilya Prigogine and colleagues (Prigogine, Nicholis, & Babloyantz, 1972a,b; Prigogine & Stengers 1984) on the behaviour of chemical systems, the field of non-equilibrium thermodynamics focuses on systems in states of extreme instability that have a potential for self-organisation and self-maintenance. Prigogine's work is characterised by descriptions of systems moving progressively further from equilibrium to a point where a “descent in to chaos” ensues and the system structures are broken down. At this point the system becomes open to its environment, importing energy and exporting entropy as a new order takes shape. This new state of complexity is not only quantitatively, but also qualitatively different from the previous state. The system is said to be dissipative, in that the entropy exportation is characterised by heat loss and the system is thus termed a “dissipative structure.”

The behaviours of such systems cast doubt on the general validity of the second law of thermodynamics where systems are marked by deterioration and entropy production. Non-equilibrium thermodynamics and dissipative structures suggest the possibility that physical systems exhibit self-organising behaviours through the principle of “order through fluctuation” (Jantsch, 1975; 1980). An intricate web of non-linear system relationships and random developments combine to create new system configurations in a way, which is largely indeterminate. Whilst systems can and do exist in equilibrium, such dissipative structures are typified by non-linear dynamic processes and non-equilibrium conditions of change and transformation which are subject to a different set of laws.

The point emphasised here is that in non-equilibrium conditions, the operation of simple rules in conjunction with positive feedback lead the system through a sequence of transitions or fluctuations can give rise to the emergence of new, qualitatively different, structures at periodic bifurcation points. From the dissipative structures perspective system instabilities may not be inherently negative but a necessary prerequisite for system change and development. The key to understanding morphogenic and transformational change lies in understanding the dissipative process through which new structural arrangements emerge from the interplay between system and environment, order and disorder.

2.3.1.1.2 Catastrophe Theory

Similar to the dissipative structures approach, discontinuities and revolutionary change in system behaviour is the focus of catastrophe theory. Catastrophe theory attempts to mathematically describe and model discontinuous system behaviours resulting from continuous stimuli (Gregory-Allen & Henderson, 1991; Vendrik, 1993; Kauffman & Oliva, 1994).

Catastrophe theory takes issue with traditional research efforts and methods, which assume gradual, incremental, and evolutionary change is the norm for systems.

In mathematical terms, the solutions to a differential equation must be functions that are differentiable. Relatively few phenomena are that orderly and well behaved; on the contrary, the world is full of sudden transformations and unpredictable divergences, which call for functions that are not differentiable. (Zeeman, 1976: 65)

Catastrophe phenomena are the result of dynamic processes that lead to sudden changes in at least one variable within the context of relatively small changes in other variables or parameters (Brown, 1995). Descriptions of system behaviours have traditionally been modelled by use of differential equations which are limited in their usefulness as a descriptive language of system behaviour since they can accurately describe only those phenomena where change is smooth and continuous (Thom, 1975). Thus, catastrophe theory was developed as a mathematical modelling methodology to be applied in situations where gradual and continuous forces or pressures lead to abrupt, discontinuous, or divergent changes and is a formal system which mathematically locates these points of equilibrium breakdown (i.e., bifurcations) in terms of polynomial representations of seven “elementary catastrophes” (Tabor, 1989).²⁴

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In its original formulation by Thorn (1975), catastrophe theory states that “... if a process is determined by minimizing or maximizing some function, and if it is controlled by no more than four factors, then any singularity of the resulting behavior surface must be similar to one of the seven catastrophes” (Zeeman, 1976: 80). However, Thorn’s (1975) early work has been further generalized and is no longer bound by polynomial representation of such models (Brown, 1995).

2.3.1.1.3 Chaos Theory

Chaos theory is a branch of what is technically known as ‘dynamical systems theory’, a mathematical theory that is applied to a variety of different phenomena (Kellert, 1993). Chaos theory, according to Kellert (1993: 2) is the ‘qualitative study of unstable a-periodic behavior in deterministic nonlinear dynamical systems’. At its most elementary level, chaos theory is an attempt to understand the seemingly random behaviour exhibited by a simple deterministic system consisting of only a few variables or interacting components. Chaotic phenomena are deterministic and appear to be random or stochastic. Chaos research focuses on answering a seemingly paradoxical question: “How can a deterministic system, governed by fixed rules that do not themselves involve any elements of chance, generate such random appearing behavior?” (Butler 1989; Hansson, 1991). Though the possibility for chaos-like phenomena had been suggested earlier, the term “chaos” gained broad recognition by the scientific community with the analysis by Li and Yorke (1975) and popularity through Gleick’s (1987) work.

Deterministic chaos is defined as a-periodic bounded dynamics in a deterministic system with sensitive dependence on initial conditions (Kaplan & Glass, 1995: 27). A-periodic refers to the fact that a system state is never repeated. This lack of periodicity implies a lack of predictability in truly chaotic systems and the seemingly random behaviour that is exhibited. Though the behaviour of the system is a-periodic, it is bounded in such a way that on successive iterations the system remains within a finite range, never exploding into unconstrained growth. Deterministic means that temporal dynamics and spatial interactions are regulated by definite rules (i.e., mathematical relationships), which include no random or stochastic terms. Finally, sensitive dependence on initial conditions suggests that systems, which have very close initial starting points, will diverge as time proceeds. This is an essential aspect of chaotic systems. This sensitivity to initial conditions implies that without infinite precision in the measurement of initial conditions of system parameters, long-term predictability may be theoretically and practically impossible.

Given the difficulties in empirically demonstrating the applicability of chaos theory to management and organisations, one would expect the management literature to be relatively silent on the implications of chaos theory to managerial practice.

Interestingly, this is not the case (Cooksey & Gates, 1994; Muller & Watts, 1993; Peters, 1988; Stacey, 1991; Vinten, 1992). However, chaos theory has been represented more on a metaphorical or intuitive level in the recent management and strategy literature. “Intuitively, the patterns we observe [...] all point to the importance of chaos in the practice of business management. The failure to predict [...] provide[s] further intuitive support” (Stacey, 1991:361). Despite the limited evidence, bold claims are being made about chaos theory being the “next major breakthrough in management” (Vinten, 1992: 1). It seems that increased turbulence in the business world and the accelerating rate of change is sufficient to label social system as chaotic.

To sum up, chaos theory shows mathematically that with simple non-linear deterministic equations small changes in initial conditions can generate unpredictable outcomes. New patterns may emerge from very simple rules of non-linear feedback.

2.3.1.1.4 Self-Organisation

Research conducted by the biologist Kauffman (1991, 1993, 1995) into the apparent complexity of living systems focuses on processes of adaptation and on the conditions under which new order emerges. The process whereby new order spontaneously emerges in spatially complex systems is referred to as self-organisation. In many respects this approach provides the complement to chaos theory (Leifer, 1989; Lewin, 1993; Stewart, 1993).

As opposed to chaos theory which is the generation of disorganized behavior from simplicity, complexity involves the development of an organized complex system from a random group with simple rules. (Stewart, 1993: 2)

The theory of self-organisation seeks to understand how spatially complex systems with many interacting components that have the potential for chaotic behaviour, generate and maintain organised and patterned temporal behaviours enabling the functioning of large-scale structures (Ruthen, 1993).

A new form of order is established in a far-from-equilibrium system when positive feedback promotes the growth of a new form of behaviour which accords with the simple rule set of the system. Iterative cycles of rule-application lead to the development of order with ever-increasing levels of sophistication and detail and

highlight the capacity of open and living systems to generate new forms resulting from endogenous rather than exogenous processes (Loye & Eisler, 1987). While the detailed form of such emergent structures cannot be predicted, the range of broad possibilities is to some extent contained within the set of rules applied to generate the order.

The principles governing such self-organising behaviour are believed to be discoverable and widely occurring in many natural and physical systems. In biology, such rules may be encoded in the genetic formula of DNA molecules (Goodwin, 1994), or ecological selection principles (Kauffman, 1995). In physical chemistry, they may simply be the laws of physics operating in the context of a phase transition (Prigogine & Stengers, 1984). The aspect to also serve as a proxy for social systems has already inspired the imaginations of management thinkers (e.g. Peters 1987, Wheatley 1992). The combination with recent findings from study of the behaviour of complex adaptive systems (CAS) may provide the key to developing social systems within which constant streams of self-renewal flow.²⁵

2.3.1.1.4.1 Complex Adaptive Systems

While the dissipative structures, catastrophe, and chaos perspectives all focus on providing explanations for system discontinuities and radical transformation, some systems seem to naturally evolve to a critical state poised between order and disorder (Bak & Chen, 1991; Singh & Swindle, 1993; Ruthen, 1993).

The tendency of CAS behaviour to move away from the extremes of complete order, inertia, and stasis on the one hand and complete randomness and chaos on the other has become the primary focus self-organisation research, although, to date, no universally accepted definition of a CAS exists. Vriend described several features of complex adaptive systems:

²⁵ A major step toward understanding how artificial systems (such as CAS) might serve as a proxy for social systems such as organisations, is in realising that the essence of a system lies in the logic of its organisation; not the objects from which it is made. For example through the application of its logical organisation a machine could be replicated in some other medium.

A 'complex system' is a system consisting of a large number of agents that interact with each other in various ways. Such a system is 'adaptive' if these agents change their actions as a result of the events in the process of interaction. (Vriend, 1994:1)

The term “complex” is usually used to denote systems whose elements are so densely and variously interconnected, that simple, linear, cause-and-effect interactions are largely ruled out since an event in any given element could theoretically pass through the system by an infinitude of routes, all of which will have different spatial and temporal dynamics.

This multiplicity of potential interconnections is responsible for the flexibility or adaptiveness of such systems, in that any configuration of interconnections constitutes a possible system state. Thus any change in environmental or internal conditions can be addressed from within the system's vast range of possible configurations. This adaptability is sometimes expressed in terms of degrees of freedom of computation (Coveney & Highfield, 1996).

Holland (1995) identifies four common properties of CAS. Very briefly, these include:

1. Aggregation: CAS can be grouped into categories, which can then be nested into larger aggregates. For example, a human being is a complex adaptive system, but also acts as an agent in a larger complex adaptive system (an organization), which forms part of a still larger complex adaptive system (the economy), and so on.
2. Non-Linearity: a given action can lead to several possible outcomes, some of which as the result of positive feedback are disproportionate in size to the initial action itself.
3. Flows: the agents of complex adaptive systems are connected by networks and nodes enabling multiplier and re-cycling effects.
4. Diversity: the persistence of any individual agent in a CAS depends on the context provided by the other agents in the system. Each agent occupies a 'niche', which will be filled by other agents should that agent vanish.

Holland supplements these characteristics by three operating mechanisms:

1. Tagging: a mechanism by which boundaries are established allowing agents to distinguish among CAS.
2. Modification of internal models: agents are able to learn to anticipate some of the results of their actions over time. They do this through a set of decision rules, which are used to recognise patterns and make decisions. These internal models are also termed 'schemas'.
3. Create building blocks: agents have the ability to decompose complex phenomena into parts, which can be assembled and re-assembled in different ways to deal with recurring situations, or to improve existing internal models.

Much of the research on CAS has focused on the use of cellular automata as a basic proxy for complex systems in the real world (Langton, et al., 1992; Wolfram, 1986).²⁶ Cellular automata are mathematical realisations of physical systems in which space and time are discrete, and physical quantities take on a finite set of discrete values. They are constructed from many identical components, each simple, but together capable of complex behaviour. In these models the state of a single cell is determined, via a set of rules, by the state(s) of its immediate neighbours. States are designated as 'on' or 'off'. The range of possible interconnects gives rise to non-linear feedback mechanisms in particular, positive feedback acts to amplify certain events and drive the system away from static equilibrium. This contrasts with negative feedback, which serves to control stability and restore system equilibrium.

Researchers have also been concerned with the *emergent* behaviour of the system. Four consistent patterns of behaviour emerge in cellular automata under different rule sets and have been classified accordingly (Kauffman, 1991; Langton et al., 1992; Wolfram, 1986). In Class I models, any combination of live and dead cells quickly converge towards a steady equilibrium state where all cells are 'dead'. Thus, life is extinguished. In Class II models, the cells develop into static groupings or patterns of

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The Game of Life invented by English mathematician John Conway, a popular computer program, is a well-known form of cellular automata.

live cells, or perhaps groups of cells that oscillate between fixed states. Cells in Class II systems do not die, but stagnate.

Class III models are the opposite of Class I and II models. Class III models degenerate into chaos - the cells in Class III systems act randomly, alternating wildly between 'on' and 'off' positions and there are no predictable patterns or any form of stability. The final set of models, Class IV, combines Class II and III behaviour. Class IV models are capable of producing "extended transients", "[...] coherent structures that propagated, grew, split apart, and recombined in a wonderfully complex way" (Waldrop, 1992: 226) and that can survive and propagate for an arbitrarily long time. To a greater or lesser extent the behaviour of these extended transients is stable and predictable. However, there is also a degree of uncertainty in Class IV systems, and extended transients may be destroyed by an interaction with another "entity" or completely random "mutation". Generally, cells in Class IV systems show true orderliness - forming groups and splitting apart to form new groups in patterns that show symmetry and predictability.

It is important to note that Class IV behaviour happens not after Class III (after chaos) but before providing a superior alternative. There is a growing body of evidence in physics and biology that complex systems tend to evolve to a state of *complexity* at the edge of chaos (i.e. into Class IV systems). Studies on phenomena as disparate as sand piles, earthquakes and artificial life have found that systems move towards complexity or Class IV behaviour (Bak & Chen, 1991; Kauffman, 1991; Langton, et al., 1992). Some observers from outside the pure natural sciences, including Waldrop (1992) and Stacey (1996) also make reference to the notion of "edge of chaos", where the system is balanced between stability and chaos, a state in which spontaneous self-organization, adaptation and "creativity" is believed to flourish. Class IV behaviour enables entities in the system to maximise the benefits of stability while retaining a capacity to change.

According to Kauffman, it is this interaction between external selection mechanisms and internally generated self-organization, which is important and novel in explaining system evolution and development. Being "ordered" is not logically equivalent to being adaptive, so that self-organising mechanisms for generating order are not

alternatives to selection mechanisms but rather that both are necessary for an adequate explanation of developmental and evolutionary phenomena (Reeve & Sherman, 1993). Similar to the dissipative structures approach, the self-organising approach suggests that the system and its environment are inextricably intertwined and that both internal and external factors must be considered in attempting to understand system change and transformation. Moreover, the relationship between order and disorder is critical. It is at this transition point between order and disorder (i.e. at the edge of chaos) where new structural arrangements and morphogenic changes are most likely to emerge.

2.3.1.2 Self-Producing Systems: The Theory of Autopoiesis

Traditional approaches to organisation theory are dominated by the idea that change originates in the environment. Typical of this is the open-systems view where the organisation is in constant interaction with its environment. Environmental changes present challenges to which the organisation must respond.

This basic idea is challenged by the implications of the research work of Maturana and Varela (e.g. 1978, 1980) and together with Uribe (1974). This approach to systems theory argues that all living systems are organisationally closed, autonomous systems of interaction that make reference only to themselves. Maturana and Varela base their argument on the idea that living systems are characterised by autonomy, circularity, and self-reference lending them the ability to self-renew.

The living system's endurance demonstrates an internal organisation that can resist any change that threatens the system's autonomous identity by being organised in such a manner that the organisation itself is the fundamental variable that is maintained constant.

There is an important difference between what may be called 'defenceless' open system [...] and defended open system and that is that the latter is capable of search and can process information into images of the world around it. This is perhaps one of the most fundamental differences between living and non-living organizations. (Boulding, 1970: 5-6)

Thus a living system is able to equilibrate changes in the environment as well as to curtail any change threatening to disrupt the specific way it is organised.

Living systems [...] [are] organized in a closed causal circular process that allows for evolutionary change in the way the circularity is maintained, but not for the loss of the circularity itself. (Maturana, 1970)

2.3.1.2.1 Concept and Definition

To characterise those systems, which (a) maintain their defining organization throughout a history of environmental perturbation and structural change and (b) regenerate their components in the course of their operation Maturana and Varela coined the term *autopoiesis*. The term combines the Greek ‘auto’ (self-) and ‘poiesis’ (creation; production) (Maturana & Varela, 1980: xvii). The concept is formally defined as follows:

An autopoietic system is organized (defined as a unity) as a network of processes of production (transformation and destruction) of components that produces the components that:

1. through their interactions and transformations continuously regenerate and realize the network of processes (relations) that produced them; and
2. constitute it (the machine) as a concrete unity in the space in which they [the components] exist by specifying the topological domain of its realization as such a network. (Varela, 1979: 13)

Any entity meeting these specifications is an autopoietic system and realised in physical space is a living system. The key feature of an autopoietic system is the maintenance of its organisation, i.e. preservation of the relational network of production processes, in which the function of each component is to participate in the production or transformation of other components in the network and which defines it as a systemic unity. Since all changes in the system take place within this basic circularity the components that specify the circular organisation must also be produced and maintained by it. “In a living system, the product of its operation is its own organization.” (Maturana & Varela, 1980: 82). Further structural properties that extend beyond self-production are not specified. However, the above definition contains several important ideas, which are discussed in the following sub-sections.

2.3.1.2.2 Fundamental System Attributes

Organisation and Structure

Central to Maturana and Varela's concept of autopoiesis is the distinction between 'organisation' and 'structure', which provides a basis for distinguishing between abstract and concrete aspects of systems descriptions.

The relations that define a machine as a unity, and determine the dynamics of interactions and transformations which it may undergo as such a unity, constitute the organization of the machine. (Maturana & Varela, 1980: 77)

Maturana (1975: 315) notes that 'organisation' is of Greek origin and means 'instrument' and its choice emphasises "[...] the instrumental participation of the components in the constitution of the unity." This implies the creation of a boundary that specifies the domain of the network's operations and defines the system as a unit. Hence, the organisation of a system is instrumental in establishing identity.

The authors assume that autopoiesis is a general pattern of organisation, common to all living systems, regardless of the nature of their components. The system's organisation is independent of the properties of its components, so that a given organisation can be embodied in many different manners by many different kinds of components.

A system's organisation is specifically realised through the presence and interplay of components in a given space. These comprise its structure. Maturana (1975) points out the word 'structure' comes from the Latin meaning 'to build'. Structure describes an actual example of a type of system with components and their properties and relations but is not sufficient to define it as a unity; it determines only "[...] the space in which it exists and can be perturbed" (Maturana, 1975: 315-316). In other words, the system's structure is the physical embodiment of its organisation.

The organization of a machine (or system) does not specify the properties of the components which realize the machine as a concrete system, it only specifies the relations which these must generate to constitute the machine or system as a unity. Therefore, the organization of a machine is independent of the properties of its components which can be any, and a given machine can be realized in many different manners by many different kinds of components. In other words, although a given machine can be realized by many different structures, for it to constitute a concrete entity in a given space its actual components must be defined in that space, and have the

properties which allow them to generate the relations which define it. (Maturana & Varela, 1980: 77)

In essence, a system's organisation specifies a category, of which there may be many specific realisations. Specific systemic entities consist of particular components and relations, which exhibit the general pattern of their organisation. The 'particulars' of a given system's individual realisation make up its structure. A unity may change structure without loss of identity, so long as its organisation is maintained.

Structural Determination and Coupling

Structural determination implies that the actual course of change in a systemic entity is determined by its structure rather than the result of direct environmental influence. All composite systems, including autopoietic ones, are structurally determined. The environment can only act as a trigger, initiating structural change and co-determining or selecting its path.

These circular patterns of interaction are also always self-referential because a system cannot enter into interactions that are not specified in the pattern of relations that define its organisation. Accordingly, systems can be recognised as having environments, the nature of the relationship, however, is determined internally. This implies that a system's interaction with its 'environment' is really a reflection and part of its own organisation.

Recurrent interaction with their respective environments allows systems with a changeable structure to develop a relationship of structural coupling '[...] leading to the structural congruence between two (or more) systems' (Maturana & Varela, 1987: 75). Particular structural states are selected in the organisms and to some extent in the environment to create compatibility with others. Organisms develop sets of mutually triggering behaviours that are suitable for the maintenance of the organisation of each, providing the basis for environmental adaptation.

Structural determination suggests that the structure of the system not only determines its perceptive selection but also limits the range of actions possible. This may provide an explanation for the failure of companies to initially detect environmental changes and subsequently to generate and implement effective measures. The nature of structure-dependent systems also challenges current notions about the role of

information. This is mainly because of the impossibility of instructive interactions. An observer who can see both an organism and its wider environment may make descriptions such as these, but they do not explain the actual operations, which depend only on local, structurally determined interactions.

Hence, the theory of autopoiesis challenges the validity of boundaries traditionally drawn between a system and its environment and offers an alternative perspective for understanding the processes through which living systems change.

Autonomy

Autopoiesis is built on the self-referential nature of a living organism's persisting autonomy in which survival depends on the system's identity taking precedence over all else. As a result the identity of the system, its unique way of being organised, determines what its environment will be. Perception cannot be viewed as the representation of an external reality but is rather specified through the system's process of circular organisation. The environment is only experienced in terms of the internal state of the organism.

Autopoietic systems are organisationally closed and autonomous. The system's organisation is therefore not primarily characterised through inputs from and outputs to the environment; on the contrary, all possible states of activity of the system must lead to or generate other, internal states of activity and serve to maintain stable patterns of relations.

Organisational closure does not imply interactive closure or isolation from the environment. Organisms interact with their environment, however, such interactions form part of the circular, self-sustaining process and serve the ongoing process of autopoiesis; changes of state in response to changes in their medium are realised and propagated solely within the network of processes that define and constitute them. The system's ability to resist change results in autonomy, creating systemic identity, and ensures survival.

Summary

The strength of autopoiesis lies in its strict formal construction and the provision of a generative mechanism to account for the phenomena of living systems from basic

processes to language, cognition, and construction of reality. Of primary importance, is the formal specification of the concept of autopoiesis, which allows to distinguish between living and non-living systems.

The term itself does not have any mysterious explanatory power; it merely describes one way in which a set of processes might be connected to one another and claims that, if a system were organized in this way, then it would display the phenomena, such as autonomy and identity despite structural change, that characterise living systems. (Mingers, 1994: 206)

The issue of how autopoiesis can or should be applied to social systems is an ongoing topic of debate (cf. Zeleny, 1980; Benseler, Hejl & Kock, 1980; Zeleny, 1981; Ulrich & Probst, 1984; Mingers, 1994). However, Maturana and Varela developed a theory as part of a new interpretation of biological phenomena and have strong reservations about applying it to the social world.

Two approaches prevail in applying autopoiesis to social systems. The first seeks to apply the formal aspects of autopoietic theory (e.g., organization; autopoiesis) to the social system itself. In this view the social system provides the static and the dynamic framework within which the presence and behaviours of its participating subsystems are realised. This requires that a social system can be analysed as a coherent network of objects and processes. So far this has been the dominant approach since such analyses are characteristic of many social and organisational science studies. The best-known proponent of this approach is Niklas Luhmann, who fits autopoiesis into an ongoing systemic analysis of society (e.g. Luhmann, 1982; 1984; 1986; 1995).

The second approach derives an explanation of the social system from the phenomenological aspects of the theory (e.g., the observer; languaging) treating social systems as constitutively emergent from interactivity among their participants. This approach takes the individual and collective participants as the fundamental objects of interest. The social system itself is addressed as the emergent phenomenon which is conventionally described as an 'organisation'. This alternative view of autopoiesis and social systems has been mainly developed through the work of the sociologist Peter Hejl (Hejl, 1980; 1981; 1984).

These two approaches have demarcated the lines of debate over the extent to which social systems can be characterised as autopoietic over the years and provides evidence of the difficulties in ontological commitment. These difficulties are

connected to the strict formal definition of autopoietic systems, and centres on the formal requirement that autopoietic systems must produce their own components in addition to conserving their organisation.

[...] in order to say that a system is autopoietic, the production of components in some space has to be exhibited; further, the term production has to make sense in some domain of discourse. Frankly, I do not see how the definition of autopoiesis can be directly transposed to a variety of other situations, social systems for example. It seems to me that the kind of relations that define units like a firm [...] are better captured by operations other than productions. Such units are autonomous but with an organizational closure that is characterizable in terms of relations such as instructions or linguistic agreement. (Varela, 1981: 38)

The application of autopoiesis in a strict sense to social systems is very questionable and requires some form of generalisation. In response Varela developed the broader concept of autonomy, of which autopoiesis is a special case. Autonomous systems maintain their organisation, but do not necessarily regenerate their own components. They are defined by their organisational closure:

That is, their organization is characterized by processes such that

1. the processes are related as a network, so that they recursively depend on each other in the generation and realization of the processes themselves, and
2. they constitute the system as a unity recognizable in the space (domain) in which the processes exist. (Varela, 1979: 55)

Such processes could be of many different types, including non-physical or symbolic. Organisationally closed systems retain most of the important properties of autopoiesis, in particular autonomy and structure dependence. This implies that the sequence of system states is primarily determined by its structure and only triggered by its environment.

This slightly generalised version of autopoiesis could be effectively applied to the realm of social systems. So far a social theory based on the concept of organisational closure does not exist. In its current form the concept still leaves the problem of determining the exact nature of the components, processes, and relations of such a system. To discover the nature of a total system, it is necessary to interact with it and trace the circular pattern of interaction through which it is defined. This throws up the

problematic question of defining system boundaries. According to Maturana and Varela systems are being made up of wholes within wholes with no identifiable beginning or end. This kind of self-referential paradox is fundamental because a system must be understood as a closed loop of interaction (Morgan, 1996: 254).

Used metaphorically, the theory of autopoiesis has intriguing implications for the understanding of social systems and is reasonably unproblematic since it avoids the ontological problems discussed above.

Metaphorical application of autopoiesis generates several new insights. First, a creative interpretation of the concept of self-reference suggests organisations achieve a form of self-referential closure in relation to their environments, continually recreating and maintaining the image and identity projecting themselves on to their environments. The system's interaction with its 'environment' is a reflection and part of its own organisation as well as individual concerns and interests.

To no small degree, an organization's environment is an arbitrary invention of the organization itself. The organization selects the environment it will inhabit, and then subjectively defines the environment it has selected. (Starbuck, 1976: 1080)

It is possible that this is an evolutionary process, which strengthens over time – the older the organism, the stronger its identity (in turn strengthening established defence mechanisms) since it has a larger repository of beliefs and experience to draw on.

Second, autopoiesis suggests that the relationship between a social organisation and its environment is primarily determined by the organisation's internal self-image or identity. This indicates that social organisations may only be able to interact within self-defined perceptual categories and that many of the problems that organisations encounter could be intimately connected with the kind of identity maintained. Therefore, explanations of the evolution, change, and development of organisations must give primary attention to the factors that shape the patterns embracing both organisation and environment in the broadest sense.

Third, the notions of 'structural determination' and 'structural coupling' provide a basis for analysing enterprises and their operations in terms of their general and actual form (i.e. their organization and structure). The distinction between organisation and

structure is very useful in delineating and analysing systems' form and function. This aspect of autopoietic theory makes it useful in describing firms as having generally invariant form in spite of specifically changing components. This approach maintains a focus on the subject enterprise and minimises counterproductive bias toward a priori allusions to abstractions such as 'information flows' or 'market forces'.

Finally, looking at the history of change and development of an organisation suggests that it should be concerned that its identity is flexible and compatible with its environment and context:

The theory of autopoiesis suggests that the pattern of organisations that evolves over time does so in an open-ended and evolving way. Some forms disappear and others survive through transformations controlled by the self-referential processes that define the total system. (Morgan, 1986: 247)

This suggests, that social organisations might respond by choosing a design that allows for structural coupling to the environment and by being aware that structure can, if necessary be changed without a loss of identity.

2.3.1.3 Systems View: Conclusions and Implications

Change and transformation are areas of critical concern to organisation theory and analysis. So far, the understanding of fundamental change processes in social systems is limited. This chapter has introduced systems theory and thinking and the related research into self-organisation as the means of exploring change within the organisation and to help address the urgent need for a greater understanding of the nature of change. While the theories investigated in this section must be regarded as exploratory, their implications suggest substantial changes in the understanding of the way organisations operate and how they should be studied. In order to support this claim and develop an adequate theoretical approach to change and transformation, the insights must first be integrated at the meta-theoretical, substantive, and methodological levels of organisational analysis.

Central to systems thinking is the concept of the system used to highlight structural similarities across disciplines and providing a meta-language through which the paradoxes and language of individual subject disciplines can be discussed. A system is an organised collection of interconnected elements or parts, and contained within

some identifiable boundary. It has an identity that sets it apart from its environment and is capable of preserving that identity within a given range of environmental scenarios. Nevertheless, systems are always defined by an observer and therefore are subjective constructs.

Systems are often characterised by their degree of complexity - as measured by the variety of states they can occupy – and exist within a hierarchy of other systems. They contain subsystems and are themselves element of some wider system. All are interconnected, with the subsystems being less complex than the containing systems.

Due to their inherent complexity systems are not decomposable through reductionism. Systems at the level of the whole have emergent properties, which do not exist within the subsystems and cannot be explained by simple aggregation of component elements. System thinking questions the empirical separation of elements and components and therefore emphasises holism.

Despite criticisms open systems theory - aided through the insights developed by the research into self-organisation - has broadly advanced along two lines: formal systems theory and qualitative systems theory. Formal theories are based upon rigorous mathematical formulations and logical definitions of system types, attributes and dynamics (Stein, 1989; Zurek, 1990).

Qualitative systems theory, on the other hand, does not use formal mathematics as a vehicle for system investigation and description, but deals in conceptual models as well as metaphor and analogy where appropriate. Systems theory remains a conceptually insightful approach - a uniting analytical schema within which the artificial boundaries between different disciplines can be transcended:

[...] even stripped of its substantive laws (though few), [systems theory] has made its mark in the scientific world by providing the framework for viewing complex phenomena as systems, as wholes, with all their interrelated and interacting parts. Herein lies one of its merits, and its justification. (Schoderbek et al., 1990: 35)

The concept of self-organization originated in the early years of cybernetics, when scientists began to construct mathematical models representing the logic inherent in neural networks. Throughout the past decades, the key ideas of these early models were refined and elaborated by researchers in several countries who explored the

phenomenon of self-organization in many different systems.²⁷ The resulting models of self-organizing systems share certain key characteristics.

The first important characteristic of self-organization, common to all models, is the non-linear interconnectedness of the system's components. Physically, this non-linear pattern results in feedback loops; mathematically, it is described in terms of non-linear equations.

A second common characteristic of these models of self-organization is that both positive and negative feedback are necessary to explain the behaviours of complex systems operating far-from-equilibrium. A constant flow of energy and matter through the system is necessary for self-organisation to take place. The striking emergence of new structures and new forms of behaviour, which is the hallmark of self-organization, occurs only when the system is far-from-equilibrium.

The third common characteristic - marking a difference between the early concept of self-organisation in cybernetics and the more elaborate later models - is the creation of new structures and new modes of behaviour as part of the self-organising process. This contrasts with 'Ashby's Law of Requisite Variety' which holds that any attempt to change or control a system over time must generate at least as much variety as the system itself (Ashby, 1956). For Ashby all possible structural changes take place within a given 'variety pool' of structures, and the survival chances of the system depend on the richness, or 'requisite variety', of that pool. In this view, the system lacks creativity, development, and evolution. The later models, by contrast, include the creation of novel structures and modes of behaviour in the processes of development, learning and evolution (Capra, 1997: 110-111).

The challenge to researchers attempting to integrate these insights into their particular discipline is to specify how these implications may be best utilized and under what conditions each may apply. This is the problem confronting those who wish to explore the issues involved in examining organized complexity.

One of the more significant substantive implications of the complexity sciences is that dynamic, non-linear systems may exhibit surprising and counterintuitive behaviour,

²⁷

For a detailed review of the history of these research projects, see Paslack (1991).

making prediction and control problematic. Cartwright (1991) notes that even if the “rules of the game” were completely known and understood at the local level, it would be impossible to predict global results and “[...] this problem is inherent rather than situational [...] planning based on prediction is not merely impractical in some cases; it is logically impossible” (Cartwright, 1991: 45).

A second reason for the potential applicability of complexity research is that complexity sciences represent an approach to the study of dynamic systems (i.e., systems characterised by non-linear linkages between components and composed of recursive, self-referential elements) and the processes, which lead to that dynamic behaviour. While much of the research into complex systems began with an examination of physical and natural systems, it has been noted by several authors that processes in social, ecological, and economic systems can similarly be characterized. That is, social systems can also be characterized as having (a) dynamic non-linear relationships among a multitude of components, (b) complex, recursive, or highly iterative interactions among components, and that (c) systems with these characteristics may have potential to evolve dynamically over time (Levy, 1994; Radzicki, 1990; Butler, 1990).

Erich Jantsch’s “The Self-organising Universe” contained some of the first insights of applications of complexity theory in the social sciences in general and in management in particular (Jantsch, 1980). In terms of organisation, Jantsch viewed the organisational world as an essentially dynamic system in which change and innovation were key features of organisational life, giving rise to what he termed “the supremacy of processes over spatial structures”. The fact that social systems exhibit many of the requirements for complex temporal behaviours is a driving force in much of the current research. The complexity approach is consistent with the increasing emphasis in the organizational sciences on process research and organizational dynamics (Lichtenstein, 1995; Slater, 1995; Stacey, 1995, 1996; Rajagopalan & Spreitzer, 1997).

At an intuitive level, because the complexity sciences are specifically and fundamentally concerned with efforts to explain dynamical system behaviours and processes, they appear to hold promise for a better understanding of organizational processes.

Instability and unpredictability appear to be inherent to the social world and cause and effect relationships often seem to be inextricably intertwined. To the extent that the complexity sciences can help to explain and illustrate dynamic processes in natural and physical systems, they offer the potential for a better understanding of similar processes occurring in social systems.

2.4 An Integrative Theoretical Framework

Organisational renewal involves changes in the nature of organisational activities. By definition, the issues and difficulties surrounding organisational renewal are unstructured and non-routine since the organisation faces unfamiliar changes with far-reaching consequences which are -- because of the inherent complexity and the time-frame involved -- often counter-intuitive in development. They also appear paradoxical. How can organizations operate efficiently and continuously adapt to maintain effectiveness? Bouchikhi (1998) notes that theories often downplay this complexity in favor of either/or frameworks, such as contingency theories in which the impacts of organic versus mechanistic structures are distinguished or in which organizations are categorized as stable or in flux. For example, according to a number of writers (cf. Duncan, 1976; Shepard, 1967; Tushman & O'Reilly, 1996) the implications for strategy are that firms should develop organisational forms that are immune to the cycles of technology-destroying competencies and can survive the periodic alteration between incremental and radical change. The central question, however, is not what technology, structure, or culture to put in place to encourage innovation, but how to manage the seeming paradox of organizing, typically manifested in mixed messages and system contradictions.

This section aims to develop a framework in which dynamic and opposing forces coexisting within organizations are accented. Using such a framework, organizing appears to inherently juxtapose tensions between preservation and progress. The paradox of progress and preservation is evident in many different systems. Particularly life sciences such as biology and the earlier discussed CAS research mark this as an integral characteristic of systems. The implications for organisations are profound.

2.4.1 The Duality of Progress and Preservation

To survive and prosper organisations need to explore new opportunities effectively as well as exploit those opportunities efficiently, to change their strategic focus easily as well as develop some strategic direction. These paradoxical requirements imply that balances must be struck if organisations are to remain vital. How can firms reconcile the conflicting forces for change and stability?

A number of researchers have highlighted the paradox of preservation and progress (cf. Pascale, 1991; Porras & Collins, 1994; Stacey, 1993, 1996; Volberda, 1998). Although only few have incorporated this aspect into a framework. Quinn (1988; see also Denison et al., 1995), for instance, uses a paradox framework to explore conflicting performance demands, such as concerns for morale, profitability, innovation, and stability. So far this aspect has not been formalised in a framework for organisational transformation or renewal. Despite a number of attempts to emphasise systemic thinking (e.g. Flood & Jackson, 1991; McCalman & Paton, 1992; de Sitter et al., 1990) this issue central to renewal has remained neglected.

In organization studies distinctions are apparent in such seemingly polar constructs as quality/cost, differentiation/integration, stability/change, and cohesion/division. In contrast, Eastern philosophies stress the need to avoid simplistic distinctions. For instance, the T'ai-chi T'u, the Taoist symbol of Yin and Yang, signifies a natural wholeness composed of contradictions. When one force (e.g., Yin, femininity, intuition, dark) escalates to its extreme state, it retains elements of its opposition (e.g., Yang, masculinity, rationality, light), eventually reversing the trend.²⁸

In order to understand how organisations are capable of chaotic as well as stable behaviour it proves helpful to view them as systems interacting through a vast web of feedback loops, which fall into the following two main categories.

Convergent: moving systematically towards a single (best) solution through a process of selection, with the aim of establishing focus and pooling

²⁸ See Hampden-Turner (1981: 20-21), Morgan (1997: 283-285) and Rothenberg (1979: 140-142) for more elaborate discussions of this symbol.

limited resources. To reap the advantages of synergy and co-ordination, organisations integrate tasks, manage overlaps in market segments and production processes, concentrate power, formalise and standardise communication and procedures. Often strongly shared cultures establish. Left unbalanced, an organisation increasingly develops rigid structures, rules, procedures, and systems until it eventually ossifies.

Divergent: generating a large number of potential options, which provide the base for doing things differently. Processes belonging to this category widen the spectrum of options and force the organisation to seek new points of view. To enhance effectiveness organisations need to encourage continuous learning and experimentation. To this end organisations divide tasks, segment markets, appeal to individual motivators, empower people, promote informal communication, and separate production processes in geographic and other terms. Left unbalanced, these steps lead to fragmenting cultures and dispersed power eventually leading to chaos and disintegration. Divergence becomes evident in practice as companies split into more and more business units and find it increasingly difficult to maintain control.

The findings from the research on complex adaptive systems suggest that success lies in a non-equilibrium state between stable and unstable equilibria, where systems and structures are continually altered to avoid disintegration or ossification. The CAS-model argues the need to avoid a stable equilibrium and to manage systems far-from-equilibrium through processes that allow elements to engage in collaborative self-organisation out of chaos. The elements must be free to import energy, to fluctuate. At microscopic level:

Chaos widens the spectrum of options and forces the organization to seek new points of view. For an organisation to renew itself, it must keep itself in a non-equilibrium state at all times. (Nonaka, 1988: 59)

Flexibility requires high responsiveness (generated by diverging forces) of the organisation as well as a dynamic control capability (generated by converging forces). This interaction is such that the elements must be in balance. If one outweighs the

other, there is no gain. More responsiveness does not compensate for less control capacity. The system is only as effective as the weakest dimension. To function properly an organisation necessarily needs to host both convergent and divergent drivers actively to form an integrative system that ensures systemic generation of renewal.

The key to managing the apparent paradox is provided by focusing on processes. The focus on processes emphasises the need to think dynamically as well as to address the issue with the necessary complexity. It also allows resolving the apparent paradox between routinizing current operational activities while simultaneously supplanting these same routines.

A process view of organizations offers additional advantages. First, it provides a disaggregated model of the firm, but does so in ways that make the analysis of implementation more tractable and explicit. Put another way, if organizations are “systems for getting work done,” (Perrow, 1967) processes provide a fine-grained description of the means. Second, the intimate connections exist among different types of processes and analyzing them in isolation is a futile exercise. It is extraordinarily difficult - and, at times, impossible - to understand or alter a single process without first taking account of others on which it depends (Garvin, 1995). However this implicitly forces to acknowledge the inherent interdependence and to generate complex responses to complex issues.

As Van de Ven and Huber (1990) suggest, the understanding of temporal sequences (i.e., conducting process research) is fundamental and critical to the development and testing of theories of organizational dynamics. Addressing this issue, for example, Monge (1990) develops an analysis of temporal issues relating to the study of organizational processes. However, this trend toward the analysis of organizational processes and temporal characteristics should not be taken to an extreme such that content issues, or spatial characteristics, are neglected. The complexity sciences suggest that the interplay and interaction between temporal and spatial dimensions may be particularly significant.

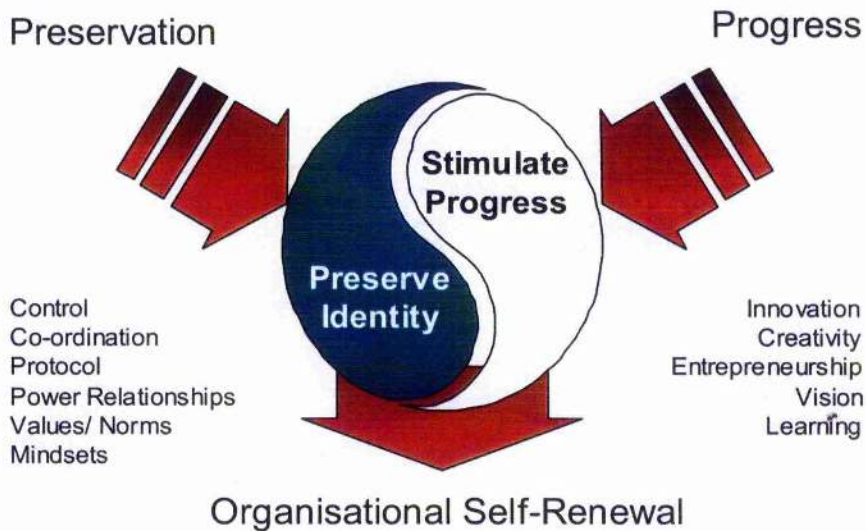


Figure 2-2: Forces for Progress and Preservation

Source: Developed by the Author

Reflecting on the earlier discussion of the drivers of renewal in Chapter 1, facilitating processes are entrepreneurship, creativity, innovation, learning and experimentation. Generally, these processes lead an organisation to divert its activities and explore different directions. Renewal-obstructing processes, on the other hand, establish focus and, as a result, channel or bundle organisational activities in a particular direction. Their tendency is to infuse stability into the system and establish and preserve the identity of the system. Drivers identified with this category are, for example, control, co-ordination as well as rules, mindsets and existing power relationships.

To ensure long-term success and survival both obstructing and facilitating processes must necessarily co-exist within any organisation. Forces for progress must be combined with such that generate stability. The system must not exhibit so much order as to fall into the “trap” of inertia and stasis, but must also guard against extremes of disorder and chaos. Successful systems are those

[...] at the transition between order and chaos. A central tenet of complexity theory is that selection or learning drives systems towards this edge of chaos. Systems that are too simple do not survive in a competitive environment because more sophisticated systems can outwit them by exploiting their regularities. But systems that are too random do not survive either. It pays in

survival terms to be as complicated as possible, without becoming totally structureless. (Stewart, 1993: 3)

The idea is not wholly new, for Scott (1965) observed that creating too great a capacity to respond by deliberate postponement of decisions resulted in a lack of decisiveness, progressively increasing costs, and a continual revision of plans. Too great a reaction capacity or too short a reaction time may lead to over-reaction, excessive information search, and wasted resources, Weick (1982) concluded that total flexibility makes it impossible for the organisation to retain a sense of identity and continuity; in other words, flexibility without stability results in chaos. More recently, Van Ham, Pauwe and Williams (1987) stressed the stability component of flexibility as necessary to preserve the identity and maintain the controllability of the organisation. Similarly, Adler (1982) claimed that flexibility is advantageous or meaningful concept only against a backdrop of stability.

To conclude, organisational renewal is a function of the interaction of two sets of process variables that drive progress and preservation. The paradoxical requirement to address both simultaneously implies that dynamic balances must be struck if organisations are to remain vital. The complexity of an organisation and the counterintuitive characteristics of organisational processes require a systemic and holistic approach.

2.4.2 The STORM Model

In the following, the proposed **Strategic Organisational Renewal Meta (STORM)**-model for understanding the renewal process within an organisation is outlined. To survive and prosper organisations need to explore new opportunities effectively as well as exploit those opportunities efficiently, to change their strategic focus easily as well as develop some strategic direction, and to change their dominating norms and values as well as correct deviations from essential norms and values. In essence, organisational renewal involves balancing the paradoxical forces of preservation and progress.

Organisational renewal is rooted in individual talent and systematic management processes. Accordingly organisational renewal should be perceived as a managerial task as well as an organisation design task. The concern lies with the creation of the

right setting to nurture conditions for growth while establishing a sense of stability and direction. The key to managing the apparent paradox is provided by focusing on processes. The focus on processes emphasises the need to think dynamically as well as to address the issue with the necessary complexity. It also allows resolving the apparent paradox between routinizing current operational activities while simultaneously supplanting these same routines.

The system causes its own behaviour. Placed in the same system, different people tend to produce similar results. To understand organisational behaviour and initiate effective measures for renewal requires management to look beyond personalities and events into the underlying structures and processes that shape individual actions and create the conditions where certain types of events become likely.

Reflecting upon these fundamental flows and forces provide the answer to the key question, which of these lead an organisation to success. Thus, flows exerting converging forces drive the organisation toward a stable equilibrium and ultimately ossification while flows exerting divergent forces drive it far-from-equilibrium toward a highly unstable state resulting in disintegration. In systems theory this duality is mirrored in the concept of positive and negative feedback loops. It is in the positive feedback that one finds the forces for change and growth, but also the causes for chaotic behaviour and disintegration.

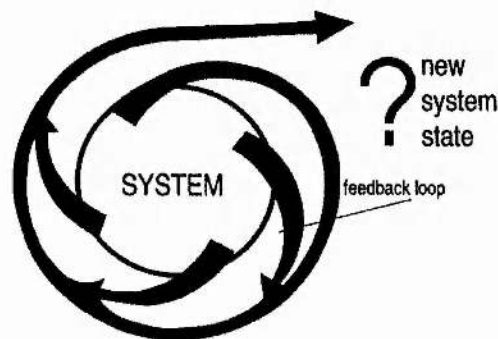


Figure 2-3: The Destabilizing Effect of Positive Feedback Loops

The negative feedback, or goal-seeking, structure of systems drives an organisation towards stability but also the causes of ossification and long-term organisational decline.

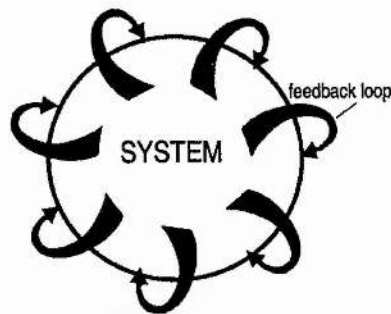


Figure 2-4: The Stabilizing Effect of Negative Feedback Loops

The proposed framework conceptualizes this paradox and might help researchers to address existing tensions and why these may fuel reinforcing cycles as well as how actors may understand and manage paradoxes to foster change more effectively. Conceptualizing paradox entails building constructs that accommodate contradictions. Rather than polarize phenomena into either/or notions, researchers need to use both/and constructs for paradoxes, allowing for simultaneity and the study of interdependence. Theorizing paradox entails developing a frame that encompasses opposites, enabling a more complicated understanding of their coexistence and interrelationships (cf. Bouchikhi, 1988, and Poole & Van de Ven, 1989). According to Argyris (1993), a theory of paradox accounts for the seemingly illogical, ideally by depicting tensions, defenses, and their management in dynamic and multidimensional detail. Such theorizing requires theorists to think paradoxically themselves: to work toward tensions and the anxieties they provoke in search of insightful interconnections.

Due to the relatively limited understanding and the dynamics of the phenomenon of organizational change and renewal this research has argued for the use of a systems approach. When faced with a management problem there is tendency to blame some external event. The systems approach, expressly takes an alternative viewpoint -namely that the internal structure of the system is often more important than external events in generating the problem. Throughout this research work the term 'system' has been used to mean an interdependent group of items forming a unified pattern. The particular interest placed in business processes, establishes focus on systems of

people and technology intended to design, market, produce, and distribute products or services.

Attempts to explain poor business performance commonly involve showing how one set of events causes another or, when studying a problem in depth, by showing how a particular set of events is part of a longer-term pattern of behavior. The difficulty with this “events causes events” orientation is that it does not provide a particularly powerful way to alter the undesirable performance. Typically any identified event can yet in turn be linked to another causal event, resulting in an endless chain. For example, poor sales of a new product (the event that is a problem), may lead to the conclusion that the sales force is not doing enough to push sales (the event that is the cause of the problem). This naturally leads to the question why the sales force is not pushing it. However, further analysis may lead to the insight that this is because they are overworked. The search for the cause of this condition will yet again lead to another event opening up an endless process but leaving the difficulty of finding the appropriate response to improve performance.

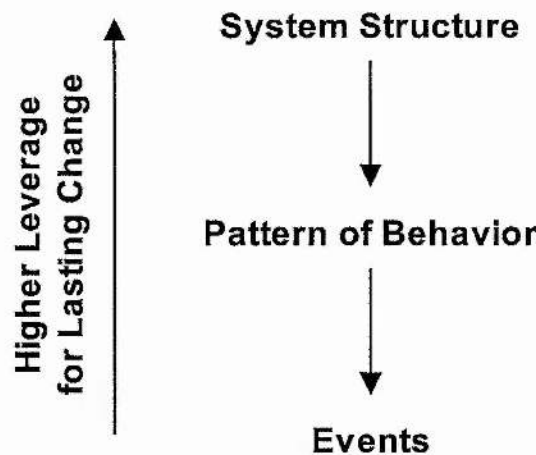


Figure 2-5: Change Levers

Source: Author

The shift from such event orientation to focusing on the internal system structure provides the possibility of improving business performance pervasively. This is illustrated by above diagram. This is because system structure is often the underlying

source of the difficulty. Unless system structure deficiencies are corrected, it is likely that the problem will resurface, or be replaced by an even more difficult problem.

Identifying the underlying system structure, involves a process that begins generalizing from the specific events associated with the problem to considering patterns of behavior that characterize the situation. Usually this requires investigating how one or more variables of interest change over time. Finding and modifying the system structure, provides the possibility of permanently eliminating the problem pattern of behavior. It also holds the key to identifying key levers for triggering such pervasive change.

To better understand and depict responsible system structures, a ‘causal loop diagram’ (CLD) is used as a notation for representing such system structures. The following diagram structure leading to organizational decline is illustrated by, which is based on and seeks to integrate the findings of the research on organizational decline and renewal discussed in Chapter 1.

This diagram shows the relationships among the elements involved in the renewal process. The short descriptive phrases represent the elements, which are considered instrumental and the arrows represent the causal influences between these elements. For example, examining the top half, the diagram illustrates that “**Strategic Orientation**” as well as “**Resource Munificence**” and “**Willingness to take Risks**” directly influence “**Investment**”. In turn, “**Investment**” influences organizational “**Fit**” with “**Environmental Requirements**”.

These relationships are difficult to verbally describe because normal language presents interrelations in linear cause-and-effect chains, while the diagram shows that in the actual system there are circular chains of cause-and-effect.²⁹

²⁹ This figure is an annotated causal loop diagram. This diagram includes elements and arrows which are called causal links. In addition each causal link is annotated by an ‘S’ or an ‘O’. A causal link from one element A to another element B is positive if either (a) A adds to B or (b) a change in A produces a change in B in the same direction (denoted by ‘S’). A causal link from one element A to another element B is negative if either (a) A subtracts from B or (b) a change in A produces a change in B in the opposite direction (denoted by ‘O’).

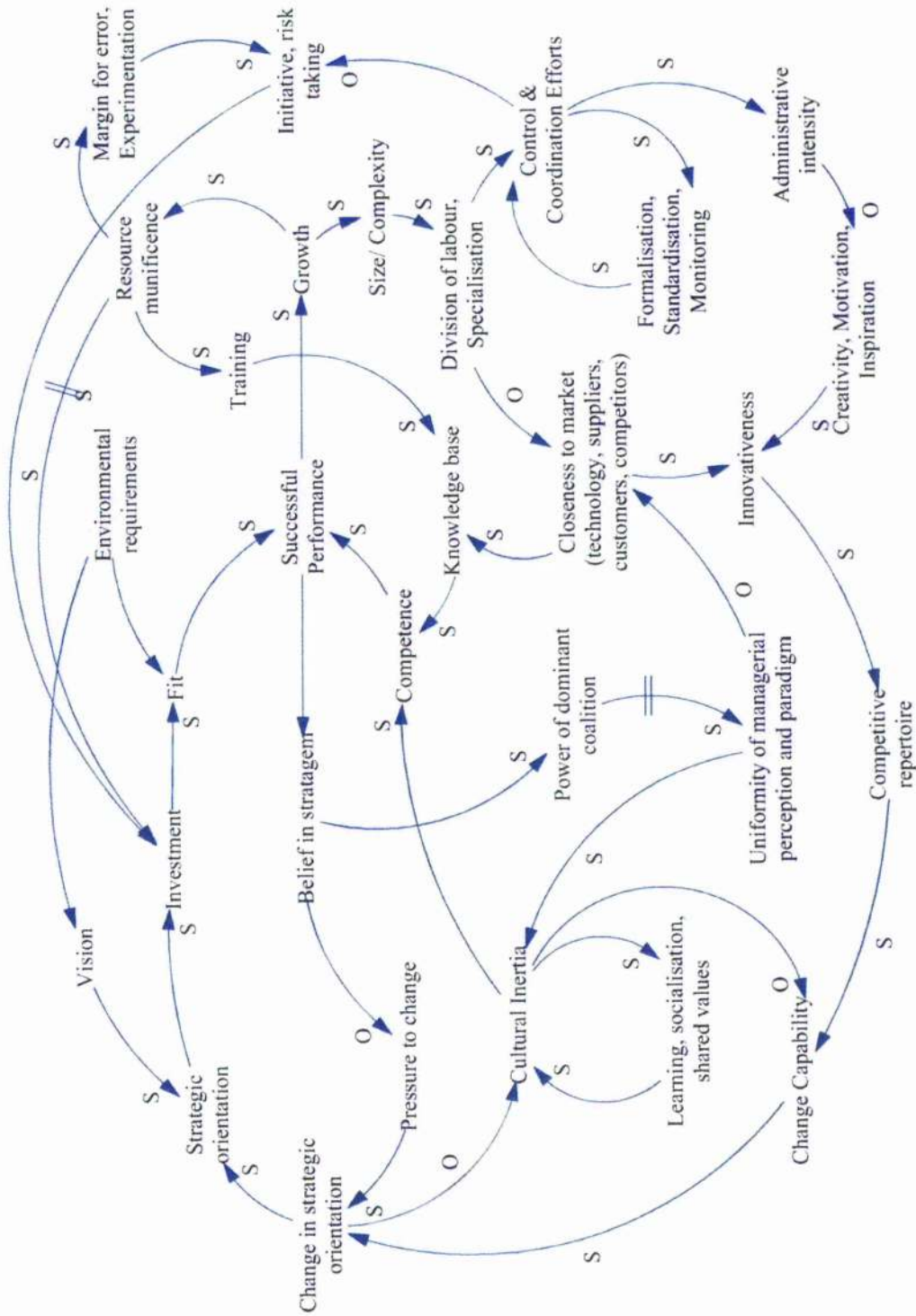


Figure 2-6: The Strategic Organisational Renewal Meta (STORM)-model

Source: Developed by the Author

2.5 Conclusion: Research Propositions

This chapter has served to develop a theoretical framework. The nature of organisation studies necessitates meta-theoretical and metaphorical reasoning. Therefore, a large portion of this chapter dealt with these aspects. The complex and paradoxical nature of organisations and the particular interest in transformation and change processes advocates the use of systems theory and its many derivatives.

From the outset of this chapter the argument has been for adopting a systems view. Complex systems are composed of variously super-ordinate or sub-ordinate information-feedback and control loops. Inherent with this approach is an understanding of system attributes to consist of non-linear dynamics and irreversible phenomena with unanticipated outcomes. The system tries to maintain a steady state, so dominance among the loops may shift unexpectedly, unknown to human observers and participants. Attempts to change the behavior of the system through policy changes may have no effect because the system, in attempting to maintain steady state, swallows up the policies. Sometimes intervention from the outside greatly strengthens or weakens given feedback loops exacerbating the original problem. Because of their structure, complex systems may behave counter-intuitively, that is, in a manner opposite to what our initial expectations of cause-effect might be.

These and related ideas are embedded in the structure of the STORM-Model presented in the preceding section. Based on the literature review, a number of propositions emerge that are also reflected in the outlined STORM-Model and that should be helpful in guiding the empirical research.

Proposition 1. There exist two types of process categories in organisations that can be distinguished by their exertion of converging or diverging forces on the activities of an organisation.

In order to renew companies will need to deploy some or a combination of these drivers and build them into core competence. There is not one best way for companies to renew, i.e. there are multiple paths that companies seeking renewal can choose and harness similar results.

Proposition 2. An organisation's capacity to renew can be systematically fostered by organisational processes and systems

An organisation's capacity to renew can be systematically fostered by organisational processes and systems. Leaders are fundamentally less important than the institutions they serve. The great charismatic leader model has one fundamental flaw: leaders are mortal. In order to transcend this unchanging reality, the focus must be primarily on building the characteristics of the organisation.

Organisations rely on individual talent and organisational processes in order to sustain long-term performance and initiate innovation and creativity. Sustained, continuous renewal requires the organisation to embed suitable triggers. This can be done by using the facilitative or obstructive role of processes. Differences exist in the extent of formalisation of processes for fostering creativity and innovation when comparing successful with less successful organisations.

Proposition 3. Most organisations systematically increase the number of controls (both in quantity and quality) as they grow

In organisations the issues of control and co-ordination are central problems of growth. The mechanisms that promote control and co-ordination are increased in number (quantity) and level of formality (quality) as organisations grow in size and gain complexity. Complexity is determined by size, diversity of activities, location, and relationships.

Proposition 4. With increasing size organisations lose their potential to change.

Decentralisation requires vast amounts of control and co-ordination but provides the organisation with close relationships to its customers. These controlling and coordinating are increasingly formalised. This attention is not given to diverging processes, such as creativity or innovation.

Proposition 5. Organisations become increasingly inert over time as procedures, roles, routines and structures establish implying that organisations lose their capacity to change with increasing age.

Proposition 6. Organisations unintentionally engage in processes of selection and reinforcement that are dominated by short-term considerations but limit future strategic flexibility and manoeuvrability.

In competitive environments the focus turns to financial controls and bottom line results. Assessment of past success is based on historical data. The application of simplistic, highly biased models based on linear cause and effect relationships results in convergence and through reinforcement ultimately organisational inertia. The capacity to renew requires organisations to avoid equilibrium at all times. Existing practices need to be systematically questioned.

Proposition 7. Organisations depend on and employ similar processes to convert inputs into outputs. The processes employed are determined by the nature of organising workflow and information sharing and, therefore, similar in different organisations. The processes employed are determined by the nature of work and information sharing. These are similar in all organisations regardless of the context within which organisations operate. Different organisations will host same activities. This lies in the nature of transforming inputs into outputs. Observed differences represent variations of the processes, not different processes.

Proposition 8. Organisations can only transform in radical steps.

Companies engage in cycle of convergence interspersed by short periods of radical transformation (punctuated-equilibrium view of organisational change). The chosen drasticality of measures will depend on how well the company is accustomed to changing.

Organisational change can be usefully conceptualised in terms of process and content. Process refers to how change occurs. Content describes what actually changes in the organisation. Theories and analyses of organisational change seek to explain why organisations change as well as what the consequences are of change. Empirical evidence on both aspects is fragmentary and occasionally contradictory. Models that consider both process and content show the greatest potential for resolving this situation. Organisational change involves, by definition, a transformation of an organisation between two points in time. For most analysts, the key aspect of change

comes from comparing the organisation before and after the transformation. Making such comparisons constitutes an analysis of the content of organisational change. It assesses what actually differs in the organisation at the second point in time. A second dimension of organisational change concerns the way the transformation occurs –the speed, the timing, the sequence of activities, the decision-making and communication system, the resistance encountered, etc. Examining these factors involves a focus on the processes involved. Process considerations may be independent of content, or they may be interactive. However, attempts at organisational change often take unexpected turns and lead to transformations other than those intended (Merton, 1936). Furthermore, change may occur unintentionally as a by-product of other decisions and actions within the organisation (March, 1992; Burgelman, 1994). For these reasons it is important to focus on organisational transformation in content. In most contexts, it is best to analyse and evaluate both process and content factors.

This chapter has served to develop a theoretical framework. The nature of organisation studies necessitates meta-theoretical and metaphorical reasoning. Therefore, a large portion of this chapter dealt with these aspects. The complex and paradoxical nature of organisations and the particular interest in transformation and change processes advocates the use of systems theory and its many derivatives. The methodological transfer of the findings resulted in the conception of a theoretical framework and the derivation of implicit propositions for research. Underlying the chosen metaphors and perspectives is an ontological approach for studying organisations. This will be dealt with in-depth in the next chapter.

Chapter

3

**ORGANISATIONAL RENEWAL:
PROCESS DESIGN**

Methodology

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3. Methodology

3.1 Research Context

Many different forces and processes, operating in most areas of life, appear to be eroding current economic, political and social structures. In response, most companies de-layer, restructure, reduce costs, outsource and sell-off marginal assets. For many companies such measures only hold bottom line improvements that do not extend beyond the short term. What is often missing, however, is the ability to regenerate true competitive momentum and achieve authentic breakthroughs sustaining successful performance of the organisation into the long-term.

Designing organisations that are suited for survival and success in the context of such dynamic environments is being addressed by practitioners and academics alike. Current literature emphasises customer focus, swiftness, flexibility, innovation, knowledge use, learning and vision. Moreover, traditional organisational forms are regarded as synonymous with an absence of such characteristics (Camillus, 1993). An increasing body of literature suggests that organisations have to transform themselves to restore effectiveness with the aim of sustaining and renewing their capabilities and regaining competitiveness (e.g. Beer, Eisenstat & Spector, 1990; Vollmann, 1996). The research work takes a systemic approach and seeks to develop an understanding of how self-renewal is affected within an organisation through a partly emergent rather than an entirely deliberate process. Further, this research explores how an organisation can develop the capability of self-renewal by identifying relevant processes and investigating their facilitative or obstructive role in the renewal process.

The main objective of this research is to increase the understanding and awareness of the processes, problems and successful means of organisational renewal. The analysis begins with an effort to understand the forces that trigger and processes that act to sustain decline in organisations. These are contrasted by a number of case studies that serve the identification of underlying characteristics and dynamics common to high-performing organisations (and that distinguish them from organisations that are not). This comparison serves to uncover principles of successful organisation and hold the key to renewal and sustained growth. Relevant data are gathered from a variety of primary and secondary

sources. It is of primary concern to develop more formalised models and translate these findings into a useful conceptual framework as a basis and stimulus for further research and as a helpful guideline for management practitioners to handle successfully the problems of entropy and organisational ossification of their business. Underlying these immediate research objectives is the concern to effectively communicate the findings and concepts of this study so they may serve academic and business communities by:

- Increasing the understanding and awareness of the processes, problems and successful means of organisational renewal through the extension of the existing research on recovery and renewal;
- Contributing to the debate between policy makers, researchers, and the business community on how sustained growth and performance can best be facilitated;
- Providing a basis for evaluating the competitiveness of business and the effectiveness of renewal policies;
- Providing a basis for early assessment of the obstacles and hence necessary steps for the privatisation of public sector organisations.

This research is exploratory, i.e. directed at theory building and development with the aim of synthesising the various individual research strands identified in the preceding literature review. Focusing rather on quality than quantity of the data, the research is case-based, providing in-depth studies of three high-performing companies. The findings from the cross-case analysis are compared and contrasted with accounts from the well-established research on organisational decline and failure (e.g. Miller & Friesen, 1984; Tushman, Newman & Romanelli, 1986; Miller, 1990, 1993; Grinyer & McKiernan, 1994a, 1994b) to identify relevant processes. Using causal maps as visual aids, relevant variables and their underlying dynamic relationships are investigated for their respective role in the renewal process.

The following sections in this chapter aim to provide a rationale for the adopted approach of organisational inquiry.

3.2 Methodological Considerations

One of the most pronounced features of contemporary research in management science is the great range of research perspectives that operate concurrently (Astley & Van de Ven, 1983; Burrell & Morgan, 1979; Morgan, 1980, 1983; Pfeffer, 1982). It is aim of the discussion in this chapter to draw attention to the underlying meta-theoretic assumptions and the research methodologies associated with these frames of reference. As part of the discussion, this chapter necessarily includes sections that highlight own assumptions. These serve to inform the reader and to provide a logical link between the preceding discussion on organizational transformation and the 'empirical' evidence sought in the following chapters.

The term 'methodology' is frequently used as a synonym for 'method' or 'technique'. However, the word 'methodology' can be used in two different but overlapping connotations, the applied and the theoretical. The applied usage refers to the concern with selecting specific technical tools and techniques for data collection and analysis. However, methodology also has a philosophical dimension oriented toward techniques and ways of knowing. The theoretical usage takes this philosophical stance and is concerned with the fields or modes of inquiry that can be used to conceptualise the problem under study. Of particular interest are (a) beliefs about the phenomenon or "object of study" and (b) beliefs about the notion of knowledge, which delineate a way of seeing and researching the world.

Ontological beliefs mainly have to do with the essence of phenomena under investigation; that is, whether the empirical world is assumed to be objective and hence independent of humans, or subjective and hence having existence only through the action of humans in creating and recreating it. Epistemological assumptions concern the criteria by which valid knowledge about a phenomenon may be constructed and evaluated. In its epistemological role, methodology functions like theory in guiding the conduct of inquiry (Kaplan, 1964). These methodological assumptions indicate which research methods and techniques are considered appropriate for the gathering of valid empirical evidence. Which methods are considered appropriate clearly depends on how the truthfulness of a theory is established. Thus, methodology becomes first an approach toward inquiry and then later evolves into particular methods or techniques.

Both, epistemological and ontological considerations underlying this research, are discussed in the following section (Section 3.3). Hence, this chapter is initially concerned with the

theoretical usage, because the methodological choices made concerning the applied have to be made after judgments have been made concerning the proper approaches to use. Such judgments are essentially ways of conceptualising. The "choice of research practices depends upon the questions asked, and the questions depend on their context" (Nelson et al., 1992: 2) what is available in the context, and what the researcher can do in that setting.

3.3 Paradigm discussion

A long-standing controversy in social science research revolves around two distinct paradigms.³⁰ These two main research paradigms are generally labelled quantitative and qualitative (cf. Cassell & Symon, 1994; Denzin & Lincoln, 1994; Patton, 1980 & 1990; Van Maanen, 1979) and appear to be opposed and incompatible.³¹

In an issue of *American Behavioral Scientist* devoted to multi-site/ multi-method organizational studies, Louis (1982: 6-7) highlights the differences between '[...] the two distinct "paradigms" governing the methods of social science inquiry [...].'

[One paradigm] stresses the need to apply research design and analysis principles derived from the hard sciences, and emphasizes the desirability of experimental or quasi-experimental design and statistical analysis of multiple cases [...]. [The other paradigm] argues that social phenomena are essentially different from those observed by the hard sciences and that [...] [a] holistic understanding of human social structures and behaviors requires a qualitative, observationally-based study of individual cases rather than experimental manipulation and analysis of selected variables.

For the following discussion the terms positivistic, rather than quantitative, and phenomenological, rather than qualitative, are used to refer to the competing paradigms since it is possible for a positivistic paradigm to produce qualitative data and vice versa.

³⁰ Paradigms are 'universally recognised scientific achievements that for a time provide model problems and solutions to a community of practitioners' (Kuhn, 1962, p. viii). They offer a framework comprising an accepted set of theories, methods and ways of defining data and from a philosophical standpoint reflect ontological and epistemological assumptions inevitably shaping beliefs about how research should be conducted.

³¹ Other common labels pairings, which have been used to characterise the dichotomy of these two major orientations are objectivist vs. subjectivist (Burrell & Morgan, 1979), nomothetic vs. idiographic (Luthans & Davis, 1982), etic vs. emic (Morey & Luthans, 1984), outsider vs. insider (Evered & Louis, 1981), and positivist and phenomenological (Easterby-Smith et al., 1991).

3.3.1 Positivist Paradigm

Historically the positivistic paradigm in the social sciences is based on the approach used in the natural sciences, such as biology, botany and physics. This school of thought known as 'logical positivism' or 'logical empiricism' is founded on the belief that social science should be conducted in the same way as studies conducted in the natural sciences.

A major tenet of logical positivism is its 'thesis of the unity of science' (Hempel, 1969; Kolakowski, 1968), which maintains that the methods of natural science are the only legitimate methods for use in social science. This approach has been explicitly recognised, and advocated, as the "natural science model" of social science research, and has found widespread application in social science in general, and in organisational research in particular (cf. Behling, 1980; Schön, Drake & Miller, 1984; Burrell & Morgan, 1979; Daft, 1983; Lee, 1989, 1991). With roots in logical positivism, this research perspective of social science reflects the precepts informing the study of natural phenomena (Lincoln & Guba 1985: 36):

- The phenomenon of interest is single, tangible and fragmentable, and there is a unique, best description of any chosen aspect of the phenomenon.
- The researcher and the object of inquiry are independent, and there is a sharp demarcation between observation reports and theory statements.
- Nomothetic statements, i.e., law-like generalizations independent of time or context, are possible, implying that scientific concepts are precise, having fixed and invariant meanings.
- There exist real, uni-directional cause-effect relationships that are capable of being identified and tested via hypothetic-deductive logic and analysis.
- Inquiry is value-free.

According to positivists, laws provide the basis of explanation, permit the anticipation of phenomena, predict their occurrence and therefore allow them to be controlled. Explanation consists of establishing causal relationships between the variables by establishing causal laws

and linking them to a deductive or integrated theory.³² Thus, social and natural worlds are both regarded as being bound by certain fixed laws in a sequence of cause and effect.

To support such epistemological beliefs, the positivist research perspective endorses a number of "appropriate" research methodologies. Strict adherence to these sanctioned methodologies is the only way in which valid knowledge can be obtained. The positivist mode of inquiry assumes units of data are to be identifiable (for example, subjective attitudes) and to exist independent of the method used to reveal or measure them. The validity and reliability of identifying and measuring instruments are crucial, as are researcher detachment from the research process, random assignment of subjects, and control over confounding influences. The positivistic approach seeks the facts or causes of social phenomena, with little regard to the subjective state of the individual. Thus, logical reasoning is applied to the research so that precision, objectivity and rigour replace hunches, experience and intuition as the means of investigating research problems. It is based on the assumption that social reality is independent of human psyche (reasoning/ projection/ construction) and exists regardless of human awareness. Sample surveys and controlled experiments are the primary data collection techniques, and inferential statistics is the data analysis method used to "discover" causal laws.

3.3.2 Phenomenological Paradigm

The subjectivist school of thought takes the position, that social science requires methods radically different from those of natural science. The justification it offers is that the social reality examined by social science is fundamentally different from the physical reality examined by natural science (cf. Evered & Louis, 1981; Galliers & Land, 1987; Lincoln & Guba, 1985; Morgan, 1980; Morgan & Smircich, 1980; Weick 1984).

The phenomenological paradigm purports that the physical sciences deal with extrinsic objects, whereas the social sciences deal with action and behaviour, which are generated from within the human mind. Moreover, it is argued that the interrelationship of the investigator and what is being investigated is impossible to separate. To varying degrees,

³²

A variable is an attribute of an entity that can change and take different values, which are capable of being observed and/or measured. A theory is a set of interrelated variables, definitions and propositions that presents a systematic view of phenomena by specifying relationships among variables with the purpose of explaining natural phenomena.

phenomenologists believe that social reality is a construction of the mind. There is no reality independent of the mind; therefore, what is researched is affected by the process of the research.

Considerable regard is paid to the subjective state of the individual. A phenomenon is 'a fact or occurrence that appears or is perceived, especially one of which the cause is in question' (Allen, 1990: 893). Therefore, the phenomenological paradigm is concerned with understanding human behaviour from the participant's own frame of reference. This qualitative approach stresses the subjective aspects of human activity by focusing on the meaning, rather than the measurement, of social phenomena.

The word *qualitative* implies an emphasis on processes and meanings that are not rigorously examined, or measured (if measured at all), in terms of quantity, amount, intensity, or frequency. Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. Such researchers emphasize the value-laden nature of inquiry. They seek answers to questions that stress how social experience is created and given meaning. In contrast, quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes. Inquiry is purported to be within a value-free framework. (Denzin & Lincoln, 1994: 4)

The research methods used under this approach are '[...] an array of interpretative techniques which seek to describe, translate and otherwise come to terms with the meaning, not the frequency of certain more or less naturally occurring phenomena in the social world' (Van Maanen, 1983: 9). Under this paradigm, the emphasis is on the quality and depth of the data. The data is often referred to as being rich, since it captures the richness of detail and nuance of the phenomena being studied. Some examples of methods generally associated with this view are ethnography, hermeneutics, phenomenology, and case studies.

3.3.3 Implications

As noted earlier the adoption of a particular paradigm (to a certain extent reflecting the researcher's own assumptions) has implications for the choice of methodology and the specific research methods considered suitable. The issue of self-reflection about research perspective applies to all researchers, whatever the adopted perspective. Rather than seeking congruence with own beliefs the choice of a particular paradigm the appropriateness of a research approach "[...] derives from the nature of the social phenomena to be explored"

(Morgan & Smircich, 1980: 491). Moreover, awareness of the implications of a particular paradigmatic choice and openness to the possibility of other (competing) assumptions and interests is imperative.

Drawing on Gödel's theorem (Gödel, 1962) that all theoretical formulations are necessarily incomplete, Morgan (1983) writes

[All] social phenomena may have many potential ways of revealing themselves and the way they are realized in practice depends on the mode of engagement adopted by the researcher.... [In] choosing a research strategy the scientist in large measure determines how the phenomenon being studied will be revealed, and indirectly, the consequences of the knowledge thus generated. (Morgan, 1983: 389-391)

Figure 3-1: Main features of the two main paradigms

Positivistic paradigm	Phenomenological paradigm
Tends to produce quantitative data	Tends to produce qualitative data
Uses large samples	Uses small samples
Concerned with hypothesis testing	Concerned with generating theories
Data is highly specific and precise	Data is rich and subjective
The location is artificial	The location is natural
Reliability is high	Reliability is low
Validity is low	Validity is high
Generalises from sample to population	Generalises from one setting to another

Source: Hussey, J. & Hussey, R. (1997) *Business Research: a practical guideline for undergraduate and postgraduate students*, London: Macmillan; p. 54.

The above table highlights the main features of the individual research paradigms and that both have inherent strengths and weaknesses. Social science research in general and management research in particular is rarely conducted within these pure forms. These paradigms are best regarded as the extremes of a continuum where features and assumptions of one paradigm can be gradually relaxed and replaced by those of the other paradigm. The adoption of a particular paradigm *per se* is not 'wrong' or 'right' but its suitability will depend on the nature of the research problem and will necessarily involve a trade-off and judging/ weighing contextual restrictions.

Bonoma (1985) argues that all researchers desire high levels of data integrity and generalisability. Data integrity describes those characteristics of research, which affect error

and bias in the research results. Generalisability refers to the ability to apply research results to cases or situations beyond those examined. Ideally, to establish both one would attempt to gather huge amounts of data on many cases. Since it is time consuming and massively expensive to gather huge amounts of data on many cases, one is usually faced with having to do one or the other. Therefore, any research project involves a choice between gathering a lot of information on a small number of cases as opposed to gathering a relatively limited amount of information on many cases (Ragin, 1987).

Data integrity can only be achieved by sacrificing generalisability of the results and vice versa. Fundamentally, it is a choice about which kind of leverage is sought. Choosing to study a large number of cases and focusing on variables and concepts gives leverage in comparing across cases on a limited range of the phenomena of interest. Choosing a small number of cases and focusing on the cases as wholes gives leverage in comparing across many aspects of the phenomena of interest.

Positivistic methodologies, such as laboratory experiments, are higher in generalisability than more phenomenological methodologies. Under this paradigm, measurement is an essential element of the research process, and requires strict adherence to defined forms of rigour to ensure the accuracy of the measurement. Therefore, the data collected will be mainly variable-based and quantitative facilitating comparisons and the deduction of non-intuitive implications of a theory. Because research under a positivistic paradigm focuses on the precision of measurement and the ability to repeat the experiment reliably, there is an inherent danger that the validity of results will be low. Even with many variables constructed they always represent a descriptive simplification since there always is more richness of detail than can be captured through variables. On the other hand, the construction of variables implies that the meaning of the variable or concept may be appreciated independent of the context.

However, phenomenological methodologies, such as case studies, tend to be high in data integrity because they have contextual relevance across measures, methods, paradigms, settings and time. Under a phenomenological paradigm, the emphasis is on the quality and the depth of the data. The researcher's aim is to gain full access to the knowledge and meaning of those involved in the phenomenon and consequently validity is high under such a paradigm.

A further consequence of the paradigm decision emphasises what is observed. Large samples and measuring of variables increases the chances that outcomes and talk about the formal, structural relations among variables will be examined. Focusing on a smaller number of cases

and learning as much as possible about them emphasises process rather than outcomes, the importance of agency (the intentional activities and decisions of social entities) as opposed to structure, and internal, substantial relations instead of external, formal relations.

3.4 Adopted Research Method

The choice between positivist and interpretive approaches should be based on the research question and the nature of the phenomenon of interest. If adopting a positivistic paradigm, it is essential that the data used is highly specific and precise to usefully serve adequate reality tests using statistical procedures. This in turn requires the existence of an elaborate and well-established theory.

Furthermore, positivist techniques can only be utilised with confidence if there is strong reason to suspect that the relationships underlying the phenomena of interest are determinate and one-dimensionally causal. This argument, postulated among others by Daft and Wiginton (1979), suggests that the positivist research approach (seen as encompassing "low variety" techniques) is not complex enough to reflect all of the inherent complexity, ambiguity, and instability of organisational systems.³³ Invoking the principle of requisite variety, Daft and Wiginton (1979: 187) encourage the use of alternative "high variety" methodologies, akin to the phenomenological approach. They note:

If complex organizational behaviors are modelled as if they are simple, well understood, deterministic systems, or even as stochastic systems, then the resulting models will tend to be insignificant. We propose that languages of high variety are useful tools for developing models of organizations because they have sufficient scope and richness of meaning to describe organizational processes.

³³

The most tragic effect of this measurement mentality can be seen in redundancy programmes. If someone decrees that the staff to turnover ratio is too high, the branches or departments of the organization will be asked to shed, say, 15 per cent of their staff. There is no doubt that the ratio does reveal inefficiency. Yet this inefficiency is going to be found in the working processes themselves. Most likely, 5 per cent of the work is really value-added work, whereas 95 per cent left is non-value added. Ironically, those accountable for the value-added work will be pressured for even more productivity, when the real productivity gains can be obtained from squeezing the non-value-added work out of the process. By doing so, the unit should gradually shed staff, permitting honourable treatments of traumatic events in any case. By simply going ahead with a massive redundancy programme, the likely outcome will be that the department will stay as inefficient, with fewer staff to do the work, and the pressure will soon be on to hire new staff because those in place 'just cannot cope'.

Most systems are goal seeking in their nature; as long as the operational processes are not changed, regardless of whatever shock is given to the system, it will either get back to its original steady state over time, or else move in a 'chaotic', i.e. violent and unpredictable manner (Ballé, 1994: 41).

This research is concerned with organisational renewal, i.e. strategic change. This requires understanding how organisations evolve over time and why each one evolves in a specific way. The research must be descriptive and seek to capture the processes involved. Process data “[...] consist largely of stories about what happened and who did what when – that is events, activities, and choices ordered over time” (Langley, 1999). The main arguments for generating in-depth accounts of a few cases capturing the richness of detail and nuance of the phenomena being studied in this research project –a focus on quality rather than quantity of the data- are given below:

- This research is exploratory since the existing knowledge of and practical experience with transforming organizations -despite some successes- must still be regarded as limited.
- The adopted approach to inquiry is mainly inductive because it is based on the attempt to construct abstractions, concepts, hypotheses and theories rather than test an existing theory of organizational renewal.³⁴
- This research deals with complex concepts (e.g. learning, innovation, control) that involve the consideration of many interactive system variables generating non-linear dynamics and making explanations for phenomena in terms of relationships between dependent and independent variables (i.e. statistical analysis) impractical. Therefore, this research
 - Requires a holistic rather than reductionist approach.

³⁴

Issues of theoretical or explanatory sense-making involve linking research findings into concepts of higher abstraction that are the basic building blocks of theories. Quantitative research is usually seen as being more deductive, with higher order constructs dictating what the findings should be. Qualitative research is usually seen as emphasising induction, with the findings dictating what the eventual concepts should look like (Britt, 1997: 38). In essence the two different strategies imply different start-up tactics. A deductive approach would generate an initial conceptual framework from the best accumulated science and lore of the domain under study. This framework is operationalised with research questions, start-up codes, and some initial data-gathering devices. As the research progresses the codes are enriched and reconfigured, and the research questions are answered or reframed. “Most important, the conceptual framework is gradually rehashed, refined into the ultimate causal network.” (Miles & Huberman, 1994: 134) By contrast, the inductive researcher would opt for a causal network derived from the data. The model is dredged up progressively from the field. The ultimately resulting model would then be confronted with the regnant science and lore in that domain. In practice, induction and deduction occur as a continuing cycle of re-specification.

- Is concerned with processes, rather than outcomes.
- Employs temporal ordering and probabilistic interaction between entities providing the key to identifying and understanding patterns in events.
- Since the process phenomena under investigation in this research have a fluid character spread over both space and time, it is concerned with multiple levels and units of analysis that are primarily interconnected and whose boundaries are ambiguous (Mohr, 1982).
- With its concern for organizational renewal this research is placed in a natural and temporally embedded and therefore contextual, rather than in an artificial setting. The research focuses on irreversible, evolutionary phenomena with heterogeneous outcomes over time.

The lack of an elaborate and well-established theory on organisational renewal in conjunction with the complexity of the phenomenon of interest argues in favour of a qualitative approach. The need to study the renewal efforts in context, the involvement of multiple, interconnected units of analysis, the aim of developing in-depth understanding of the phenomenon and the processes involved present a compelling argument for focusing on limited number of cases as opposed to large samples. Case-based analysis focuses on the case as a whole: all of the individual, all of the group, all of the organisation (Ragin, 1987). The general concept and its associated methods such as procedures of data collection and presentation are described in the following sections.

3.4.1 Research Strategy: Case study research

Case study research is often defined as a qualitative methodology. Prominent writers on case study (Eisenhardt, 1989; Hartley, 1994; Lee, 1991, Stake, 1994, 1995; Yin, 1981, 1984, 1993, 1994) prefer to promote it as a unique research strategy since a case study does not imply the use of a particular type of evidence nor of a particular data collection method. According to Stake (1994: 236) "case study is not a methodological choice, but a choice of object to be studied. [...] As a form of research, case study is defined by interesting individual cases, not by the methods of inquiry used." Hence a case study can be qualitative or quantitative or a combination of both drawing evidence from a variety of different sources such as fieldwork,

archival records, verbal reports, or observations and employing a variety of collection methods for studying an issue in-depth and contextually.

As a research strategy, *the distinguishing characteristic of the case study is that it attempts to examine:* (a) a contemporary phenomenon in its real-life context, especially when (b) the boundaries between phenomenon and context are not clearly evident. Experiments differ from this in that they deliberately divorce a phenomenon from its context. Histories differ in that they are limited to phenomena of the past, where relevant informants may be unavailable for interview and relevant events unavailable for direct observation. (Yin, 1981:61, emphasis in original)

Based on this definition the case study inquiry, according to Yin (1994: 13),

- copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
- relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
- benefits from the prior development of theoretical propositions to guide data collection and analysis.

Case study research involves gathering detailed information about the unit of analysis, often over a lengthy period, with a view to obtaining in-depth knowledge.

The term “*organizational case study*” refers to (1) the intensive study of a single case, where (2) the case consists of the entire configuration of individuals, groups, and social structure in the setting of an organization, and (3) the case researcher passively observes the rich details of events in the way that they naturally unfold in their natural, organizational setting. (Lee, 1989: 119-120, emphasis added)

The emphasis of passive observation rather than active participation distinguishes this approach from action research, which is usually also case-based.³⁵ Case studies can be distinguished according to the underlying research objective. They are often recommended for conducting exploratory research, for use in areas characterised by few theories or a deficient body of knowledge. However, other uses are possible. For example, Yin (1981) distinguishes exploratory, descriptive and explanatory case studies. Similarly, Scapens (1990) distinguishes the following types next to **exploratory** case studies:

³⁵

Action research is a type of applied research designed to find an effective way of bringing about conscious change in a partly controlled environment. The main aim of action research is to enter into a situation, attempt to bring about change and to monitor the results.

- **descriptive** case studies where the objective is restricted to describing current practice
- **illustrative** case studies where the research attempts to illustrate new and possibly innovative practices adopted by particular companies
- **experimental** case studies where the research examines the difficulties in implementing new procedures and techniques in an organisation and evaluating the benefits
- **explanatory** case studies where existing theory is used to understand and explain what is happening.

The different types of case study are not well delineated and one type may be combined with or merge into another. Using the above classification, this research employs case study research for exploratory, descriptive and illustrative purposes.

Regardless of the purpose, case study research “[...] must cope with the essential problem that, because the context is part of the study, there will always be too many variables for the number of observations to be made, thus making standard experimental and survey designs irrelevant” (Yin, 1981: 61).³⁶ However, Yin does not conceive of case study method as being purely inductive but as comprising both deductive and inductive approaches:

One should start with theoretical reasons for thinking case study appropriate, choose the cases on theoretical grounds, and plan the data collection to answer theoretical questions.

The data collected may be quantitative or qualitative. Single-case designs are seen as appropriate when the case provides a critical test of theory, is a rare or unique event, or serves a revelatory purpose. Research projects will generally incorporate multiple-case designs and should follow the logic of replication rather than that of sampling, with each case carefully chosen because either similar or contrary results are predicted.

³⁶

However, such designs may play an important part for sub-portions of a case study.

3.4.2 Design Quality: Criteria and Tactics

In search of fundamental pursuits common to both qualitative and quantitative research Yin (1992) identifies four common commitments: to bring expert knowledge to bear upon the phenomena studied, to round up all the relevant data, to examine rival interpretations, and to ponder and probe the degree to which findings have implications elsewhere. These commitments are regarded as being as important in case research as in any other kind of research.

Case study research is traditionally criticised for being anecdotal and subjective (cf. House, 1982). These criticisms stress the importance of a research design that ensures reliability and validity of the findings. The language of validity and reliability was originally developed for use in quantitative social science and many procedures have been devised for assessing different facets of each (cf. Kirk & Miller, 1986; Sekaran, 1984). In quantitative research factual accuracy is the goal; the more credible the claim to factual accuracy, the more descriptively valid the research. Descriptive validity is often termed reliability. Validity and reliability determine the extent to which results can be generalised to settings beyond those examined in the study.

Easterby et al. (1991: 40) note that “[there] has been some reluctance to apply these ideas to phenomenological [...] research because they might imply acceptance of one absolute [...] reality.” This criticism is particularly aimed at the notion of generalisability as a valid quality criterion. Normann (1970) contends that it is possible to generalise from a very few cases, or even a single case, if the analysis has captured the interactions and characteristics of the phenomena under study. Stake (1994) argues that a case should not be mistaken for a single data point but should be compared to a complete experiment. In a similar vein, Yin (1994: 43) argues, “[...] survey research relies on *statistical* generalization, whereas case studies (as with experiments) rely on *analytical* generalization.” In analytical generalisation, the researcher strives to generalise a particular set of results to some broader theory rather than inferring from a sample to a population. Based on Kidder (1981), Yin suggests the following criteria for assessing the quality of research design when conducting case studies (see Figure 3-2 below) and in addition recommends corresponding tactics for effectively addressing these.

Figure 3-2: Case Study Method: Research Quality Criteria and Tactics

	Definition	Case Study Tactic	Corresponding Phase of Research
Construct validity	Establishing correct operational measures for the concepts being studied	Use multiple sources of evidence Establish chain of evidence Have key informants review draft case study report	Data collection Composition
Internal validity	Establishing a causal relationship whereby certain conditions are shown to lead to other conditions	Pattern-matching explanation-building time-series analysis	Data analysis
External validity/ generalisability	Establishing the domain to which the study's findings can be generalised	Use replication logic in multiple-case studies	Research design
Reliability	Demonstrating that the operations of a study, such as data collection procedures can be repeated with the same results	Use case study protocol Develop case study data base	Data collection

Source: Yin, R. K. (1994) *Case Study Research: Design and Methods, 2nd Edition*. Thousand Oaks: Sage; p. 40-41.

The four tests may be considered relevant in judging the quality of any research design although the above table addresses the measures with consideration of strengths and weaknesses particular to the case study method.

The above criteria provide a helpful guideline and discipline to ensure necessary rigour in conduct and quality of the resulting findings. Though not all of the recommended tactics occur at the formal stage of designing the case study, they will be implicitly dealt with as part of the discussion in the following section.

3.5 Research Design

As mentioned above, the research work seeks to develop an understanding of how self-renewal is affected within an organisation. Furthermore, it explores how an organisation can develop the capability of self-renewal by identifying relevant processes and investigating their facilitative or obstructive role in the renewal process.

The aim is to provide a research-based guideline for managers faced with the task of developing effective organisational structures and triggering the actions necessary to create and sustain future competitive advantages in increasingly turbulent markets.

This research work started out with a literature survey, which served

- to assess the current state of the art, i.e. dominant streams of thinking and suggested solutions for coping with the issues of organisational entropy and ossification and
- the development of a theoretical framework and related set of research propositions to guide the process of further inquiry

The outcome of the literature review highlighted the fragmentation of research efforts and the limitations of insular solutions to alleviate decline. To effectively generate organisational renewal there is a clear need for integration and synthesis of various findings with a more holistic framework. This was addressed in the second chapter; set against the backdrop of general systems theory, complexity theories and autopoiesis, a variety of different perspectives and findings have been incorporated to form an integrated framework. The framework and the resultant set of propositions about the functioning of organisations and the process of renewal are formulated loosely and have the main purpose of guiding the research design, the data collection and the subsequent analysis.

The main objective of this research is to increase the understanding and awareness of the processes, problems and successful means of organisational renewal. In order to find possible answers the developed theoretical framework is used to compare declining organisations with well performing organisations. The research approach begins with an effort to understand the forces that trigger and processes that act to sustain decline in organisations. The phenomenon has been increasingly studied and there is a rich source of data from which to draw.

These are contrasted by a number of case studies that serve the identification of underlying characteristics and dynamics common to high-performing/ successful organisations (and that distinguish them from organisations that are not). These in turn serve as a starting point for uncovering principles of successful organisation and practices that hold the key to renewal and sustained growth. To this end, three in-depth case studies are undertaken with the focus set on self-renewing processes and structures.

3.5.1 Case Selection

A unique aspect of case study in the social sciences is the selection of cases to study. Depending on the adopted paradigm the criterion will be representativeness (cases are selected to represent some population of cases) or opportunity to provide insight and enhance learning (cases are chosen according to their potential for learning) the latter, according to Stake (1994), possibly providing the superior criterion for selection.

3.5.1.1 Replication Logic

Yin (1983) contends that case study research should not seek to generalise on a numerical basis, as would survey-based quantitative research. Rather, he proposes that case study research should use “analytic generalisation” to ensure external validity. Multiple case studies are not intended as a statistically valid sample of a population, but to provide replications

Which [seek] convergent evidence regarding the facts and conclusions for the case; each case’s conclusions are then considered to be the information needing replication by other individual cases

He distinguishes between two types of replication: theoretical replication, which selects cases which vary against key variables and literal replication marked by the choice of cases which are the same on critical dimensions.

3.5.1.2 Applied Selection Criteria

The selection of cases for the empirical study was mainly guided by their ability to provide insight and learning on the subject matter. To this end it was of primary concern for the selection that the organisations would allow **good access** to ensure the necessary quality and depth of data. While good access was paramount, the organisations selected for the study had to conform to set criteria regarding **performance**, and were deliberately chosen with

differences regarding **size**, **age** and **industry sector** in order to provide insight on the derived research propositions. The following section tries explain the underlying rationale for the choice of criteria.

A number of researchers assert that organisations become increasingly inert over time as procedures, roles, routines and structures establish. This implies that the likelihood of organisational change decreases with an organisation's **age**. However, many of these studies have been developed by retrospectively examining the histories of a few large organisations (e.g. Hannan & Freeman, 1984). Based on the literature review this research suggests that while the problem of relative decline such as inertia or convergence may often coincide with maturity this cannot serve as explanation since there are mature organisations that operate successfully in highly competitive environments.

It is also a common argument that larger organisations (size is measured in form of workforce level and turnover) are less likely to change due to a hierarchical structure that typically accompanies **size** to establish in control in face of added complexity. However, some contend that larger organisations may be more likely to change because of their greater access to resources (e.g. Kimberly, 1976; Aldrich & Auster, 1986; Mohrmann et al., 1989). Empirical evidence on this issue is mixed: some studies suggest large organisations as more likely to change (e.g. Huber et al., 1993), other studies find less change among larger organisations (e.g. Delacroix & Swaminathan, 1991, Halliday et al., 1993), and still other work finds medium-sized organisations the most flexible (e.g. Haveman, 1993). Nevertheless is often suggested that smaller organisations are more flexible, are better equipped to innovate, and therefore have a competitive edge. This has led many organisations to seek renewal in trying to 'right-size' and many researchers to identify this as a key strategy. The problem underlying is that may not lead to the desired result because structural conditions (in form of controls and reporting) of the former 'large' organisation are still in place. The differences of the studied cases with respect to above criteria should allow for an interesting comparison. As with age, an increase in organisational size is not necessarily an indicator for reduced competitiveness.

A further criterion was the **branch or industrial sector** of the organisation mainly to ensure that the organisations did not come from new or rapidly growing industries, which would distort the picture. All organisations chosen for this study compete in well-established, mature markets. This was also done to demonstrate that superior 'organisational performance' is

exactly what the term suggests and cannot be adequately reduced to and understood in terms of size, age or maturity of industry.

Also representative selection criteria were applied. Organisational renewal is mainly concerned with (re-) establishing high levels of **performance** in an organisation. To conform to the aforementioned research objectives there was an implicit need for the selected cases to qualify as successful, high performing organisations. Both 'successful' and 'high-performing' are ambiguous terms and needs to be defined more closely to provide a useful selection criterion. An organisation is deemed successful if it manages to generate profits on a sustained basis. In order to qualify as 'high-performing' the respective organisation's performance in generating profits needs to be higher than that of other organisations in the same sector, i.e. its direct competitors. In order to qualify as 'high-performing' the company should be marked above-average performance relative to its branch for a period longer than 5 years. High-performing implicates successful; this relation does not necessarily apply vice versa.

Two companies agreed to participate in the field study, which also comply with the proposed selection criteria. **Petroline Wellsystems** a manufacturer of oil well drilling and maintenance equipment based in Aberdeen, Scotland has averaged an annual growth rate above 20 percent in its turnover over the past ten years. Its profits have increased 78% a year, from £1m in 1995 to £5.6m in 1998, when sales reached £20.9m. The strong record of innovation in this organization makes it particularly interesting case.

As a result of structural changes that date back to the mid-eighties, **Shell direct GmbH**, an affiliate of the Royal Dutch/ Shell group of companies based in Hamburg, Germany has managed to regain competitive momentum, increasing their market share in the stagnating German heating oil market and enabling an expansion of its traditional business by adding additional products and services.

In both cases, existing contacts provided the key to gaining access to the organisations. The author has well established links to Shell direct since 1987 resulting from a research project that was concerned with the development of an MIS for this organisation. The St. Andrews Management Institute -a professional consulting body and affiliate of the University of St. Andrews- provided the introduction to Petroline Wellsystems. The Management Institute had been involved in a number of consulting projects and workshops at Petroline in the past and

had well-established links to the company. An overlap between the aforementioned prior projects and this research suggested mutual benefits for both sides (Petroline and the author) so that the Management Institute provided an introduction. After a number of initial interviews in which terms and conditions of access were discussed, a research proposal -modified for the respective organisation- was drafted and sent to the contacts in the respective companies. The proposal outlined the background and objectives of the research, included a timetable, and detailed the required resources and information.³⁷

The first of the two case studies was conducted at Shell Direct, Hamburg, Germany over a period of two months and successfully completed in September 1997. The second case study was conducted at Petroline WellSystems in Aberdeen during September and October 1998. These initial studies were followed up on a number of occasions during 1999 to update and complete missing information.

These two case studies are complemented by a case study of the Minnesota Mining and Manufacturing Company (3M). The company is renowned for its innovative stance and in many respects epitomises the vision of the continuously renewing organisation. It has been repeatedly listed in Fortune 500 for the past twenty years. 3M operates six divisions: industrial (advanced adhesives, tapes, and abrasives), transportation, graphics and safety (reflective materials, respirators, and optical films), health care (drugs, dental, and skin products), consumer and office (tape), electro and communications (insulating products), and specialty material (gases and plastics). Drawing from this diverse pool of technology platforms, 3M makes everything from masking tape to asthma inhalers. Well-known brands include Scotchgard fabric protectors, Post-it Notes, Scotch-Brite scouring products, and Scotch tapes. The company operates in more than 60 countries, and international operations account for nearly 60% of sales. 3M Company was not subject to the immediate field study as the other two companies Petroline and Shell direct. However, the case was included as a benchmark of best practice on organisational renewal. After completing the field studies at Petroline and Shell direct and first analytical insights gradually developed it was felt that the inclusion of this case would not only provide additional insight on the topic in form of an interesting case but also allow for significant comparisons since it complies with the applied

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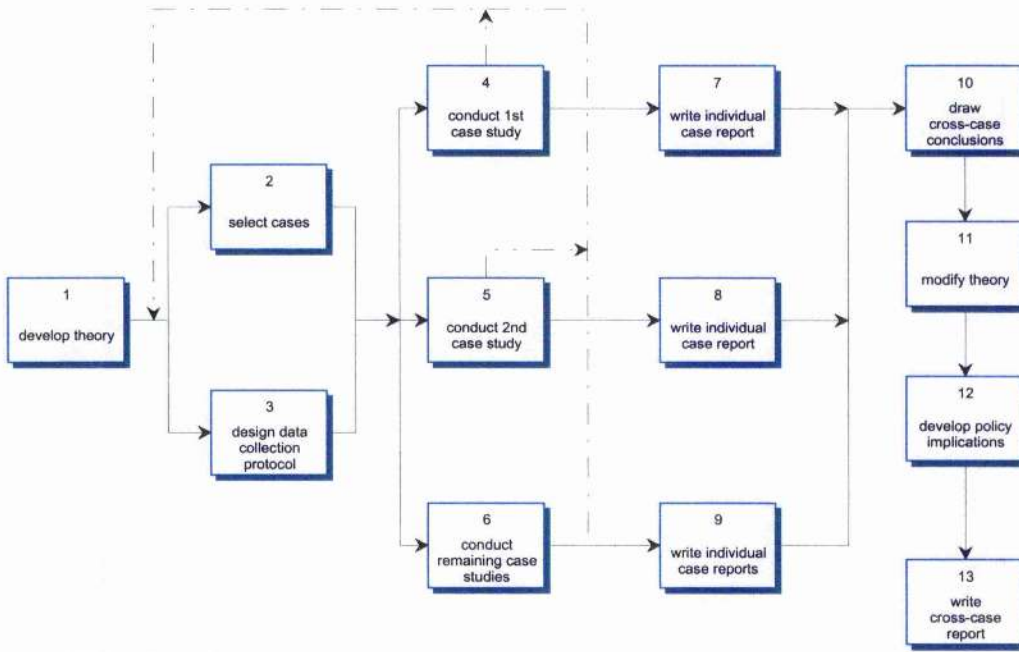
A draft of the proposal is included in Appendix A1 and A2.

selection criteria, adding to the overall explanatory quality of the research evidence. Since 3M Company is relatively old, extremely large by comparison and must be regarded as leading in its chosen fields of operations this case ideally complements the other two cases. Due to its prominence 3M Company is also extremely well documented. There is rich coverage of the company by the media and extensive information on history, provided by 3M Company via its corporate web-site. Additionally, direct contact to the company was established via the company's public relations departments at the 3M headquarters in St. Paul, MN, USA and in 3M Deutschland GmbH based in Neuss, Germany. Both departments were extremely helpful in providing requested information and internal documents. While the 3M case study database does not include elements that are subject to own observation and interviews this company has been focus of many different (related) research projects that have (e.g. Collins & Porras, 1994; Ghoshal & Bartlett, 1998; Gundling, 2000; Kanter et al., 1997; Peters & Waterman, 1983) which have been used here to complement the available sources of information to provide an in-depth account of the company.

The inquiry will focus on providing descriptive accounts of each organisation's development and their respective settings. Further the general picture of the organisation will be complemented by embedded sub-case studies of particular projects providing a much more intimate picture of the organisations' functioning and allowing for an in-depth analysis of the processes and supporting structures that the individual organisations employ and subsequently enhance their competitive position and long term prospect of survival.

As part of the analysis, the individual case accounts are compared with one another to see how and why the organisations are and have been successful. The findings from the cross-case analysis are also compared with the accounts from declining organisations.

3.5.2 Research Process



Case Study Method: Process Design

Figure 3-3: Case Study Method: Process Design

Adapted from: Yin, R. K. (1994) *Case Study Research: Design and Methods, 2nd Edition*. Thousand Oaks: Sage; p. 49.

According to Yin (1994), the case study process typically includes the following four main stages.

1. Design the case study,
2. Conduct the case study,
3. Analyse the case study evidence, and
4. Develop the conclusions, recommendations and implications.

Then, the insights gained from the individual case studies are compared and used to develop the guidelines. The thesis concludes with a discussion of the implications of these ideas to research and practice. The flowchart above incorporates these phases and depicts the research process adopted for this project.

3.5.3 Data Collection

Case study research attempts to understand events in their wider societal and historical background and is therefore contextual. It provides a relatively flexible and open research strategy. The primary advantage of the case study is that an entire organization or entity can be investigated in depth and with attention to detail. This highly focused attention enables to carefully study the order of events as they occur or to concentrate on identifying the relationships among functions, individuals, or entities.

There are, however, no standard procedures to follow. Theories and propositions act as guides rather than formalised models. Researchers must be flexible and attempt to collect information and insights wherever they find them. The freedom to search for whatever data an investigator deems important makes the success of any case study highly dependent on the alertness, creativity, intelligence, and motivation of the individual performing the case analysis. It also highlights the need to pay particular attention to rigour in order to ensure a high level of quality of the study.

3.5.3.1 Data Type

As mentioned at the outset of this chapter this research is concerned with organisational dynamics. Although prevalent, many analyses portray an organization as static, and do not reveal its developmental capabilities. Systematically analysing an organization implies that it is less important to discover where an organization is than to understand how it got there, and its future prospects.

Organisational change can be usefully conceptualised in terms of process and content. Process refers to how change occurs. Content describes what actually changes in the organisation. Theories and analyses of organisational change seek to explain why organisations change as well as what the consequences are of change. Empirical evidence on both aspects is fragmentary and occasionally contradictory. Models that consider both process and content show the greatest potential for resolving this situation. Organisational renewal involves, by definition, a transformation of an organisation between two points in time. For most analysts, the key aspect of renewal lies in comparing the organisation before and after the transformation. Making such comparisons constitutes an analysis of the content of renewal initiatives. It assesses what actually differs in the organisation at the second, later point in time. A second dimension of organisational change concerns the way the transformation

occurs –the speed, the timing, the sequence of activities, the decision-making and communication system, the resistance encountered, etc. Examining these factors involves a focus on the processes involved.

Processes are the media by which an organization creates future acts out of its past experiences. [...] Processes are difficult to comprehend because their visages shift with the events streaming through them: processes' strength and usefulness rest on their adaptability to heterogeneous demands. Yet understanding processes warrants effort, because principles that generalize across diverse circumstances are the keys to both scientific comprehension and effective designs. (Starbuck et al, 1976: 41)

Process considerations may be independent of content, or they may be interactive. However, attempts at organisational change often take unexpected turns and lead to transformations other than those intended. Furthermore, change may occur unintentionally as a by-product of other decisions and actions within the organisation (March, 1992; Burgelman, 1994). For these reasons it is important to focus on renewal initiatives in content. To draw a complete picture it therefore, in most cases, is best to analyse and evaluate both process and content factors.

3.5.3.2 Data Sources

Yin (1994) provides a useful overview of these six major sources and considering their comparative strengths and weaknesses. It is important to stress that no single source has a complete advantage over all the others. In fact, the various sources are highly complementary, and therefore it is aim to use as many of these sources as possible for the individual case studies.

The field studies conducted at Petroline and Shell direct draw on all of theses major sources of evidence with the exception of participant observation. However, the weighting of the individual sources in relation to the overall case study database differs from case to case. In case of Petroline, reporting and documentation were comparatively sparse so that data collection was highly dependent on interviews and observation. For example, Shell direct projects and internal decision making processes are richly documented. Documentation and archival records were abundantly available and due to the good working relationship also accessible. This limited the need to gather the required information through interviews and direct observation.

Source of Evidence	Strengths	Weaknesses
Documentation	<p>stable - can be reviewed repeatedly</p> <p>unobtrusive - not created as of the case study</p> <p>exact - contains exact names, references, and details of an event</p> <p>broad coverage-long span of time, many events, and many settings</p>	<p>retrievability - can be low</p> <p>biased selectivity - if collection is incomplete</p> <p>reporting bias - reflects (unknown) bias of author</p> <p>access - may be deliberately blocked</p>
Archival Records	<p>[Same as above for documentation]</p> <p>precise and quantitative</p>	<p>[Same as above for documentation]</p> <p>accessibility due to privacy reasons</p>
Interviews	<p>targeted - focuses directly on case study topic</p> <p>insightful - provides perceived causal inferences</p>	<p>bias due to poorly constructed questions</p> <p>response bias</p> <p>inaccuracies due to poor recall</p> <p>reflexivity - interviewee gives what interviewer wants to hear</p>
Direct Observations	<p>reality - covers events in real time</p> <p>contextual - covers context of event</p>	<p>time-consuming</p> <p>selectivity - unless broad coverage</p> <p>reflexivity - event may proceed differently because it is being observed</p> <p>cost - hours needed by human observers</p>
Participant Observation	<p>[Same as above for direct observations]</p> <p>insightful into interpersonal behaviour and motives</p>	<p>[Same as above for direct observations]</p> <p>bias due to investigator's manipulation of events</p>
Physical Artefacts	<p>insightful into cultural features</p> <p>insightful into technical operations</p>	<p>Selectivity</p> <p>Availability</p>

Figure 3-4: Major Sources of Evidence - Strengths and Weaknesses

Source: Yin, R. K. (1994) *Case Study Research: Design and Methods, 2nd Edition*. Thousand Oaks: Sage; p. 80.

Sources of evidence for the 3M case study are mainly provided by documentation and archival records. Due to its prominence, 3M Company is extremely well documented. As mentioned before, there is extensive coverage of the company's activities by the media and

rich information on its founding and history, its ownership and employees, its product lines, formal structure and financial status via 3M's corporate web-site. Additionally, direct contact to the company was established via the company's public relations departments in St. Pauls and in Germany who were more than helpful in providing requested information and internal documents. To offset the lack of evidence from own direct observation or own interviews the case study makes use of findings from ample research projects (e.g. Collins & Porras, 1994; Ghoshal & Bartlett, 1998; Gundling, 2000; Kanter et al., 1997; Peters & Waterman, 1983) that are also based on these sources of evidence and provide an in-depth account of the company in this respect.

3.5.3.3 Data Collection: Methods and Procedures

Yin (1983) suggests that the process of data collection for case study inquiry is not parallel but sequential process. Since data are not collected at one point in time, it is also a cumulative process. Each successive case is written with knowledge of the findings of previous cases.

The first of the two case studies based on passive observation was conducted at Shell Direct, Hamburg, Germany over a period of two months and successfully completed in September 1997. The second case study was conducted at Petrolinc Wellsystems in Aberdeen during September and October 1998.

Data was collected at the respective premises of each organization through direct, albeit passive, observation and through retrieval of information from the other aforementioned sources if available. The initial findings from this 6-8 week period on-site were subsequently analysed and followed up on several occasions to during 1998-99 to update and complete missing information.

In both cases a personal liaison was nominated for the duration of the data gathering. This person was well informed about the objectives of the research and acted as a focal point for all research-related matters, for example identifying and establishing contacts to prospective informants or gaining access to other sources of internal information.

Although having the same agenda in each case the use of the different types of information sources had different weighting with respect to each company's case-study database. Due to the availability and accessibility of rich archives at Shell direct, interviews were conducted sparingly as means of collecting information in comparison to Petrolinc Wellsystems. The

interviews here had the main purpose of gathering information that would allow structuring the information and sequence of events.

Initial data collection efforts were aimed at developing a basic understanding of the organisation though knowledge of its history, its products and its members. From outset the information and data was analysed to ensure relevance and used to establish reference points for further inquiry. Although the entire data collection was conducted as open-mindedly as possible, it was guided by the theoretically developed framework and propositions. Inevitably, data informing about the processes involved in each organization's development were of much concern.

Data gathering focused particularly on issues that might highlight the role of the different variables presumed relevant, for example a particularly important phase in the company's development or projects that were considered important milestones or that resulted in the development of a very successful product. This approach also proved quite effective for coping with the overwhelming amount and availability of information and for tracing the interaction and relationships between variables. This proved particularly helpful in jump starting interviews with informants. Most seemed quite delighted at the opportunity to share their experiences and with a concrete issue at hand informants tended to focus much more on recollecting events and telling a story. This involved identifying the groundbreaking ideas and tracing the decision-making process as well as the main actors involved. It also involved reconstructing the evolution of the project and the subsequent impact on the organizations development and competitiveness.

Passive observation was instrumental in developing informed own impressions of the organisation's functioning.³⁸ The collection on-site also allowed developing a much richer picture of the organization and its members. In Aberdeen this form of involvement provided the opportunity for general cultural exchange. Social events such as the opportunity to watch the local football team in action, dinner invitations or a lively discussion after work in a pub were pleasant and memorable side effects of the stay. The resultant informal 'off-duty'

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A schematic representation of the respective company's case study database and the various sources of evidence contained therein can be found in Appendix A.

conversations not only gave further insight in to the larger societal context in which the organization operates but also allowed developing a deeper cultural understanding.

These 'softer' data collection activities were supplemented by the collection of factual data mainly from archives and other company records general information such as organisational charts, financial data etc. Data was also extensively collected on the activities these organizations engage in. The results from this inquiry and collection effort are represented in form of business activity models.³⁹

While some interviews were scheduled from the outset, the majority informants were identified through casual conversations with organizational members or the result of a direct reference made in an interview. Initial curiosity about the presence of a 'stranger' and the research project often led to a wider discussion where views and own experiences were shared. Whenever sensible and also possible an interview with a prospective informant was scheduled.

Name	Position
Dr. Jochen Weise	Managing Director
Dieter Gutmann	Director Finance & Accounting
Jan Christoph Sklorz	Technical Services Manager Homebase Fuelling Systems

Figure 3-5: Informants at Shell direct GmbH, Hamburg

The interviews conducted as part of the case studies were relatively unstructured and extensive and can best be described as depth interviews. During the interview session, questions were asked mainly with the aim of encouraging informants to talk freely and to elaborate on the topic being discussed without influencing the direction of the conversation too much.

³⁹ The approach used in this context and the presentation of the results can be found in Appendix B.

As mentioned afore, the interview session often highlighted the involvement of other organizational actors, which then became the next address for gathering further information. This 'snowballing'-technique proved very useful for gathering rich and relevant data. With each interview a richer picture emanated highlighting issues from multiple, often quite different angles to an issue and providing further reference points or new points of departure for further inquiry. The interplay of the variables and the dynamics often well-hidden in rich data gradually unraveled as a result of this collection process and of careful analysis of the data rather than reflecting informants' preconceived solutions to the research question.

Name	Position
Klaas Zwart	Owner
Fraser Innes	Managing Director
Paul Metcalfe	Technical Services Manager EST
Stuart Ferguson	Director Technical Services
Rab Anderson	Director Engineering
Hazel Murdo	Human Resources Co-ordinator

Figure 3-6: Informants at Petroline Wellsystems Ltd, Aberdeen

Interviews usually lasted about an hour. To ensure completeness and avoid distraction all interviews were taped. Informants were made aware of this tool and its use was subject to their prior approval. The use of tapes enabled concentrating on the conversation despite the complex subject matter and making supplementary notes that enabled cross-referencing and stressing points that needed further elaboration. This use of tapes also proved helpful to maintain the flow of the conversation and in latter reconstruction particularly when respondents made use of technical terms. Where issues not covered by data from other sources own notes supplemented the interviews. All interview tapes were fully transcribed.⁴⁰

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A list of all transcribed interviews is provided in Appendix A.

3.5.3.4 Ensuring Database Quality

Ensuring database quality helps to avoid unpleasant surprises and limit bias. It is important to address this issue not only at an analysis level but also at the stage of collection in order to increase the rigour of the case study evaluation (e.g. Yin, 1984) and increase the potential for utilizing the results (e.g. Alkin et al., 1979).

According to Yin (1989: 98-102), the weakness in reliability often associated with case study research can be attributed to the frequent failure to create a case study database apart from the case study report. To remedy the often-criticised lack of rigour, Yin (1992: 132-133) emphasises, “[...] the data collection process should culminate in the creation of a formal, case study database –whether including organized field notes, archival documents and records in retrievable form, tabular materials, or even the investigator’s own narrative responses to the case study protocol. The ultimate case study report needs to be completely separate from this database. In theory, an external observer should be able to inspect the database whether or not a report exists.”⁴¹

To ensure the necessary rigour data collection procedures relied on triangulation and the creation of a separate case study database. Within the case studies of Shell and Petrolina all sources are made use of for the individual case studies. Personal notes of day-to-day activities and impressions of the respective organization supplemented these.

3.5.4 Data Analysis Process

Process data collected in real organisational contexts have several characteristics that make them difficult to analyse and manipulate. First, they deal mainly with sequences of events. Second, they often involve multiple levels and units of analysis whose boundaries are ambiguous. Third, their temporal embeddedness often varies in terms of precision, duration, and relevance. Finally, despite the primary focus on events, process data tends to be eclectic, drawing in phenomena such as changing relationships, thoughts, feelings, and interpretations.

Process research is concerned with understanding how things evolve over time and why they evolve in this way (cf. Van de Ven & Huber, 1990), and process data therefore consists largely of stories about what happened and who did what when -that is events, activities, and

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Access to the case study database can be made upon request to the author.

choices ordered over time. Although temporal phenomena remain one of the distinguishing features, process data are not composed only of descriptions of discrete events. They also incorporate a variety of other types of qualitative and quantitative information. Again, this makes analysis and interpretation more complex.

When collecting process data, the research attempts to document as completely as possible the sequence of events pertinent to the processes studied. However, unless the process is highly circumscribed, certain phenomena will tend to be absent from a systematic list of ordered incidents. For example, there are often gradual background trends that modulate the progress of specific events. Also, points of interest may be going on in people's heads and leave no concrete trace of the exact moment of its passing.

Finally, particularly in macro level studies of such processes as strategy making, innovation, and decision-making, the researchers is often obliged to combine historical data collected through the analysis of documents and retrospective interviews with current data collected in real time. While the first type data is sparse and synthetic, focusing on memorable moments and broad trends, the second is richer and finer grained. And, while the first type misses certain useful nuances and details, the second type may require a certain distancing before it is possible to separate out what is really significant from what will be treated as merely noise (Leonard-Barton, 1990).

A process database, thus, poses considerable challenges. The sheer volume of words to be organised and understood can create a sense of drowning in a shapeless mass of information. The complexity and ambiguity of the data make it difficult to know where to start. Also, although offering greater potential for new discovery, the open ended inductive approach that most researchers using process research employ, tends to lead to postponement of the moment of decision between what is relevant and what is not, sometimes aggravating these difficulties (Miles & Huberman, 1994).

The complexity of process data is, of course, a reflection of the complexity of the organisational phenomena. Increasingly simple process models that assumed neat linear progressions of well-defined phases leading to well-defined outcomes are being questioned (Schwenk, 1985; Van de Ven, 1992). Although the linear phase model still has attractions, process representations now often show divergences from the main route, recycling between phase and parallel tracks. Researchers are also increasingly recognising that the presence of multi-layered and changing contexts, multi-directional causalities, and feedback loops often

disturb steady progression toward equilibrium. Several researchers, therefore, argue that chaos theory or complexity theory may offer the potential for better understanding organisational processes.

The central challenge lies in moving from a shapeless data mass toward some kind of theoretical understanding that does not betray the richness, dynamism, and complexity of the data but that is understandable and potentially useful to others. However, regardless of the applied method of data reduction (i.e. write-ups of field notes, transcription procedures and conventions, computer programs used, etc.) and of data reconstruction (such as development of categories, findings, conclusions, connections to existing literature, integration of concepts) analysis and interpretation of such data is highly subjective and it is difficult to determine the "true interpretation."

To this end Yin (1992: 133) suggests "[...] the report should contain formal presentations of the relevant evidence and data from the database –so that reader can observe, question, and (if necessary) re-interpret that data independent of any reading of the report's narrative portion. The presentation of the data may take the form of numerical tables, word tables, vignettes, reproduced documents, or other materials that may also appear in a separate appendix. Whatever the form, the narrative of the cases study report should relate specific interpretations and conclusions to specific data presentations in the report."

3.5.4.1 Unit of Analysis

A unit of analysis is the kind of case to which the variables or phenomena under study and the research problem refer, and about which data is collected and analysed. A case study usually "[...] focuses on understanding the dynamics present within a single setting" (Eisenhardt, 1989: 534). This may imply a single unit of analysis, such as a company or a group of workers, or an individual.

Complex phenomena such as processes (e.g. strategy formation or learning) are difficult to isolate. Process phenomena have a fluid character that spreads out over both space and time (Pettigrew, 1992). In addition, one of the main reasons for taking a qualitative process approach is precisely to consider the contextual setting (Pettigrew, 1992; Yin, 1994). This inevitably leads to the consideration of multiple levels of analysis that are sometimes difficult to separate from one another. These levels are represented by a continuum rather a hierarchy or clear classification.

3.5.4.2 Triangulation

The researcher often relies on triangulation, or the use of several kinds of methods or data. Triangulation is meant to be a heuristic tool for the researcher. The term was originally used to describe the use of three points to locate oneself at particular intersections. Denzin (1978) identifies four basic types of triangulation:

1. data triangulation: the use of a variety of data sources in a study
2. investigator triangulation: the use of several different researchers or evaluators
3. theory triangulation: the use of multiple perspectives to interpret a single set of data
4. methodological triangulation: the use of multiple methods to study a single problem

Janesick (1994) suggests adding interdisciplinary triangulation as a fifth form of triangulation. Interdisciplinary triangulation may broaden the understanding of method and substance by using other disciplines to inform research processes.

The prevailing myths about aggregating numbers and, more tragically, aggregating individuals into sets of numbers have moved us away from our understanding of lived experience. (Janesick, 1994: 215)

For further elaboration of Denzin's construct, see Patton's (1990) adaptation of it for the evaluation researcher. This research employs data triangulation, theory triangulation and to limited extent methodological triangulation as heuristic tools with the aim of increasing the validity and reliability of the findings. The 3M case study is based on accounts from different research projects conducted by different researchers and therefore additionally features investigator triangulation.

3.5.5 Representation of Research Data

The final issue to address is the issue of representation. How an analyst goes about describing a problem situation by a rich picture has a fair degree of arbitrariness. Any description is strongly influenced by the purpose of the analysis, own paradigmatic beliefs as well as resources (time, funds, people) available for the project.

To come to terms with the inherent complexity process data researchers can employ a variety of generic strategies. Process data analysis may involve the manipulation of words (e.g. narrative strategies or grounded theory), of numbers (quantification), or of matrix and graphical forms (Miles & Hubermann, 1994). Such strategies are generic approaches rather

than step-by-step recipes or techniques. Each approach tends to overcome the overwhelming nature of boundaryless, dynamic, and multi-level process data by fixing attention on some anchor point that helps in structuring the material but that also determines which elements will receive less attention. It is because of this that the adopted strategy can have an important impact on the nature of the emerging theory. The different strategies tend to produce different forms of theory that are neither intrinsically better nor worse but have different strengths and weaknesses. Some strategies seem best adapted to the detection of patterns in processes, whereas others penetrate the driving mechanisms. Some are more oriented towards the meaning of process for the people involved, whereas some are more concerned with prediction. This research will mainly employ the narrative strategy and visual mapping strategy.

3.5.5.1 Narrative Techniques

Organisational dynamics are typically portrayed using stories (Clark, 1972; Mitroff & Kilmann, 1976). Such narrative strategy involves construction of a detailed story from the raw data. In the area of strategic management this style dominates in the work of strategy researchers who adopt a "contextualist" perspective (e.g. Dawson, 1994; Johnson, 1987; Pettigrew, 1985, 1990; Pettigrew & Whipp, 1991). Descriptive narratives are also the traditional tool of ethnographers (Van Maanen, 1988) and they frequently play a key role in studies of cultural change (Bartunek, 1984). In fact, almost all process research involves recourse to this strategy at some point. However, the narrative can serve different purposes, depending on the objectives of the research. For many it is merely a preliminary step aimed at preparing a chronology for its subsequent analysis - essentially, a data organisation device that can also serve as a validation tool.

For those who adopt a constructivist or naturalistic perspective (Dyer & Wilkins, 1991; Lincoln & Guba, 1994), the narrative can be the main product of the research. The aim is to achieve understanding of organisational phenomena - not through formal propositions but by providing the "vicarious experience" of a real setting in all its richness and complexity (Lincoln & Guba, 1994). For the proponents of this approach, it is the contextual detail and the narrative that will allow the reader to judge the transferability of the ideas to other situations. The theorist who adopts this philosophy tries to avoid excessive data reduction and to present as completely as possible that the different viewpoints on the process studied.

This strategy avoids commitment to any specific anchor point, although because of the structure of narrative, time tends to play an important role. Also, because of its focus on contextual detail, this approach works best for one or a few cases. Ideally, the variety and richness of the incidents described and of the linkages between them should convey a high degree of authenticity that cannot be achieved economically with large samples. The researcher who adopts this approach tries to avoid excessive data reduction and to present as completely as possible the different viewpoints on the process studied.

In the hands of an accomplished writer, this sense-making strategy has the great advantage of reproducing in all its subtlety the ambiguity that exists in the situations observed. It avoids the necessity of clear definitions when boundaries are not clear and, and easily accommodates variable temporal embeddedness and eclectic data. Verbal statements have the advantage of being widely comprehensible. They have the disadvantage of being unwieldy for logical manipulations. Without denying the usefulness of the narrative approach for communicating the richness of the context, research -particularly in management science- is expected to offer more explicit theoretical interpretations. Narratives describing critical events or summarizing unobtrusive long-run developments generally derive from interpretations made after the fact, and are therefore subject to bias and distortion. When relying on this strategy alone, one may to easily end up with an idiosyncratic story of marginal interest to those not involved and a rather thin conceptual contribution. Appealing process research needs to push beyond authenticity to provide something of wider value.

3.5.5.2 Visual Mapping Techniques

Process data analysis may also take matrix and graphical forms (Miles & Hubermann, 1994). According to Miles and Huberman (1994), such forms are deemed to have several advantages over narrative approaches. They allow the presentation of large quantities of information in relatively little space, and they can be useful tools for the development and verification of theoretical ideas. Visual graphical representations are particularly attractive for the analysis of processes data because they allow the simultaneous representation of a large number of dimensions, and they can easily be used to show precedence, parallel processes, and the passage of time.

This type of drawing obviously is not a theory but an intermediary step between the raw data and a more abstract conceptualisation. To move toward a more general understanding and further analysis, one might compare several such representations to look for common

sequences of events and common progressions in sources of influence (Langley & Truax, 1994).

Different forms of process mapping have long been used by organisations to plan, understand, and correct their own work processes (in systems analysis, quality improvement, business process re-engineering, and so forth). Organisational researchers could perhaps learn from this example.

One way to represent system dynamics is by the use of causal loop diagrams or causal map, which were first suggested by Maruyama (1963). A causal map visually depicts the relationships between the entities that comprise a complex system. These diagrams are also known as influence diagrams (Wolstenholme, 1990; Daellenbach, 1994). They are intended to be of use in understanding the broad structure of a system rather than its detail and they are therefore kept deliberately simple. A causal map, as defined by Montazemi and Conrath (1985), refers to a representation of the relationships that are perceived to exist among the elements of a given environment. The purpose of causal mapping is to develop rich understandings of complex situations. The causal mapping technique provides a means of identifying and understanding the critical decision and information structures that underlie an organisation's behaviour by visually depicting key variables and processes and their associated feedback loops. The causal map can then also be used as a guide for modifying these decision and information structures in order to provide decision makers with more relevant, accurate, and timely feedback data. One could also proceed to developing more abstract coding to generate local "causal maps" that would constitute the beginning of a middle-range theoretical explanation (as described by Miles & Huberman, 1994). Finally, one might compare and integrate several such causal maps to elaborate a more general theory.

Causal mapping techniques have been usefully employed in a number of areas: system dynamics (Richardson & Pugh, 1981), administrative science (Bougon, Weick & Binkhorst, 1977; Ford & Hogarty, 1984; Weick & Bougon, 1986), and management science (Carroll & Thomas, 1982; Nakamura, Iwai & Sawaragi, 1982; Zirk & Adelman, 1987). Causal Loop Diagrams (CLD) provide a useful way for representing dynamic interrelationships. CLD make explicit the understanding of a system's structure, provide a visual representation to help communicate that understanding, and capture complex systems in a succinct form providing a useful alternative/ supplement to narrative for describing complex dynamic phenomena. The relationships in a system can be represented by the influences the

components will have on each other: influences can be reinforcing (i.e. positive) or balancing (i.e. negative). Furthermore, the influences in a system are often subject to delays. Such diagram or map shows the transformation processes of the system, i.e. how the control inputs and other inputs affect the system variables for various components, and how these in turn affect the system outputs, in particular performance outputs. It does not show the flow of material or information or the sequence of tasks and/ or the steps of the replenishment of decisions. An example of a very simple causal map of a feedback is displayed in the figure below. The concept of feedback allows to link causal structure to dynamic behaviour.

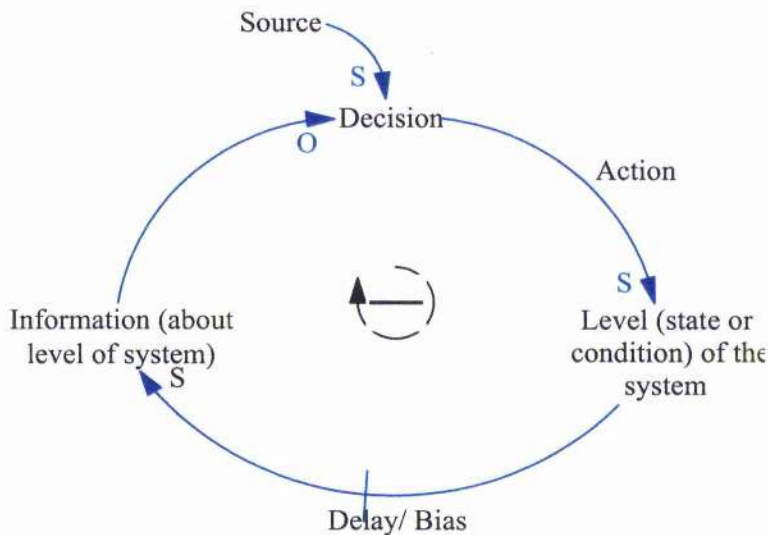


Figure 3-7: Causal Loop Diagram of a Basic Feedback Loop

Adapted from: Forrester, J. W. (1968) *Principles of Systems, 2nd Preliminary Edition*. Cambridge, Ma: Wright-Allen; p. 1-8.

In feedback diagrams the labels '+' and '-' are attached to causal links to denote their polarities, i.e. the relative direction of change of the elements being linked; equal direction for '+' and opposite direction for '-'.⁴² The polarity of a feedback loop is the product of the polarities of its causal links providing a very simple rule for determining the overall character of the feedback loop. An odd number of negative links indicates a self-balancing ('negative') loop, an even number of negative links a self-reinforcing ('positive') loop. Feedback loops are frequently composed of both positive and negative causal links, and their overall character

⁴² Alternatively 'S' (same) and 'O' (opposite) are used to denote the polarity of a causal link and 'R' (reinforcing) and 'B' (balancing) to indicate the overall character of a feedback loop.

can be determined by counting the number of negative links of a loop (Anderson & Johnson, 1997; Kim, 1994; Richardson, 1992).

In above figure, the feedback loop is a closed path connecting in sequence a decision that controls action, the level (understood as state or condition) of the system and the information about the level of the system, the latter returning to the decision-making point. The available information, as it exists at any moment, is the basis for the current decision that controls the action stream. The action alters the level of the system. The (true) level of the system is the generator of information about the system, but the information may be late or erroneous. The information is the apparent level of the system, which may differ from the actual level. It is the information (apparent level), not the true level, that is the basis for the decision process (Forrester, 1968: 1-7 – 1-8). This is an example of a negative-loop causal structure where the system stabilizes at a certain level. In positive feedback causal structures, there is ever-increasing growth or decay. "Complex" organizational systems are thought to be complex because they are perceived as being comprised of numerous and quite convoluted positive and negative feedback structures. Even when such structures are explored through a systematic methodology, they can prove very troublesome to unravel and understand.

The above figure also reveals a number of the conventions used in CLD. The first is that each link is represented by an arrow that carries a sign at its head to indicate the direction of causality of the link. A 'S' next to the arrow's head indicates that a change in the factor at the tail of the arrow will cause the factor at the head of the arrow to change in the same direction, other factors remaining constant. An 'O' indicates that the resulting change will be in the opposite direction. Delays are marked by a line perpendicular to the arrow.

Montazomi and Conrath (1985) state that to build a causal map of an organizational phenomenon, it is necessary to first start with the purpose for which the map is being built. This statement of purpose provides a clear definition of the problem space and aids in the next step, factor (variable) identification. Relevant factors are those believed to influence the decision environment and that can be expressed in terms of levels or system states. In an effort to preserve the clarity of a causal model, it is imperative to include only those factors that are truly important and relate directly to system output. Rockart (1979) suggests that one possible means of identifying these truly important factors is the critical success factors methodology. The final step in the construction of a causal map involves the identification of the causal relationships among these factors. A number of methodologies are available to

facilitate such an exercise: analysis of members' statements (Axelrod, 1976), an interviewing process (Bougon, 1986), specially designed questionnaires (Montazomi & Conrath, 1985), or by structured goal analysis (Coyle, 1977). The causal mapping process is invariably cyclic and iterative (Asher, 1983).

Approaches like those described required many observations of similar processes. This indicates that the mapping strategy may be most fruitful as a theory development tool for the analysis of multiple holistic or embedded cases. Of course, as a simple presentational method, it has a broader application.

Process mapping allows the preservation of some dimensions of data ambiguity but excludes others. This form of representation gives no room to such factors as power, conflict and emotion. In part, the range of possibilities for mapping depends on the researcher's objectives and creativity. However, graphical forms may be biased towards the representation of certain types of information and against others. Relations of temporal precedence, authority, and influence between objects or individuals are quite easily represented. Continuous traces could even be used to represent the levels of key variables (e.g. financial performance). However, emotions and commissions are less easy to express this way, being more difficult to temporally pin-down.

The graphical strategy, thus, offers a means of data reduction and synthesis that is less radical and more flexible than that used in the quantitative studies. However, unless supported by other methods, the conclusions derived from it can have a rather mechanical quality, leading the researcher to neglect important contextual factors by dealing more with the surface structure of activity sequences than with the underlying forces driving them.

The approach can produce useful typologies of process components, but attempts to reach beyond this to deeper generalisations are often parsimonious because of the large number of variations possible and the difficulty of predicting which ones will occur and why. This is important when attempting to generalise findings since this could lead to decisions based on incorrect assumptions.

3.5.6 Summary and Conclusion

Any research project involves a choice between gathering a lot of information on a small number of cases as opposed to gathering a relatively limited amount of information on many cases. Fundamentally, it is a choice about which kind of leverage is sought. Choosing to study a large number of cases and focusing on variables and concepts gives leverage in comparing across cases on a limited range of the phenomena of interest. Choosing a small number of cases and focusing on the cases as wholes gives leverage in comparing across many aspects of the phenomena of interest.

This research is concerned with organisational renewal, i.e. strategic change. This requires understanding how organisations evolve over time and why each one evolves in a specific way. The research must be descriptive and seek to capture the processes involved. Process data “[...] consist largely of stories about what happened and who did what when – that is events, activities, and choices ordered over time” (Langley, 1999). The lack of an elaborate and well-established theory on organisational renewal in conjunction with the complexity of the phenomenon of interest argues in favour of a qualitative approach. The need to study the renewal efforts in context, the involvement of multiple, interconnected units of analysis, the aim of developing in-depth understanding of the phenomenon and the processes involved present a compelling argument for focusing on limited number of cases as opposed to large samples.

The following propositions were derived from the literature review and were instrumental in guiding data collection plan.

Proposition 1. There exist two types of process categories in organisations that can be distinguished by their exertion of converging or diverging forces on the activities of an organisation.

Proposition 2. An organisation’s capacity to renew can be systematically fostered by organisational processes and systems

Proposition 3. Most organisations systematically increase the number of controls (both in quantity and quality) as they grow in size.

Proposition 4. With increasing size organisations lose their potential to change.

Proposition 5. Organisations become increasingly inert over time as procedures, roles, routines and structures establish implying that organisations lose their capacity to change with increasing age.

Proposition 6. Organisations unintentionally engage in processes of selection and reinforcement that are dominated by short-term considerations but limit future strategic flexibility and manoeuvrability.

Proposition 7. Organisations depend on and employ similar processes to convert inputs into outputs. The processes employed are determined by the nature of organising work flow and information sharing and, therefore, similar in different organisations.

Proposition 8. Organisations can only transform in radical steps.

Figure 3-8: Guiding Research Propositions

Three in-depth case studies are undertaken with the focus set on self-renewing processes and structures. These in turn serve as a starting point for uncovering principles of successful organisation and practices that hold the key to renewal and sustained growth. In order to find possible answers, the developed theoretical framework is used to compare declining organisations with well performing organisations. The case analysis begins with an effort to understand the forces that trigger and processes that act to sustain decline in organisations. These are contrasted by a number of case studies that serve the identification of underlying characteristics and dynamics common to high-performing/ successful organisations (and that distinguish them from organisations that are not).

To provide insight and learning on the subject matter good access was paramount in the selection of companies. Furthermore the organisations had to conform to set criteria regarding **performance**, and were deliberately chosen with differences regarding **size, age and industry sector** in order to provide insight on the derived research propositions. Petroline Ltd and Shell direct GmbH agreed to participate in the field study. These two case studies are complemented by a case study of the Minnesota Mining and Manufacturing Company (3M) which was not subject to an immediate field study. The case was included as a benchmark of best practice on organisational renewal. Sources of evidence for the 3M case study are mainly provided by documentation and archival records as opposed to interviews and direct observation. Due to its prominence, 3M Company activities are extremely well documented.

To offset the lack of evidence from own direct observation or own interviews the case study makes use of findings from ample research projects that are also based on these sources of evidence and provide an in-depth account of the company in this respect.

For Petroline and Shell direct the data collection was conducted on-site and were based next to documents and archival records on interviews and passive observation. Inevitably, data informing about the processes of progress and preservation and subsequent organizational developments were of primary concern. Data sets also included information on projects that demonstrated innovativeness (e.g. new product development) or trying to assess the impact of ideas and trace their path from the individual into the organizational decision-making process. This involved identifying the groundbreaking ideas and tracing their way into the organisational decision making process as well as the main actors involved. It also involved reconstructing the evolution of the project and the subsequent impact on the organizations development and competitiveness. These aspects were supplemented by general information such as organisational charts, financial data etc. Furthermore data was extensively collected on the activities these organizations engage in. This data is represented in form of a Business Activity Model.⁴³ Passive observation was instrumental in developing informed own impressions of the organisation's functioning. To ensure reliability of the data a case study database was created for each company.

To ensure construct validity, data was triangulated by using multiple sources of evidence and were possible having key informants review the draft case study report. The research design is based on multiple cases that follow replication logic. The cases have been carefully selected to differ along a variety of important dimensions (size, age, industrial sector) and conformity with respect to the dimension of superior performance relative to direct competition allowing for both literal and theoretical replication depending on the dimension at question. While this helps establishing external validity, the results from this case analysis, like all exploratory research, should be seen as tentative. Generalizing from a few cases can be dangerous because most situations are atypical in some sense.

Organisational change can be usefully conceptualised in terms of process and content. Process refers to how change occurs. Content describes what actually changes in the organisation. Theories and analyses of organisational change seek to explain why organisations change as

⁴³

The approach used in this context and the presentation of the results can be found in Appendix B.

well as what the consequences are of change. Empirical evidence on both aspects is fragmentary and occasionally contradictory. Models that consider both process and content show the greatest potential for resolving this situation. Organisational change involves, by definition, a transformation of an organisation between two points in time. For most analysts, the key aspect of change comes from comparing the organisation before and after the transformation. Making such comparisons constitutes an analysis of the content of organisational change. It assesses what actually differs in the organisation at the second point in time. A second dimension of organisational change concerns the way the transformation occurs –the speed, the timing, the sequence of activities, the decision-making and communication system, the resistance encountered, etc. Examining these factors involves a focus on the processes involved. Process considerations may be independent of content, or they may be interactive. However, attempts at organisational change often take unexpected turns and lead to transformations other than those intended (Merton, 1936). Furthermore, change may occur unintentionally as a by-product of other decisions and actions within the organisation (March, 1992; Burgelman, 1994). For these reasons it is important to focus on organisational transformation in content. In most contexts, it is best to analyse and evaluate both process and content factors.

This aim of this research is to identify what kinds of processes exist, how processes interact with one another, and how organizational designs can be constructed from interacting processes. This research aims to employ both methods of narrative and process mapping in the analysis and evaluation of both process and content factors and to capture and present the relevant dynamics, help establish internal validity.

Chapter

4

ORGANISATIONAL RENEWAL: PROCESS DESIGN

Case Study:

Petroline Wellsystems Ltd, Aberdeen, Scotland

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4. Petroline Wellsystems

Petroline Wellsystems Ltd was established in 1980. Operating within the specialist area of well intervention and completion, the company rapidly gained a reputation as a leading innovator of oil and gas industry-based technology, developing a wide range of specialist products for companies operating on a worldwide scale. In 1999 Petroline was acquired by Weatherford International, one of the leading American oil-service companies, for approx. £104m.⁴⁴

4.1 Company Development

Petroline Wellsystems was founded by Klaas and Mirjam Zwart, a Dutch husband and wife team, in their garage in Aberdeen, Scotland in 1980. By 1998 Petroline employed around 200 people, operating engineering facilities in Aberdeen and Arbroath and had an international network of sales offices. Its net-profits increased on average 78% a year, from £1m in 1995 to £5.6m in 1998, when sales reached £20.9m.

Petroline Performance Summary 1993 - 1998

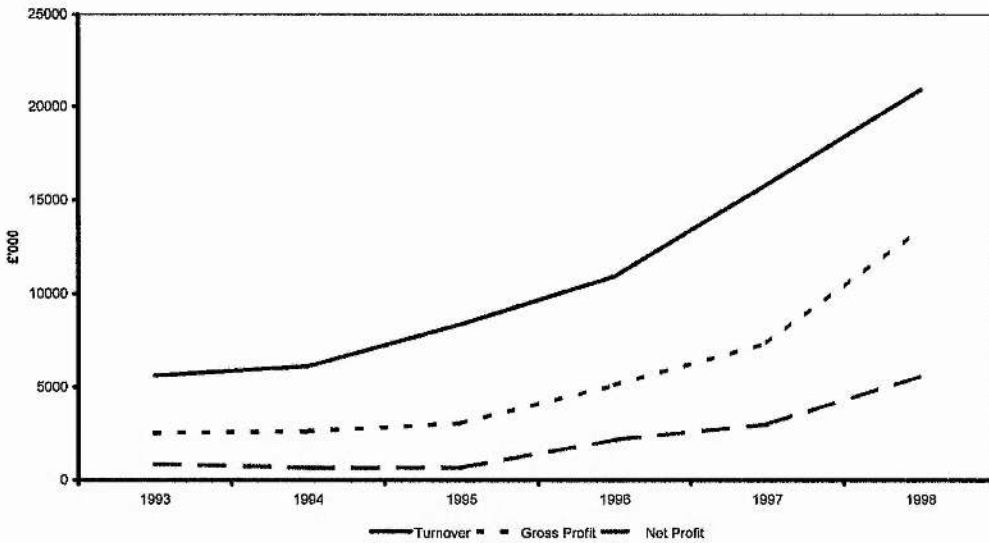


Figure 4-1: Petroline Wellsystems Performance 1993-1998

Data Source: Petroline Wellsystems Ltd.

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This case study is concerned with the developments of Petroline Wellsystems from its founding in 1980 until 1998/99, that is the period before it became part of Weatherford Completion Systems.

In the early days of the Petroline's existence their products focused mainly on post completion well intervention operations. From the outset, Petroline has pursued a policy of building unique (new) products.

I think, I started off with the best piece of equipment I could start off with because the [Pumpopen Plug] was like an accessory, and an addition to existing equipment, and that piece of equipment was quite easy to make. It wasn't expensive and it didn't have any disadvantages. So they could just connect it, thread it on to the existing piece of equipment, run it down the hole as they normally did and there was no down side. There was only a plus side. [...] As I wasn't a good salesman, I'm still not a good salesman, I couldn't sell any of that stuff. But if you can convince a customer you can save them £50,000, eventually people start believing you. And that's what happened, you know. (Interview K. Zwart)

Due to persistent product development and expansion of the existing portfolio, Petroline's current product lines can affect well performance from the planning stage, through drilling, completion and subsequent well maintenance over the entire productive life-span of the field.

I have never been in business to produce imitations. If there was a packer, or a specific piece of equipment that was functioning, well, I didn't have any interest in reproducing it or coming up with a similar piece of equipment. We only came in where there was a lack of something, or something performed very poor. [...] I steer clear of doing the same thing as everybody else. (Interview K. Zwart)

Petroline Wellsystems: Patents 1990-1998	
1990	Uniset, QLS, Pumpopen Plug (prior to 1985), PAJ ('85 – '90)
1992	Bride Plug, Pack-off element, Running Tool, Thin Safety Valve, Bombhanger
1994	Metal Seal, Standing Valve, ABD, Centraliser, EST-Applications (3 official)
1996	Selective Lock, Cementing System, Improved Check Valve, Modification to Russel Valve, EST Applications (another 3 official)
1998	EST-Applications (another 6 official), Chemical Injection Sub, CIV-MR

Figure 4-2: Patented Petroline Products (1990 – 1998)

Data Source: Petroline Wellsystems

The first product was the Pump-open Plug (PoP). It was designed to enable plugged wells to be brought back into production more safely and economically in comparison to using conventional wireline plugs. It is operated by applied differential pressure from above, allowing the device to be pumped open, hence, giving its name. In comparison to solutions using a conventional wireline plug the PoP is a real time saver.

Any oil company that's got to, if you've got to plug a well for example, using a wire line plug, to get the oil back on stream you have to go back in with a wire line unit, pull normally an equalising prong, then go back in and pull the plug, so usually you've got two runs, and a wire line to do it. What this device did was it enabled you to set a lock with this plug below it, plug off the well, so that when you come back to the well and you want to put it into production all you had to do was pressure up the fluid above this, which indexed it down. It's a clever way it's done as well. It's now just a standard type design. Whether you pressure up above the PoP, it moves down, it opens up ports and it lets the well flow. What that means is you can immediately put your well back into production and you don't need to pull this thing out until such times as you got to go in and do some intervention work in the well anyway. (Interview R. Anderson)

The development of own product lines, however, was a gradual process. Initially, the company was mainly occupied with “[...] machining, reproducing bars for service companies, and doing fishing tools for service companies [in order to keep] the turnover going” (Interview K. Zwart). The production of additional solutions was very much customer-driven. Starting with the PoP, which was mainly a well maintenance tool, the product range expanded to include more the tool string components for well maintenance. Then heavy-duty fishing tools were added to the range. Petroline's managing director Fraser Innes recalls:

When I joined in 87 there was really only three fully-fledged products. There was the Uniset-Lock system, which was still in development. We had only one or two sizes. Then there were the Jars, which again we didn't have all the sizes we have now, that was the main product line. And the Pump Open Plugs. That was really all there was. We had just put the first trial Uniset locks onto the market place as a retro fit, so it was a very small product line at the time. All the products we had at that time tended to be low volume, high margin products.

What essentially happened, I mean I was out trying to generate business, and very much coming at it from the point of view that we only had one or two products to offer. If you went and offered the products and they weren't

interested, where do you go from there? So it was very much a consultative thing, trying to find out what the issues were, the problems were, and going about it with in mind that if we didn't have something we could come up with something. Sort the problem out, and find a solution. So it was a solution-based approach even very early in the company's existence. And that's really been primarily where the products have come from.

From the way I understand it, the classic relationship for industrial, or technical, product sales, is you are in the middle, and you are representing your customer to the company, and it is your ability to interpret what they want and what you might be able to offer them —because they don't always know what they want— your skill is to interpret where there is an opportunity for the application, and then put that back into the organisation and get the right kind of output for the customer to then recognise that he can address his issues and get his business done. So it is kind of a two-way process. (Interview K. Zwart)

4.2 Sub-case: Expandable tubular products

In the early 1990s, researchers at Shell had an idea for expanding a slotted tube/casing with help of a cone that passes through it. The Expandable Slotted Tube (EST) is a pipe with a series of staggered, overlapping axial slots cut into it. This slot configuration allows the pipe to be radially expanded more easily than a solid tube. Expansion is achieved by pushing a conical expansion mandrel through the EST in an axial direction.



Figure 4-3: Deployment of an Expandable Slotted Tube

Source: Petroline Wellsystems, Ltd.

The slot pattern allows for expansion up to several times its initial diameter, depending on the slot geometry and dimensions and can be designed to fit almost any well-bore size, yet remain small enough to pass through prior restrictions allowing it to be used in virtually any well application. These expandable properties also provide the flexibility to cope with unexpected problems during both drilling and completion of the well. Typical expansion is 50 % with less than 1 % overall contraction. The

expansion process strain-hardens the metal keeping its burst/collapse properties essentially constant.



Figure 4-4: Finite Element Analysis Design of EST

Source: Petroline WellSystems, Ltd.

EST is deemed a key technology for slim-hole drilling, which could help oil and gas operators access reservoirs not easily reached with current methods. Existing technology requires that wells are drilled and completed in a telescopic fashion with successively smaller casings/ liners and completion components being set at successively greater depths. Consequently, large-diameter top and intermediate holes have to be drilled and cased to allow relatively small-diameter production casings and tubing to be run and installed. This is a wasteful process and a number of developments are in progress throughout the oil and gas industry to make well designs more diameter-efficient. Ideally, wells would be drilled with one hole size from top-to-bottom and be lined with one size of casing. By expanding the casing, hole size could be maintained and targets reached with minimal well tapering. The results are obtained through improved reservoir economics by reducing well capital expenditures and improving success rates in reaching sub-salt targets. In addition to rig-time savings and lower well costs, the application of EST technology promises to result in overall smaller hole size. Expandable pipe may also have applications in patching and cladding existing casing.

However, at the time of its initial conception it was very much an idea generated by research people. Subsequently the technology that allowed deploying and commercially using such a technology downhole did not exist. This had yet to be developed.

The first potential application identified, which was based on this expandable technology, was a borehole stabilisation technique, i.e. expanding one of these pipes up against the well bore and stabilising it. Briefly explained, after a well section is drilled, expandable casing is run, in the usual manner. Once in place, a mandrel is run to expand the casing. The mandrel can be pushed, pulled or pumped through the casing, depending on application.

To further the development process first-hand practical knowledge of a service company was required. Initially major suppliers for drilling and wellsystem equipment such as Baker, Halliburton, Schlumberger, Dresser and Weatherford were approached to try to get them interested. At the time, these major service companies did not see much future in this expandable technology.

There were two reasons why they weren't interested. 1 They didn't have the vision. The initial way it was thought of was quite abstract. A piece of pipe that you slot in and you expand. 2 It conflicted with their existing product portfolio. So what Shell wanted to do with it, use it as a borehole stabilisation technique, really impacted on their market for selling drilling products, which were liners, casings and cementing services. (Interview P. Metcalfe)

In 1993 Petroline were involved in some discussions with Shell Research on other products. Quite by chance, they were also approached to become involved in the development of expandable slotted tubes, i.e. the design of deployment techniques and the application of the technology so it could be used down hole in an effective and viable manner.

It was a loose agreement early on that Petroline would provide the running equipment for the expandable slotted tubes, and Shell would work on the development of the slotted tube itself. Or in the case of the sand screen, similarly, Petroline would provide the deployment techniques, the running tools, the expansion mandrels and Shell would develop the expandable sand screen. (Interview P. Metcalfe)

Petroline had been given an idea by a major oil company and those in charge (Klaas Zwart and Fraser Innes) saw that for relatively little import on their side, they could have a chance at commercial exploitation of this potential technology.

Ultimately these guys are very focused on making money out of technology. It's not technology per se. Ultimately this technology could have very good

use in oil and gas wells, and it could make Petroline money in the future. It must have been a long-term bet at the time, but where we are now, we are a bit closer to reality. We have one commercial product and we've got two more following closely on their heels. (Interview P. Metcalfe)

Initially, the main task involved was trying to find suitable (essentially commercially exploitable) applications for the expandable technology.

So far, Petroline's range of expandable products consists of three main systems:

- ESS - Expandable Sand Screens
- ABL - Alternative Borehole Liner
- ECL - Expandable Completion Liner

While all use the expandable slotted pipe as the base of the technology, the individual products differ in their application.

Although they are all very much aligned on the same basic theme, the actual products themselves are three distinct applications. For example the expandable sand screen has no complement whatsoever to the alternative-borehole-liner. They are in different market niches and require completely different market approaches. (Interview P. Metcalfe)

In its simplest form, an expandable slotted tube can be used to line a well bore, as a completion liner across the inter bores producing oil and gas.⁴⁵ Used as a completion liner, EST offers a number of advantages over conventional liner technology. Annular flow paths are eliminated. Production from the reservoir flows directly from the formation face into the wellbore. This makes production logging more effective and

⁴⁵

The harsh conditions experienced in the borehole of a typical oil and gas well place extreme demands upon any mechanical components or hardware inserted into it. This presents a significant challenge when drilling very deep prospects in proven areas, where at depths between 5,000 and 8,000 metres the pressure may be in excess of 750 bar and temperatures up to 210°C. If testing in a well indicates the presence of a potentially productive formation, the well must be "completed" so that the hydrocarbons can be produced. Once the well has been drilled, a casing is fixed to the wall as part of the completion process. This supports the walls of the hole against collapse and prevents "communication" between various rock strata. The entry into the well of fluids from formations other than the producing layer, and the flow of oil from the producing layer into other rock formations must be prevented. According to the nature of the producing formation, different completion methods are used, but a string of casing is always run and cemented, at least to the top of the producing layer.

results in enhanced reservoir well test analysis/ simulation. Estimates suggest that over the full lifecycle of the well could improve the ultimate recovery by as much as 10% compared to the ordinary slotted liner.

Unexpected problems while drilling a hole might dictate the premature setting of a casing string. Using conventional technological solutions, this causes a reduction of the hole diameter that results in a compromised completion size. This is a major problem in modern, optimised well designs. This telescoping effect can result in unworkable hole sizes that could lead to well abandonment. The ABL eliminates these problems without the loss of hole size. The ABL is a borehole lining technique that can isolate sections of a borehole with zero or minimum loss of hole size allowing to retain the hole size and the well to be completed according to plan. The ABL utilises the expanded slotted tube as a guide and wear resistant liner across the problem section and the cement sheath, if required, provides the pressure seal around the EST. By utilising ABL strings as an integral element of well design, wells can be drilled slimmer, faster and therefore cheaper.

Some wellbores for oil and gas produce sand as well as hydrocarbons requiring a sand screen. The third potential application combined EST with sand control technology creating an expandable sand screen (ESS). Due to its expandable nature, the combination of EST with sand control technology eliminates the weaknesses of current sand control products and provides a number of unique features. The ESS expands against the borehole providing support and eliminating the annulus, but it can be installed as quickly and as easily as conventional screens. Because the annulus is removed, reservoir treatment and isolation become possible. Because the ESS is expandable, it is also suitable for remedial installations, avoiding expensive work-over costs. Its remedial use is especially attractive for multiple zone completions where only one intermediate zone may require sand control. Placing conventional screens across intermediate failed zones usually results in smaller diameter restrictions limiting well accessibility and productivity. ESS overcomes this problem.

Initial ideas were focused on the development of EST for use as an expandable sand screen. In 1995, the picture changed somewhat, in that Shell-Expro, (exploration branch of Shell UK) required an application to stabilise and resolve a drilling

problem. Researchers at Shell (Stewart et al., 1997) developed a fibre-cement wellbore-lining system based on EST to provide a casing system without loss of hole size (essentially the ABL application described above). This temporarily shifted the emphasis completely away from the initial idea of developing an expandable sand screen.

Over an 18-month period, all the efforts went into developing and field-testing the ABL-technique. Shell provided the wells for field-testing. Once the tests proved that the ABL could be deployed successfully and reliably, Shell decided it wanted to commercialise this technology so that their operation companies could start using it and save costs on their wells. There was a further 12-month delay until April 1996 when Petroline actually signed a commercial agreement with Shell whereby the base-knowledge and the patent around the expandable slotted tube was licensed in return for a royalty fee. Petroline started a commercial business on the back of it. This meant further-developing the product and overcoming a series of hurdles in the process.

4.2.1 Technological Issues and Obstacles

4.2.1.1 Expandable Connectors

One of the main obstacles in the development of EST was how to connect individual lengths of these tubes. It was recognised early on that it was crucial to get an idea that worked to make the technology viable. Hence, Shell and Petroline worked extensively on trying to develop a connection technology for EST. Petroline was first to develop and patent such an expandable connector. From that point on Petroline ceased to be involved in just the development of running tools and started to get critically involved in the design of EST, in particular the design of the slots that determine the expansion behaviour and hence the functioning of EST.

There were still many other hurdles to overcome especially problems surrounding the manufacturing of the product. The unique device/ process, which could manufacture EST in quantity, whilst meeting the high standards of quality and precision, had yet to be developed.

Although it appears very simple on the surface, the manufacturing side of EST initially proved a larger hurdle than designing the tool. Designing the

expansion tools and the connections was easy compared to all the technical problems we had to overcome to manufacture these things, to the desired quality, quantity and precision. [...] We couldn't make any ESTs commercially for 18 months because we didn't have the manufacturing technology to be able to do it. (Interview P. Metcalfe)

4.2.1.2 New Manufacturing Process

First, the available cutting-machinery was unsuitable. The machines used circular saw-blades and consequently were suited for cutting straight. The typical EST pipe, however, is not straight. The limited action of conventional machines never allowed cutting slot patterns, which were perfectly aligned with respect to the shape and form of the pipe. Perfect alignment, however, is critical for EST performance. If the widths and the spacing of the slots are not uniform, the EST will expand asymmetrically or may rip down one side. Therefore, much effort went into the development of the actual design of the slot patterns and a machine that could produce those patterns.

It was a brand new process, which hadn't been used with pipes before. People had always slotted pipes using circular saw blades. We developed a brand new technique, which had significant advantages in the end. It uses higher-pressure water to cut the slots. (Interview P. Metcalfe)

4.2.1.3 Metallurgy

Much of the research and development efforts focused on overcoming pluralities regarding the metallurgy. In the early days of its development EST were manufactured using a very expensive, highly ductile material called 316L. After prolonged tests with a variety of different substitute materials Petroline developed a carbon-steel alternative, which was much more robust and cost only a quarter of 316L.

The design of the pipes posed further critical metallurgy issues to overcome. Layers of varying thickness over length of the pup joints, for example at the connection, resulted in different rigidity with varying expansion properties.

4.2.2 Organisational Issues and Obstacles

Traditionally Petroline has been concerned with well completion. With its EST engagement, Petroline has entered the market for drilling equipment. This new

venture has exposed several organisational deficiencies requiring some form of organisational response/ alteration to the design and the structure but also touched on cultural aspects. Mainly lacking expertise with the development. This of course had ramifications for the production and R&D and also the sales side of ABL, which is essentially a drilling product.

4.2.2.1 Developing the Product

Building a Critical Knowledge Base

As mentioned earlier the technology was completely new and there were many critical issues connected to the design but also to the fabrication of the tubes that needed to be solved. To overcome aforementioned obstacles a range of different approaches were used. Initial initiatives were focused on establishing and developing the necessary knowledge base to successfully develop and produce EST products. To this end, Petroline developed a project team and strongly liased with universities in addition to employing the help of a number of consultants.

To get things started Petroline hired an expert, Paul Metcalfe, who had a strong background in drilling and consequently brought with him a set of experiences, which nobody else at Petroline had. During the early stages of its development there were only two people working on EST. Once Petroline got a license, a further design engineer was hired to speed up the development process. About 6 months after having the license, an additional drill engineer was hired with the main task of selling EST.

It's been an extremely small team that's done that all the way through. We're probably going to look at three full-time engineers working on EST so that's only a team of 7 maximum within a company of over 200 people now working on EST. [...] As far as the actual product development goes, it's all done within that team, and is based on the team's experience. [...] There's quite a critical base knowledge now at Petroline.

The small team size has pros and cons. It's been good in terms of time to develop. It's been bad in terms of breadth of knowledge in coming up with the best solution. If we had access to all the best minds in Petroline to develop a product, we'd have ended up with a better product earlier, rather than having to slowly amend the product and make it better and better. If we'd had too big an organisation to start with, we maybe would have lost direction, maybe would have not communicated as well as in a small group. It doesn't matter because at the end of the day, the size of the group was

determined by cash flow availability in Petroline, and investment capability. Relative to the size of the company, they still invested a heck of a lot of time and people in to EST. The R&D group is 5, three of them are EST. In terms of R&D investment the contribution has been large. (Interview P. Metcalfe)

The manufacturing technology was developed in conjunction with a locally based company called Aquatronic that had expert knowledge of the fabrication of pipes. Petroline encouraged them to get involved by offering them licences for the key manufacturing technology for cutting the slotted pipes. The main technology devised for cutting the slotted patterns uses water pressure. Depending on the metallurgy, an alternative production technique using laser technology to cut the slotted patterns was also developed. Aquatronic saw an opportunity to build a business on the back of this technology and developed a machine that allowed manufacturing EST with necessary quality specifications in the desired quantity. By acquiring shares, Petroline secured their interest in this company with this manufacturing capability.

It's a funny old thing that piece of pipe. It looks quite simple but there's a lot of know-how goes into expanding that piece of pipe. And that all resides within the team. Manufacturing people help us make it, but all they have to do is take the drawing and help us manufacture it. The design, engineering, the development of the product, the marketing of the product, that's all done with that small team. There's very little interference from anywhere else. [...] We've got a product which we understand and we can create and sell. And the other side of the thing now is the reaction in the market to the product. (Interview P. Metcalfe)

Securing Knowledge

A key element in the development of EST has been the systematic use of patents to protect critical knowledge and investment. Petroline holds patents that extend from the actual base technology over the design of the tube to the manufacturing of these tubes, despite much of the invested capital being provided from external sources for example oil companies. Usually at the outset of the development project a development agreement is signed that specifies that both partners are free to develop ideas and patent them.

You've got to have that open relationship. Most operators start off, when you try to get money off them, they say, 'Anything you design is ours'. And I'll say, 'Let's look at the practicalities of that. Even if you've got an idea, will you ever be able to use it? No, you haven't got the structures in place to be

able to use it.' Most standard contracts are like that, but reality pervades. You've got to have a reciprocal intellectual property agreement there, otherwise what's the point? It's not commercial; we're not commercially interested in only developing something for one person. [...] The oil company isn't working on it night and day, so they don't have any ideas, and they don't patent. We are, we do, and we secure it. (Interview P. Metcalfe)

However, the active use of patenting to protect knowledge was not only applied to EST. The company has a long and strong history of patents (see Figure 5-2).

There's no point in spending a lot of money on R&D if somebody else is going to copy your ideas. That's happening. We have a few court cases where people have tried to do that. That happens everywhere. Therefore, you spend a lot of money on patenting to keep your property. (Interview KZ)

Risk Control/ Funding

For a relatively small company like Petroline the amounts involved in developing a product like the EST mean high investments and consequently high-risk exposure if the development fails. A key success factor, in effect limiting the risk exposure, has been the company's ability to convince customers to invest in development projects.

I convince an oil company that they need the product and I get them to pay for development. That's precisely what we've done on four developments now. We've taken over a million pounds worth of oil company money and invested that in R&D because then we don't have to justify it internally. Just use somebody else's money. (Interview F. Innes)

In essence, the arrangement with customers resembles placing a bet, since the amount of investment is small in relation to the potential savings for the customer if the tool is successfully deployed.

The key is to identify an operator that has a short to medium-term need for a solution that promises huge savings. You say, 'We can do that for you and even if you spend half a million, if it works, it will save you 50 million.' Is it worth the risk? It's like going to the betting shop and putting 50p on with the chance, you might win £55. Generally, the mentality is the same. They say, 'We'll invest that small amount of cash because if it works, the rewards will be huge and if it doesn't work, well then we didn't waste that much cash.' Now what to them is not a lot of cash, to us is a heck of a lot of cash. Half a million pounds of research money to us is a godsend, because it's half million pounds we would have to have taken off our bottom line, which is much more of an impact than spending someone else's money. It's half million on a spending budget of, let's say, 12 million. That's a large

percentage. That's what you do, you search around for an operator, or they come to you, and they say, 'I think I've got something that could save me a lot of cash. Could you develop it?' Whether it's a sand screen, an EST product, a valve, no matter what it is, if you convince them that spending this small amount of money to develop this product could save them a lot in the long-term. That's what's they're paying for. And that's what we're very good at — actually, very, very good at. (Interview F. Innes)

4.2.2.2 Organisational Challenges

Petroline's engagement in EST also created organisational challenges. Traditional product ranges were wire-line products and completion components. Initial ideas for applications of EST, such as the expandable sand screen, reflected this traditional engagement. However, with the development and field-testing of the ABL-technique (which seemed the most promising application at the time) Petroline entered unfamiliar territory since it is essentially a drilling tool. Prior to the development of ABL, there was no background and expertise with regard to drilling at Petroline.

The new product threw up organisational challenges to overcome since it did not really fit with the prevailing culture and conflicted with existing product philosophy.

Petroline's core business was running tools inside that final completion tubular to shift valves, to run tools into the well to monitor the performance of the well, and latterly to provide certain components within that tubing string — various valves, various profiles for locating tools [...] generally known in the industry as the well completion side of the business. Drilling is making the well, getting to the bottom [...]. The ABL, is very much a drilling-orientated product. The drilling industry is big money, lots of money is spent in drilling wells. It's also extremely time-sensitive in that people want the product when they need the product. They are used to buying things in bulk and having it at low prices and quick availability; all those things, which we couldn't gear up to meet because of our organisational structure, but also because of our financial structure. [...] You really need to be a very large company. (Interview P. Metcalfe)

Completion people tend to buy their equipment on a longer-term basis, sometimes six months to twelve months in advance. In drilling operational, time and financial pressures require a much shorter-term view.

Assume you've got a drilling rig sitting there consuming £200,000 a day operating costs, and pressures to do things right first time are quite high. So to introduce a new technology in a drilling environment, the pressures are very high, you get it wrong people won't like you for it. Your product

doesn't work you'll soon be out of the game. In the completion world, it's different. You've maybe got a platform with 20 wells and a crew of two people, a very cheap little wire line unit for running a bit of wire in the well, every now and again, you're doing a few operations, a maximum operating cost of about £10,000 a day. So the time pressures and cost pressures on those products in the completion and well intervention world are much less, than they are in the drilling world. Because there's a much bigger focus from the cost point of view and the risk point of view, [to compete successfully in the drilling world] you really have to have a good product, have good support, timely, professional people and products.

You do something wrong in a well it could cost you millions, if you lose total production. Generally, the impact is a little bit less. When you drill a well everybody's looking at the pounds and the pence, they're looking at the expenditure. Once the well is drilled and it's producing gas or oil, although the value of that gas or oil can far exceed the costs of the well to drill, the focus is less so, because in people's mind, they know that well is there. [...] So your products have to perform, and becomes very apparent if they don't; very apparent, very quickly. People around the place will know it very quickly. [...] That's the risk with a drilling product. If it works, the market's huge. If you struggle a little bit, then people perceive it to be a risky product, which in general most of the people do with this. (Interview F. Innes)

In drilling, time pressures are almost as important as cost pressures. Hence, equipment is expected to be available immediately, when a problem arises. However, in Petroline, much of the completion equipment is custom made and usually takes weeks to manufacture. Moreover, cash flow is an important factor and there is a limit or rather high-risk exposure in stocking too much in advance.

To circumvent these limitations, Petroline went about shifting products, by convincing customers to not treat ABL, despite being a contingency tool, as a last minute lifesaver for a problem in a well.

Look at all the problems you may have, assess the risk, if you think the risk is large enough, buy some of this in advance as an insurance against a problem happening so that if that problem happens, you've got it available yourself, you the oil company. You don't have to worry about us supplying it at the last minute, us having it, us not having it. So we used that technique to get the stock the product to sell equipment. [...] That trick worked pretty well so that we sold a lot of stuff. But the downside of it was, that once people bought stuff, the immediacy of it tended to be removed from their minds so that when the problem happens they are less likely to want to use it. They have forgotten about it, or people have moved on. The guy who bought the stuff is now in a job somewhere else. The guy who's doing the job now hasn't been through all the technical briefing on the product, he doesn't

understand it. He feels uncertain about it, so he won't use it. (Interview P. Metcalfe)

Since people have been running straight tubes inside other tubes for years, EST, particularly ABL, is regarded to be brand new, out with conventional solutions. To run a tube and expand it to the same size as the other is perceived to be impossible by most drillers. Apart from overcoming the technical hurdles, introducing this new range has meant having to overcome perceptions and ultimately the mindset of potential users/ customers.

Drilling was always an industry based on experience. Up until very recently, the last 10 years, the majority of drilling managers were old Americans who couldn't even add 10 to 25. Virtually everything they knew was based on operating experience and rules of thumb. [...] And those sort of people either like an idea and they run with it, or they say they are not interested in it; 'get out of my office!' Now we are getting a newer generation of drilling engineers and managers coming through, who are a little more technically based, coming from degree standard. They are more likely to take on new ideas. But it's taking time, for the old school, if you like, to be retired, and the new school to come through. (Interview P. Metcalfe)

However, even if individuals are convinced of ESTs' potential they may still have to overcome internal pressure. Since accepted knowledge is built on operating experience, it is perceivable that most experience will reside with the oldest guy around and he will have a very strongly ingrained mindset in favour of the 'tried and tested' solution.

The great thing to do, if possible, would be to come to the marketplace with a new product and say, 'It's not new, we've actually run 50 before'. Then you'd be laughing. But people ask those questions: 'What could go wrong? Where did you run it? Let me see a list of who's run it. Give me contact numbers, I'll phone the guy, see how he got on.' You've got to have that track record to convince people to use it without thinking. (Interview P. Metcalfe)

4.3 Creating a Market Niche

Petroline is still a fairly small player trying to enter a market where the main competitors are already well established. Under such conditions there is an increased pressure for small firms to be innovative, as they do not have economies of scale to

compete on price. Fraser Innes outlines the recent developments and how Petroline actively seeks to effective response measures

In very simple terms, increasingly we find that we have to go and sell products and services to our customers because our competitors are global, multinationals. You've got all kind of different facets and we have to go and try and sell value-added solutions to people who are not necessarily there in an objective role, they have another agenda. [...] It spawns what they call integrated services companies. For example [Company X] are the biggest although maybe not the best exponents in the North Sea, but they have a capability to do everything from drill bits to mud systems. You know they could take a whole field and run it. [...] In our small bit of the world, equipment supply for wells, what happened was the oil companies pushed the expertise out to the service sector, that's the overhead into the service sector. They said, 'You come in and technically manage everything from this level down.' So, where those roles would have been filled in by oil company personnel in the past, they are now filled by contractors. The contractors work for major service product providers. One aspect of the theory met the perceived needs of the oil companies in a number of ways. However, I think that the oil companies failed to recognise that these were basically wedges and once they had driven a wedge in from the management point of view, their remit was always to deliver their own products and services in as huge an amount as possible. Of course [this development] made it difficult for smaller companies like ourselves, where we are looking to add value for the engineers of the oil company, we were suddenly up against an agenda, not always a well hidden agenda, which was basically, we want to sell them, but if they had anything remotely similar, they would always choose their own.

We have tried to overcome this in a number of ways. The first major step was, we had to recognise that if expertise was being pushed into the service sector, we would have to have a greater level of expertise than what we traditionally had. We then started to recruit ex-operators, petroleum engineers, drilling engineers, and so on. The recognition that if we could provide a genuine value-adding service, we could either circumvent this barrier, and the people above in the operations would force [the contractors] to select us. Alternatively, we could provide such a service, and such a range of products that ideally they would be superior, even to the extent that on occasion we would be selected. That also happens but not as often as we like. So that was a major change in this company—to raise the level of expertise that we had here. We are great believers in expert sellers, and the qualities of people we have here genuinely add value for the customer at low cost. (Interview F. Innes)

Of the EST-based developments the ABL was the first marketable development. To market the product and provide technical support Petroline hired people that had drilling experience. At the time, this amounted to three people in the company.

Traditionally, the drilling fraternity are very conservative. They don't take to new ideas unless they've been proven, and so we've found quite some difficulty penetrating the market with the alternative bore lining. We've seen a slight change in attitude recently. People have started to take on new technologies more easily. We've sold quite a lot of the ABL to people who initially were reluctant to relate it to their wells because they saw it as a new technology and therefore they saw it as a risk. (Interview P. Metcalfe)

To increase sales Petroline use a wide range of marketing techniques such as videos, advertisements in brochures and magazines, direct mail shops, presentations. 10% of Petroline's revenue came from EST in its first year. Despite being a difficult product for Petroline to support because the ABL is part of a drilling vehicle, it has been successful and may prove to be a valuable complement to the existing product ranges. However, if sales get bigger the inherent conflict between existing and new product lines may cause more problems.

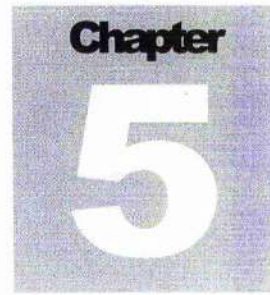
Part of the reason [is] that only certain people have sold ABLs in this company and they are the people who've got the drilling background because they have the know how to approach people, they know what they want to hear about the product and what's important to them. And the people that are involved in selling completion products, they are not aware as strongly what the drilling people want. So yes, that's what I was trying to get across about being an organisational hurdle to overcome. We could never sell £10 million worth of ABL with our current sales-force because 90% of the current sales force don't understand the product, they don't understand what their customers want. And if you are a good sales person, you understand implicitly what your client wants, the way he behaves, his responses to certain questions, and that's what makes you a good salesman. (Interview P. Metcalfe)

Long-term success of the ABL within Petroline, however, will require hiring more specific people and managing to create the correct organisational structure or forming some type of liaison with other, more specialised companies. With these problems in mind Petroline has been actively pursuing the development of the Expandable Sand Screen (ESS). The ESS application is a different application altogether since it is a piece of equipment that is chosen as a way of controlling the sand across a reservoir. If a well is going to produce sand as well as oil, a sand screen is essential to the well design and therefore not used as a contingency tool. Its deployment is known well in advance, providing, from the company's point of view, a much cleaner sale.

It's also bought in advance, and it's definitely going to go in the well. So from a business point of view, it's more attractive because it gives a known turnover. If you sell the stuff you know it's going to be used, it's not sitting on people's shelves. [...] If you sell ABL to four companies around the Aberdeen area, the incentive for fifth company to buy it from you is diminished [...] because they know that others have it sitting on their shelves and they can get it from one of them if there is a problem. (interview R. Anderson)

It should also be kept in mind that Petroline has developed the EST-range, including the ABL with very little own actual capital input through cooperation with oil companies. As a completion product the ESS is much more in line with Petroline's existing product philosophy possibly providing a large incentive to push funds and focus in this direction. Despite lacking the appropriate support structure for marketing drilling products the ABL has been successful. Further growth of this product, however, will depend on building an appropriate support structure internally or by liasing with other companies. With this in place the ABL could prove to be a valuable extension of/ addition to Petroline's existing product lines.

We've now got a product which we understand and we can create and sell. And the other side of the thing now is the reaction in the market to the product. (Interview P. Metcalfe)



ORGANISATIONAL RENEWAL:
PROCESS DESIGN

Case Study:

Shell direct GmbH, Hamburg, Germany

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5. Shell direct GmbH, Germany

This chapter provides a case study of Shell direct GmbH, based in Hamburg Germany. Shell direct is a 100% affiliate of the Royal Dutch/ Shell Group of companies and primarily responsible for supplying heating oil and diesel to private households and small and medium enterprises throughout Germany. Shell direct's story is not so much marked by spectacular product developments but by a continuous quest to transform from a fairly bureaucratic organisation into sales organisation. Using creative internal design with a primary focus on information processing, rigid structures and processes were gradually replaced with cost-efficient, yet highly responsive and flexible internal structures and processes allowing the company to leverage organisational capabilities for competitive strength and long-term survival. The case also demonstrates how directional and orchestrated incremental changes can work to reinforce to the organisation's momentum for change until it transforms.

This chapter starts off with a brief overview of Shell direct activities and then seeks to trace the change initiatives that led to the company's transformation. As a result Shell direct has not only managed to defend its market share but expand its activities within its traditional markets as well as build and seize new business opportunities by employing state of the art IT solutions. Finally two projects are outlined that demonstrate the company's current competitiveness and manifest the extent of its change initiatives.

Shell direct GmbH was founded under the name Deutsche Gesellschaft für Erdölinteressen (DEUGERD) GmbH more than 50 years ago. Initially it functioned as a small holding company comprising a number of Shell-specific characteristics and as the parent company Deutsche Shell AG, its headquarters was based in Hamburg. From 1967 onwards the company took on a much more active role as management holding. Simultaneously more than 400 SMEs (mainly local heating oil distributors) were acquired all across Germany.⁴⁶ These were subsequently re-organised to form 78 daughter companies. Further re-structuring initiatives during the Eighties enabled

⁴⁶ Before the German re-unification in 1990 the company was only active in West Germany and Berlin (FRG). Sales in the regional area of the former GDR began only after 1990.

reducing the number of companies from 78 to 11 by clustering the individual units into larger organisational entities whilst maintaining point of sales at 110 locations (see Figure 6-1 below) throughout Germany. The individual branches and sales offices function as regional distributors for the bulk products (mainly diesel and heating oil) as well as lubricants. In addition these companies also offer a range of complimentary products and services such as heating systems, boiler installation and maintenance. Overtime the product portfolio was widened.

**Shell direct GmbH
Branch and Sales Offices
Locations - 1998**



Figure 5-1: Location of Branch and Sales Offices throughout Germany

Data Source: Shell direct GmbH

From 1998 onwards the company is named Shell direct.⁴⁷ The main reasoning behind this re-branding were the stronger association with the well-established Shell brand as well as a move to emphasize customer closeness. Supporting functions such as

⁴⁷ To avoid confusion the company will be referred to as 'Shell direct' for the remainder of the case study.

administration and IT services now form a separate service company and are directly benchmarked against competitors.

The company serves more than 625,000 customers of which approximately 100,000 are commercial businesses, mainly small to medium enterprises (SMEs) such as farmers or car dealerships or garages. 1,050 employees sell approximately 2,000 products generating 1 billion Euros annually of which diesel, heating oil, lubricants and coal as well as boiler installation and maintenance make up the core.

5.1 Changing Energy Consumption Patterns

The 1981/82 oil crises had a large impact on German consumer behaviour resulting in a substantial reduction in the usage of oil products. Shell direct experienced a reduction in sales of its core business by 33%. This market trend was sustained as German households became increasingly price-aware and drastically altered their patterns of heating-oil consumption. Consumer behaviour became even more difficult to predict during 1990s because of the increasing capacity of the storage tanks -some of which hold reserves for several years- resulting in uneven purchasing/ buying patterns with long intervals between individual orders.

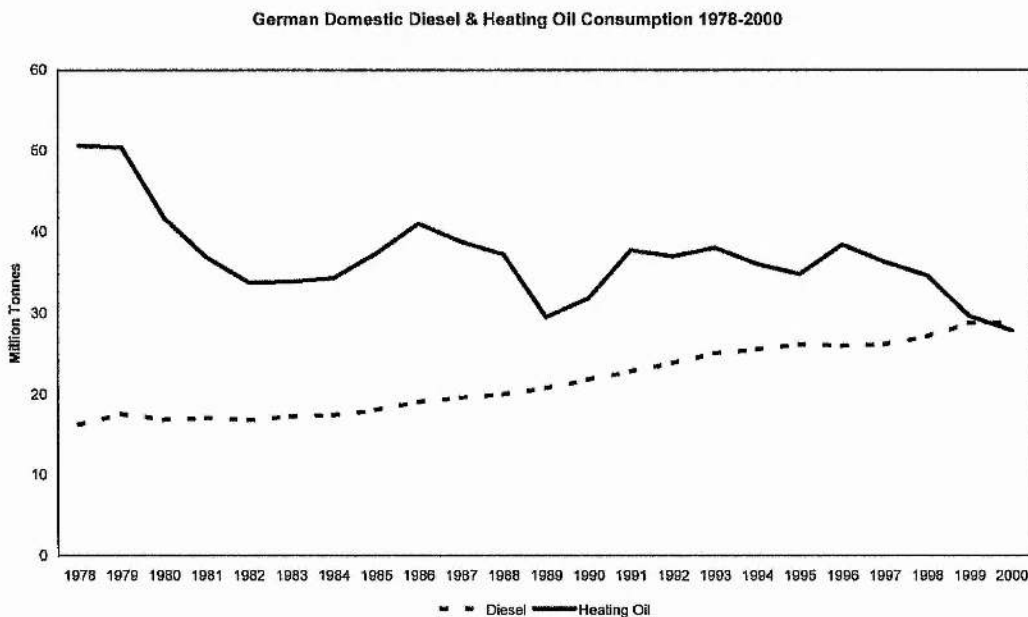


Figure 5-2: Domestic Market Development for Diesel and Heating Oil (1978-2000)

Data Source: MWV e.V. Germany

The company cost structure was detrimental to this development with stagnating, i.e. declining sales with markedly poor margins. The fixed costs in this particular branch average above 80 percent. These in turn are structured as follows: 42% personnel costs, 45% transport fleet, 13% other costs.

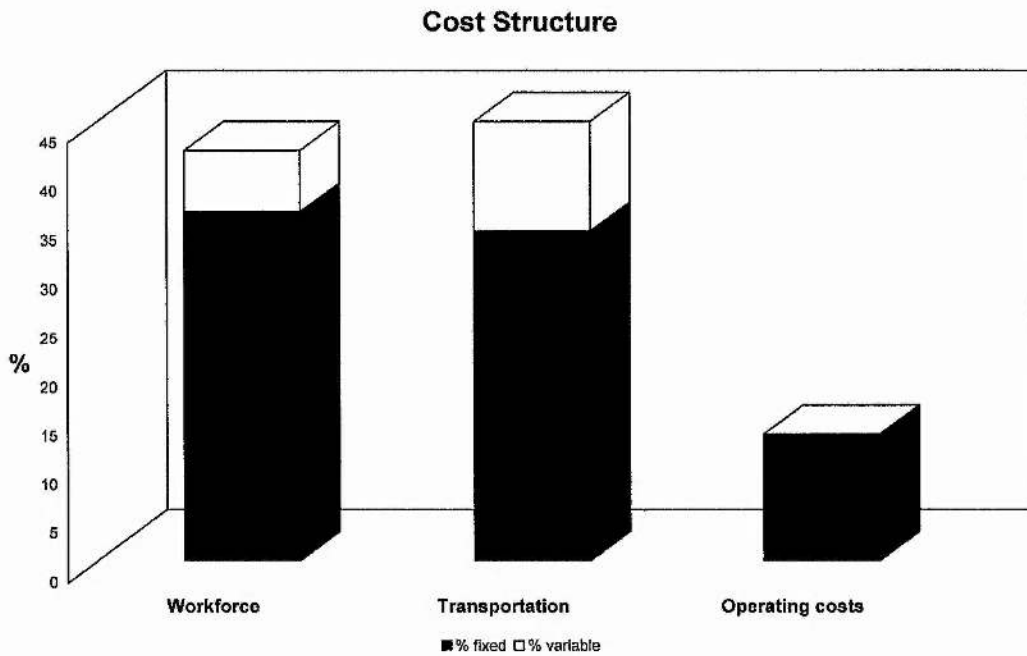


Figure 5-3: High-level Fixed Cost Structure

Data Source: Shell direct GmbH

To survive and compete successfully in the short-term the management felt that Shell direct needed to drastically reduce its costs. To ensure long-term survivability the company needed to reposition and strive for a different strategic direction by transforming from a bureaucratic, passive organisation burdened by huge staff numbers and high administrative intensity into a flexible and proactive competitor at the leading edge in its sector. The company’s management recognised these challenges early on and initiated change projects in a nearly continuous fashion to transform the organisation.

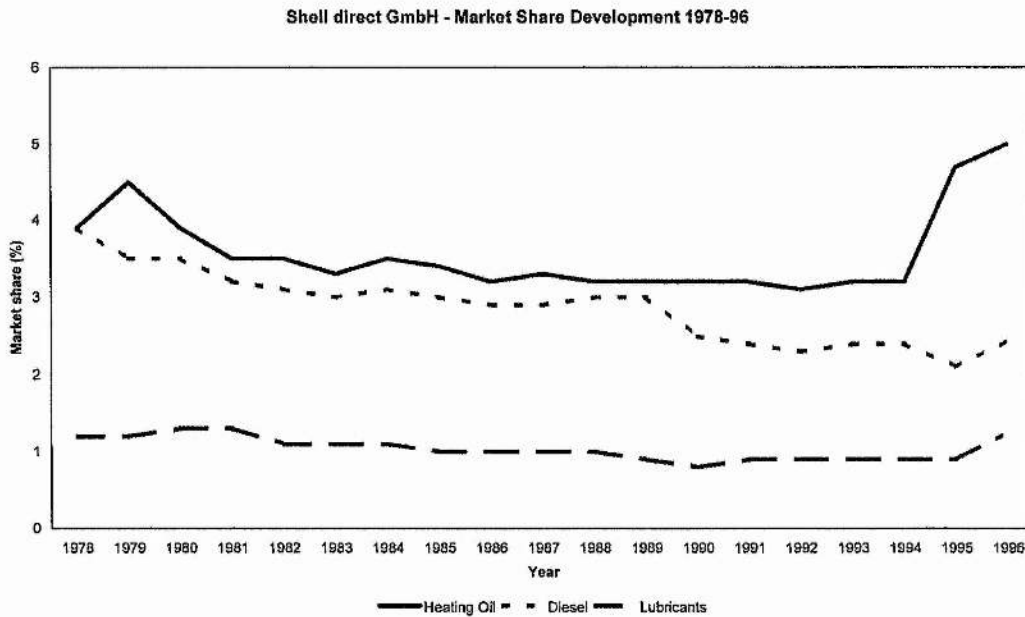


Figure 5-4: Development of Market Share 1978-96

Data Source: Shell direct GmbH

Main objectives were to design and develop a networked organisation marked by flat organisational hierarchy and increased span of controls, process-oriented workflows, and improved decision-making. These changes necessarily involved increased responsibilities and empowerment of individual functions.

Information technology (IT) was regarded as a key technology to realising these strategic objectives. Against the background of drastic decreases in sales and subsequent production capacity it became increasingly necessary to assist operative (mainly sales) units of the company with IT to seize control of a market that was increasingly turning into a buyers market. Customer service and with it customer information was considered increasingly important for running the business successfully. As a result sales staff became responsible for customer service, the granting of credit as well as the purchasing and selling of particular product lines.

To ensure efficiency in handling of such a widely dispersed communication network it became essential to collect and input information at the source of origin so the required information was readily available throughout the whole organisation at any point in time. The remote control IT-architecture also enabled centralised access to

established hardware and software structures opening up new dimensions for organising and servicing a computer network and the restructuring of technological and managerial workflows. To ensure long-term success it was also considered elemental to rationalise no longer needed activities or functions to ensure the desired objectives of cost reduction.

Implementing a communication network within an organisation usually requires deep rooting organisational changes. Despite the tremendous challenge the management felt the opportunities were so enormous that this chance should not be let slip by. Once studies confirmed technical feasibility a project team was formed, consisting of managers and organisation designers. Up to this point in time the organisation used IT solely for administrative purposes.

5.1.1 Transformation towards a Sales-driven Company

In response to the developments the company was changed in 5 major phases, which will be outlined in the following sections.

By 1978 roundabout 300 acquired SME heating or retailers had been acquired and clustered into 82 autonomous units. Within this structure the potentials for rationalisation had been exhausted leading to growth problems. Subsequently this led the management to search for an alternative concept.

The heating-oil market collapsed nearly overnight making immediate action necessary to secure the short-term survival and competitiveness of the organisation. Initial measures were aimed at generating short-term improvements and involved drastic re-design of the organisation's accountancy mainly by harmonising accounting procedures and reporting. Furthermore, the company introduced a cash management system to automate and speed-up in- and outflows of monies. Prior to these changes every location would keep customer records on file and invoice using a conventional cash register individually. Concurrently the number of bank accounts was reduced from 360 to approximately 80 in number. For the first time the company introduced computer-assisted processes, which supported and were integrated with the sales function.

During this phase the first major change initiatives were directed at establishing a networked organisation based on the IT-network standard of DATEX-P. The resulting full-coverage networked IT-processing provided the basis for making significant changes to company's vertical and hierarchical structures. These changes were mainly aimed at performance improvements and rationalisation. The middle management layer was reduced by 50 percent. Simultaneously the existing companies were reduced in number from 82 down to 45 larger business units. Sales staff was delegated competencies for product, customer and financial matters and was simultaneously provided with the means to calculate and monitor (target) sales margins as well as the outcome and development of their sales activities. Concurrently a new IT-assisted business planning system was introduced, which allowed the integration of reporting with accountancy data.

By 1986 the changes described above had been implemented successfully. Due to continued decline of the market main focus during this phase had been on rationalization of operations. At this point in time, pro-active marketing was virtually non-existent within the organisation. To counteract 10 IT-assisted marketing campaigns were initiated as first attempts to transform Shell direct from a bureaucratic organisation with high administrative intensity into a marketing and sales-oriented organisation. The effective implementation of these strategies was geared toward developing pro-active sales personnel and acquiring specialised knowledge.

KPI	1984	1988 onwards	Development (in %)
Companies	82	11	- 86 %
Locations	140	120	- 14 %
Managers	82	11	- 86 %
Employees	1.450	1.050	- 28 %
Customer base	350.000	625.000	+ 79 %
Revenue	1.200.000.000 DM	2.000.000.000 DM	+ 66 %
Sales transactions	900.000	1.250.000	+ 39 %
HGVs	220	260	+ 18 %
Service fleet	250	200	- 20 %
IT - Terminals	172	200	+ 16 %
PCs	8	240	+ 290 %
HGV Onboard-Computers	-	260	+ 100 %
No of Printers	200	600	+ 300 %
Logistics-Partners	-	10	+ 100 %
Homebased workplaces	-	60	+ 100 %

Figure 5-5: Shell direct: Indicators of Change 1984-1988 onwards

Data Source: Shell direct GmbH

From 1987 onwards, initiatives towards forming a sales-oriented organisation are increased and reinforced. This involves a change in the corporate culture. The measures taken to facilitate this transition included:

- production of a best-practice video to motivate and guide the employees
- creation of an employee forum to discuss issues and share experience with the aim of furthering best practice
- introduction of quality circles to improve internal and external performance
- first investments in acquisitions to increase market share

- introduction of focal points responsible for environmental protection issues and job-security on corporate level.

In 1988 the different names of the individual sales outlets are replaced with the unified brand name 'Shell-Mineralölhandel und Heizungsdienst' to establish a new corporate identity that is also associated with the parent company. The customers were informed with a double A4 sized colour leaflet giving information of the product portfolio and all services provided by the organisation as well as the reasons for the change in name. Included are the pictures of all employees and their areas of responsibilities within the organisation.

The company is subjected to further restructuring measures reducing the number of branch offices from 45 down to 11 business units. Concurrently the middle management is further reduced from 45 down to 22 with the aim of increased employee involvement. From 1989/90 onward the company is heavily involved in gaining market shares in the regional territory in of the former GDR.

Accompanying measures also focus on redesigning the organisation's IT strategy. Decentralised IT-solutions are streamlined and concentrated and eventually replaced with a more centralised concept. Again the measures are sought to strengthen the sales level whilst flattening the corporate hierarchy and allowing to gradually move away from a change policy mainly based on rationalisation. In the meantime a complex cash management system had been introduced, allowing to pool incoming and outgoing monies fully automatically as well as synchronising monetary flows with the aid of an online banking system between the company and its banking partners.

To comply with the Shell HSE (Health, Security and Environment) standards of operating a 10-year program to renovate the existing storage tanks was initiated.

During the period from 1993 until 1996, Shell direct increasingly bought up market share and introduced new product lines, moving away from pure product sales to the sale of solutions/ systems to secure and sustain its competitive advantage. Core elements reflecting this new marketing approach which were also aimed at completing the initiated cultural change towards pro-active marketing included

- the financing, construction and operating of block-heating-systems;
- introduction of customer budget accounts;
- providing and servicing automated petrol-pumps;
- the financing, construction and operating of works petrol stations combining card service competence and securing long-term supply contracts;
- development of retail/ wholesale activities;
- integration of a host of operations from the parent company (new products e.g. lubricants, new customer groups) with existing product lines and sales activities;
- development of electronic-commerce;
- controlling of the organisation based on a stringently and uniformly conceptualised MIS involving the definition and application of key-performance-indicators (KPI); Targets are agreed and the progress and effectiveness with the aid of computerised monitoring;
- External Customer satisfaction study as a trigger for change initiatives;
- Implementation of marketing-support teams to assist in all marketing concerns, such as marketing mix (4 P's: pricing, promotion, placement).
- Introduction of "flexible salaries" and remuneration schemes particularly for management level employees.

In the period from 1993 to 1994 Shell direct became the strategic outlet for Shell retail activities in Germany. Growth generation was based on acquisition of additional market share as well as on transfer of former sales activities from the parent company Deutsche Shell to Shell direct, which by now had realised excellence as 'low-cost-operator'. Initially Shell direct took on approximately 33% of the existing business activities from the sales areas bulk oil products (heating oil and diesel); lubricants and approx. one third of the customer base (mainly lubes) from Deutsche Shell's

commercial activities. This decision was based on the idea to pool customers with regional markets in an organisation that is present on a national level. As a result the 11 Shell direct subsidiaries now supplied approx. 210 000 customers with Shell products and services. “The fact that we have local presence allows us to serve these newly acquired customers efficiently and flexibly” the managing director, Dr Jochen Weise explains.

These measures were accompanied by continuous software development as well as fundamental changes in logistics and sales. During this stage tanker-based invoicing was introduced, the scheduling of tanker drops and delivery were centralised and based on the use of satellite technology, artificial intelligence and digital mapping. Additionally a variety of pro-active marketing campaigns were launched.

Transition towards a pure sales company was marked by further decisive changes. The portfolio was systematically expanded through further acquisitions increasing overall market share, transfer of business fields from the parent company to Shell direct as well as innovative system-based sales concepts, e.g. the construction and operation of home base fuelling stations. Meanwhile, Shell direct’s overriding motto has become “The customer comes first!” The introduced change measures led to an expansion of the portfolio whilst increasing the level of service quality. From 1997 onwards there is a distinct move away from selling bulk products purely based on price to offering solutions that create high levels of service.

Regardless of the area of operation, the aim has become to provide a fast, dependable fuel delivery service and a comprehensive range of home heating services that establish direct, binding relationship with the customer. To this end Shell direct offers a range of services to increase the benefit and convenience for their customers. The company offers its customers an automatic delivery system. Customers who join this scheme have their consumption monitored. The consumption estimate is based on the customer’s usage information and an analysis of daily outside temperatures. Heating oil delivery is scheduled automatically.

This concept provides a win-win situation for both sides, as the customer does not have to call and place any further orders and does not have to be at home for a delivery. The fuel storage tank is monitored and filled up directly by Shell direct. The

advantage for Shell direct is two-fold, in that the customer commits to a longer contract period and the company can schedule the drops when the general seasonal demand is fairly low, optimizing the use of its tanker fleet capacity.

To bind customers the company also offers a boiler maintenance service. Qualified heating engineers service the customer's boiler on a regular basis and attend to any emergency breakdown. Moreover, the company offers a professional installation service should customers consider replacing their central heating, boiler or oil storage tank.

Customers also have a choice of several payment options to suit their circumstances, most notable a flexible budget account method, which can be used for the purchase of fuel as well as in connection with a boiler maintenance contract or a boiler or tank replacement. The budget account scheme spreads customer fuel bills over the year so that particularly customers participating in the automated delivery scheme can plan their expenses independently from the actual delivery and avoid having to make large payments.

The sales outlets have now become purely occupied with sales as the organisation introduced a back-office organisation centralising and hence removing administrative functions from the branch and sales offices. As a result the management was further reduced in headcount from 22 down to 11. The holding employs approximately 10 employees and exercises typical shareholder activities: objectives and budgets are negotiated and monitored in conjunction with the fairly autonomously operating dependencies. "Our most important and prominent task consists in coaching of these dependencies" Weise summarises. "We need to promote creativity and readiness for work through our own behaviour and service-offering, so that our companies are able to persevere under conditions of harsh competition. In a nutshell: the job should be exciting and fun!"

There is a switch to channel marketing in conjunction with Royal-Dutch Shell's global re-positioning strategy (embedding of reporting and planning activities/procedures). The aim is to only offer such services that are valued by the customer and he is therefore prepared to pay for. In all other service areas such as fleet management and storage the principle target is cost efficiency. What the customers

value is object of regular independent surveys, the result of which is fed to the individual operating companies so that they can refine their offerings and activities accordingly. To maintain business performance control the functionality of the MIS was improved and extended.

The restructuring measures throughout the past two decades seem to have benefited the organization financially. The return on sales is comparatively low and ranges from 0.1 to 0.4 % for bulk products, from 8 to 12 % for lubricants and from 5 to 10% for heating technology and service. The return on investment is targeted at a minimum of 15% after tax. Since the capital bound in relation to the sales is very low (non-capital intensive industry) a ROACE (return on assets and capital employed) of 8 to 15 % and higher can be achieved. However due to fluctuations in the value of the current assets and liabilities this is always under threat. To achieve the ambitious ROACE Shell direct adheres to strict cost management, with an aim for cost leadership within the branch. While, Shell direct's results have improved substantially major challenges still lie ahead.

According to Dr. Weise "There is much at stake for the oil business in the years to come". Nearly sixty percent of all oil tanks are more than 10 years old and technically out-dated. "Here investment decisions are imminent – promoted by governmental initiatives – that may sway in favour of alternative supply methods, if we do not manage to present ourselves to our customers and other decision makers, such as architects, constructors or chimney sweeps as being competent partners in all aspects of the heating business. "We need to move away from the habit of seeking our competitive advantage in cheap rates for heating oil."

Dr Weise continues, "Today our business environment is characterised by fierce competition on a greater scale than ever. In addition, society's expectations for business are changing. Companies in our market that fail to respond effectively to these challenges will simply decline and eventually go out of business."

Other factors also call for change:

- there is increasing economical use of fuels.
- many of Shell direct's business activities are in large markets with low growth.

- there is an increasing emphasis on reducing the impact of human activity on the environment.

Our competitive marketplace is extremely challenging - but new technologies, the opening up of new markets, rapid growth in some parts of the world, the rapid change in customer requirements and expectations, and other characteristics of this market present many opportunities for significant improvement. To take advantage of these opportunities, we need breakthrough performance. (Interview Dr. Weise)

The difficult conditions prevailing the heating oil market are well documented. During the year 2000, the demand for light heating oil decreased in comparison to 1999 by six per cent. This decline is a trend that has been persisting for several years now. Simultaneously, backed by environmental considerations, competition from substitutes such as a natural gas is strongly increasing. Furthermore, two billion outdated oil-based heating systems need to be replaced by the year 2004 increasing the competitive pressure even more and increasing the likelihood that more consumers will switch heating energy supply sources. Paired with the expected technological advances to decrease carbohydrate emissions and improve efficiency of heating systems even less heating oil will be consumed in future. The other major foothold for Shell direct, diesel is only expected to increase marginally. Moreover, the competitive pressure is mounting on the third traditional tier for Shell direct, the lubricants.

The number of dealerships has been continuously declining in Germany over the past thirty years. In the Seventies, their number was reduced from 18,000 to nearly 9000. Since the beginning of the Eighties, this number has nearly halved and currently lies at approximately 4500. Forecasts suggest that their number may be reduced even further to less than 1500 by the year 2004. In order to survive in this stagnating market and to further compete successfully Shell and their partners need to be prepared.

5.1.2 Automated Delivery

Efficient usage of the tankers provides a considerable contribution towards cost savings. As a result of the various changes Shell direct has placed a lot of effort streamlining the distribution of its products, in the process extending the function of its tanker fleet beyond the purely functional aspect to incorporate marketing functionality.

Conventionally the process of distribution is triggered by a customer order. Highly knowledgeable personnel handled the planning of routes. Each tank has a number of individual compartments to allow the simultaneous transportation of different products such as heating oil and diesel. A route usually includes drops to multiple sites. The task of the route planner is to reduce the distance run by an individual truck to complete its delivery. This not only requires planning the best possible route (which is subject to a variety of contingencies such as accessibility or customer wishes such as specific delivery time) but also optimizing the tanker load, which is subject to limited capacity and consists of different products. For each scheduled drop a delivery slip would be printed and handed to the driver before loading. The driver would then load the truck according to plan. The driver had to keep record of the actual products in the individual compartments and the level of loading. The driver would then commence the delivery. This process of delivery is not a necessarily as straightforward as it may sound. Some properties may need to be approached from a particular direction or the storage tanks may have special fittings or may be in some remote spot and not readily accessible. The driver has to be aware of all these contingencies in order to make the delivery. Once the drop has been successfully performed the driver prints or fills out a delivery form and hands this to the customer to acknowledge receipt. On return the slips are handed to the controller at the branch office for invoicing. The invoices would be generated overnight and sent out by mail to the customer for payment and monitored accordingly. Between delivery and receipt of payment from the customer lies a considerable time span of approximately 14 days. Initially the time outstanding could even reach six weeks.

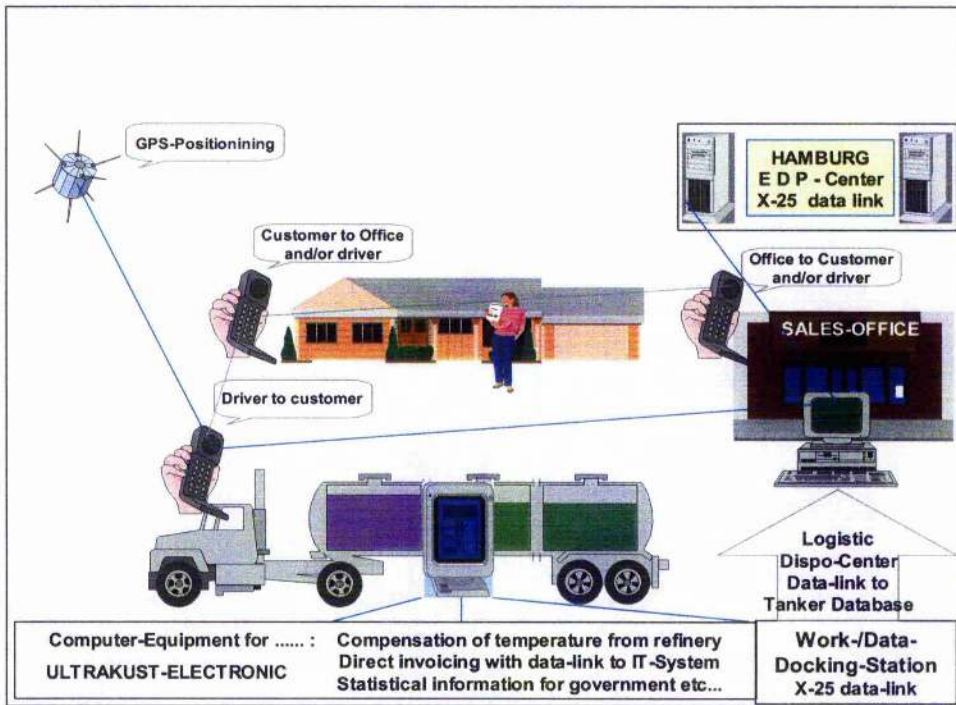


Figure 5-6: Components of the Streamlined Delivery Process

Data Source: Shell direct GmbH

As a result of the continuous development of the IT systems and the advance of a variety of other technology such as GPS fundamental changes in logistics and sales were initiated. To keep Shell's truck drivers constantly in touch with the office, the cabs are equipped with a GSM telephone and a CB radio, as well as a satellite navigation system to ensure the quickest possible route to the customer. Furthermore tanker-based invoicing was introduced. This means that the tankers are equipped with computing facilities that contain all necessary customer data and prices, informing the driver of all contingencies in connection with the delivery and allowing invoicing directly at the time of delivery. The customer could now be handed the invoice directly with the delivery of the fuel, substantially cutting the time lag between delivery and payment. The computer records all activity of the drops and this data is transferred automatically to the central database for monitoring and further processing, e.g. updating the customer files to calculate future automated deliveries. The increasing availability of GPS and satellites dramatically changed the scheduling of tanker drops and planning of delivery routes. In a joint development programme

with the University of Nürnberg an artificial intelligence based software application was developed for optimizing the scheduling of multi-drop trips and routes. These activities that were formerly located in the branch offices and sales outlets have now become centralised and are based on the use of satellite technology and digital mapping. The optimisation process has improved through the concept of automated delivery, allowing combining direct customer orders with drops that lie on route and may require a 'top-up'.

The tankers now also run independently from the branch offices. The storage facilities are now located in some remote place, where there is less risk to the environment and that rent or prices of the grounds cheap. The storage tanks are filled on a regular basis by deliveries, usually by rail, directly from the refinery. The premises are unmanned and therefore also called 'ghost deposits'. This planned route is transmitted directly from Hamburg to the storage site. Before loading this data is downloaded to the tanker. Sensors keep track of the current load in the individual compartments in quantity and quality and provide the on-board computer to calculate the amount to be filled of the various products. The tanker is automatically filled with the required amounts. The tracking via sensors also allows for improved and efficient stock control. All of these elements serve to cut costs whilst maintaining flexibility.

5.1.3 Home base Fueling Stations

Changes in German environmental legislation provided Shell direct in 1997 with an opportunity to expand its business. In the mid 1990s the regulations concerning the use of petrol pumps were tightened considerably affecting not only the construction of petrol stations but also work station pumps or home-base refueling station. The regulations affected such aspects as the sealing of the road surface to avoid leakage and subsequent contamination of soil and ground water as well as to protect users from inhaling fumes, which are considered to be carcinogenic, by replacing existing separators with more sophisticated, technologically advanced systems. Compliance with these new regulations requires engaging in a complex application procedure for gaining building permission from local authorities and obtaining official approval to operate the facility.

Mainly because they were faced with implementing these changes themselves, Shell direct recognized that there were many obstacles on the way to owning or modernizing a petrol station. Rather than seeing this as threat, Shell direct's management recognized this change in legislation as an opportunity to attract new business in the established domain of selling fuels. Their experience provided them with a core competence that could be used for a new business venture to attract further business.

Our customers benefit from our competence in designing and constructing as well as from our experience in operating such facilities. Mainly this generates a massive cost saving since approximately 80 percent of the construction costs have to be committed from the outset. After all we don't offer our customers a predefined solution, but rather develop a customized solution that considers a variety of contingencies such as size of the fleet, location and various other parameters. (Interview J. C. Sklorz)

Their new service includes consulting in all aspects of new environmental legislation as well as taking care of matters in connection with dealing with official authorities, the construction planning all the way up to a fitting and running the complete facility. The first step in the consultation process is to meet at the location for discussions and an eventual inspection of existing installations and to draw up an overall report. As the subject is rather complex, it is nothing that can be dealt with on the telephone. The building of a new petrol station is comparatively easy. Complications usually arise when planning a partial renewal or a complete redevelopment. Additional advice is needed if the operator is not familiar with the current legislation.

Potential customers are transport companies and haulage firms, who need to cover their own fuel requirements and want to remain independent from the public network, also workshops and car traders who want to offer their customers a higher level of service belong to this group, as well as local and governmental authorities like the police force who depend on guaranteed supply of fuel. Last but not least we also have industrial customers, mainly from the manufacturing, who often operate vehicles and machines that cannot be serviced publicly like fork lifts or locomotives. (Interview J. C. Sklorz)

Over time the initial service idea tied into a larger conceptual solution where the customer covers most of his petrol needs from same source. Three alternative solutions for operating such facilities are offered to customers. Shell direct mainly offers so called home base facilities for customers who want to cover their own

requirements. A second alternative is provided for customers who want to supply others; these facilities are called shared-home base facilities. A third possibility is outsourcing. The customer leaves the grounds to Shell direct to run the facilities directly. To provide the customers with flexibility the pump station is based on a modular construction and can be expanded if needed.

We aim to provide our customers with long-term solution. This often requires a slightly higher investment, which however is offset by long-term advantages mainly due to lower operating costs. This based very much on the insight that the joy of quality lives much longer than the joy of a low price. Due to our experience this philosophy even helps our customer gain a financial advantage. Our main interest lies with selling fuels and not the construction of such facilities. We aim to provide our customers with an optimal solution with respect to usage, investment and operation. In the end the customer should have a best possible solution not the most expensive facility on his premises. (Interview J. C. Sklorz)

A basic installation costs approximately 77 000 Euro. This completely equipped facility meets the requirements of a filling station, including double fuel dispenser, tank automation, storage station as well as electric distribution and roofing with spray protection. Also included are the filling area and separator system and the cost for the approval procedure. The financing is calculated over a five-year period without a residual value. During this period the customer is supplied exclusively with Shell fuels. Interest and construction costs are incorporated in the fuel price. Depending on the overall consumption the customer may fare cheaper with this solution in comparison to covering the supply from public service stations.



Figure 5-7: Combining Home Base Facilities with EuroShell Card Services

Data Source: Shell direct GmbH

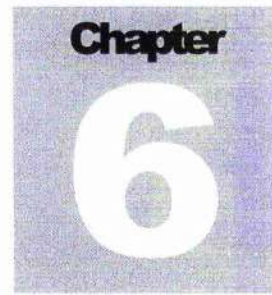
To market its concept Shell direct used a two-tiered approach combining its experience with the card-handling competency of EuroShell adding value to the original solution through increased flexibility and outsourcing of admin.

From our vast experience with transport companies, it soon became evident that complete solutions draw the most demand. Apart from the construction and operation of the facility this also involves the supply with fuel and the corresponding invoicing. (Interview J. C. Sklorz)

With the opening of national markets within the EU fleet management and cost control have become increasingly important. Further benefits of the package specifically target the aspect of advanced fleet management and added transparency of costs with advanced data communication techniques and through the possibility to generate a fuel consumption analysis. Since the consumption usually cannot be completely covered from this home base station the customer usually opts for a combination with the EuroShell service-card, enabling to secure and pay traveling supplies using one card. This is accepted at approximately 20000 venues throughout Europe and can also be used as access control to the home base fuelling system.

Added benefits from this combination arise from an enhanced consumption analysis since also these transactions are recorded providing a more complete picture and the invoicing.

However the development and introduction of this solution in combination with EuroShell was not without problem. Strong resistance came from within the Deutsche Shell organisation. This new venture was cutting across established business boundaries within the parent company. It also cut into established business relationships with potential to draw away massive business from other autonomously run business units. Since the feasibility of running such a home-based solution is based on large consumption volume it is not difficult to imagine that these activities run counter to other profit center interests.



ORGANISATIONAL RENEWAL:
PROCESS DESIGN

Case Study:

Minnesota Mining Manufacturing (3M) Company

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6. Minnesota Mining Manufacturing (3M) Company

Minnesota Mining Manufacturing (3M) Company is a diversified American corporation manufacturing a wide range of products, including abrasives, adhesive tape and related products, videocassettes, carbonless paper, and computer-synthesized graphics. Its headquarters are based in St. Paul, Minnesota.

The company was incorporated under its present name in 1902, and its first product was sandpaper. 3M grew steadily, adding waterproof sandpaper, adhesive cellophane tape, masking tape, and desktop copiers, among others, to its product line and today operates on more than 30 technology platforms that span diverse disciplines of science including specialty materials and polymers, adhesives, non-woven fibers, films, optics, filtration, ceramics, electronics, precision coating. 3M's business units comprise more than 40 product divisions, subsidiaries and departments, organized into three markets: Transportation, Safety and Specialty Material Markets; Industrial and Consumer Markets; and Health Care Markets.



Figure 6-1: 3M Company Markets

Source: 3M Company

3M has a consistent track record of innovative activity that goes back to the early part of this century and has led to the creation of whole new industries. The company currently manufactures more than fifty thousand different products. Due to imaginative combination and application of its core technologies 3M has become a global leader in a highly diverse range of markets, from industrial abrasives to electronics, specialty chemicals to health care.

This commitment to technical excellence was recognized in 1995, when the company received the National Medal of Technology, the highest honor bestowed by the president of the United States for technological achievement.

3M products are sold in two hundred countries and with operations in 60 countries employing approximately 50% of 3M's 70,000 workforce total. There are substantial research activities and local manufacturing operations in a number of these locations. In 1998, more than half of 3M's \$15 billion in sales were generated outside the United States.

3M is one of 30 companies in the Dow Jones Industrial Average. It has placed in the top ten on Fortune magazine's list of America's most admired companies in ten of the fifteen years in which Fortune has published the list. The company is consistently recognised for its outstanding performance by practitioners and academics alike, and has been the subject of many research efforts and case studies. In their study *Built to Last: Successful Habits of Visionary Companies* Collins and Porras conclude:

[...] If we had to bet our lives on the continued success and adaptability of any single company in our study over the next 50 to 100 years, we would place that bet on 3M. (Collins & Porras, 1997: 150)

3M proves that innovation can successfully be managed systematically and even have a positive effect on various other aspects of an organisation and its management. In a recent survey of U.S. executives (cited in Gundling, 2000), comparing their attitudes toward forty-eight top U.S. companies, 3M was rated as the company with the most aggressive research and development programs, and which would best be able to adapt to future market conditions. 3M has also achieved high ratings in areas usually less commonly associated with innovation. Among the items which received high national survey ratings were:

	Ranking Among 48 Top U.S. companies
Aggressive research and development programs	1
Best able to adapt to future market conditions	1
Leaders in recognizing corporate social responsibilities	3
Reputation for offering high-quality products or services	2
Ability to attract, retain, and develop high-quality employees	3
Establish and demand high standards of ethical business practice	3
Responsive to environmental concerns and problems	1
Companies with which your company would be willing to do business	1
Companies you would be willing to recommend as an employer to a colleague or friend	1
General favorability	1

Figure 6-2: 3M's Favourable Rating Among U.S. Top Executives

Source: Gundling, E. (2000) *The 3M Way to Innovation: Balancing People and Profit*, Tokyo: Kodansha International

3M is noted for its growth by largely internal means rather than by means of large-scale acquisitions. Making effective use of technological, cultural and structural elements an overall organizational environment is established in which growth is systematically managed and the company's competitive repertoire continuously renewed. This case study seeks to outline the key elements of 3M's system by examining the complex fabric of success and failure, invention and ideology that work together to perpetuate its success.

6.1 Company History

3M was founded in 1902 at the Lake Superior town of Two Harbors, Minnesota. Five businessmen agreed to mine 'corundum', a mineral deposit for grinding-wheel abrasives. At the time, corundum was considered an excellent natural abrasive and was used to make grit on sandpaper. Since an increasing number of industries were requiring sandpaper in some phase of production, 3M's founders thought they could make a business out of quarrying the corundum and then selling it to grinding-wheel manufacturers. But the deposits proved to be of little value, and the new Minnesota Mining and Manufacturing Company quickly moved to nearby Duluth to focus on sandpaper products.

Despite this change in location and activity the company sank further into debt. Years of struggle ensued until the company could master quality production and a supply chain. New investors were attracted to 3M, such as Lucius Ordway, who moved the company to St. Paul in 1910. Gradually early technical and marketing innovations began to produce successes. In 1914, 3M began production of a synthetic abrasive named Three-M-ite. The product doubled company sales in just two years. The new product was considered the best metal-working abrasive available at the time and served to establish 3M's reputation as a serious competitor in the sandpaper business. In 1916, fourteen years after its founding, the company finally turned a profit and was able to pay its first dividend - 6 cents a share.

The world's first waterproof sandpaper, which eased the health problem of sanding dust, was developed in the early 1920s. A major milestone occurred in 1925 when Richard G. Drew, a young lab assistant, invented masking tape - an innovative step toward diversification and the first of many Scotch brand pressure-sensitive tapes.

In the following years technical progress resulted in Scotch™ Cellophane Tape for box sealing. Drawing on expertise in bonding mineral grit to sandpaper, 3M brought out new adhesives to replace tacks in bonding upholstery, and sound-deadening materials for the auto industry's new metal-framed cars.

The roofing granule business (ceramic coated bits of rock) was developed in response to a need to make asphalt shingles last longer. In the early 1940s, 3M was diverted into defense materials for World War II, which was followed by new ventures, such

as Scotchlite™ Reflective Sheeting for highway markings, magnetic sound recording tape, filament adhesive tape, and the start of 3M's involvement in the graphic arts with offset printing plates.

In the 1950s, 3M introduced the Thermo-Fax™ copying process, Scotchgard™ Fabric Protector, videotape, Scotch-Brite™ Cleaning Pads and several new electro-mechanical products. In the 1960s dry-silver microfilm was introduced, photographic products, carbonless papers, overhead projection systems and a rapidly growing health care business of medical and dental products.

3M's Milestones

1902	Minnesota Mining and Manufacturing founded in Two Harbors, Minnesota.
1904	"Corundum" production begins.
1905	Edgar Ober and Lucius Ordway purchase 60 percent of 3M stock and take control of the company. 3M moves from Two Harbors to Duluth, Minnesota.
1906	Sandpaper production begins.
1907	William McKnight hired as assistant bookkeeper.
1910	3M moves from Duluth to St. Paul, Minnesota.
1914	First product innovation: invention of synthetic abrasive Three-M-ite.
1916	First quality laboratory established by McKnight. 3M pays first dividend to stockholders.
1920	Ober implements profit-sharing practice with key employees.
1921	Wetordry waterproof abrasives developed at 3M labs by Francis Okie.
1924	First product innovation failure: Restut car polish is discontinued only a decade later after slow sales growth.
1925	Dick Drew, lab assistant, works on his own initiative to invent Scotch masking tape, 3M's first nonabrasive product. Richard Cariton, lab manager, publishes technical information manual to encourage high quality standards and cooperation between sales and manufacturing.
1929	McKnight, newly elected president of 3M, establishes policy of devoting money to research. 3M and 9 other U.S. abrasives manufacturers form Durex company to manufacture and sell their products in foreign countries.
1930	First commercial shipments of Scotch brand cellophane tape, invented by Dick Drew.
1932	McKnight pioneers one of the country's first company-financed unemployment insurance programs for 3M employees. Production of Colorquartz aggregate artificially colored roofing granules begins.
1937	Central Research Labs established to conduct long-term scientific research. General profit-sharing plan implemented for all 3M employees.

1939	First reflective sheeting for highway signs developed.
1940	New Products Department organized to study new product ideas. Product Fabrication Lab established to develop new manufacturing methods.
1944	Magnetic sound recording tape research begun. 3M becomes the first U.S. company to master the manufacturing process, and succeeds in bringing Scotch magnetic tape to the mainstream.
1948	McKnight's principles of delegating responsibility and encouraging individual initiative are written down. Company restructured into separate business divisions with near autonomous status.
1949	Nonwoven fabric invented. Becomes the basis of hundreds of 3M products including face masks, absorbent materials for oil and air filtration, medical tapes, and Scotch-Brite cleaning products.
1950	U.S. government orders dissolution of Durex company. 3M begins solitary overseas expansion.
1951	Technical Forum founded by 3M scientists with the purpose of "encouraging a free and active interchange of information and the cross-fertilization of ideas."
1954	Scotch magnetic videotape first used to record television programs.
1956	Scotchgard fabric and upholstery protector developed.
1959	Scotch-Brite cleaning pads introduced to consumers.
1960	First surgical tape, Steri-Strip tape for wound closures, invented.
1962	Scotch magic transparent tape introduced.
1963	Carlton Society formed to honour extraordinary scientific and technical contributions.
1964	Dry Silver technology invented. Allows for reproduction of images by heat process.
1972	3M data cartridge technology revolutionizes computer data storage.
1973	Disclosure that corporate funds have been used to make illegal political contributions generates shock waves throughout the organization.
1975	Pollution Prevention Pays (PPP) program introduced to reduce or eliminate pollution during 3M manufacturing processes.
1979	Lightweight Thinsulate insulation material introduced, providing warmth without bulk.
1980	Post-it notes introduced. Scotch Very High Bond (VHB) tapes introduced.
1985	Invention of first successful optical disks for information storage. First refastenable diaper tapes developed.
1989	Introduction of Maxair Autohaler asthmatic inhaler for delivering accurate doses of medicine triggered by breathing.
1992	APC adhesive-coated orthodontic brackets introduced: first brackets with pre-applied adhesives.
1995	3M microreplication technology leads to development of structured abrasives, the first abrasives with a precise surface. Spin-off of Imation Corp. and other restructuring steps eliminate \$3 billion in product revenues and 11,000 employees.

1996	<p>Innovator Award introduced to reward employees for non-directed projects resulting in new and profitable technologies and products.</p> <p>Dual Brightness Enhancement film invented based on microreplication technology. More than doubles the brightness of computer screens.</p> <p>HFEs (hydrofluoroethers) developed to replace harmful chlorofluorocarbons (CFCs) and other ozone-depleting substances.</p>
1997	<p>Major new product introductions: Aidara cream and 3M Volition Fiber Optic Cabling System.</p>
1998	<p>Pacing Plus programs pass \$1 billion in sales for the first time.</p> <p>Negative impact of turmoil in international markets and currency losses; flat growth in sales and profits. Additional restructuring announced to reduce employment by 4,500 and cut back on product lines with low earning potential.</p>
1999	<p>Organizational realignment eliminates group vice-president level of management and creates six market-based organizations.</p> <p>Renewed focus on successful commercialisation, outside acquisitions, and speed in decision-making and product development.</p>

Figure 6-3: Milestones of 3M Company

Source: 3M Company

During the 1970s and 1980s the company expanded globally and diversified into pharmaceuticals, radiology, energy control, and the office market. In the 1990s 3M set new sales records of over \$15 billion annually, with about 30% of sales generated from products less than 4 years old. Although its headquarters are still in St. Paul, Minnesota, 3M maintains operations in more than 60 countries and employs more than 70,000 people worldwide. Rather than be dominant in just a few markets, 3M's growth has come through an unwavering legacy of innovation at every level, a dedication to developing new products and a desire to participate in many markets where the company can make a significant contribution from core technologies.

6.2 Sub Cases

In order to illustrate the extraordinary working environment and understand the essence of success at 3M two of the many successful cases of product development demonstrating how the processes of creativity and innovation are managed at 3M, are looked at more closely in the following section.

6.2.1 Art Fry and the Invention of Post-It® Notes

Today, Post-it notes are one of the five most popular office products in the United States, and are best sellers around the world. The story of how these detachable, self-sticking notes came into being in the latter part of the 1970s has attained legendary status well beyond company boundaries.

As a corporate scientist with almost 40 years of experience developing new products for the 3M Company, Art Fry has made several contributions to 3M's new product world, but the most significant was the invention of the Post-it® Note. Art Fry did not invent the special adhesive, nor did he invent the paper; but he combined these two elements to come up with the most revolutionary thing to happen to notes in years. His invention - marketed around the world by 3M under the Post-it® brand name - fastens itself just about anywhere, and (once applied) can be removed without leaving a visible trace.

The product developed as a solution looking for a problem, rather than vice versa. Using the 15 percent rule and mixing certain chemicals together -“just to see what would happen”- Dr. Spence Silver, working as an adhesive researcher at 3M, had invented an aberrant adhesive composed of tiny particles that would adhere instantly, but less tightly than other adhesives by experimenting in the lab. He later explained:

The key to the Post-it adhesive was doing the experiment. If I had factored it out beforehand, and thought about it, I wouldn't have done the experiment. If I had really seriously cracked the books and gone through the literature, I would have stopped. The literature was full of examples that said you can't do this. (cited in Collins & Porras, 1995: 159)

However, Silver could find no real uses for his discovery. Despite considering his invention a failure because of its low adhesive properties, he shared his finding (in

true 3M spirit) in the hope that it might provide a solution to one his colleagues. Fry's initial business application for the adhesive, a bookmark, developed a while after this presentation. He sang in a church choir and used scraps of paper to mark selections in his hymnal. Unfortunately, they kept falling out and he would often lose his place. "I needed a bookmark that would stay put, yet could easily be removed without damaging my hymnal." He remembered attending said presentation by Spence Silver on an impermanent glue he had invented. The adhesive was strong enough to hold papers together, but weak enough to not tear paper fibers when removed.

Fry realised this unique adhesive was perfect for his needs. One morning, Fry applied some of the adhesive to the edge of a piece of paper and "[...] had a bookmark that could stick to the page while exposing a part that wasn't sticky." Fry worked on his own time to develop a prototype "temporary bookmark." A short time later, Art Fry realised his invention's full potential, when he wrote a note on one of his new "bookmarks" and attached it to a report he was forwarding to a colleague. "That's when I came to the very exciting realization that my sticky bookmark was actually a new way to communicate and organize information," and the initial product concept broadened from bookmark to note paper, vastly enlarging its potential applications. Soon co-workers were at Art Fry's desk demanding more samples of his invention. The Post-it® Note was born.

Even with his sample product in hand, though, Fry's work was not over. Next the marketing department had to be convinced that people would actually buy such a product. "It was hard to sell the concept that people needed a notepad that would sell for a premium price compared to ordinary scratch paper," Fry recalls. To promote his invention Fry and his colleagues distributed prototype products to office personnel around the company, including administrative assistants who worked for key executives, thereby generating internal demand and repeat orders. Eventually Fry convinced the Commercial Office Supply Division to manufacture Post-it notes.

This proved to be just the beginning of a long effort by Art and teams of colleagues to bring Post-it® Notes, tapes, and labels to the market. 3M put Art Fry in charge of a research team, and after 18 months, they were ready to show samples to the marketing department. In 1977, 3M test-marketed Post-it® Notes in four cities: Richmond, Tampa, Tulsa and Denver; however, the results were not good, indicating a flop of the

product. It seemed consumers were just not ready to buy something they had never used before.

Out of desperation, Joe Ramey and Geoff Nicholson, then managers in 3M's Commercial Office Supply Division, flew to Richmond and tried to sell the product themselves. They dropped in unannounced at banks and offices to demonstrate the product. This approach seemed successful. Customers and office workers immediately found uses for it and by the end of the day, the two managers had stacks of orders for their notes.

At that time, giving away free samples was foreign to the office supply industry. 3M devised a bold new marketing strategy based on heavy consumer sampling. To test the strategy, 3M chose Boise, Idaho, for one final experiment with astonishing results. Nearly 90 percent of the consumers who tried Post-it® Notes indicated they would buy the product; this was unprecedented for an office supply item, where 50 percent are generally considered an excellent result.

Encouraged by Ramey's and Nicholson's success, 3M began a major roll-out of Post-it® Notes in 1979, with heavy consumer sampling in 11 Western states. This was such a success that distributors and consumer companies began shipping Post-its® to areas where the product was not yet available. They were released onto the American market in 1980. In the following year, Post-it® Notes were introduced in Canada and Europe, where their success quickly paralleled the results in America and Fry's invention was honoured with 3M's Outstanding New Product Award. Within five years, Post -it® Notes were generating annual sales in excess of \$200 million. Over the last two decades, the Post-it® Product line has grown to include flags, memo boards, cubes, fax notes, dispensers, organizers and more.

The invention of the Note earned Art Fry a number of 3M internal honors. He received the highest form of peer recognition by being elected to 3M's Carlton Society. He was also on the team for two Golden Step Awards and was elected to 3M's Circle Of Technical Excellence.

Reflecting on this somewhat chaotic process, 3M executive Geoffrey Nicholson pointed out that “a lot of the things [that led to the Post-it] were accidental.” Commenting on this statement, Collins and Porras (1995: 159) conclude

Although the invention of the Post-It note might have been somewhat accidental, the creation of the 3M environment that allowed it was anything but an accident.

Had it not been for a 3M policy that encourages scientists to spend 15 percent of their time on projects of their own choice and initiative, Art Fry's idea would have remained just that. Moreover, when initial market surveys indicated that the product would fail, 3M neither stopped the project nor replaced the manager nor had the product re-developed, but instead chose to develop a different marketing approach. The responsible marketing manager received a second chance and attempted the introduction of the product once again. Had Fry and Silver and their colleagues been in an environment that discouraged creative use of failure and stubborn persistence in the face of adversity Post-it® notes would probably not exist as a commercial product.

6.2.2 Richard Miller and the creation of Aldara™ Cream

Richard Miller is the unquestioned champion of a new technology, which he invented and almost single-handedly kept alive. A senior research specialist at 3M Pharmaceuticals, Miller discovered a new product line that represents a marked departure from 3M's more traditional businesses such as non-woven materials. He spent more than a decade nurturing a laboratory discovery, which consists of a new class of therapeutic agents known as immune response modifiers, into a 3M breakthrough product. The first product of this class is called Aldara cream, a treatment for external genital and perianal warts.

While searching for antiviral agents to combat herpes, Miller tested a new compound (synthesized by 3M chemist John Gerster) that first appeared to have only marginal effectiveness - a finding that less determined researchers might have ignored. Miller, however, decided to continue experimentation and subsequent results indicated extreme potency.

Drug research is an inherently risky and expensive proposition, and Miller's superiors were initially doubtful about his technology's prospects. As Miller himself admits, "The success ratio is something like 10,000 to 1." Unimpressed by his early research findings and as cost-cutting measures were implemented, 3M officially terminated Miller's antiviral research program. Miller was placed on the unassigned list, the company's in-house version of temporary unemployment.

At this point it would have been easy simply to accept another project, but Miller refused to give up on such promising data. Even though Miller was not officially assigned to the project, he kept at his research through the use of self-directed time under 3M's 15 Percent Rule. Understating the case considerably, Miller notes that he was "fairly consumed by the project, trying to keep it alive." He wrote memos on his findings and sent them to other 3M laboratories, with copies to management. This activity -along with the research results- led to the program's official reinstatement in 1983, seven months after it had been axed.

Gratifying as that triumph was, it was only the start of a long campaign to transform promising research into a promising product. Miller continued his leadership on behalf of the molecule -now known as imiquimod- seeing it through clinical trials. In 1993, ten years after its reinstatement, the project received Pacing Plus designation. Finally, in 1997, the FDA approved the first product to emerge from Miller's research - Aldara™ (imiquimod) Cream, a treatment for external genital and perianal warts. The product is awaiting review by regulatory agencies in other countries. It shows high commercial promise, and could eventually lead to a broader family of immune response modifiers with potential applications against keratosis, basal cell carcinoma, viral infections, and Hepatitis C. Sales for Aldara cream alone are projected to exceed \$100 million annually within a few years. In acknowledgment of his belief in an idea and uncommon persistence, Miller was selected for the 3M Innovator Award and named the 3M Global Ambassador of Innovation for a year. In 1999, he received the highest honor 3M can bestow upon a scientist - election to the prestigious Carleton Society.

Miller cited the value of an open-minded approach to work - and life. "You never know what good can come out of something. I know I sound like Forrest Gump when I say that, but it's true, nonetheless. Take the early cancellation of my research project.

The recognition I've received in the years since has been greater, because it all makes for a good story. If you have a promising idea, and you can build on the idea with supporting results, stick to it."

6.3 Tracing 3M's Success

Few companies have succeeded like 3M in creating an organizational structure that stimulates innovation among its scientific and engineering personnel.

In many articles 3M's success and innovative capacity is attributed to the often-cited 15% rule. Indeed this policy, attributed to William L. McKnight, has also helped foster many of 3M's other breakthrough products, such as Scotch™ Tape. A closer look however reveals that the company hosts/ features an intricate system where technology, culture and structural elements interact to foster innovation in an almost systematic fashion.

6.3.1 Institutionalised Innovation

If there is a single secret to 3M's success, it's the company's ability to stimulate intrapreneurship among its scientists and engineers. 3M's dozens of divisions are organized into groups, and the groups are divided into four sectors, or categories. Yet the structure is highly decentralized, and researchers are given a great deal of discretionary latitude with their projects. In fact, 3M has a long-standing policy allowing its researchers to spend up to 15 percent of their time on projects of their own choosing. Moreover, the company encourages its employees to take risks and rewards them well when they succeed. Of course, 3M is well aware that creating an intrapreneurial climate means having a different breed of employee. Because they're interested in change and making things happen, 3M researchers do not readily accept rules and regulations, and they challenge authority, ask embarrassing questions, circumvent the chain of command, and often behave in ways incongruent with bureaucracy.

Mechanisms to Stimulate Progress at 3M

<p>“15 % Rule” - a long-standing tradition that encourages technical people to spend up to 15 percent of their time on projects of their own choosing and initiative.</p>	<p>To stimulate unplanned experimentation and variation that might turn into successful, albeit unexpected, innovations.</p>
<p>“30 % Rule” - each division is expected to generate 30 percent of annual sales from new products and services introduced in the previous four years</p>	<p>To stimulate continuous new product development</p>
<p>“Golden Step” award, granted to those responsible for successful new business ventures originated within 3M</p>	<p>To stimulate internal entrepreneurship and risk taking</p>
<p>“Genesis Grants” - internal venture capital fund that distributes parcels of up to \$50,000 for researchers to develop prototypes and market tests</p>	<p>To stimulate internal entrepreneurship and risk taking</p>
<p>Technology sharing awards, granted to those who develop a new technology and successfully share it with other divisions</p>	<p>To stimulate internal dissemination of technology and ideas</p>
<p>New product forums, where all divisions share their latest products</p>	<p>To stimulate new ideas across divisions</p>
<p>“Own business” opportunities - employees who successfully champion a new product then get the opportunity to run it as his or her own project, department, or division (depending on the sales levels of product)</p>	<p>To stimulate internal entrepreneurship</p>
<p>“Problem-solving missions” - small hit teams sent out to customer sites in response to specific, typical customer problems</p>	<p>To stimulate innovation via customer problems that are the seeds of new opportunities.</p>
<p>“Pacing Plus Program”- each division selects priority products to get to market within a short, specified time frame</p>	<p>To speed product development and market introduction cycles, which thereby increases evolutionary “variation and selection” cycles</p>
<p>Profit sharing schemes</p>	<p>To stimulate a sense of individual investment in the overall financial success of the company, and thereby stimulate individual effort and initiative</p>
<p>Dual ladder career track that allows technical and professional people to move up without sacrificing their research or professional interests.</p>	<p>To stimulate innovation by allowing top professional and technical people to “advance” without having to switch to a managerial track.</p>

Figure 6-4: Mechanisms to Stimulate Progress at 3M

Source: Collins & Porras, (1997) *Built To Last: Successful Habits of Visionary Companies*, London: Random House: pp. 156-158

These mechanisms create an intricate system that is responsible for 3M long-standing success. The listed mechanisms are highly integrated and interactive. Some target the individual employee while others become effective on a higher organizational level. Based on these base themes the following section attempts to capture the structural and organisational design components employed at 3M Company to systematically invoke continuous organisational renewal.

6.3.2 Levers on Individual/ Group Level

6.3.2.1 Communication and Dissemination of Ideas

Innovation involves a highly creative process as a result of which new products, processes, and strategies develop. Since psychology still has little to offer with respect to how creativity functions and how it can be nourished and directed there is a tendency to treat the subject with an mysterious, intangible aura that leaves little space for hard work and well organised research. It is an often-neglected fact that creativity can only develop if it is based on a firm foundation of knowledge and skills, experience and engagement. Without solid management of knowledge creativity will remain what the aura suggests, namely intangible and mysterious, its outcome a coincidence and therefore only providing an unreliable base for long-term existence and development of an organisation.

Knowledge management contains all processes responsible for the development, change, and securing of knowledge in an organisation with the goal of having the right know-how available at the right time and the right place. How existing knowledge and skills in an organisation are put to use depends on the willingness of experts to pass on a their skills, knowledge, and experiences on to others. Only if employees trust the company and its management will they be prepared to share their expertise. Establishing an appropriate corporate culture is instrumental in this.

To facilitate and foster communication 3M use a variety of means such as meetings, conferences, cross-functional teams, computer software, databases, and so forth. What is even more important, however, is that 3M manages to foster an environment where employees feel free to seek out the input of persons from completely different parts of the company, and where the individuals who are contacted are ready to share generously what they know. As a result cooperation is the norm rather than the

exception to the rule. Right from the start researchers, marketing experts and engineers work together closely in order to ensure the successful development and marketing of their product idea. On a higher organizational level this also involves close collaboration between individual research centers and laboratories to ensure that existing technical knowledge within the organisation is used effectively.

While in many large organizations requesting resources from other departments often involves a fairly long and difficult approach fraught with bureaucracy 3 M emphasises neighbourly help. For example, the development of transdermal skin patches, which are capable of transporting pharmaceuticals through the skin to the affected area, required finding an adhesive or tape that was suitable for use on human skin. The transdermal development team lacked a member with the background on medical skin patches. So the help of the 3M Tape Laboratory was sought. The joint cooperation resulted in the development of the Minitran™ Transdermal Delivery System. The product's innovative aspect lies in the fact that no separate gauze bandage containing the medication is required. The adhesive of the dermal patch contains the pharmaceuticals so that the whole covered area is treated comprehensively, conveniently adding the benefit of smaller size and less interference to the patient in comparison to treatment conventional bandages.

This type of interdisciplinary corporation is necessary since 3M is keen to avoid that parallel (possibly redundant) capacities are built up in the worldwide, geographically dispersed research centres and laboratories.

On an individual level the close collaboration and cooperation is mainly made possible by the 15 percent rule and the possibility of direct communication without a necessary involvement of the direct superior. The 15 percent rule has a long standing tradition at 3M that encourages technical staff to spend up to 15 percent of their work time on projects of their own choosing and initiative. This implies that researchers have the freedom to define the themes of their research individually. These 15 percent can and also should be used to assist other research teams or departments. The underlying theme here is reciprocity since the individual researcher or department may be in need of assistance from other departments in the future. This form of reciprocity is labeled "sharing technology" at 3M and is a normal, ongoing process.

Departmental and international collaboration, however, is also promoted through other instruments and structures. For example 3M has introduced so called “Genesis Grants” which are specifically used for financing research projects that are of use to several departments or benefits several of 3M’s existing products but that cannot be directly attributed to a single entity or group. In essence these are internal venture capital funds that are used to finance research projects that fall outside regular cost structures. A “Genesis Grant” provides up to 85,000 US dollars for the development of prototypes and market tests as a realisation of a research project after completion of the idea phase.

Another means to promote direct communication amongst employees is the “3M Technical Forum”. This is best described as a worldwide network of 3M’s technical community. It comprises more than 10,000 members and is an instrument to stimulate dissemination and cross-fertilisation of ideas and technology through free flow of information. It actively promotes information sharing and building through training courses, chapter meetings, conferences, and symposiums.

6.3.2.2 Lived Values: 3M Principles and Policies

As our business grows, it becomes increasingly necessary for those in managerial positions to delegate responsibility and to encourage men to whom responsibility is delegated to exercise their own initiative. This requires considerable tolerance. Those men to whom we delegate authority and responsibility, if they are good men, are going to have ideas of their own and are going to want to do their jobs in their own way. It seems to me these are characteristics we want in men and [they] should be encouraged as long as their way conforms to our business policies and our general pattern of operation. Mistakes will be made, but if the man is essentially right himself, I think the mistakes he makes are not so serious in the long run as the mistakes management makes if it is dictatorial and undertakes to tell men under its authority to whom responsibility is delegated, exactly how they must do their job. If management is intolerant and destructively critical when mistakes are made I think it kills initiative and it is essential that we have many men with initiative if we are to continue to grow.

(William L. McKnight, former President, 3M
from his “Philosophy of Management,” a paper presented in 1941 cited in Huck, 1955: 239)

William L. McKnight laid out these basic rules as an instrumental part of 3M's management philosophy in 1948.⁴⁸ The McKnight principles and policies, which embody a variety of corporate values and ideas such as delegation, tolerance, stubborn persistence, learning from mistakes, curiosity, and individual initiative are fundamental to 3M's corporate culture. Some of his most influential contributions have been in the area of human resources. At a time when such practices were hardly commonplace, 3M treated its work force well. Old age pensions and disability insurance were put into place. McKnight extended a profit-sharing program instituted by his predecessor, Edgar Ober, to include every 3M employee. McKnight believed that, "3M is people, and our opportunity to succeed depends upon the capabilities of our people."

What is striking, however, for observers jaded by association with companies whose values seldom extend beyond plaques on the wall, is that 3M's values are for real. [...] [such values] are, if anything, understated rather than overstated. When 3M leaders and publications say they want to create a company that employees are proud to be a part of, they are tapping into deep subterranean reservoirs of loyalty and mutual affection. These are priceless resources bestowed by the company's history, and they are its most vital current assets. (Gundling, 2000: 66-67)

Some of these principles are expressly realised in the various rules most notably the 15 percent rule, which encourages managers to allow employees time to work on projects of their own personal interest. This rule is also instrumental in establishing the necessary conditions for personal freedom and motivation since it not only creates the organisational conditions to enable own initiative but simultaneously establishes/acts as a sign of trust by the organisation towards the loyalty of its employees and emphasises the value of individuality.

3M hopes that this rule will stimulate unplanned experimentation and variation that might turn into successful, albeit unexpected, innovations. Amongst a variety of 3M products whose invention and development are attributed to this rule apart from the Post-It note and Aldara Cream are also for example Thinsulate™ Thermal Insulation or Emphase™ Biosupport Media.

⁴⁸

William L. McKnight joined Minnesota Mining and Manufacturing Company in 1907 as an assistant bookkeeper. He quickly rose through the company, becoming president in 1929

Another effective management instrument to generate motivation and initiative on an individual level is the “3M Leading Edge Academic Program”. This program encourages technical employees to engage in advanced research projects at academic or governmental institutions. The employee works on the project of the chosen institute but continues to be on 3M’s payroll. There are mutual benefits for all parties involved. The advantages for 3M are obvious. The company gains access to technology that would have been much more costly to develop in-house, with the added benefit of reducing the development time and ensuring that employees remain in touch with the latest developments in the field.

Through the participation in this program the 3M employee has the possibility to update his skills and knowledge on a regular basis at the company’s expense. The value of such an arrangement becomes evident when keeping in mind the rapid technological developments often outdating current „cutting edge“ knowledge within a few years. Moreover the researcher can acquire new working skills and experiences from the other research team members and has the opportunity to become a member of an informal network outside of the 3M organisation.

- **Fostering Individual Initiative**

Individual initiative can only develop where employees have the possibility to make own decisions and also have the freedom to make own mistakes. Essentially this means that employees should be encouraged and trained to decide and act on their own in uncertain conditions. The resulting higher margin for mistakes should be understood as an intensified process of gathering additional skills and knowledge.

Innovation management requires experimentation on both individual and organizational level. Both cannot develop as long as people work in an environment that does not tolerate mistakes. In such an environment mistakes are seen to be a sign of failure and weakness and not understood as the source of new insights. These important aspects are captured in 3M’s human resource policy, which is a testament to the ideas propagated by William L. McKnight.

3M - Human Resource Policy

The people of 3M are the company's most valuable resource. They are the primary means by which 3M goals and objectives will be attained. 3M management, therefore, believes that it is essential to provide an organizational structure and a work climate which will:

- Respect the dignity and worth of individuals by encouraging their highest level of performance in a fair, challenging, objective, and cooperative work environment. Individual rights are respected. Timely and open communication to and from employees is encouraged. Supervisors and managers are accountable for the performance and development of the employees assigned to them.
- Encourage the initiative of each employee by providing both direction and the freedom to work creatively. Risk-taking and innovation are requirements for growth. Both are to be encouraged and supported in an atmosphere of integrity and mutual respect.
- Challenge individual capabilities through proper placement, orientation, and development. Responsibility for development is shared by the employee, by supervisors and managers, and by the company.
- Provide equal opportunity for development and equitably reward good performance. Performance is evaluated against objective, job-related criteria and rewarded with appropriate recognition and compensation.

Figure 6-5: 3M - Human Resource Policy

Source: 3M Company

“Most innovative enterprise” and “preferred supplier” are general enough to fit everyone, but by themselves they would be empty abstractions. Such sparse vision statements are complimented and given substance by a number of success stories that espouse “[...] a kind of hero’s journey, in which the creator of a revolutionary idea persists through trials and disappointments to ultimately prevail” (Gundling, 2000: 47). Stories like these are told and heard over and over again within 3M. The company treasures these legends and keeps them alive. From time to time new success stories are added. Such legends ultimately serve to reinforce the shared belief of employees in a deep-rooted notion that one person who has a bright idea and who is willing to work hard enough to turn it into reality can make a difference. The individual is encouraged to pursue their dream with freedom, even in face of adversity or interference from above, regardless how long a raw idea may take to make it in the marketplace, using informal channels and to pursue their dream even if they might fail (Nonaka & Imai, 1995:38).

The actual circumstances in which innovation occurs are complex and varied. Since disappointments far outnumber triumphs, narrative provides a welcome means to

enshrine the rebellious spirit of 3M's "individuals with initiative" (McKnight), "corporate heroes" (Peters & Waterman, 1982) or "intrapreneurs" (Pinchot, 1985) to preserve the myth of the "tradition of innovation". As result even the people whose projects ultimately fail feel better for having tried.

6.3.2.2.1 Assess Contribution and Performance

Motivation also results through honouring the achievements of the employees by the company. 3M favours public display of such orders over payment. Employees are merited for outstanding performance in ceremonies in which they receive an award. This method has advantages for both sides. The contribution of a single person does not remain confined to a department or conversation between a employee and his superior but is made public in front of the whole workforce. Choosing not to reward outstanding achievements by payment saves money, avoids jealousy and amongst the workforce. Often it is not clear where or with whom a suggested improvement or successful idea originated, how to measure the contribution or how the value of a particular idea compares to others. Of course it is not feasible to merit individual performance publicly all the time, since this would lower its value, making it ineffective as an instrument for motivation. Personal communication becomes a central leadership instrument to mobilize and perpetuate innovative and ensure committed behaviour.

How well this task is fulfilled depends to large extent on the management team. However there are a number of instruments and institutionalized processes that promote recognition personal merit and communication between workforce and management. At 3M one of the core instruments is called Employee Contribution and Development Process (EC&DP). It serves the assessment and development of employees.

The employee fills out a 2-page form stating his/her personal goals for the past year and to what extent he/she feels these have been realised. Strengths as well as targets for future personal development are also included. The following step involves a discussion of the supervisor with colleagues from other departments that also know the employee in question. The aim is objectify the own assessment. Following this, the manger discusses the future development with the employee. Both agree on a

development plan and targets for the coming period. Improvements with respect to performance and targets are discussed in regular meetings and updated as necessary.

A further instrument available to the 3M managers is the so-called "multiple source feedback". This process for personal assessment allows managers to send an e-mail with questions to their own person to up to 12 superiors, employees, and colleagues. The responses are anonymous to ensure highest possible standards of objectivity and integrity. This type of instrument not only serves to improve the self-judgment but also signals a high appreciation of the individuals judgment as well as seriousness in the attempt to improve own management skills.

6.3.2.2.2 Promoting Diversity

The call for initiative, independence and responsibility can only function if the uniqueness of each member of the organisation is expressly recognised. There is otherwise always the potential danger that employees are hired to match a particular profile rather than serve the organisation by increasing its complexity through personal differentiation. Employing employees with a corresponding profile with respect to knowledge, skills, personality and mode of operation will inevitably lead to mediocre performance and similar decisions. External complexity and diversity need to be matched through internal diversity and complexity. The underlying idea is that the more an organisation converges the more crisis-prone it eventually becomes. Only by specifically targeting and promoting diversity among the workforce, can an organization enable the self-perpetuating creative process required to generate organisation renewal.

At 3M the workforce diversity is specifically fostered. As mentioned earlier, when structuring research teams every attempt is made to avoid and build up parallel capacities. This ensures cross-functional and international teamwork with the added effect of generating new momentum and creating new synergies.

6.3.3 Levers on Organisational Level

6.3.3.1 “Grow and Divide” Divisional Structure

In 1949, McKnight proposed an innovative change in 3M's organizational structure. A few years prior, he had given the Detroit Adhesives and Coating Division near-autonomous status, with control of its own finances. When this experiment proved successful, McKnight determined that a decentralized, divisional structure would best serve the entire 3M organization. Each division was given a sales force, a research lab, and responsibility for its own profits. New divisions could easily be added and, “[there] would be no limit to how big [3M] would grow.”

Ray Herzog, one of McKnight's successors as CEO and chairman of the board, commented on the invigorating effect that the divisional system has had on 3M employees:

When we break out these new businesses we appoint a new management team. We give people an opportunity to identify with a new business and become more important to 3M; and we find, almost without exception, that the new division begins growing at a faster rate. We also stimulate the established division to find other new products and markets, which will help it meet our growth objectives.

Overtime, the company has grown so big that the efforts of its more than forty divisions are now coordinated by product or market groupings. The basic structure McKnight implemented, however, is still in place.

6.3.3.2 Strategic Stretch

There are only a handful of 3M corporate goals. As in most companies several of them concerned with financial performance such as earnings per share, return on capital, return on stockholder's equity. A variety of goals specifically serve to foster innovation by setting out ambitious and quantifiable targets.

At 3M this “stretch” is achieved with the “30-Percent-Challenge”. The 30-Percent-Challenge serves primarily to stimulate continuous new product development as well as the pace of innovation. Each division is expected to generate 30 percent of annual sales from new products and services introduced in the previous four years. To establish an even greater sense of urgency 10 percent of sales should come from

products that have been in the market for just one year. Both targets are recent refinements; before 1993 this target was set at 25 percent and five years. Innovation is time sensitive. Therefore, recent considerations aim to “stretch” the pace of innovation even more by setting goals that halve the time it takes to bring products to market.

The 30 percent challenge and designated goals produce constant pressure to innovate. To support and reinforce these ambitious targets 3M’s top management introduced so-called “High Impact Programs”; each division selects one to three priority products with the aim of speeding product development and market introduction cycles. This first attempt to establish a priority system brought new problems: many good ideas competing for limited resources soon multiplied the number of such programs beyond the original intent. To increase the effectiveness of selection and to nourish the most promising opportunities 3M introduced the Pacing Plus Program. The roughly thirty programs at 3M that have received Pacing Plus designation are defined as those which:

- Change the basis of competition in new or existing markets
- Offer large sales and profit potential, with attractive returns on investment
- Receive priority access to 3M resources
- Operate in an accelerated time frame
- Employ the best available product commercialization processes

Pacing Plus is currently the most powerful management tool used by 3M to support and reinforce an idea with strong potential. It assists in prioritizing new product ideas and concepts with high market potential in a non-bureaucratic fashion. This includes the allocation of necessary funds, lab resources as well as the assignment of project members.

6.3.3.3 Synergy: Combining Competence

3M provide more than 50,000 products for multiple markets that are rooted in diverse core technologies. These core technologies have been classified into well over thirty distinct technology platforms. These platforms are leveraged widely across 3M and illustrate the kinds of solutions 3M can apply to meet customer needs. The true potential of these different platforms lies in the their possibility to be combined in search and development of new solutions.

3M Technology Platforms

Acoustics	Adhesives	Batteries	Ceramics
Coated Abrasives	Copper Interconnects	Dental and Orthodontics	Display Materials
Drug Delivery	Electromechanical Systems	Electronics	Films
Filtration	Fluoromaterials and Fluoropolymers	Fuel Cells	Health Information
Imaging	Infection Prevention	Inks & Pigments	Microbiology
Microreplication	Molding	Non-wovens	Optical Fibers and Connectors
Optics and Light Management	Particle and Dispersion Processing	Pharmaceuticals	Polymer Melt Processing
Porous Materials and Membranes	Precision Coating	Radiation Processing	Skin Health
Software	Specialty Materials and Polymers	Surface Modification	Vibration Damping

Figure 6-6: 3M's Technology Platforms

Source: 3M Company

Consider 3 M's competence with sticky tape. In dreaming up businesses as diverse as post-it notes, magnetic tape, photographic film, pressure sensitive tapes, and coated abrasives, the company has brought to bear widely shared competencies in substrates, coatings, and adhesives and devised various ways to combine them. Indeed, 3 M has invested consistently in them. What seems to be an extremely diversified portfolio of businesses belies a few shared core competencies.

Core competence is communication, involvement, and a deep commitment to working across organisational boundaries. It involves many levels of people and all functions. World-class research in, for example, lasers or ceramics can take place in corporate laboratories without having an impact on any of the businesses of the company. The

skills that together constitute core competence must coalesce around individuals whose efforts are not so narrowly focused that they cannot recognise the opportunities for blending their functional expertise with those of others in new and interesting ways.

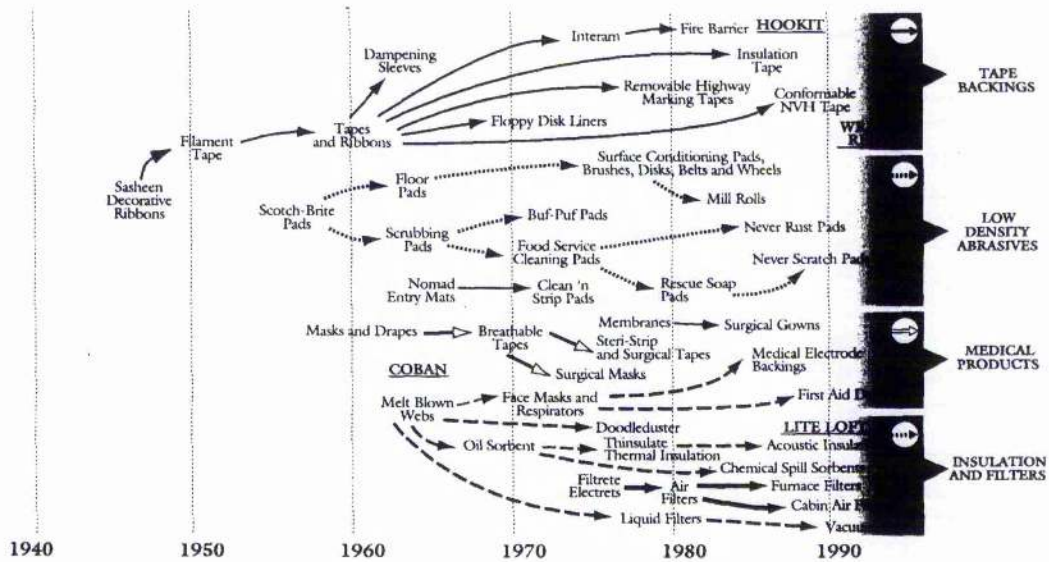


Figure 6-7: Developing Core Competence: 3M Nonwovens Technology Platform

Source: Gundling, E. (2000) *The 3M Way to Innovation: Balancing People and Profit*, Tokyo: Kodansha International

Core competence does not diminish with use. Unlike physical assets, which do deteriorate over time, competencies are enhanced as they are applied and shared. However, competencies still need to be nurtured and protected; knowledge fades if it is not used. Competencies are the glue that binds existing businesses. They are also the engines for new business development. They may guide patterns of diversification and market entry, not just by the attractiveness of markets.

6.3.3.4 Company Internal Venture System

3M hosts an internal venture system that provides a project with additional funds and resources from multiple sources reflecting the maturing process of the initial idea. This venture system is based on the “grow and divide” divisional form and a “variation and selection” process, which was codified in 3M’s technical guidance manual as early as 1925 by Richard P. Carlton, director of research and later president of 3M

[We] must possess a two-fisted generating and testing [process] for ideas [...] Every idea should have a chance to prove its worth, and this is true for two reasons: 1) if it is good, we want it; 2) if it is not good, we will have purchased our insurance and peace of mind when we have proved it impractical. (cited in Collins & Porras, 1997: 153)

According to Collins and Porras (1997), Carlton also added two other key criteria for evaluating and selecting ideas. First, for an idea to be selected, it has to be new. Second, the idea has to meet a demonstrable human need. The first criterion ensures innovativeness while the second criterion scrutinizes its marketability and hence its usefulness to 3M. This screening process is quite elaborate and invoked at various stages throughout the development process.

For example, both sub-cases show that an inventor must not only have a good idea but also be able to seek out and persuade others to lend the resources necessary to take a project to the next stage. Even modest successes at this point make it necessary to obtain further resources, be it from colleagues who may be willing to offer their help or from managers who require tangible evidence that the investment will be worthwhile. Then the whole process of establishing support begins again on a greater scale, while the scientist must sustain the technical momentum of the project and organize the resources won thus far. The company's risk exposure increases gradually, but in a highly controlled fashion since the project has to prove its viability, with every new stage, as more funds and resources are committed to the project.

As a new technology area becomes too complex and logistically demanding for one individual to manage, a team may be required. Successful programs tend to accumulate their own volunteer momentum, particularly when they receive positive management signals such as Genesis Grants or Pacing Plus designation.

6.3.3.5 Customer Orientation and Involvement

Effective innovation management extends beyond creating sufficient freedom for creativity to flourish. Invention and ideas alone do not generate growth. Scientific or technological developments can only be considered an innovation if it is turned into a marketable product. If customer acceptance is low the idea will turn into a flop.

To a large extent the success of an innovation depends on how well it is managed and the extent to which the customer is at the center of attention. An MIT study conducted

by Eric von Hippel (cited in Blank & Kremer, 1999) provides insight into the importance of innovation management. The study concludes that 80 percent of all innovations are invented by end-users. It, however, took 5 to 7 years before they became commercially available.

At 3M customer orientation has long-standing tradition.

In our early days, we realized that in order to create products that truly solved customer problems we had to get our sales representatives and technical people past the purchasing office and onto factory floors where our products were being used. (William D. Coyne, Senior Vice President, Research & Development quoted in Kanter et al.,1997:46)

This approach traces back to the company's first successes, which followed a decade of struggle and near failure. The founders' intent was to mine corundum, an abrasive mineral used to make sandpaper. When the corundum deposit turned out to be nothing more than a low-grade look-alike, 3M began manufacturing sandpaper to survive. With the hiring of William L. McKnight in 1910, 3M gradually began to emerge as a viable business.

Some years later, in his new role as a sales manager, McKnight instructed sales representatives to go "behind the smokestacks," to truly understand customers' problems. That was how 3M discovered that curved or recessed surfaces presented real problems to automobile body shop workers. The contours were difficult to sand using conventional abrasives with their semi-rigid paper backing, and the dust from sanding was an irritant that caused chronic health problems. Acting on that intelligence, 3M developed 3M-Ite, a cloth abrasive that was more flexible than sandpaper, and Wet-or-Dry sandpaper, which could be used wet, keeping dust to a minimum. The two products moved the company into the black and set 3M on the path it has followed ever since.

Today, customers are involved in the development process in various points in a variety of ways. Customers are often involved in the definition and structuring phase of a research project. It is of prime importance to identify potential applications of an invention at an early stage. Customer opinions, experiences, problems, and wishes are also important in identifying new applications for existing products. One of the products that resulted from this approach was the tape dispenser.

The creation of Scotch™ cellophane tape was of major importance to 3M. John Borden, a sales manager in the Chicago area saw the benefits of 3M's cellophane tape, but he also saw that customers had a difficult time using it. At that time, most people peeled the tape off the roll with one hand, then cut or tore it with the other. Any excess would fall back onto the roll and the edge would be virtually invisible.

Borden thought there had to be a better way. After 18 months of experimenting with designs and searching out metal-stamping operations that could make prototypes, Borden created a dispenser that had a built-in cutter. Users could now unwind the tape, cut exactly what was needed, and leave the remaining tape ready for easy use. Borden's dispenser became a key element in the growing market for cellophane tape. For decades, it has been the tool that made cellophane tape widely useful.

Customer feedback is also sought regularly for assessment, development and adjustment of appropriate services. The customer involvement, however, is not solely confined to surveys and market testing. In some cases customers even become full-members of the research teams.

6.3.3.6 Multiple Ladder System

The fact that 3M workforce consists of high percentage of researchers and scientists also creates management recruiting problems. For example, the decision if an idea should be integrated into a research project usually requires expert knowledge, which suggests occupying this position with the most knowledgeable person, i.e. best expert available. This, however, holds high risk potential. First, the most knowledgeable may not necessarily be the best-suited person in terms of leadership qualities. Second, researchers are only seldom attracted to management and leadership tasks since they are often associated with a host of administrative tasks and meetings, which hinder any meaningful research activity.

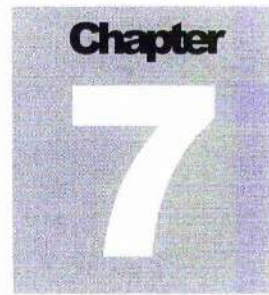
In order to address this issue 3M introduced the “Dual Ladder System”. This enables researchers, but also sales or marketing personnel, to advance the corporate ladder without completely having to give up their current activity. For such a system to function reducing the administrative overhead is a necessary pre-condition. To this end 3M has introduced a variety of measures to flatten the corporate hierarchy,

establish short and clear decision paths, and direct communication between corporate units.

6.4 3M Company: Concluding Remarks

For over nine decades, 3M has been ‘balancing on the innovation high wire’, and has prospered as a result. Many factors contribute to their success. It lies with the company’s ability to attract imaginative and productive people, create a challenging environment, design an organization that doesn’t get in people’s way, and offer rewards that nourish both self-esteem and personal bank accounts. All this is synchronised with 3M’s determination not only to keep up with the needs of their customers but also to anticipate those needs.

We identify customer problems, anticipate their unarticulated needs, and come up with innovative solutions. We are not a commodity marketer. We could not survive on me-too products or product extensions. Granted, a lot of risk is involved in emphasizing the new and untried; but it’s far riskier to rely on the comfortable and familiar. Putting bells and whistles on the buggy didn’t distract consumer attention from the horseless carriage, and no combination of better keyboards and correction ribbons could save the typewriter when computers and word-processing software appeared on the scene. In our case, the risks associated with introducing the new and untried are minimized by the diversity of our fifty thousand products. We are involved in so many businesses and markets that a problem in one has a minimal effect on our overall business. (William D. Coyne, Senior Vice President, Research & Development quoted in Kanter et al.,1997:47)



ORGANISATIONAL RENEWAL:
PROCESS DESIGN

Case Analysis

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7. Case Analysis

This chapter attempts to provide an analytical account of the case study evidence. It also serves to uncover principles of successful organisation by comparing the individual cases and contrasting these with the research findings on organisational decline, which is subject to the cross-case analysis in the latter sections. In other words, it presents an effort to understand and identify the forces and processes that trigger and sustain decline as well as those levers that trigger organizational renewal and hold the key to sustained growth.

As mentioned earlier, the selection of cases for the empirical study was mainly guided by their ability to provide insight and learning on the subject matter. The organisations selected for the study had to conform to set criteria regarding performance, however, they were deliberately chosen with differences regarding size, age and industry sector. In terms of size and age (measured in number of employees as an indicator of structural complexity and turnover as an indicator of dynamic complexity) Petroline Wireline Ltd. is considered relatively a small and young company (200 employees/ 20 years) while Shell direct GmbH takes a medium position (1000 employees/ 50 years). With approximately 70.000 employees and nearly 100 years of age 3M Company is the largest and oldest firm of the three cases. All three companies operate particularly successfully in their chosen field. To demonstrate that superior 'organisational performance' is exactly what the term suggests and cannot be adequately reduced to and understood in terms of size, age or maturity of industry all companies chosen for the study compete in well-established, mature markets. To eliminate any possible distortion (for example, if companies in the sample operate under conditions of a favourable business climate) the firms were deliberately chosen to represent different fields of business.

A popular assertion within the management sciences is that organisations increasingly become inert as they grow and as procedures, roles, routines and structures establish. This implies that the likelihood of organisational change decreases with an organisation's size and age. This contrasts with the evidence provided by the selected cases, which suggest (similar to the occurrence of decline and failure) that superior

performance and sustained success may be experienced by organisations regardless of their size and age.

While there may be a high correlation between size/ age and inertia these are supporting, not sole explanatory factors. The focus on size and age is very much a result of the methods that are concentrated on superficial phenomena. For example, many of these studies have been developed by retrospectively examining the histories of a few large organisations (e.g. Hannan & Freeman, 1984). It may be that these findings also result from employing such empirical and (in light of the complexity of the issues associated with organisational change) fairly superficial, quantitative methods.

7.1 Lessons from Research on Organisational Decline

Backed by empirical research Mintzberg (1989), Miller (1990) and Pascale (1990) all make the point, albeit approaching the phenomenon of organizational decline from different angles, that the harmony, consistency and fit achieved by a firm that reaches a viable configuration are at one and the same time its strength and its downfall. The tendency for companies in this position is to concentrate on improving what they already do well. Their strategies become ones of selection, repetition and ultimately excess.

General Motors' (GM) gradual fall from dominance illustrates the issue. For over half a century, GM dominated the automotive industry. GM's difficulties did not result from a lightning attack by Japanese auto manufacturers. Today, more than three decades after the start of Japanese automobile importation to the United States, the company is still attempting to find a way to its former dominance. During this period GM has had plenty of time to adapt. While many of GM's employees and managers have turned over, the company still has difficulty adjusting. There seems to be something about the way that GM is organised that makes its behavior hard to change.⁴⁹

⁴⁹ In the following CLD diagram variables identified by the research on organisational decline to be instrumental in triggering and sustaining processes of organisational decay are highlighted through red boxes.

The CLD depicting the structure of decline suggests that the failure to recognize environmental changes and initiate necessary organizational responses is indirectly related to efforts by the organization to cope with the effects of growth, namely the increased organizational complexity concurrent with an increase in organizational size. Organisational growth -manifest in increased workforce size or geographical spread- usually increases structural and dynamic complexity requiring the organization to split up processes to maintain control.

Organisations use horizontal and vertical differentiating strategies to break down their work. Specialization of labour and departmentalisation are design methods that result in horizontal differentiation of organisational activities. Delegation and decentralisation are methods for vertically differentiating authority. Specialization of labour involves horizontal differentiation at the individual level and refers to the number of different specialties or occupations within the organization. Vertical differentiation occurs within the organization's up-and-down dimension and refers primarily to the number of managerial levels and the authority that accompanies them. This series of levels is commonly referred to as the "hierarchy of authority".

In order to combine the differentiated efforts of its member's organisations employ integrating strategies. Such integrating strategies are based on facilitating communication and coordination by hierarchy of authority, formalization, committees, and span of control. In small organisations the most common integrating mechanism is the owner or founder. This person is usually equipped with the formal authority to supervise, direct, and lead. To cope with the increased complexity as organisations grow the formal authority is delegated throughout the organisation -establishing further managerial levels- to facilitate the coordination of organisational workflows but with the side-effect that top executives and hence organizational decision-making become increasingly detached from the realities of the market. Further coordinating mechanisms are the development of formal rules and procedures and the increased attention to span of control, to ensure efficient supervision and channeling of efforts towards organizational goals. Committees and regular meetings also serve to coordinate by bringing together representatives of diverse organizational parts in a structured, routine way.

The essence of all integrating devices lies in the importance of communication to ensure effective coordination of organizational efforts. In a sense, every differentiating strategy requires a counterbalancing integrating strategy. No one person in a modern, complex organization can do and know everything, so tasks must be divided up and assigned. The organization must coordinate these many divided-up tasks or it will become ineffective and chaotic. Striking a healthy balance between these opposites -differentiation and integration- is a critical task in the quest for organisational self-renewal.

The research on organizational decline suggests that for successful companies the tendency is to concentrate on doing better that which they already do well. The quest for effectiveness is gradually replaced by a quest for organizational efficiency. The strategic recipes that are associated with past success are increasingly refined. Accordingly the organization increasingly engages in processes of selection, repetition and ultimately excess. As organizational controls intensify and administrative intensity increases the possibilities for individuals to introduce new ideas and changes in face of firmly implemented and prescribed workflows increasingly diminish.

As a result of such strategic drift, organizations in these studies became overtly adapted to their respective environment and, when faced with environmental changes, had great difficulty of or even failed in changing. The organizations became specialized towards generating a particular output as efficiently as possible and seemingly opposed changes with every means at their disposal.

In systems theory this effect is known as homeostasis. Ecological, biological, and social systems are homeostatic. A homeostatic system reacts to changes in the environment, or to random disturbances, through a series of modifications of equal size and opposite direction to those that created the disturbance. They oppose change with every means at their disposal. The goal of these modifications is to maintain the internal balances. If the system does not succeed in reestablishing its equilibriums, it enters into another mode of behavior, one with constraints often more severe than the previous ones. This mode can lead to the destruction of the system if the disturbances persist.

In organizations homeostatic behaviour is also mirrored in the observation that prolonged decline is usually treated in stages (Grinyer, Mayes & McKiernan, 1988). First, there is a problem of identifying the organisational situation as a crisis. This is based on the assumption that the organisation is most likely to initially confront what will become a prolonged decline as if it were merely an aberration. The decline in performance is ignored or denied. Second, when the facts of decline are evident, it will be treated as temporary crisis. However, as the situation worsens a variety of side-effects such as increased conflict, increased politicking, increased resistance to change, and a drop in employee motivation and morale reinforce the downward trend and make effective crisis management extremely difficult.

By abruptly and dramatically making major changes, managers hope to rapidly book tangible progress - and instantly win recognition and promotion. However the scale and scope of such measures make this an extremely risky approach, as the changes result in overreaction with often counter-intuitive results. In their study (Grinyer, Mayes & McKiernan, 1988) found that the engagement in 'big projects that failed' was one of the most frequent causes of organisational failure.

Initially it is the organization's homeostatic nature that lies at the root of loss in performance. However, faced with impending disaster countermeasures are often introduced without regard for the possible consequences. This behaviour triggers processes that push the organization even further towards disaster as controls and caution are progressively undermined and neglected. To reiterate some of the reasons whereby top management may neither understand nor be able to control the internal dynamics of the organization:

1. Subsystems are subtly losing congruence and cohesiveness, leading to the disintegration of the organization. For example, a traditional power subsystem may become increasingly incompatible with a social subsystem that has become greatly modified by values, which reject any form of absolute authority.
2. Complexity, as defined in terms of the number of linkages and interactions and the emergence of new forms, has far exceeded the information-gathering and communications capabilities of the organization.

3. The effects of policies are frequently counterintuitive. Yet policymakers respond to the worsened situation with more of the same old policies aggravating the situation even more.

4. Processes cross-cut structure (for example, facilities and equipment layout, organization chart, span of control, and centralization-decentralization) and function (for example, R&D, engineering, production, and marketing). By focusing on the latter, executives may not always recognize subtle, latent, or insidious changes in pressures, influence, communications, lags in getting things done, and so on. Structure and function have been well studied but the forces and processes that operate within organizations are still relatively poorly understood. In the long run forces and processes are much more important to organizational success or failure than are the structures and functions which are much more accessible.

5. The entire organizational climate can change because of the processes mentioned or because of the specific acts or deficiencies of given top managers. In these cases motivation and morale deteriorate throughout the organization. Employees lose confidence in the leadership. Aspirations and expectations fall, and the organization collectively no longer has confidence in itself, no longer believes it can compete, achieve, succeed, and win. An aura of hopelessness and failure permeates the organization, the ability to learn rusts, and problem solving and decision-making become more and more routinised, short-term, and shortsighted with an unhealthful element of individualism and selfishness. Due to an inevitable increase of counterproductive conflicts the organization responds sluggishly if at all to internal conflicts and tensions and stresses and to outside threats and opportunities.

6. Money commonly is not available either to start or to sustain the growth of a new organization or to maintain an organization at a stage of healthy maturity.

7. Risks, especially conflicts between or among risks, are poorly assessed if they are assessed at all.

Seldom do these problems occur in isolation; rather each is linked with others in a pattern. Each symptom reinforces others and in turn is reinforced through destructive positive-feedback loops. The pattern itself continues to grow in scope, progressively incorporating other system elements, and perhaps increasing in velocity and

acceleration, until some threshold is exceeded and the system collapses. The antidote to such system pathology is obviously negative-feedback regulation and feed forward anticipatory planning.

7.2 Individual Case Analysis

7.2.1 Petroline Wireline

Petroline Wireline is a relatively small, fast-growing company. The case demonstrates the central role of personal ambition and talent of individuals in the early development and success of this organisation. The success of Petroline is driven by entrepreneurial spirit, motivation, inventiveness and innovation. Problems and successes are shared and ideas disseminated. Daily operations are marked by hard work as much as by fun.

We try to celebrate success whenever we can because it is a thing that people generally don't do enough of and it is so stressful working here that if you didn't celebrate successes it wouldn't be worth it. It wouldn't matter how much you paid people, because once you take all the fun out of it, it just becomes a drudge, so we always try to celebrate success. Then you find people will work harder during your next stressful periods. When you do have a result, you've got to celebrate. (Interview S. Ferguson)

Group meetings and discussions take place on an ad-hoc basis and are subject to a fairly informal atmosphere. The company is bound together by its success and there is a strong informal and individualistic cultural aspect holding the organisation together.

Limited in complexity, small companies like Petroline require little organisation in the form of control structures or formalized and standardized routines. Particularly the administrative activities are still limited and are gradually introduced as the organization grows.

As a general point, I would say that the growth of the company is forcing us to put in place more controls, such as budget cycles, which we have not had until the last year or so. The trick is trying to do this without becoming stifled by the red tape. (Interview S. Ferguson)

The case study of Petroline clearly demonstrates that at this stage of growth it is not the lack of ideas that limits the company's ambitions but constraints imposed by

limited resources, particularly limited finances and limited human resource and expertise to cope with all facets accompanying added demand for products and services.

The thing that you have to look out for, because you are a small company you are battling against the big [...] multi-billion pound companies. If you are competing as a small company, you must make sure you have a niche. In other words, your responsiveness must be much better. The people you employ have the task of selling to the customers. But it's not like selling, it's more like holding their hand, guiding them through the processes of making good choices of equipment. It's like assisting in a design process. You have to have superior products, you have to have a niche, you have to have superior people if you want to compete against these big companies. We pay a much higher salary than most people because you get better people. There are a number of areas where you want to be ahead of them. In other words better responsiveness, better quality, really thought through equipment, and very clever petroleum engineers that are there in the office, but also likeable people as well. That's crucial. (Interview K. Zwart)

It seems particularly important that in pursuits of further success the firm does not engage in too many different, competing projects simultaneously that force it to divert its activities and resources, possibly losing its overall competitive impact and failing to establish sustained market presence. Investment in the company's activities to induce further growth requires commitment of scarce resources. In the face of scarcity any commitment of resources necessarily must involve choice and consequently bears relatively high-risk exposure if the activity proves a failure. To avoid dangers induced by rapid organizational growth, necessarily risk needs to be managed with prudence and strictly controlled to limit exposure. Petroline succeeds because it repeatedly manages to convince customers to bear (partially or wholly) the substantial development costs for a new product solution.

Product development is still largely customer-led and demonstrates market closeness and responsiveness. Despite having a dedicated R&D unit all key management personnel are still in direct contact with the customer and are actively engaged in product development.

[...] We saw competitors on the market with electric line set devices and explosive sets and we said, 'If we had a plug that can be set mechanically, not explosives there would be a benefit for various reasons.' For 18 months Klaas said, 'No it can't be done, it can't be done.' Then we had a [really] bad month [...] He went off and designed it. He just couldn't be [bothered

before] basically. The bad month [...] was the thing that got him up to go and have a look at it. Having said that, from [the time] he came up with the concept it took us a long time to overcome some technical challenges, and then to develop the whole product range, and then to build the stock up. It took a long time but it's one of our best selling products now. That was [an example of going] out interpreting a market gap and then going in and designing a product to suit it. The bulk [of our products] has been delivered on the back of a specified customer requirement, and then you also have certain products where we identified the market gap. (Interview F. Innes)

The innovativeness of the organization is evident in its expansion and diversity of its product line. Innovativeness that results from superior process is not so much evident. This may be a result of the still not yet established routines and process improvement does not attract so much attention as the company still generates major success through extension of its product lines. In comparison to the other companies in this study Petroline employs limited structural and technical solutions to nurture new ideas and innovation. Developed products and solutions are protected through patents to secure and sustain any acquired competitive advantage. Such process embedded know-how has the advantage that it is extremely difficult for competitors to emulate. However, patenting the production process for cutting EST displays Petroline's pronounced effort to develop and secure production process technology in effort to secure competitive advantage.⁵⁰

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In the following CLD diagram variables targeted by the organisation to counter processes of decay and decline are highlighted. Red colouring signifies reinforcement, blue deliberate weakening of specified variable by the organisation. The associated mechanisms or systems in place have been added and linked to demonstrate their focus.

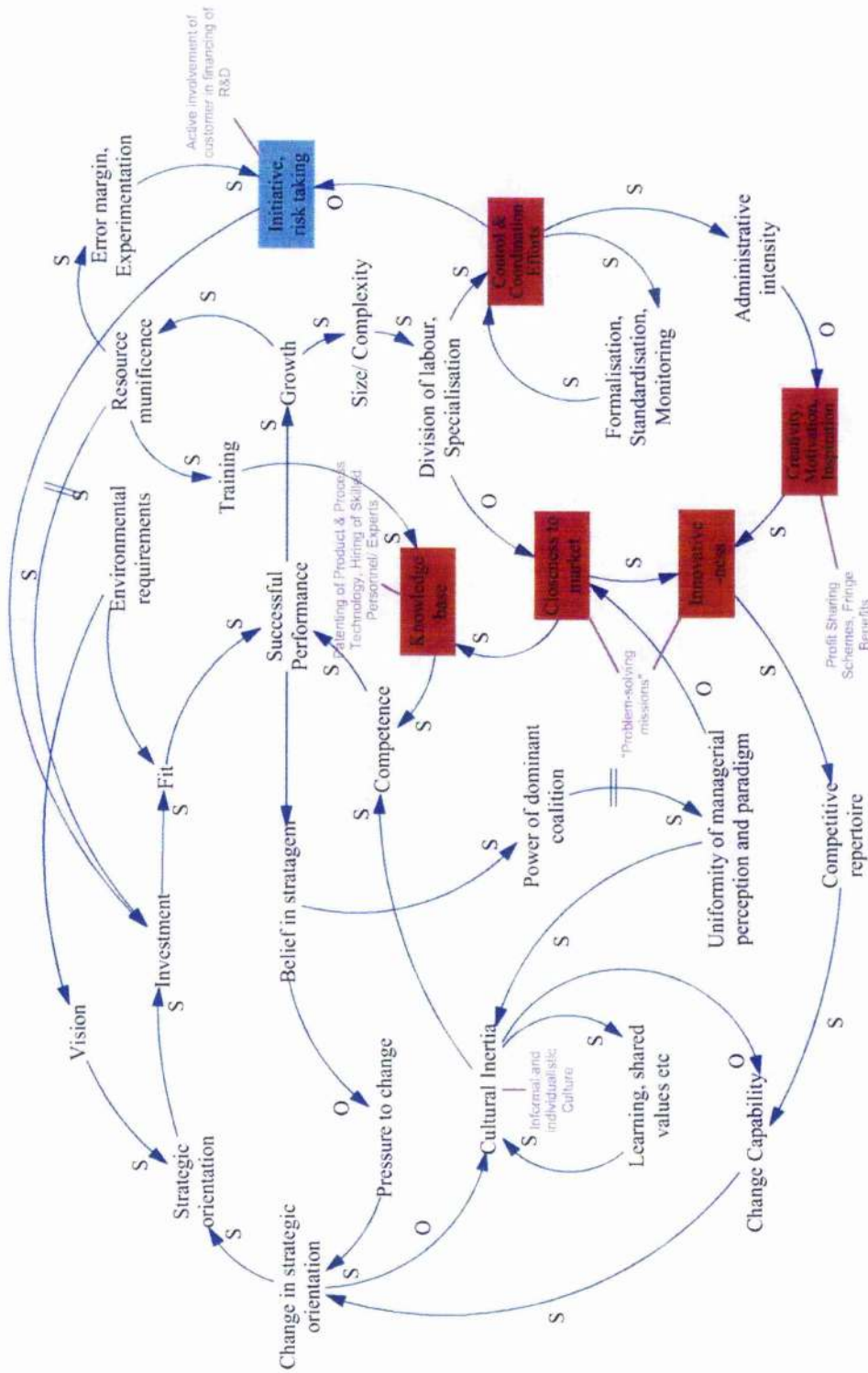


Figure 7-2: Renewal Mechanisms and Triggers at Petroline Wireline Ltd

Source: Author

7.2.2 Shell direct

In comparison to the other two organisations, Shell direct GmbH is a medium-sized enterprise. It has employed a structural solution, enabled by a technical solution to maintain such size. As a networked organization with small units it can generate local market presence and is able to stay in close contact with customer while maintaining a competitive cost structure. A pronounced effort is made to transfer routine work to be handled by computers to free workforce for more important and creative activities in sales and marketing. This networked solution allows for sophisticated cash management, reporting, invoicing further increasing the company's competitive advantage. Due to its highly geographically dispersed structure organizational culture may possibly prove a weak point, i.e. as it provides leverage point for long-term growth, something which 3M has managed to employ with considerable beneficial effect.

Imposing selected discipline resulted in tremendous cost-savings and, ultimately, better services and information for employees. Standardizing specific practices and centralizing certain systems and activities also provided, perhaps surprisingly, benefits usually associated with decentralization. Giving managers instant access to company information accelerates decision-making and helps make a big organization, no matter how dispersed or heterogeneous, feel small and agile.

The developed structural solutions have been careful to avoid losing the benefits that flow from an informal and individualistic culture: motivated employees, close links with the market and customers, quick reaction time. The IT-based network structure has helped combining advantages of the large organization with traits typically associated with small organizations, such as flexibility and first-mover advantage. The individual units are geographically dispersed but due to the information sharing capabilities able act jointly. New customers do not necessarily require an increase in organizational size but can be handled through addition of an extra workstation.

To keep the system abreast with the latest developments in the field the company employs "trigger teams" - experts and focal points that, for example, develop

marketing approaches and are charged with the task of integrating solutions and developing coherence in market approach.

Due to its affiliation with Deutsche Shell the managerial level is subject to regular rotation. This is done as form of managerial development as it creates differing challenges through new contexts for the managers in which they have to learn to operate. A side effect is that organization is less likely to be to fall in the trap of inertia and is constantly infused with new ideas and different modes of thinking.⁵¹

⁵¹ In the following CLD diagram variables targeted by the organisation to counter processes of decay and decline are highlighted. Red colouring signifies reinforcement, blue deliberate weakening of specified variable by the organisation. The associated mechanisms or systems in place have been added and linked to demonstrate their focus.

7.2.3 3M Company

Few companies have succeeded like 3M in creating an organizational structure that stimulates innovation among its scientific and engineering personnel. In many articles 3M's success and innovative capacity is attributed to the often-cited 15% rule. Indeed this policy, attributed to William L. McKnight, has also helped foster many of 3M's other breakthrough products, such as Scotch™ Tape. A closer look however reveals that the company hosts/ features an intricate system where technology, culture and structural elements are combined to ensure long-term survivability

If there is a single secret to 3M's success, it's the company's ability to stimulate intrapreneurship among its scientists and engineers. 3M's dozens of divisions are organized into groups, and the groups are divided into four sectors, or categories. Yet the structure is highly decentralized, and researchers are given a great deal of discretionary latitude with their projects. In fact, 3M has a long-standing policy allowing its researchers to spend up to 15 percent of their time on projects of their own choosing. Moreover, the company encourages its employees to take risks and rewards them well when they succeed. Of course, 3M is well aware that creating an intrapreneurial climate means having a different breed of employee. Because they're interested in change and making things happen, 3M researchers do not readily accept rules and regulations, and they challenge authority, ask embarrassing questions, circumvent the chain of command, and often behave in ways incongruent with bureaucracy.

These mechanisms create an intricate system that is responsible for 3M long-standing successes. The listed mechanisms are highly integrated and interactive. Some target the individual employee while others become effective on a higher organizational level. Based on these base themes the following section attempts to capture the structural and organisational design components employed at 3M Company to systematically invoke continuous organisational renewal.

To stimulate unplanned experimentation and variation that might turn into successful, albeit unexpected, innovations 3M employs the "15 % Rule" encourages technical people to spend up to 15 percent of their time on projects of their own choosing and initiative. To stimulate continuous new product development each division is

expected to generate 30 percent of annual sales from new products and services introduced in the previous four years known as the “30 % Rule”.

3M actively seeks to stimulate internal entrepreneurship and risk taking with the “Golden Step” award, granted to those responsible for successful new business ventures originated within 3M. Further measures that serve to encourage intrapreneurship are an internal venture capital fund known as “Genesis Grants” that distributes parcels of up to \$50,000 for researchers to develop prototypes and market tests the provision of employees who successfully champion a new product with the opportunity to run it (depending on the sales levels of product) as his or her own project, department, or division. 3M grants “Technology sharing awards” to those who develop a new technology and successfully share it with other divisions as well as new product forums, where all divisions present and share their latest product developments. These instruments serve to stimulate internal dissemination of technology and new ideas across divisions.

Customer problems are regarded as the seeds of new opportunities and provide a powerful engine to stimulate innovation. To this end 3M uses small teams sent out to customer sites in response to specific, typical customer problems “problem-solving missions”. As part of 3M’s “Pacing Plus Program” each division selects priority products to get to market within a short, specified time frame speed product development and market introduction cycles, which thereby increases evolutionary “variation and selection” cycles

Profit sharing schemes stimulate a sense of individual investment in the overall financial success of the company, and thereby stimulate individual effort and initiative. The “Dual ladder” career track that allows technical and professional people to move up without sacrificing their research or professional interests stimulates innovation by allowing top professional and technical people to “advance” without having to switch to a managerial track.⁵²

⁵² In the following CLD diagram variables targeted by the organisation to counter processes of decay and decline are highlighted. Red colouring signifies reinforcement, blue deliberate weakening of specified variable by the organisation. The associated mechanisms or systems in place have been added and linked to demonstrate their focus.

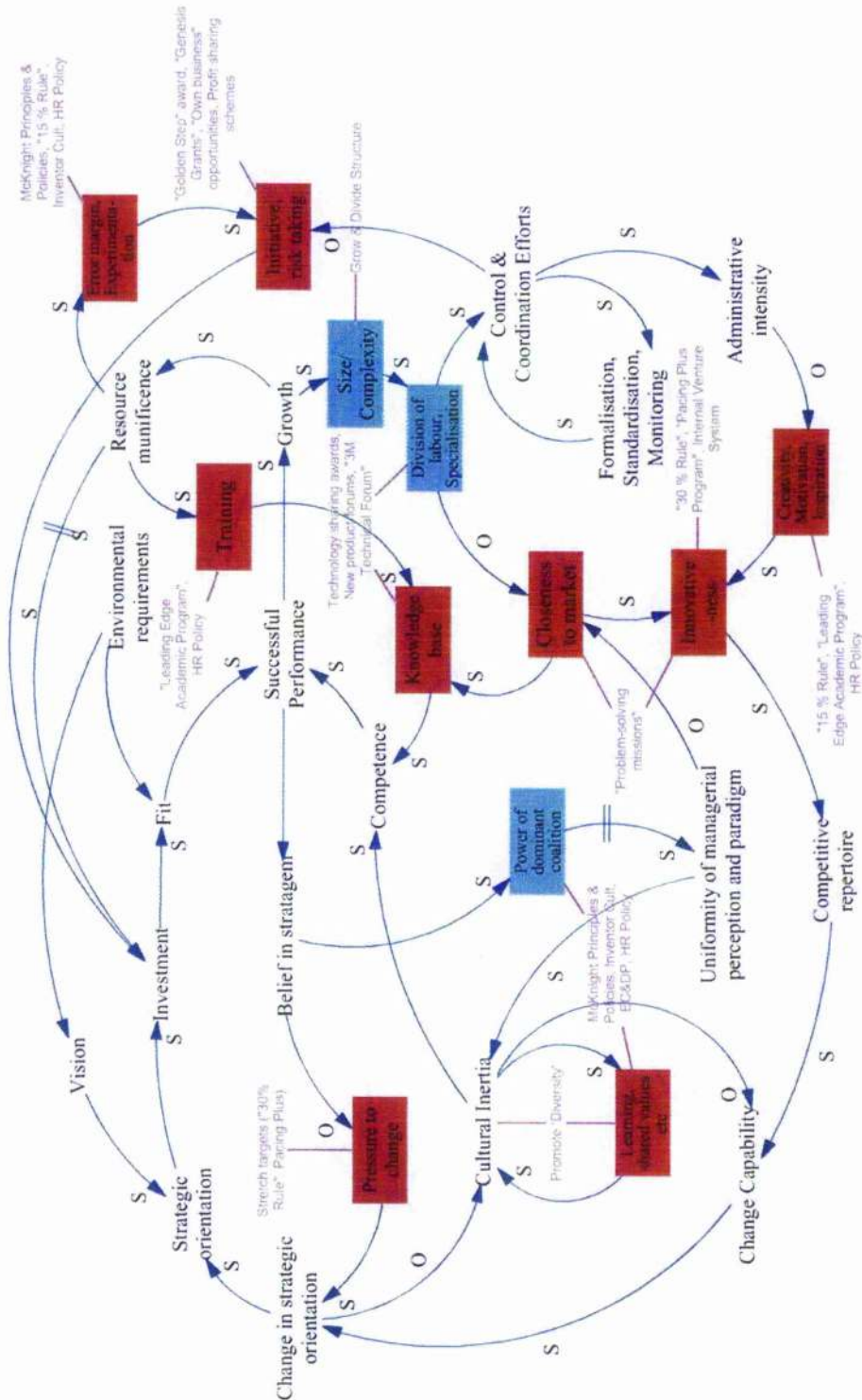


Figure 7-4: Renewal Mechanisms and Triggers at 3M Company

Source: Author

7.3 Cross Case Comparison and Analysis

The discussion in this section serves to uncover principles of successful organisation by comparing the individual cases and contrasting these with the research findings on organisational decline. The discussion is guided by the research propositions that were developed as a result of the literature review and the development of the theoretical framework and where instrumental in the research design and for the case selection.

Proposition 8. Organisations can only transform in radical steps.

That companies engage in cycle of convergence interspersed by short periods of radical transformation (punctuated-equilibrium view of organisational change) has become a popular view in the management sciences. The case study accounts, however, cannot confirm this view. A pronounced effort was made to include innovative projects and change programmes in the individual case reports. The evidence gathered at Petroline, Shell, and 3M suggests that these organisations work very hard to change, but do this in a rather continuous fashion. With respect to the above proposition, the description of the change programmes initiated by Shell direct's management to transform the company from a fairly bureaucratic organisation into a sales-driven company provides a particularly interesting picture. The change process and its accompanying measures were systematically developed and incrementally implemented over period of nearly 20 years, ultimately transforming the organisation to great effect. The conclusion drawn from the research findings with respect to this proposition is that organisations do not necessarily have to transform with radical change measures. Much more the research evidence seems to suggest, that given enough time, even small or incremental changes may generate a huge impact. However, this may be an option that organizations that are struggling with symptoms of decline do not have. The chosen drasticity of measures may therefore depend on how well the company is performing and how well it is accustomed to changing. Drastic change measures bear high risk potential for back firing and ultimately worsening the situation since one of the most consistent findings from systems research is the tendency of such measures to develop counter-intuitively. Therefore, the best strategy an organization can pursue, seems to be one, where

change becomes a normal part of organizational life and is not treated as an exception. This is evident in the accounts of all three companies studied here.

Proposition 7. Organisations depend on and employ similar processes to convert inputs into outputs. The processes employed are determined by the nature of organising workflow and information sharing and, therefore, similar in different organisations.

Initial investigation of the field study focused on the comparison of business activities.⁵³ Business activity models (BAM) provide a convenient overview of what is done in organisation. Through its omission of specific temporal sequences of activities the BAM allowed for a benchmarking of practices across organisations. In addition to the activities, information on the frequency and the department/ persons responsible was collected.⁵⁴ What was striking was that although active in completely different fields and differences in size, both Petroline and Shell direct employ similar activities to transform inputs into outputs. This similarity is evident in all managerial activities and most supporting activities. Remarkable similarities are also present when comparing activities involved in selling to a customer or in the distribution or procurement. Differences mainly arose where segments of the value chain were not shared. For example, Shell direct has no own production so that no comparison of this segment is possible. However, it seems that if differences between organisations arise, then these will mainly result from differences in handling of materials and the actual process technology involved in production. Differences between the two organisations involved in activity study also arose in intensity and frequency with which activities are carried out. For example, in comparison to Petroline, Shell direct hosts much more formalised and proliferated strategic planning or human resource management. Without being able to provide conclusive evidence this difference may be attributable to differences in respective organisational size.

⁵³ The results of this study are presented in more detail in Appendix B.

⁵⁴ This information was omitted due to confidentiality reasons.

The findings are based on the comparison of two organisations and therefore are far from providing any conclusive evidence. However, arguing from a heuristic standpoint, this finding would be in line with the observation that similar issues may arise in different organisational settings, for example that organisations struggle with decaying forces regardless of their operational field, size or age. Furthermore it needs to be stressed that this comparison is based on activities rather than on actual processes, which may be subject to different sequencing and frequency. However, observed differences in this respect represent variations of the processes, not different processes.

Proposition 6. Organisations unintentionally engage in processes of selection and reinforcement that are dominated by short-term considerations but limit future strategic flexibility and manoeuvrability.

That organisations unintentionally engage in processes of selection and reinforcement is manifest in the findings from the research on organisational decline reviewed in Chapter 4. This proposition is not verified by the case study accounts of Petroline, Shell direct and 3M in any way. On the contrary, the case study organisations – particularly the Shell direct and the 3M case accounts demonstrate this– work very hard at infusing their systems with strategic flexibility and maintaining manoeuvrability. For example, Shell direct has developed a structural solution based on an open IT-network to obstruct rigidity and maintain flexibility. Shell direct also makes intensive use of scenario technique and vision to foster long-term considerations of organisational development and direction. At 3M and Petroline such strategic flexibility is provided by new product development and innovation. 3M, for example, employs various rules that specifically counter such convergence through the application of a variety of rules, most notably, the “30 % Rule” that expects divisions to generate 30 percent of their annual sales from new products and services introduced in the previous four years. This rule is based on the insight that, while risk is involved in emphasizing the new and untried, it may prove far riskier in the end to rely on the comfortable and familiar. Petroline is very much an expanding business and is possibly not yet tried and tested in this respect. Manifest in the company’s development, however, is the unwritten rule never to be satisfied with the status quo and to push the organisation and the development of new products forward. Both, 3M

and Petroline follow an uncompromising product development policy that distances itself from imitations and knock-offs placing a premium on being innovative.

Proposition 5. Organisations become increasingly inert over time as procedures, roles, routines and structures establish implying that organisations lose their capacity to change with increasing age.

Proposition 4. With increasing size organisations lose their potential to change.

According to findings from the research on organisational decline reviewed in Chapter 4 organisations are prone to inertia. Such development is often linked to organisational size. Both size and age are considered mitigating factors of such development towards inertia. To provide insight the organisations selected for the study had to conform to set criteria regarding performance, however, were deliberately chosen with differences regarding size, age and industry sector. In terms of size and age (measured in number of employees as an indicator of structural complexity and turnover as an indicator of dynamic complexity) Petroline Wireline Ltd. is considered a relatively small and young company (200 employees/ 20 years) while Shell direct GmbH takes a medium position (1000 employees/ 50 years). With approximately 70.000 employees and nearly 100 years of age 3M Company is the largest and oldest firm of the three cases.

To demonstrate that superior 'organisational performance' is exactly what the term suggests and cannot be adequately reduced to and understood in terms of size, age or maturity of industry all companies chosen for the study compete in well-established, mature markets. The firms were deliberately chosen to represent different fields of business to eliminate any possible distortion (for example, if companies in the sample operate under conditions of a favourable business climate).

Petroline Wellsystems has averaged an annual growth rate above 20 percent in its turnover during the ten-year period from 1988 up to 1998. Its profits have increased 78% a year, from £1m in 1995 to £5.6m in 1998, when sales reached £20.9m. The strong record of innovation in this organization makes it particularly interesting case.

As a result of structural changes that date back to the mid-eighties, **Shell direct GmbH**, an affiliate of the Royal Dutch/ Shell group of companies based in Hamburg, Germany has managed to regain competitive momentum, increasing their market share in the stagnating German heating oil market and enabling an expansion of its traditional business by adding additional products and services.

3M has a consistent track record of innovative activity that goes back to the early part of this century and has led to the creation of whole new industries. The company currently manufactures more than fifty thousand different products. Due to imaginative combination and application of its core technologies 3M has become a global leader in a highly diverse range of markets, from industrial abrasives to electronics, specialty chemicals to health care.

3M products are sold in two hundred countries and with operations in 60 countries employing approximately 50% of 3M's 70,000 workforce total. There are substantial research activities and local manufacturing operations in a number of these locations. In 1998, more than half of 3M's \$15 billion in sales were generated outside the United States.

3M is one of 30 companies in the Dow Jones Industrial Average. It has placed in the top ten on Fortune magazine's list of America's most admired companies in ten of the fifteen years in which Fortune has published the list.

In light of the companies' performances the findings suggest that maturity is a state of mind rather than result of organisational age. All case study companies are united in the fact that they demonstrate capacity for change regardless of their age.

With respect to size the findings offer a more complex picture, which will be dealt with in detail in the discussion of the remaining propositions. For the moment it may suffice to point out that an increase in organisational size does not inevitably result in a loss of change capability. Shell direct as well as 3M Company have maintained high competitiveness and agility despite having increased in size.

Proposition 3. Most organisations systematically increase the number of controls (both in quantity and quality) as they grow in size.

As mentioned before, organisational growth typically results in an increase in size adding structural and dynamic complexity, which in turn generates stability due to the relative diminished impact of individual entities and relationships in relation to the functioning of the whole.

There are clear advantages to an increase in size such as increasing economies of scale and scope. An increase in organisational size usually also holds a certain amount of slack providing the organisation with an increased margin for error and a cushion to compensate for failure.⁵⁵

In our case, the risks associated with introducing the new and untried are minimized by the diversity of our fifty thousand products. We are involved in so many businesses and markets that a problem in one has a minimal effect on our overall business. (William D. Coyne, Senior Vice President, Research & Development quoted in Kanter et al., 1997:47)

Organisational slack also allows for increased experimentation. The downside of increased organisational size is the increased need for control and co-ordination. Typical design tools such as division of labour and resulting from that specialization were discussed above. The organisation increases control and co-ordination efforts through formalization and standardisation, which eventually result in the consolidation of established, success-proven routines.

Routines lie at the core of organisational functioning. While routines create stability and reliability and in this sense are vital for organisational functioning, they quickly become ingrained and alternative thinking and alertness to change signals deteriorate. If organisations are operating in increasingly unpredictable global and national markets, then their ability to manage change may increasingly become central to their competitive position and ultimate survival. Faced with these challenges, organisations

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It is when you run out of both –money and ideas- that the real trouble starts...

either become more adaptive, flexible, and anticipative, or they become rigid and stagnant, reacting to change after the fact, often when it is too late.

Limited in complexity, small companies like Petroline make relatively little use of control structures or formalized and standardized routines. Particularly the administrative activities are still limited and are gradually introduced as the organization grows.

As a general point, I would say that the growth of the company is forcing us to put in place more controls, such as budget cycles, which we have not had until the last year or so. The trick is trying to do this without becoming stifled by the red tape. (Interview S. Ferguson)

The functioning of a system fundamentally alters with the number of elements making up the system. Therefore, large organisations demonstrate in many aspects very different characteristics when compared to small organisations. A large organisation is not simply an aggregate of small systems but rather something completely different; nearly all co-ordinating, controlling and directing mechanisms as well as all related communication, planning and control processes are different. Furthermore, a multitude of other factors, which are essential to the functioning and hold substantial ramifications for the management of a system such as equality, mutual trust, motivation, power, the handling of rumours and intrigues etc. differ when comparing small with large systems. Due to this discrepancy seemingly similar problems require completely different solutions in large organisations from those in smaller ones.

Both Shell direct and 3M employ tight controls. The research evidence shows that 3M employs tight controls for example for scrutinizing new product developments. While researchers are actively encouraged to develop new product ideas they are only provided with the necessary resources if they can convince a panel that their product is viable. At 3M these controls are balanced by rules that work to develop a structure that control risks but simultaneously does not obstruct employees to pursue novel ideas.

The case evidence from the Shell direct study the presence of controls is indicated by the pronounced effort to reduce and control costs. Accordingly, the company relies

heavily on budgeting and other control measures. Controls are also vital to maintain joint action since the organisation is geographically highly dispersed.

To conclude, the research findings provide evidence that suggests that controls increase in quantity and quality as they grow in size.

Proposition 2. An organisation's capacity to renew can be systematically fostered by organisational processes and systems

Proposition 1. There exist two types of process categories in organisations that can be distinguished by their exertion of converging or diverging forces on the activities of an organisation.

A point of departure with regard to answering Proposition 1 is provided by the realisation that every system has two fundamental modes of existence and behavior: *maintenance* and *change*. The first, based on negative feedback loops, is characterized by *stability*. The second, based on positive feedback loops, is characterized by *growth* (or *decline*).

The growth of a complex system (in volume, size, number of elements) is triggered by positive feedback loops. The positive feedback loop amplifies the slightest variation; it increases the possibilities of choice, accentuates differentiation, and generates complexity by increasing the possibilities for interaction. Due to its re-enforcing nature, a positive feedback loop leads to the accelerated growth of a given value. This value can be *number* (population growth), *diversity* (variety of elements and interactions between elements), or *energy* (energy surplus, accumulation of profits, growth of capital).

A homeostatic system evolves through a complementary process of total or partial disorganization and reorganization. This process is produced either by the confrontation of the system with random disturbances from the environment or in the course of readjustment of an imbalance (resulting, for example, from too rapid growth).

Through the complementary play of positive and negative feedback loops, searches for new points of equilibrium and new stationary states allows systems to adapt in

face of environmental changes. The evolution of an open system is marked by the integration of such changes and adaptations, the accumulation in time of successive plans or "layers" of its history. This evolution materializes through hierarchical levels of organization and the emergence of new properties. Emergence is linked to complexity. The increase in the diversity of elements, in the number of connections between these elements, and in the play of nonlinear interactions leads to patterns of behavior that are difficult to predict.

To ensure long-term success and survival both obstructing and facilitating processes must necessarily co-exist within any organisation. Forces for progress must be combined with such that generate stability. The system must not exhibit so much order as to fall into the "trap" of inertia and stasis, but must also guard against extremes of disorder and chaos to avoid disintegration. Successful systems are those

[...] at the transition between order and chaos. A central tenet of complexity theory is that selection or learning drives systems towards this edge of chaos. Systems that are too simple do not survive in a competitive environment because more sophisticated systems can outwit them by exploiting their regularities. But systems that are too random do not survive either. It pays in survival terms to be as complicated as possible, without becoming totally structureless. (Stewart, 1993: 3)

Successful organizations display such paradoxical behaviour and rarely simply conform to one or the other extreme but avoid (even if sometimes inadvertently) falling into this trap.

We all know the small aggressive entrepreneurial firm, the perfectly machine-like Swiss hotel, the diversified conglomerate, the professional collegial university, the freewheeling intrapreneurial Silicon Valley innovator. But some organizations do not fit, [...] and even many that seem to, on closer examination reveal curious anomalies. It is difficult to imagine a more machine-like organization than McDonald's; why then does it seem to be rather innovative, at least in its own context? And why is it that whenever I mention to an executive group about a 3M or a Hewlett Packard as innovative in form, someone from the audience leaps up to tell me about their tight control systems. Innovative adhocracies are not supposed to rely on tight controls. (Mintzberg, 1989: 97)

It is the consideration of anomalies or paradoxes that demonstrate that successful organisations do not simply operate with the harmony and consistency, avoiding contradiction and instability at all costs but expressly incorporate both. In fact it is

hard to imagine any successful organization even if inadvertently that does not experience such dynamic balance of seeming paradoxes at some point in time. Unfortunately this balance is usually lost and replaced by a systemic constellation that favours one set of forces at the expense of the other causing the organization to either diverge or converge.

This suggests that organisational renewal is a function of the interaction of two sets of process variables that drive progress and preservation. For a complex system, to endure is not enough; it must adapt itself to modifications of the environment and it must evolve. Otherwise outside forces will soon disorganize and destroy it. The paradoxical requirement to address both simultaneously implies that dynamic balances must be struck if organisations are to remain vital.

Reflecting on the earlier discussion of the drivers of renewal in Chapters 1 & 2, entrepreneurship, creativity, innovation, and learning are identified as facilitating processes. Generally, these processes lead an organisation to divert its activities and explore different directions. Renewal-obstructing processes, on the other hand, establish focus and, as a result, channel or bundle organisational activities in a particular direction. Their tendency is to infuse stability into the system and establish and preserve the identity of the system. Drivers identified with this category are, for example, control, co-ordination as well as rules, mindsets and existing power relationships.

That organisations are subjected to processes that can be distinguished by their exertion of convergence or divergence is evident in the developed causal loop diagrams (CLD) for declining organisations as well as in the models developed for Petroline, Shell direct and 3M. The findings from organisational decline suggest that, while being initially responsible for their success, such forces also hold the seeds for decay, as the organisation increasingly strives for reinforces and refines successful activities. The evidence further indicates that Petroline, Shell and 3M actively target individual variables/ processes, more or less intentionally conditioning a dynamic balance between the two opposing flows. The case evidence indicates that this can be done in a variety of ways.

Petroline targets a variety of variables. Patenting of product and process technology as well as the pronounced effort to hire skilled personnel help secure a strong knowledge base. The company is expanding heavily. To maintain control in view of associated risk and limited financial resources the company has introduced budgeting and actively involves customers to contribute towards the financing of development projects to minimise the risk of failure.

It seems particularly important that in pursuits of further success the firm does not engage in too many different, competing projects simultaneously forcing it to divert its activities and resources, possibly losing its overall competitive impact and failing to establish sustained market presence. Investment in the company's activities to induce further growth requires commitment of scarce resources. In the face of scarcity any commitment of resources necessarily must involve choice and consequently bears relatively high-risk exposure if the activity proves a failure. To avoid dangers induced by rapid organizational growth, risk needs to be managed with prudence and strictly controlled to limit exposure. Petroline has been successful because it repeatedly managed to convince customers to bear (partially or wholly) the substantial development costs for a new product solution.

Customers are directly involved in the product development. All managers are also active in selling the products and are usually also actively involved in R&D. These two aspects serve to establish closeness to the market ensuring innovativeness of the company and the development of products that are valued by the customer.

The case study of Petroline clearly demonstrates that at this early stage of growth it is not the lack of ideas that limits the company's ambitions but constraints imposed by limited resources, particularly limited finances and limited human resource and expertise to cope with all facets accompanying added demand for products and services.

Shell direct employs a host of measures most notably the open network IT strategy that has had profound impact on a variety of variables. The development of the IT network enabled the organisation to substantially reduce red tape and administrative intensity. Due to the improvement in information handling, the IT strategy also positively influenced dissemination and sharing of knowledge. Employing uniform

coding techniques the company was able to improve its reporting and provide the managers with market information and feedback on a real time basis. The networked strategy also allowed the company to remain locally dispersed, maintaining sales offices throughout Germany while overheads were centralised and headcounts reduced. This has served to limit organisational size reducing the need for division of labour and reduced the necessity for measures of control in form of formalisation. Stretch targets and long range planning based on scenario technique help developing managerial vision and create the pressure to change. Job rotation on the management level regularly exposes the organisation to different leadership styles and thinking avoiding narrow views due to uniformity of paradigm and perception. To maintain closeness to the market the company conducts regular market surveys, which also serve to monitor levels of service and to discover area for improvement. Such surveys have been instrumental in developing a variety of innovative solutions such as the automated delivery.

Shell direct also invests quite heavily in training and development of its workforce. One of the more interesting aspects of the change program was the persistent effort to train former accountants (who had been set free as result of the restructuring) to become sales personnel.

Of the three cases, 3M probably hosts the most intricate system. The various rules target initiative and risk taking, and have already been discussed in much detail. To stimulate continuous new product development each division is expected to generate 30 percent of annual sales from new products and services introduced in the previous four years known as the “30 % Rule”. The “30% Rule” also serves to infuse the system with change pressure. A variety of measures such as the “Golden Step” award, “Genesis Grants”, profit sharing schemes and “Own Business” opportunities encourage initiative and risk taking and seek to stimulate entrepreneurship. Technology sharing awards, new product forums or 3M’s Technical Forum help build a knowledge base through dissemination and diffusion of knowledge. Innovativeness is targeted by the 30% Rule, the Pacing Plus Program and an internal Venture System. To establish market closeness customers are directly involved in new product development. So-called problem solving missions where small teams are sent out to

customer sites in response to specific, typical customer problems are regarded as the seeds of new opportunities and provide a powerful engine to stimulate innovation.

The research evidence shows that the organizations can employ a variety of solutions to maintain a dynamic balance between converging and diverging flows and forces. The structural triggers employed by Petroline, Shell direct and 3M seek to provoke inquiry, communication, facilitate learning and creativity, and encourage entrepreneurship and innovativeness. Alternatively, measures can also focus on dampening undesired effects, for example the reduction in organisational size may reduce the need for co-ordination and subsequently allow reducing the number of controls.

7.4 Conclusion: Ensuring Dynamic Balance

To conclude, the failure to recognize environmental changes and initiate necessary organizational responses is indirectly related to organizational efforts to cope with the effects of growth, namely the increased organizational complexity concurrent with an increase in organizational size. Organisational growth -manifest in increased workforce size or geographical spread- usually increases structural and dynamic complexity requiring the organization to split up processes to maintain control; no one person can do and know everything, so tasks must be divided up and assigned. However, as soon as people and activities are grouped together to enhance their communication, goal orientation, and information flows, they are, by definition, distanced in those same ways from other groups, activities, and information sources located outside their own structural boundaries.

Coping with increased size and added complexity necessarily involves a series of decisions about grouping and linking aimed at enhancing the organization's ability to process information and coordinate interdependent work that crosses formal grouping boundaries. Faced with increasing dynamic complexity most organisations respond by institutionalising and amplifying control and coordinating processes. These measures are aimed at increasing stability and efficiency through uncertainty and risk reduction; inadvertently they are also the source for convergence and inertia causing the organisation to loose its capability to change eventually leading to the decline and possibly failure of the organisation.

In order to break the vicious circle of such destructive forces, an organisation needs to actively harness its creative and inventive potential dynamically balancing flows and forces inducing continuity and progress. Successful organisations achieve this balance often inadvertently. Especially in the early phases of an organisation's life this balance may be an emergent rather than a planned and deliberate result. Internal forces for progress are abundant and can unfold freely as they are not yet restrained by complex relationships; controls and mechanisms of co-ordination are introduced gradually. In this early stage of an organisation's life, restraints are often externally induced, for example by tight finances or through competitive barriers to entry. Mechanisms of control and co-ordination (such as organisational recipes or espoused cultural values) underlie a reinforcing nature and are hard to break once established. This becomes particularly noticeable in the latter stages of an organisation's life as this dynamic balance increasingly shifts in favour of forces for preservation. Once preserving forces are firmly entrenched, they may become so powerful that any emerging force for progress is immediately choked.

Organisational renewal is rooted in individual talent and systematic but most importantly systemic management of processes. Accordingly organisational renewal can be perceived as a managerial task as well as an organisation design task. The concern lies with the creation of the right setting to nurture conditions for growth while establishing a sense of stability and direction. Analysis of the case reports suggests that many paths lead to organisational renewal, however with increasing dynamic complexity of an organisation, possibilities for direct leadership intervention become limited and systemic management and design necessarily gain importance for exploiting inherent organisational potential. Organisations are complex social systems consisting of interrelated parts in which leadership is an important factor, but nevertheless, one of many other variables contributing to the overall outcome. Its relative strength to influence depends on a variety of other variables, their mutual relationship being determined by the complexity and structure of the system.

The system causes its own behaviour. Placed in the same system, different people tend to produce similar results. To understand organisational behaviour and initiate effective measures for renewal requires management to look beyond personalities and

events into the underlying structures and processes that shape individual actions and create the conditions where certain types of events become likely.

However self-renewal stratagem is not about choosing the appropriate structure or strategy. Inherent is the risk of choosing the wrong one. A self-renewal stratagem should therefore not so much focus on moving a company from its current state to a desired viable future state, but on developing a long-term sustainable organisation that continuously seeks to renew itself by balancing the paradoxical forces of preservation and progress. Such forces for progress already exist within an organisation but need to be systematically unleashed by structural triggers provoking inquiry, communication, and creativity and by support mechanisms providing suitable leverage to sustain organisational vitality. The successful companies in this study deploy a variety of systems that either seek to strengthen or weaken influential variables maintaining the dynamic balance between progress and preservation.

At first glance no uniform pattern emerges when comparing the individual companies. Each company in the study seems to employ individually fashioned solutions to combat organisational decay and stimulate renewal. However a closer look at the CLDs fashioned for each case reveals that quite a few variables are commonly addressed. The companies even occasionally employ similar structural mechanisms to trigger specific variables. Not only are similar variables directly targeted but the desired directional effect (positive/ negative) typically seems to coincide. For example, Petroline, Shell and 3M all seek to reinforce market closeness, innovativeness or their knowledge base. The means and modes employed towards reaching the desired effect vary.

It seems the lesson to be learned here is that while the variables to target correspond to a generally applicable, possibly even generic, pattern the modes and means put in place to attain the desired effect may differ. This finding is not very surprising when considering that the successful organisations in this study have attained different levels of complexity.

Such levels of complexity correspond to the type of mechanisms employed. As structural obstructions increase, increasingly structural solutions reflecting increased complexity are sought. The importance for any organisation obviously lies in

discerning these structural obstructs. In Shell direct this is particularly evident in the shift in emphasis from product towards process innovation. Shell direct has implemented its open-network IT-strategy aiming to directly weaken the effects of several variables to reduce convergence while strengthening and reinforcing desired effects such as market closeness. In comparison, the solutions sought by Petroline are primarily focused on product innovation and place high attention to people. In direct comparison this may appear relatively simplistic, but is perfectly appropriate considering the size and complexity of the organisation. Adverse effects of increased administration do not stifle the organisation and communication paths are short and direct. In this setting new ideas can easily be shared and jointly developed. This different level of complexity is also evident in the deliberate attempts to introduce mechanisms that establish and reinforce control and coordination.

The choice of measures also reflect contextual settings of each organisation since the mechanisms were usually not introduced as part of a long-term strategic plan but apparently have emerged from/ been triggered by some past event and therefore can be linked to each organisation's history. However the business-activity models presented as part of the case study evidence in Appendix B highlight that, despite differing contextual influences and settings, organisations employ similar activities to convert inputs into outputs. This finding suggests that individual organisational solutions might be effectively transferred from one organisation to another. The suitability, i.e. effectiveness of a transferred solution, will most likely be dependent on the specific setting and the level of complexity. For example, a structural measure directed at forging a particular organisational culture in the long-run will probably stand a greater chance if implemented in a small company like Petroline, where belief and value systems have not yet been firmly entrenched. The relative impact of the same structural mechanism in a large organisational setting with well established value and belief systems will most likely fail to create the necessary impact.

Targeted Variable	Petroline WellSystems	Shell direct	3M
Administrative intensity		Distribution of Power, Delegation of Authority, Open Network IT Strategy	
Closeness to market	Problem solving missions	Customer Surveys, Open Network IT Strategy	"Problem-solving missions"
Control & Coordination Efforts	Gradually intensifying control and coordination efforts		
Creativity, Motivation, Inspiration	Profit-sharing schemes, Fringe benefits		"15 % Rule", "Leading Edge Academic Program", HR Policy
Cultural Inertia	Informal and individualistic culture		Promote 'Diversity'
Division of labour, Specialisation		Information Transparency, Uniform Coding, "Trigger Teams", Open Network IT Strategy	Technology sharing awards, New product forums, "3M Technical Forum"
Error margin, Experimentation			McKnight Principles & Policies, "15 % Rule", Inventor Cult, HR Policy
Formalisation, Standardisation, Monitoring		Open Network IT Strategy	
Initiative, risk taking	Active involvement of customer in financing of R&D		"Golden Step" award, "Genesis Grants", "Own business" opportunities, Profit sharing schemes
Innovativeness	Problem-solving missions	Customer Surveys, "Trigger Teams", Benchmarking	"Problem-solving missions", "30 % Rule", "Pacing Plus Program", Internal Venture System
Knowledge base	Patenting of Product and Process Technology, Hiring of Experts	Information Transparency, Uniform Coding, "Trigger Teams", Open Network IT Strategy	Technology sharing awards, New product forums, "3M Technical Forum"
Learning, shared values etc		Shift from Admin to Sales driven Organisation	McKnight Principles & Policies, Inventor Cult, EC&DP, HR Policy
Power of dominant coalition		Job-Rotation on Mgmt Level, Distribution of Power, Delegation of Authority	McKnight Principles & Policies, Inventor Cult, EC&DP, HR Policy
Pressure to change		Stretch targets, Shell Scenarios, Long Range Planning	Stretch targets ("30% Rule", Pacing Plus)
Size/Complexity		Network Structure, IT Strategy	Grow & Divide Structure
Training		Workforce Training Schemes	"Leading Edge Academic Program", HR Policy
Uniformity Paradigm & Perception		Job-Rotation on Mgmt Level	
Vision		Stretch targets, Shell Scenarios, Long Range Planning	

Figure 7-5: Overview of Employed Renewal Mechanisms and Triggers

While, for example, all organisations in the study actively approach their customer base to maintain market closeness and generate innovativeness, the research results do not allow weighing the relative importance or impact of any single mechanism in stimulating or obstructing renewal. First, all the instruments differ by design and where same solutions have been employed there is sufficient case evidence to suggest that the relative impact is also subject to contextual factors. Therefore, what make sense in one organisation does not inevitably work to same effect in another organisation.

Second, instruments targeted at the same variables with the similar desired outcome may seek to do this on different structural levels. In essence the mechanism may seek leverage on individual, group or organisational level.

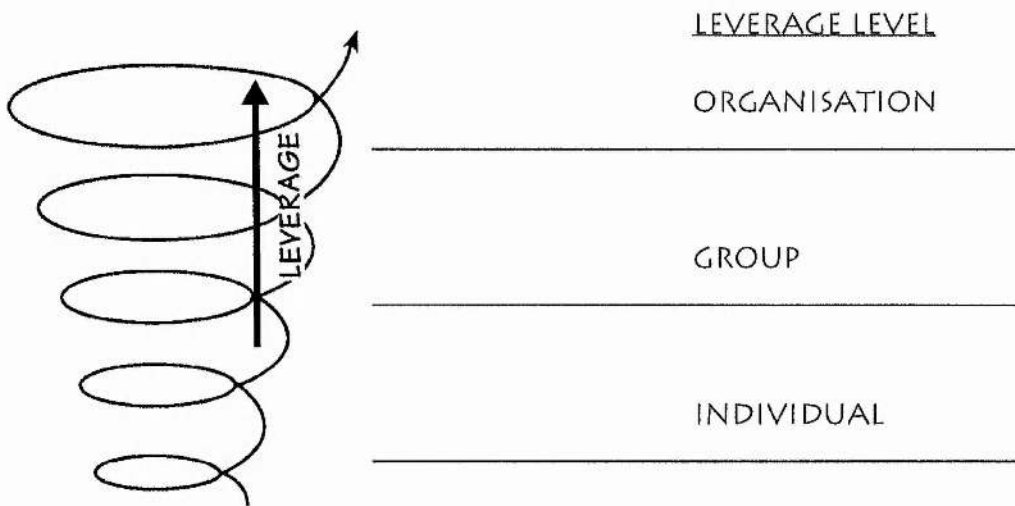


Figure 7-6: Differing Leverage Levels of Renewal Mechanisms and Triggers

Source: Author

The deliberate use of mechanisms to target these different levels of leverage is particularly prominent in case of 3M. 3M hosts an intricate system of mechanisms that interlock with mechanisms of the next higher level and serve to systematically grow ideas into innovations. For example the 15% rule provides the individual with the necessary freedom to pursue and develop own ideas into potential solutions. It can also be used to assist other research teams or departments. On a next higher structural

level this mechanism interlocks with a host of mechanisms such as regular team meetings, conferences, cross-functional teams to facilitate and foster communication as well the dissemination of knowledge and exchange of ideas on group level. Once an idea has matured and a potential product solution has developed sufficiently to justify a business case the work can be presented to management. If promising, the project will find support and be fitted with the necessary means for further development. This may involve grants but could equally be done in form of assigning further manpower to the project. These proof points are set at various stages as the project gradually takes form and the idea evolves. At each stage the controls increase but if the expectations are met the also the necessary means to keep the momentum going and take the project to the next higher level. In this fashion the mechanisms in place at 3M nourish ideas from their origin by addressing individual needs from the very start and gradually and systematically grow them into businesses.

Furthermore there also is a temporal dimension that needs to be considered when assessing the impact of individual variables. Considering the relative importance of variables it seems generate a more immediate short-term effect on operations while others generate their true impact in the long-run. For example of the key variables those that are concerned with establishing market closeness, such as product-oriented customer surveys may generate an immediate impact on the innovativeness and competitiveness. Other mechanisms, such as 3M's McKnight principles or the concerted efforts by Shell direct to train accountants to become sales personnel take a more long-term perspective. These are instrumental in forming the organisational culture and are therefore effective on much more abstract levels. Although it seems clear that they are of considerable importance, their true impact is difficult to assess since many other factors may be involved. While this suggests that there are limits to direct intervention and influence of long-term variables and the support mechanisms directed at reinforcing such variables need to be carefully chosen. However, once they have developed sufficient momentum, they serve to generate true competitive advantage that is difficult to imitate for any competitor.

Through comparison of the CLDs fashioned for the individual cases it becomes apparent that organisational efforts to counter forces for decay and generate renewal

increase with size, i.e. are linked to the complexity of the organisation. The efforts do not only increase in number but also in quality.

Successful designs draw upon the knowledge, experience, and expertise of people throughout the organization. Ideally, effective design flows from a thorough understanding of strategic objectives, takes into consideration both the formal and the informal elements of the organizational units involved, both directly and indirectly, in the redesign, and weighs the potential impact on the rest of the organization and its ability to fulfil strategic goals. Implicit is the importance of gathering, channelling, and processing of appropriate information. The increasing complexity of competitive demands and strategies is matched by growing interdependence within organizations; each organisational unit becoming increasingly reliant on others for information about technology, suppliers, customers, and competitors. The need for swift, focused, and efficient flow of information directly to and from front-line interfaces becomes paramount in establishing market closeness.

Chapter

8

**ORGANISATIONAL RENEWAL:
PROCESS DESIGN**

Conclusion

Content

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8. Conclusion

Profound transformations in society lead to the need for new organizations to be established and established ones to be modified. Political, economic and cultural shifts force to reconsider the boundaries, the environment, and the structure of the systems. Drawing from literature and field studies this research work seeks to develop an understanding of how self-renewal is affected within an organisation. To this end, the research seeks to identify relevant processes and investigates their facilitative or obstructive role.

This thesis initially attempts to classify the nature of transformations and specifically to look at the nature of transformational efforts, which seek to build “triggers” for continuous self-renewal into organisations.

The review of the extant literature on organisational transformation and renewal highlights that the field is still in its infancy and the underlying dynamics not yet fully understood. This is evident in partial and fragmented accounts. Drawing on research findings from the already well-established research on organisational decline as well as drawing from findings from other disciplines, such as systems theory or the related research in to self-design of organisations, the research set out to develop an integrative framework. The complex and dynamic nature of organisations makes any self-renewal effort a formidable challenge requiring a systemic approach. This is captured in the design of the proposed **Strategic Organisational Renewal Meta (STORM) CLD**-model that places the dynamic interplay of identified relevant process variables with converging and diverging effect at its core.

This research is exploratory, i.e. directed at theory building and seeks to answer question how an organisation can develop the capability of self-renewal by identifying relevant processes and investigating their facilitative or obstructive role. The lack of an elaborate and well-established theory on organisational renewal in conjunction with the complexity of the phenomenon of interest argues in favour of a qualitative approach. The need to study the renewal efforts in context, the involvement of multiple, interconnected units of analysis, the aim of developing in-depth understanding of the phenomenon and the processes involved present a

compelling argument for focusing rather on quality than quantity of the data. The research is therefore case-based, providing in-depth studies of three high-performing companies. Petroline Ltd and Shell direct GmbH agreed to participate in the field study. These two case studies are complemented by a case study of the Minnesota Mining and Manufacturing Company (3M), which was not subject to an immediate field study. The case was included as a benchmark of best practice on organisational renewal.

The findings from the individual case analysis are compared and contrasted with accounts from the fairly well-established research on organisational decline and failure to identify relevant processes. Using narrative and causal maps, underlying dynamic relationships were investigated for their respective role in the renewal process.

8.1 Research Implications

Firms compete based on their relative ability to renew as much as they do on their ability to extract profits from product-markets. Organisational renewal is central to long-term competitive strength by realising a vision that radically changes an organisation's products or services, customers, market channels, skills, sources of margin, competitive advantage, and persona - integrating these changes with core competencies and capabilities.

Faced with increasing dynamic complexity most organisations respond by institutionalising and amplifying control processes. These measures are aimed at increasing stability and efficiency through uncertainty and risk reduction; inadvertently they are also the source for convergence and inertia causing the organisation to lose its capability to change eventually leading to the decline and possibly failure of the organisation. In order to break the vicious circle of such destructive forces, an organisation needs to actively harness its creative and inventive potential.

At first glance no uniform pattern emerges when comparing the individual companies. Each company in the study seems to employ individually fashioned solutions to combat organisational decay and stimulate renewal. The research findings suggest

that many paths lead to organisational renewal. However a closer look at the CLDs fashioned for the respective case reveals that quite a few variables are commonly addressed. The companies even occasionally employ similar structural mechanisms to trigger specific variables. Not only are similar variables directly targeted but the desired directional effect (positive/ negative) typically seems to coincide. For example, Petroline, Shell and 3M all seek to reinforce market closeness, innovativeness or their knowledge base. The means and modes employed towards reaching the desired effect vary.

It seems the lesson to be learned here is that while the targeted variables correspond to a generally applicable, possibly even generic, pattern the modes and means put in place to attain the desired effect may differ. This finding is not very surprising when considering that the successful organisations in this study have attained different levels of complexity.

Such levels of complexity correspond to the type of mechanisms employed. As structural obstructs increase, increasingly structural solutions reflecting increased complexity are sought. The importance for any organisation obviously lies in discerning these structural obstructs.

The choice of measures also reflect contextual settings of each organisation since the mechanisms were usually not introduced as part of a long-term strategic plan but apparently have emerged from/ been triggered by some past event and therefore can be linked to each organisation's history. However the business-activity models presented as part of the case study evidence in Appendix B highlight that, despite differing contextual influences and settings, organisations employ similar activities to convert inputs into outputs. This finding suggests that individual organisational solutions might be effectively transferred from one organisation to another. The suitability, i.e. effectiveness of a transferred solution, will most likely be dependent on the specific setting and the level of complexity attained by the company.

The research findings do provide sufficient evidence to allow weighing the relative importance or impact of any single mechanism in stimulating or obstructing renewal. First, all the instruments differ by design and where similar solutions have been employed there is sufficient case evidence to suggest that the relative impact is likely

to be subject to contextual factors. Therefore, what make sense in one organisation may not work to same effect in another organisation. Second, instruments targeted at the same variables with the similar desired outcome may seek to do this on different structural levels. In essence the mechanism may seek leverage on individual, group or organisational level.

Furthermore there also is a temporal dimension that needs to be considered when assessing the impact of individual variables. Considering the relative importance of variables it seems generate a more immediate short-term effect on operations while others generate their true impact in the long-run. Successful designs draw upon the knowledge, experience, and expertise of people throughout the organization. Ideally, effective design flows from a thorough understanding of strategic objectives, takes into consideration both the formal and the informal elements of the organizational units involved, both directly and indirectly, in the redesign, and weighs the potential impact on the rest of the organization and its ability to fulfil strategic goals.

The efforts become much more deliberate and are much more intertwined with the organisational fibre in the larger organisations of the study. This suggests that with increasing organisational size and inevitably increasing dynamic complexity, possibilities for direct leadership intervention become limited and systemic management and design necessarily gain importance for exploiting inherent organisational potential. This finding is an important outcome of the analysis of the case reports.

A self-renewal stratagem should therefore not so much focus on moving a company from its current state to a desired viable future state, but on developing a long-term sustainable organisation that continuously seeks to renew itself by balancing the paradoxical forces for preservation and progress. While forces for preservation are usually firmly institutionalised to establish organisational control as the organisation increasingly develops complexity, potential forces for progress often remain neglected and therefore need to be systematically unleashed by structural triggers provoking inquiry, communication, and creativity and by support mechanisms providing suitable leverage to sustain organisational vitality. The business activity models fashioned as part of the case studies further highlight that, despite differing

contextual influences and settings, organisations employ similar activities to convert inputs into outputs. This finding suggests that individual organisational solutions might be effectively transferred from one organisation to another.

Each organisation has own solutions in place emphasizing different variables with different means. Some approaches seek to dampen the obstructive effect of converging variables, for example by reducing hierarchical layers or administrative intensity. Other solutions aim to reinforce desired processes to sustain innovativeness and creativity. All organisations in this study host a mix of both types of solutions albeit employing different mechanisms to do this resulting in different constellations that emanate from the different cases. The framework with its general distinction of converging and diverging flows proved quite helpful in establishing focus and approaching the complex issue at hand. A further challenge lies in choosing such mechanisms that do cause a considerable burden or that provide leverage The

Examples of mechanisms and how these affect the overall outcome. Allows addressing the issue with the complexity required by the subject matter. Which variables to target which variables may need strengthening and as the body of knowledge grows which design solutions may provide suitable, desired impact. Specific integration of systems approach as an established approach to such types of issues with a wide range of tools and techniques to capture the dynamics. The CLD are just a starting point. Can be hierarchically broken down and can be used as a basis to develop a much more rigorous theoretical and mathematical approach once the relationships between the individual variables are better understood.

The case study findings seem to confirm the suggested dynamical interplay of the key variables as laid out in the STORM CLDmodel at the end of the theoretical discussion in Chapter 2. Through the identification of relevant variables and their suggested causal relationships the developed Causal Loop Diagrams (CLD) modify the STORM Model. Combined with the CLD the STORM Model provides a helpful instrument to assess an organisation's *potential* for self-renewal provided by existing structures and processes. In combination with the developed CLD, the STORM-Model can also assist decision-makers in developing an effective renewal stratagem by enabling the

identification of leverage points for altering patterns of activity, behaviour and performance and by providing guidance for their integration with the dynamic whole.

8.2 Limitations of the Research and its Findings

The limitations of the research findings are reflected in the nature of the knowledge sought. This thesis is centrally concerned with renewal in established companies. Beyond the grand theme of the “why” this research seeks to answer the more important questions of “what” and “how”. The main dynamics of the renewal process, and the issues and skills involved in its management, therefore, receive detailed treatment. The main objective of this research is to increase the understanding and awareness of the processes, problems and successful means of organisational renewal.

Regarding its conceptual development the field of organisational change is still in its formative stage. Correspondingly, this research focused on developing causal understanding by identifying and describing critical variables, themes, patterns and categories and identifying the linkages between them. This involved identifying and describing relevant processes and investigating their facilitative or obstructive role in the renewal process. The underlying aim of research was to find insightful, interesting patterns offering the possibility of providing predictive, explanatory power or understanding.

To ensure construct validity, data was triangulated by using multiple sources of evidence and where possible having key informants review the draft case study report. The research design was based on multiple cases that follow replication logic. The cases were carefully selected to differ along a variety of important dimensions (size, age, industrial sector) and conform with respect to the dimension of superior performance relative to direct competition allowing for both literal and theoretical replication depending on the dimension at question. While this helped establishing external validity, the results from this case analysis, like all exploratory research, should be seen as tentative. Generalizing from a few cases can be dangerous because most situations are atypical in some sense.

The purpose of this research matches the stage of theory building in organisational renewal. The contribution of the generated findings must therefore be treated

accordingly. The findings and conclusions are drawn from a limited sample of 3 companies, each in different developmental phases, each operating in a different industry. The cases were selected to provide insight on the subject but the findings are far from providing enough backing to allow for generalisations in a scientific sense. They must be seen as further input on the subject that will hopefully serve as leverage for future research and theory building.

8.3 Outlook and Questions for Future Research

The current problems facing the World economies reflect the problems facing most organisations. There is an increasing need to address the change and development of organisations. Management and organisation sciences should and could make a major contribution through research on organisational change. However, beyond the grand theme the field has little to offer. The literature review at the outset of this study concludes that the field is still in its infancy and the existing body of research on the subject is marked by interdisciplinarity and fragmentation. Despite some advances the organizational change literature remains underdeveloped. To be of greater service to practice management and organisation change scholars need to move out of the ivory tower and engage in research that provides practical solutions. This requires developing knowledge in the image of science while also contributing to practice and policy making. This research marks such an attempt but can at best be described as a first step in the right direction. Much more research on the topic is needed.

Drawing on the model and the findings laid out in this study, further research could provide insight in a variety of ways. The developed framework could be subject to further similarly structured studies, expanding the case database and providing the necessary groundwork verification and modification with the aim of establishing a theory of organisational change and transformation. Research projects could also focus on providing further insight by varying the selection criteria, for example by conducting field studies of organisations that all operate in the same industrial sector or share other system attributes such as size or age. This research was developed with corporate enterprises in mind. Additional research projects could apply the model to public sector enterprises to establish further points for departure. Interesting insights

might also derive from a field study, which focused on developing in-depth accounts of declining organisations.

This research has argued very much in favour of adopting qualitative as opposed to quantitative methods due to the limited knowledge base. However, both approaches should not compete but complement each other as they provide different instruments to generate scientific insight. Typically the use of positivist methods in the social sciences requires a well-established theory. At this early stage, researchers preferring a quantitative approach could contribute to the development of the research body by investigating the relationships between the various variables that have been laid out in the STORM Model. These variables and their suggested causal structure are based on insights from the individual cases and subject to a whole range of assumptions. Verification of these relationships -by helping to establish if and how variables are linked and are they to change in different settings - is very demanding but paramount for further advance of the field.

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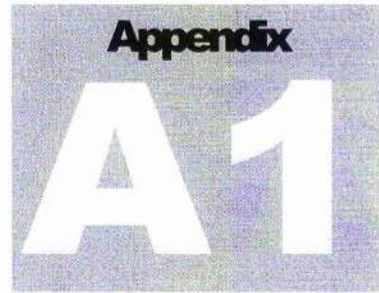
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ORGANISATIONAL RENEWAL:
PROCESS DESIGN

Case Study Database Structure
Petroline Wireline Ltd.

1.1 Case Study Database Structure

Petroline Wellsystems Ltd Case Study Database Structure

Source of Evidence

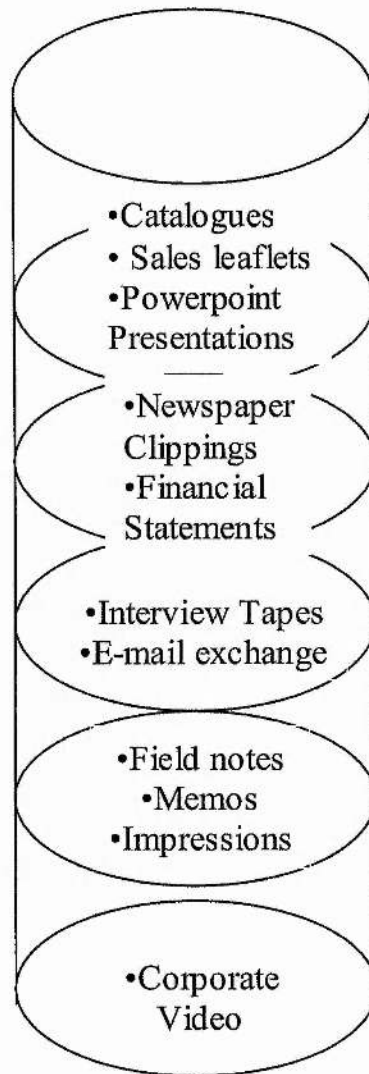
Documents

Archival
Records

Interviews

Passive
Observation

Artifacts



1.2 List of Interviews

Name	Position	Date of Interview	Duration
Klaas Zwart	Owner	09/09/1998	60 min (45 min on tape)
Fraser Innes	Managing Director	23/09/1998	70 min (on tape)
Paul Metcalfe	Technical Services Manager EST	18/09/1998	30 min (unscheduled interview/ not taped)
		29/09/1998	45 min (on tape)
Stuart Ferguson	Director Technical Services	11/09/1998	50 min (on tape)
Rab Anderson	Director Engineering	10/09/1998	60 min (unscheduled interview/ not taped)
		29/09/1998	60 min (45 min on tape)
Hazel Murdo	Human Resources Co- ordinator	29/09/1998	30 min (on tape)

Note: All taped sessions were fully transcribed. Due to sensitivity of the data they have not been included to the Appendix. Upon request the transcripts of the interviews can be obtained from the author.

1.3 Research Proposal

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23rd April 1998

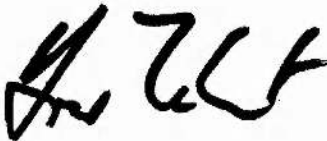
Dear Fraser,

RE: Project Outline

Please find attached the research proposal giving you some background information on my research project and detailing the type of information I will require. As discussed, I think that a time frame of 4 to 6 weeks on-site in Aberdeen will provide me with sufficient time to gather the necessary information. The possibility to commence sometime during September would suit me best.

Please let me know what you think. I look forward to hearing from you.

Kind regards,



Enc.

ORGANISATIONAL SELF-RENEWAL: PROCESS DESIGN

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Summary

The research work seeks to develop an understanding of how self-renewal is affected within an organisation through a partly emergent rather than an entirely deliberate process. Drawing from literature and case studies, the research explores how an organisation can develop the capability of self-renewal by identifying relevant processes and investigating their facilitative or obstructive role in the renewal process.

Background

After decades of competitive stability, the 1980s and the 1990s have witnessed intense competitive turmoil. In face of this challenge, most companies seek measures that often only create bottom line improvements that do not extend beyond the short term. What is often missing, however, is the ability to regenerate true competitive momentum and achieve authentic breakthroughs sustaining successful performance of the organisation.

The designing of organisations suited for survival and success in the context of dynamic environments is therefore of vital importance. An increasing body of literature suggests that organisations have to transform themselves to restore effectiveness with the aim of sustaining and renewing their capabilities and regaining competitiveness. In case of existing organisations this is referred to as a renewal stratagem. The complex nature of self-renewal efforts provides a formidable challenge and requires a system-wide and systemic approach. This is captured in the design of the model tested in the case studies.

Petroline Case Study: Research Plan and Methodology

As mentioned above, the research work seeks to develop an understanding of how self-renewal is affected within an organisation. Furthermore, it explores how an organisation can develop and maintain the capability of self-renewal by identifying relevant processes and investigating their facilitative or obstructive role in the renewal process.

The aim is to provide a research-based guideline for managers faced with the task of developing effective organisational structures and triggering the actions necessary to create and sustain future competitive advantages in increasingly turbulent markets.

To this end two in-depth case studies are undertaken with the main focus set on self-renewing processes and structures. The first of the two case studies was conducted at Deutsche Shell, Hamburg, Germany for two months and successfully completed in September 1997.

The case study of Petroline would require the following information:

Phase 1:

The first Phase would focus on gathering general information on Petroline (i.e. organisational structure, products, competition, markets etc.) and its development since its establishment. Some of this information I already have.

- Background research/ Analysis of general and operating environment
- Historical development of Petroline
- Analysis of status quo and future strategies

Note: Some of this information may require interviewing key personnel, if it isn't readily available from some other existing source.

Phase 2:

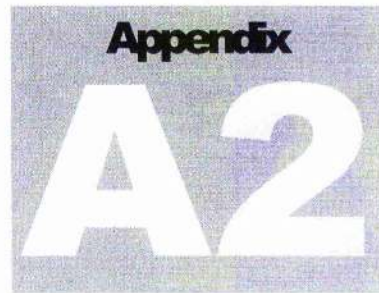
Identification and analysis of the core processes at Petroline and their role in the self-renewal of the organisation. It is intended to map these processes as well as the underlying dynamic relationships between them with the help of a systems-modelling software. The required data would be generated in conjunction with the Petroline Management. Depending on the degree of complexity additional information input maybe required from the employees.

Suggested action plan:

Step	Activity	Related Tasks/ Information Source
2.1	Process identification and analysis	<ul style="list-style-type: none"> • Identification of business processes e.g. distinction key and support processes • Breakdown of process to task-level • Map against reference model as well as use of any existing process documentation
2.2	Data generation	<ul style="list-style-type: none"> • Petroline-Management • Employees
2.3	Computer-aided documentation of Petroline's processes	<ul style="list-style-type: none"> • Development of computer models • Mapping of relationships i.e. process interdependencies (Start/ finish, activities and associated tasks, feedback loops etc.)
2.4	Process analysis	<ul style="list-style-type: none"> • Assessment and interpretation of results
2.5	Completion of case study	

Of these only steps 2.1 and 2.2 would necessarily take place on-site in Aberdeen.





ORGANISATIONAL RENEWAL:
PROCESS DESIGN

Case Study Database Structure
Shell direct GmbH

1.1 Case Study Database Structure

Shell direct GmbH Case Study Database Structure

Source of Evidence

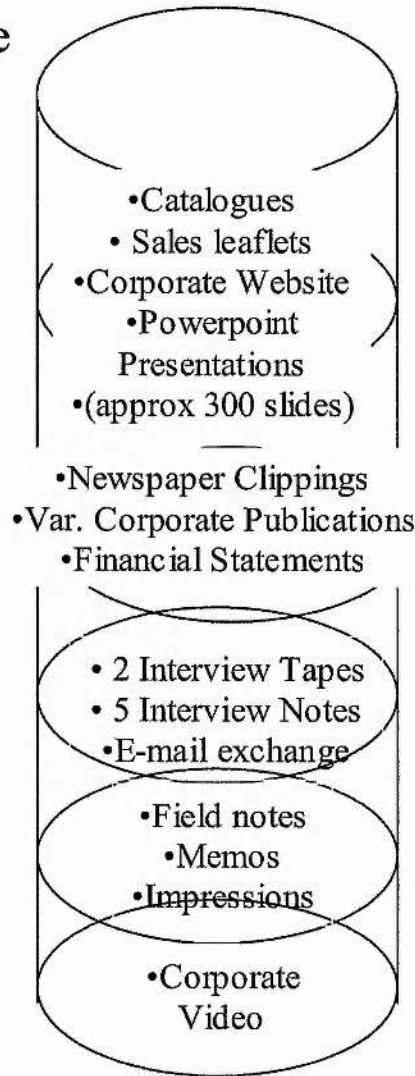
Documents

Archival
Records

Interviews

Passive
Observation

Artifacts



1.2 List of Interviews

Name	Position	Date of Interview	Duration
Dr. Jochen Weise	Managing Director	02/09/1997	45 min (on tape)
Dieter Gutmann	Director Finance & Accounting	26/08/1997	120 min (notes)
		05/09/1997	80 min (notes)
		26/09/1997	90 min (notes)
		17/11/1997	90 min (notes)
		29/12/1998	120 min (notes)
Jan Christoph Sklorz	Technical Services Manager Homebase Fuelling Systems	29/09/1997	45 min (unscheduled interview/ not taped)
		30/09/1997	30 min (on tape)

Note: All taped sessions were fully transcribed. Due to sensitivity, the data has not been included to the Appendix. Upon request the transcripts of the interviews and interview notes can be obtained from the author.

1.3 Research Proposal

TITEL:	ORGANISATIONAL SELF-RENEWAL: PROCESS DESIGN
VERFASSER:	BROER TEICHERT
THEMA:	Kontinuierliche Selbsterneuerung von Organisationen: Theoretische Grundlagen und Leitfaden zur Schaffung effektiver Organisationsformen und –prozesse zur Sicherung der Wettbewerbsfähigkeit in turbulenten Märkten

HINTERGRUND UND RELEVANZ DER FORSCHUNGSARBEIT

Die Unternehmenslandschaft ist seit geraumer Zeit durch strukturelle Wandlungsprozesse gekennzeichnet. Angesichts der dadurch entstehenden Herausforderungen für die Wettbewerbsfähigkeit versuchen betroffene Unternehmen flache Strukturen zu schaffen, sich zu restrukturieren, Kosten zu reduzieren oder zu Outsourcen. Meistens erzeugen solche Maßnahmen nur kurzfristige, bilanzielle Verbesserungen. Die Fähigkeit echte Wettbewerbsfähigkeit wiederherzustellen und einen wirklichen strategischen Durchbruch mit langfristiger Performanceverbesserung für die Organisation zu erzeugen, fehlt jedoch.

Bei näherer Betrachtung, muß zwei Entwicklungen dabei besondere Bedeutung beigemessen werden. Einerseits erzeugen politische, ökonomische, sozio-kulturelle und insbesondere technologische Entwicklungen eine Unternehmensumwelt, die sich zunehmend durch Komplexität und diskontinuierliche, abrupte Veränderungen kennzeichnet. Wirtschaftlicher Erfolg und langfristiger Fortbestand hängen daher zunehmend von der Fähigkeit des Unternehmens ab, diesen äußeren Turbulenzen genügend unternehmensinterne Dynamik entgegenzusetzen.

Andererseits liefert die Management-Forschung eindeutige Beweise dafür, daß Unternehmen destruktive Kräfte innehaben, die Verknöcherung bewirken und damit eine Erkennung und Anpassung der Unternehmung an veränderte Rahmenbedingungen verhindern; dieser Umstand führt zum Verfall und letztendlich zum Absterben der Organisation.

Im Zusammenhang solcher Herausforderungen ist der Entwurf (über-)lebensfähiger und erfolgreicher Organisationsformen ein zentrales Thema der Managementpraxis und –forschung geworden. Die derzeitige Literatur betont Kundenorientierung, Schnelligkeit, Flexibilität, Innovation, organisationales Lernen und visionäres Denken. Traditionelle Organisationsformen gelten als synonym für die Abwesenheit solcher Charakteristiken. Zunehmend wird daher gefordert, daß Unternehmen sich ändern müssen in dem sie sich grundlegend transformieren. Im Falle existierender Unternehmen wird dies als eine 'Erneuerungsstrategie' bezeichnet. Eine 'Erneuerungsstrategie' versucht die Effektivität der Organisation wiederherzustellen.

Unternehmen können den durch die inhärenten destruktiven Kräfte ausgelösten Teufelskreislauf durchbrechen, in dem kontinuierlich Selbsterneuerungsprozesse angeregt werden. Diese 'Selbsterneuerungskräfte' sind bereits (mehr oder weniger) in einem Unternehmen vorhanden, bedürfen jedoch der Freisetzung. Dies erfolgt durch eine geeignete Aufbau- und Ablaufarchitektur, in der sog. Trigger-mechanismen in Form von Prozessen und Strukturen, die Anfrage- und Untersuchung, Innovation und Kreativität anstoßen und Vitalität nähren, in der Organisation formal eingerichtet sind.

GEGENSTAND UND METHODIK

Gegenstand der Arbeit ist es, Erkenntnis darüber zu erlangen, wie eine Organisation die Fähigkeit der Selbsterneuerung entwickeln kann in dem die hierfür relevanten Prozeßabläufe identifiziert werden und auf ihre unterstützende bzw. hindernde Rolle im Selbsterneuerungsprozeß des Unternehmens untersucht werden. Dies soll als Managementleitfaden zur Schaffung effektiver Organisationsformen mit Zielsetzung der Sicherung der Wettbewerbsfähigkeit in turbulenten Märkten dienen.

Dazu sollen mehrere Unternehmensfallstudien durchgeführt werden. Die Darstellung der Selbsterneuerungsprozesse durch Systemmodelle und ihre Verknüpfung zu den damit verbundenen Aktivitäten steht dabei im Mittelpunkt der Forschungsarbeit.

ZEITPLAN

Das Forschungsunterfangen wird seit September 1996 durch die Europäische Kommission mit dem ‚Marie-Curie-Stipendium‘ gefördert.

PROJEKTUMFANG UND INFORMATIONSBEDARF

Im Rahmen der Fallstudie warden folgende Informationen benötigt:

Phase 1:

Die erste Phase focusiert auf die Erhebung allgemeiner Informationen über die DEUGERD-Unternehmensgruppe (z.B. Organisationsstruktur, Produkte, Wettbewerbssituation, Märkte, Trends etc.) und die Unternehmensentwicklung seit ihrer Entstehung. Ein Teil dieser Informationen besitze ich schon.

- Erhebung von Hintergrundinformationen / Analyse des operativen Geschäftes und der Unternehmensumwelt
- Historische Entwicklung der DEUGERD
- Analyse des Status quo und Zukunftsstrategien

Note: Sofern diese Informationen nicht bereits dokumentiert sind und in anderer Form zugänglich sind, wären Interviews eineiger Schlüsselpersonen aus dem Unternehmen notwendig.

Phase 2:

Die Identifikation und Erhebung der Kernprozesse des Unternehmens hinsichtlich ihrer Rolle bei der Erneuerung des Unternehmens. Es wird beabsichtigt diese Prozesse und das zugrundeliegende Beziehungsgeflecht mit Hilfe einer Spezialsoftware grafisch darzustellen. Die benötigten Daten würden in Zusammenarbeit mit dem DEUGERD Management erhoben. In Abhängigkeit vom Komplexitätsgrad wäre eine zusätzliche Befragung der zuständigen Mitarbeiter notwendig.

B. TEICHERT

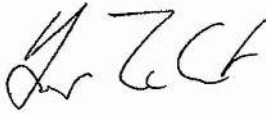
PROJEKTBECHREIBUNG

3

Aktionsplan (Entwurf):

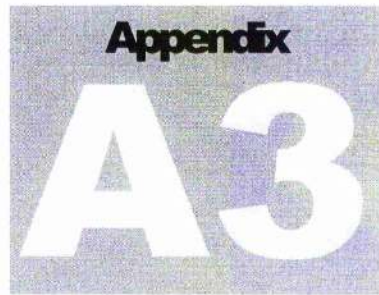
Stufe	Aktivität	Verbundene Aufgaben/ Informationsquelle
2.1	Erhebung und Analyse relevanter Prozesse	<ul style="list-style-type: none"> • Identifikation relevanter Arbeitsabläufe z.B. Trennung nach Kernprozessen und Unterstützenden Abläufen • Aufschlüsselung auf Tätigkeitsebene • Vergleich mit vorabentwickelten Referenzmodellen unter Verwendung bereits dokumentierter Unternehmensabläufe.
2.2	Datenerhebung	<ul style="list-style-type: none"> • Management • Mitarbeiter
2.3	Computerunterstützte Dokumentation der Arbeitsabläufe	<ul style="list-style-type: none"> • Entwicklung der Computermodele • Darstellung der Prozessbeziehungen (Anfang/ Ende, Aktivitäten und verbundene Abläufe, Rückkoppelung etc.)
2.4	Prozessanalyse	<ul style="list-style-type: none"> • Bewertung und Interpretation der Ergebnisse
2.5	Fertigstellung	

Von den dargestellten Projektstufen würden lediglich 2.1 and 2.2 notwendigerweise vor Ort stattfinden.



St. Andrews, 16.02.97





ORGANISATIONAL RENEWAL:
PROCESS DESIGN

Case Study Database Structure
3M Company

1.1 Case Study Database Structure

3M Company Case Study Database Structure

Source of Evidence

Documents



- 3M Innovation Website
- Transcribed Speeches
 - Presentations
- Inhouse Publications

Archival
Records

- Newspaper Clippings
- Company Statements
- Published Articles (Fortune, Economist, FT, Econy, etc.)

Interviews

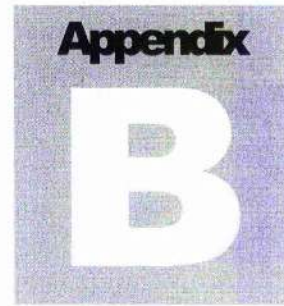
- 1 Telephone Interview

Secondary Research
based on
direct observation

- Research Accounts e.g Collins & Porras, 1994
- Ghoshal & Bartlett, 1998
 - Gundling, 2000
 - Kanter et al., 1997;
 - Blank & Kremer, 1999;
- Peters & Waterman, 1983

1.2 List of Interviews

Name	Position	Date of Interview	Duration
Manfred Kremer	Quality Management Services Manager	20/10/1999	75 min via telephone (notes)



ORGANISATIONAL RENEWAL:
PROCESS DESIGN

Business Activity Models:

Petroline Wireline Ltd. & Shell direct GmbH

Content

1.	Business Activity Model	2
1.1	Business Process Characteristics.....	4
1.2	The structure of the BAM	6

1. Business Activity Model

The Business Activity Model (BAM) seeks to comprehensively represent an organisation's activities. Unlike an organisation chart, the BAM describes the business in terms of activities – i.e. **what** is done rather than **who** does it. From a system's perspective the activities represent the relationships between the various entities. The approach described here uses the notion of business activity (or business process) as a form of abstraction which can be used to compare organisations to one another.

A BAM is structured in hierarchical form from one (or several) 'root' activity of the company to sub-activities until it leads to elementary activities. A BAM provides a tree-like graphical representation of an organisation where nodes and leaves are activities (textual description) and the branches are decomposition of activities. The BAM also shows how activities are related to one another and can be grouped into business processes. A business process is a group of interrelated activities which delivers something of value (e.g. products, services or information) to its recipients.

The BAM may be used in many different ways. However, the process view of the business which it provides is particularly helpful, because it captures the dynamics involved in generating inputs into outputs. The business processes of the company are directly responsible for the outcome.

Traditionally, as organisations grow in size, they are structured by function into divisions and departments run by staff with specialist skills dedicated to dealing with specific activities. Where different activities in a process require different skills, the overall process is likely to involve a number of people and departments. Often the functional areas are largely autonomous, and there is limited communication among functions. Multiple handovers occur as work progresses from one area to another. This causes delays and errors.

For example,

- the *sales department* finds the customer
- the *distribution department* takes the customer's order
- the *finance department* invoices the customer.

In this case, the work flows through several departments while, from the customer's point of view, a single process has taken place, as shown below.

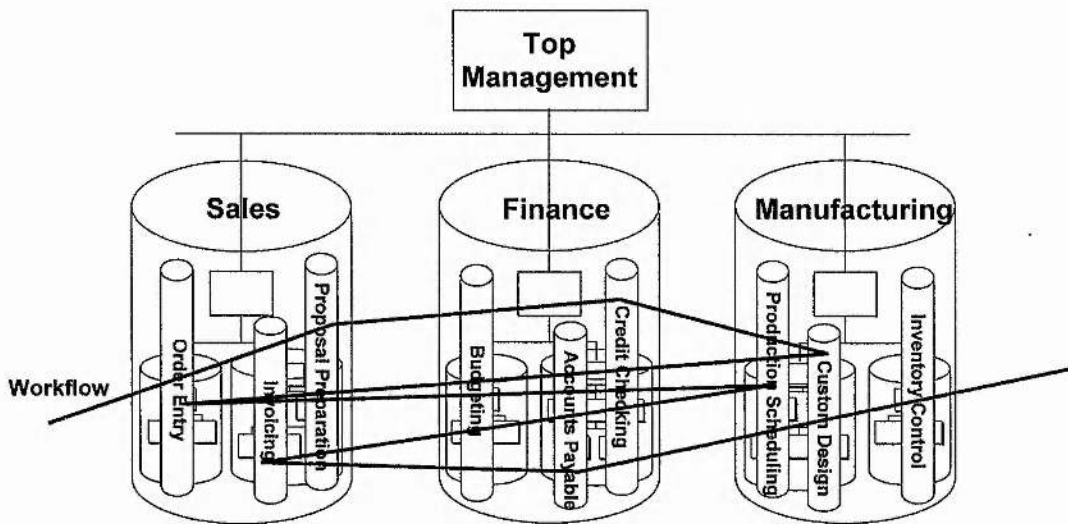


Figure 1: Functional Fragmentation of Workflows

Source: Developed by the Author

A BAM can be compared to an organisational map which provides

- a comprehensive **overview** of all business activities and how they relate to one another
- a focus on value streams and the relationship between business entities
- a picture of all the **landmarks** of a business, giving a comprehensive checklist of activities

- a common framework for communication and language for discussion, helping people from different backgrounds and disciplines to move towards a common goal.

1.1 Business Process Characteristics

This section will present a brief description of the reference model and the major concepts behind the model. The structure of the model is presented together with a description of the main features of the model.

The reference model considers an organisation to consist of four levels. These are:

- The Business
- The Business Units
- The Business Processes
- The Activities

These levels may be physical or logical.¹ The following sections describe the function of each of these levels.

The Business level represents the entire business. A business may consist of a number of logical or physical Business Units. A Business Unit is defined as the portion (physical or logical) of the organisation which services a particular market segment with particular competitive requirements. Differing market requirements distinguish one business unit from another.

Each Business Unit in turn consists of a number of Business Processes. Three layers of business processes can be distinguished:

¹ The term 'logical' means that the organisation does not need to be physically organised into four levels. In most businesses these four levels already exist. Management needs only to recognise that the four levels exist logically within the business.

- **core processes** which fulfill the fundamental commercial purpose of the company. Core Processes: These are business processes which represent the fundamental reason for an organisation to exist. In a manufacturing business typically a Business Unit may have the following core business processes: Get Order, Develop Product, Fulfil Order Support Product - i.e. the process of providing after sales support
- **management processes** which define the policies, strategies and plans that steer the core processes
- **supporting processes** which provide the essential services (e.g. financial, training, legal) which enable both core processes and management activities to operate efficiently and effectively.

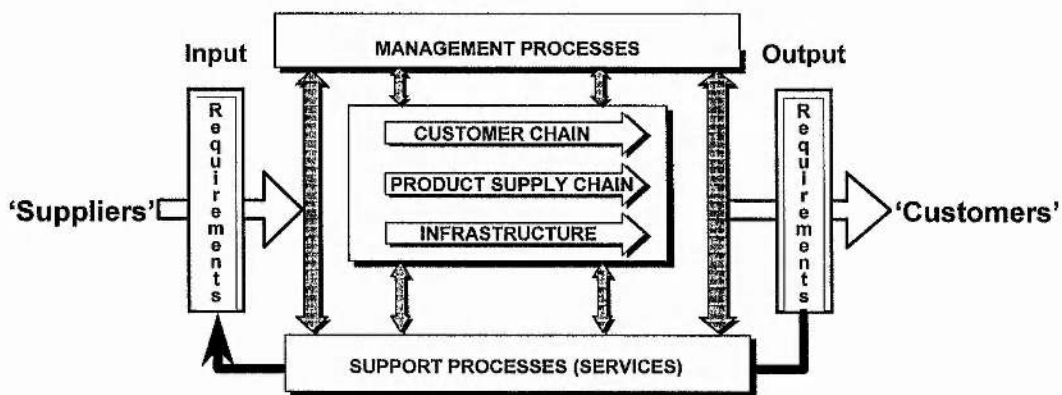


Figure 2: Basic Model of a Business Process

Source: Developed by the Author

The European Business Excellence Model distinguishes the following three core processes:

- identify and meet the needs of the **customer**
- make and supply the **product** to the customer
- develop and maintain the **physical infrastructure** needed to make and distribute the product.

These three core processes work in parallel and are largely independent. Each Business Process in turn consists of a series of Activities which may be sequential or parallel within the process.

1.2 Model Structure

The BAM presents business activities at three levels of detail:

- at Level 1 there are business processes and groups of management and support activities
- at Level 2 these are divided into sub-processes
- at Level 3 these are divided into activities.

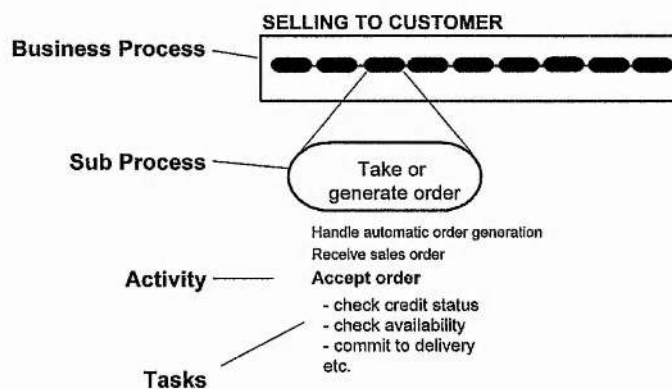


Figure 3: Hierarchical Breakdown of a Business Process

Source: Developed by the Author

Each business process can be divided into sub-processes. Each sub-process is further broken down into activities, as shown below. These activities are typically broken down into further levels of detail.

To avoid unnecessary repetition, the model also discerns 'repeated activities' used when an activity takes place at various points in the model. Examples of repeated activities include

[CON] AGREE AND MAINTAIN CONTRACT

[PIP] PLAN INDIVIDUAL PERFORMANCE

[RCV] RECEIVE STOCK

The core processes are broken down into eleven ‘Level 1’ business processes. In addition there are two groups of management activities, and one group of supporting activities.

A business activity is a logical grouping of events which can be agreed as a fundamental element of a business. Although some implicit ordering may emerge, the intention is to describe a whole business as a set of about 200 to 300 activities without concern about the order or the interactions of the individual activities. These activities are grouped on three levels. The top level comprises typically ten to fifteen processes or activities. For a manufacturing company, these activities may be:

- Manage business
- Analyse and identify market
- Develop marketing approach
- Optimise supply-chain margin
- Acquire stocks, intermediates and products
- Receive and produce
- Distribute
- Develop brand portfolio
- Develop and improve product, process technology and engineering solutions
- Develop and improve facility
- Maintain Facility and Equipment
- Provide essential services

It can be seen that at the abstract level these are very gross divisions of the company behaviour, which may be considered too obvious and simplistic. However, experience shows that it is easy to obtain broad agreement on these.

Organisational Processes

Level 1

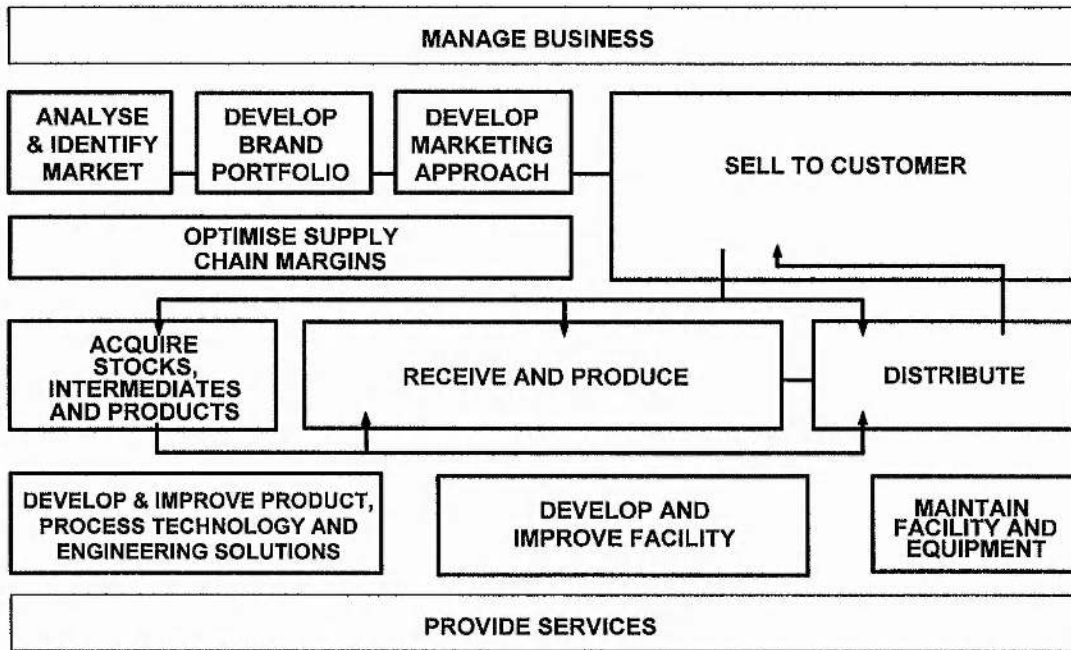


Figure 4: Map of Level 1 Processes

Source: Developed by the Author

The activity model is intended to hide organisational structure, and simply to describe the functionality of the organisation. Activities may be implemented in many different ways, sometimes even within the same company; for example there may be many types of manufacturing plant within a company, producing different goods, or producing the same goods in different ways. Having obtained the common abstraction it is possible then to map it back onto organisational structure.

The importance of the omission of information flow and temporal considerations cannot be over-emphasised. There is rarely any disagreement on what an organisation does, but there is always disagreement on how it does it. Flows can be added later, once functionality has been agreed.

The second level breaks down into finer detail each of the first level activities. Again, this is a logical grouping, and any temporal or informational links are implicit and/or

coincidental. A second level breakdown for the SELL TO CUSTOMER activity of a manufacturing business might include the following activities:

- NEGOTIATE CONTRACT - all activities involving negotiations and setting up of contracts with a customer.
- TAKE ORDER - all activities relating to order taking
- DELIVER GOODS - all activities relating to delivery
- ACCEPT RETURNS - all activities relating to return of unwanted or unsatisfactory goods
- INVOICE CUSTOMER - all activities relating to invoicing
- ACCEPT PAYMENT - all activities relating to acceptance of payment

In practice there are likely to be at least double these activities for a particular business type.

1.2.1 Conclusion

Activity models are proving a useful means of reasoning about systems at an abstract level. By omitting temporal and information flow considerations, they allow high level reasoning about systems and the environment in which the systems operate. They are largely independent of organisational considerations. They can be used as a framework for strategic planning and analysis, as a basis for a common terminology in BPR, and as an entry point for specification and initial design of systems in an object modelling approach. They offer a possible, useful extension to existing methods. They have been proven in a number of practical projects where the characteristics of the projects have involved differing organisations which provide similar products or services.

[P-01] Manage business

Develop long-term strategies and plans

- Confirm mission, vision and objectives for the overall business
- Set/reflect policy and business standards
- Initiate and maintain overall business control framework
- Develop a planning process
- Assess internal and external constraints
- Assess opportunities for business development
- Assess, prioritise and select preferred strategy option(s)
- Review existing and potential master plans and update or initiate
- Communicate objectives and strategies
- Review the planning process

Produce business plans

- Reconfirm objectives and strategies in the light of internal and external constraints
- Establish premisses to be used in business planning
- Review strategies and set key performance indicators/ benchmarks
- Consolidate master plans across the total business
- Incorporate any other ongoing business activities
- Define the resources needed to fulfil the plan
- Plan organisational change
- Produce and promote inclusions in the integrated business plan
- Produce organisational/project budgets and plans
- Communicate business plans
- Communicate business plans

Direct and review execution of business plans

- Allocate resources to implement business plans
- Provide operational and project guidelines, procedures and timetables
- Direct and motivate staff
- Plan and select projects
- Review business-control framework (audit process)
- Restate key performance indicators
- Implement organisational change
- Review business performance against key performance indicators/benchmarks
- Assess organisational effectiveness
- Review organisational/project budgets and plans
- Carry out PIRs (Post Implementation Reviews)
- Make recommendations for improvement

Develop and sustain external relationships

- Communicate with shareholders and partners
- Communicate with public
- Manage relationships with third parties
- Recognise when stakeholder opinions are changing and respond when necessary

Carry out role as shareholder of subsidiary

- Appoint (board) representative
- Assist in the setting of strategies, plans and financial targets
- Agree allocation of capital
- Appraise controls and business performance

[P-02] Analyse and identify market

Analyse total market

- Establish dimensions of total market
- Identify key segmentation variables
- Determine optimum segmentation structure
- Determine current size of segments

Determine preferred segments

- Evaluate marketing mix by segment
- Evaluate competitor market share by segment
- Determine competitive strengths and weaknesses by segment
- Forecast growth prospects
- Determine market potential by segment
- Identify competitive trends
- Evaluate threats and opportunities
- Synthesise competitive position and market attractiveness by segment
- Select preferred segments

Determine customer opportunities

- Determine opportunities to increase business from existing customers
- Determine opportunities to gain new customers

[P-03] Develop marketing approach

Develop marketing proposition

- Establish costs and margins
- Assess brand development
- Develop promotions
- Develop sales support material
- Develop pricing schedules
- Develop card strategy and rules
- Develop associated product/brand support services
- Define standard terms and conditions of trade
- Create and maintain card-acquirer agreement
- Ensure third parties understand brand propositions

Develop marketing infrastructure

- Plan sales-force structure
- Plan outlet network/distributor arrangements
- Develop distribution network

[P-04]	Optimise supply-chain margin
	Develop and maintain planning model
	Clarify boundaries of model
	Identify business parameters
	Agree business objectives
	Build the planning model
	Determine constraints on optimisation
	Identify external factors which may influence planning
	Identify internal factors which may influence planning
	Establish production, movement and storage capacities
	Establish minimum and maximum stock levels
	Identify risks and vulnerabilities
	Establish supply and demand forecasts
	Define opening conditions
	Establish demand forecast
	Establish supply options and preferences
	Establish price and cost forecasts
	Establish maintenance requirements
	Optimise margins
	Identify initial set of options
	Determine results for each option
	Analyse results and generate new options
	Agree preferred plan
	Expand into operational plans
	Monitor planning performance
	Monitor actuals versus plans
	Make initial proposals for improving planning process

[P-05]	Acquire stocks, intermediates and products
	Plan operation of buying
	Assess overall stock and movement constraints
	Find potential suppliers
	Establish potential sources
	Assess using existing agreement/contract
	Establish availability of supply
	Assess risks
	Assess economics of supply
	Determine preferred supply option
	Agree purchase terms
	Agree and maintain supply contract
	Agree exchange of stock or product
	Make arrangements for risk management
	Place purchase order
	Receive advice of purchase need
	Assess supply options
	Submit purchase order
	Acquire third-party transport and storage service
	Issue supply request
	Make arrangements for receipt
	Track purchase-order status and modify when necessary
	Confirm acceptance or action non-acceptance
	Pay for supply
	Receive invoice or statement
	Check purchase order has been met
	Submit query, complaint or claim
	Authorise payment
	Pay for supply
	Monitor buying performance
	Review supplier performance
	Make initial proposals for improvement

[P-06]	Receive and produce
	Plan receipt, production and distribution operations
	Develop and maintain scheduling model
	Plan receipt operations
	Plan use of information technology
	Schedule collection and transport
	Assign transport
	Schedule collection and transportation
	Collect from supplier and transport
	Prepare for loading
	Connect transport facility
	Load
	Agree on quality and quantity
	Collect documents
	Schedule receipt
	Determine destination storage-facilities
	Determine timing
	Determine internal-movement and fence-movement requirements
	Receive and store stock
	Execute internal movement
	Accept transport arrival
	Check delivery documents
	Receive stock
	Schedule internal stock movements
	Assign storage
	Schedule internal movement
	Handle stock in storage
	Define movement timing, quantity and routing targets
	Maintain stock quality
	Execute movement
	Prepare stock
	Schedule release of stock
	Receive request/schedule for supply to production unit
	Produce delivery documentation
	Release stock from storage
	Prepare for release
	Release stock
	Schedule production operations
	Analyse short-term production performance
	Develop and maintain scheduling model
	Assess stock and movement constraints and commitments
	Schedule short-term production and stock movements
	Plan plant performance
	Schedule processing
	Develop and maintain plant optimisation and line-up model
	Determine run sources
	Determine completion
	Generate order position
	Acknowledge advice and end date
	Determine timing/actions
	Operate production facility
	Determine 'work to' list
	Load machines for daily work requirements
	Analyse throughput
	Manufacture Sales Order requirements
	100% inspection of manufactured components
	Book to stores
	Stage components for assembly
	Assemble and test assemblies
	Pass to dispatch

Monitor production-site performance

Check daily throughput
Analyse Works Orders completed in a set period
Record Sales achieved in a month
Compare Sales with salaries with capital
Check budgets for monthly expenditure
Analyse all manufacture completed in a month
Analyse scrap and rework

[P-07] Sell to customer

Plan sales operations

Review sales forecast
Estimate expected sales
Prepare operational sales plan
Plan individual performance
Plan use of information technology

Find potential customers/sales

Target customers and send out sales information
Follow up contacts and find customers
Evaluate customers
Handle customer enquiries
Track contacts with customer

Maintain schedules

Adjust price schedules
Monitor outlet/distributor competitive status

Negotiate sales/service terms

Understand detailed product and service requirements
Negotiate terms, conditions and service levels
Explore further opportunities

Implement sales/service terms

Create and maintain sales agreement
Maintain reseller agreement
Create and maintain card-account agreement
Set up customer account
Produce and maintain cards
Assess contractual risk

Take or generate order

Handle automatic order generation
Receive sales order
Accept order
Request advance payment
Handle order status query
Handle price query
Handle order amendment
Take action to fulfil order

Identify additional sales/service opportunities

Seek new orders
Encourage customers to consider expanding orders

Dispense at outlet

Check and authorise customer purchase
Capture purchase details
Handle any returns
Handle payment for products and services received
Provide HSE data
Operate outlet site
Handle complaints and queries

Dispense product at outlet

Release stock
Promote sales and service offerings
Provide promotional material
Provide information

Provide service

Provide customer service
Provide commercial road transport (CRT) information
Provide fleet information
Provide point of sale (POS) services

Promote sales and service offerings

Provide promotional material
Handle complaints and queries

Determine payment

Confirm delivery or service
Note amendments to delivery
Agree returns made
Track customer container inventory
Calculate or recalculate value of delivered product or service
Calculate or recalculate value of card purchase
Calculate value to be claimed from card acquirer

Determine reseller settlement

Calculate settlement balance

Request or make payment

Bill customer
Bill card account
Bill card acquirer
Provide credit document
Make payment to reseller/distributor
Handle query

Provide promotional material

Suggest other terms
Send out promotional material with invoice

Receive payment

Receive payment
Confirm receipt
Register receipt
Convert foreign currency
Match and allocate payment against request

Maintain account

Establish account status
Transfer inter-company accounts
Monitor status of debts
Follow up payment or non-payment
Monitor debtor performance
Review settlement terms within the agreement
Monitor agreements with resellers
Handle account-related contact with customer

Maintain customer relations

Contact customer
Visit customer
Suggest term changes
Handle customer enquiries

Monitor sales/service performance

Aggregate actual sales
Review actuals against targets by market, customer and product
Monitor individual performance
Monitor use of information technology
Identify deviation from plan
Make recommendations for improvement

[P-08] Distribute

Plan distribution (network) operations

Analyse distribution activities for the whole network
Develop and maintain distribution-scheduling models
Assess stock and movement constraints and commitments for the distribution network

Schedule distribution

Assemble movements into despatch groups
Create movement schedule
Procure transportation service
Notify third-party carriers
Notify third-party liftings

Collect product for transportation and storage

Prepare for collection
Load
Collect documents
Transport

Schedule receipt

Determine internal-movement requirements

Receive at storage facility

Execute internal movement
Accept transport facility arrival
Check delivery documents
Receive stock

Schedule and administer stock in storage facility

Assign storage
Maintain container inventory
Acquire containers and additional materials

Schedule release

Produce delivery documentation

Release from storage facility

Prepare for release
Release product
Issue documentation

Distribute product

Transport
Handle complaints and queries

[P-09] Develop brand portfolio

Specify brand portfolio

Evaluate global core values
Define national core values
Define company brand personality and positioning
Define product brand personality and positioning by preferred segment
Generate long-term communications strategy
Institute brand-monitoring procedures

Review existing brand portfolio

Evaluate existing brand portfolio
Check brand performance against brand objectives
Monitor product/service quality against brand claims
Monitor brand infringements
Agree areas for development

Maintain ongoing brand portfolio

Set new brand objectives
Check loyalty to core values
Handle brand withdrawal
Develop short-term communication plans

[P-10]

Develop and improve product, process technology and engineering solutions

Screen new concept

Initiate and manage screening study / Recognise customer needs
Perform literature search
Review concept against alternatives
Assess strategic fit
Assess technical feasibility
Assess potential economic benefits
Formulate R&D requirements and assess chances of success
Report on findings and decide on course of action

Evaluate new and enhanced product

Manage development project
Assess product performance requirements
Assess packaging requirements
Assess handling and storage requirements
Assess transportation requirements
Assess risk

Develop product concept

Research new product (customer contact / technical discussion)
Develop concept / new product
Evaluate product performance
Develop/ review technical specifications
Review patents
Review concept/ solution with customer
Clarify commercial issues (e.g. funding)

Develop detailed design

Develop detailed design
Review design
Revise design
Finalise design
Prepare detail component drawings, assembly drawings, test procedure
Release drawings to manufacturing

Manufacture / assemble and test prototype

Manufacture prototype equipment
Assemble prototype equipment
Test prototype equipment
Design modifications and re-test
Finalise data books and test report

Delivery and installation

Deliver equipment to customer
Install prototype
Prepare installation report
Initiate customer follow-up

Develop production process technology

Execute research and development on process and engineering technology
Evaluate process and engineering technology
Protect inventions
Acquire patents and licences

Design process

Define sequence of unit operations

Scale up production-process technology

Develop modes of operation
Develop product-property (specification) data
Develop engineering solutions
Develop process models
Release results for application
Translate results into design rules

Review R&D achievements and update direction

Document R&D achievements and implementations

Consolidate and review achievements per theme

Inform of R&D achievements

Prepare technology plan (planned capital investments by technology area)

Review R&D strategy

Prepare R&D guidelines and obtain approval

Define budget per theme for core and options programmes

[P-11] Develop and improve facility

Execute scouting study

Execute feasibility/investigation study

Execute the project-preparation phase

Define facility

Validate basis of design (BOD) and project execution plan (PEP)

Define the requirements for the basic design package (BDP)

Obtain legal right to use location and to operate facility

Select contractor for BDP

Negotiate and agree contract with licensor of selected process

Obtain project-implementation approval

Perform independent management review (IMR) and decide on recommendations

Prepare for submission to Board (502F or 530F)

Evaluate technical soundness and provide technical support

Decide on progress

Develop facility/implement project

Analyse future requirements

Make Capital plan for growth

Carry out facility changes to new requirements

Ensure all safety and environment rules are in place.

Arrange for new set up to be carried out

Monitor effect of changes

Schedule acquisition and/or construction

Select and acquire site

Select and acquire construction services

Schedule acquisition

Schedule construction

Procure facilities and services

Develop and maintain item standards

Develop and maintain services-contractor base

Develop and maintain supply-source base

Prepare requisitions

Evaluate supply options

Acquire equipment, materials, systems and associated services

Prepare and supervise fabrication and supply of facilities

Approve payments for supply of materials, equipment and systems

Fabricate and supply facilities

Supervise construction and commissioning of facility

Construct and commission facility

Review development process and facility performance

[P-12] Maintain Facility and Equipment

Plan and schedule maintenance and inspection

Plan plant shutdowns in consultation with operations
Establish scope and frequency of preventative maintenance
Record work-order requests, estimate costs and prioritise
Schedule regular inspection and preventative maintenance
Schedule breakdown inspection and associated maintenance

Supervise monitoring and inspection

Monitor and inspect facility

Measure and monitor equipment condition
Inspect equipment
Evaluate inspection report and decide on further maintenance or other action
Evaluate measurements and determine maintenance and inspection requirements

Supervise maintenance

Specify maintenance task (e.g. work order) and allocate resources
Acquire equipment, materials and contract services
Award maintenance work order
Monitor maintenance progress, quality and resource-utilisation
Close out task and accept work done

Execute maintenance

Monitor maintenance performance

Determine performance of monitoring, inspection and maintenance
Make initial proposals for improvement
Determine equipment, instrument and component reliability and facility availability
Determine cost of production lost

[P-13] Provide essential services

Plan and budget finances

Plan budget cycles
Collate corporate budget
Record approved budgets and integrate with CBP
Record corporate performance against budget

Manage funds

Plan and secure funding
Forecast and plan cash flows
Reconcile and maintain bank accounts
Reconcile and report receipts and payments
Allocate and account for interest, charges and Differences In Exchange
Review funds-management performance

Account for business activities

Maintain account structures
Process accounting postings
Account for fixed assets and investments
Reconcile and value stocks
Reconcile and balance ledgers
Account for Group/shareholder/joint-venture reporting
Account for statutory requirements
Account for fiscal, tax, duty and royalty requirements

Provide specialist services (outsourced)

Provide health, safety and environmental support

Monitor environmental issues
Secure and survey safety of business operation
Conduct health, safety and environment audits
Follow up incidents and accidents
Raise health, safety and environmental awareness

Provide legal services (outsourced)

Support organisational development

Analyse future human resource requirements
Identify potential sources of human resources
Support the development and evaluation of jobs

Support human resources development

Analyse attractiveness of company in labour market
Recruit staff
Induct staff
Transfer staff
Deliver training
Terminate employment

Support human resources policies

Analyse competitive position of company
Administer employment policies
Administer compensation and benefit policies

Maintain employee relations

Develop and maintain IT facilities

Deliver application portfolios
Maintain application portfolios
Develop IT infrastructure
Maintain IT infrastructure

Provide IT services

Plan IT services
Operate IT services
Monitor performance of IT services

Provide other office services

Provide and support office systems
Provide communications
Distribute mail
Handle travel arrangements
Provide office consumables

[CON] Agree and maintain sales contract

Initiate contract

Make/receive initial enquiry
Assess ability to meet demand
Evaluate potential benefits
Evaluate risk

Tender contract

Pursue tender prospect
Receive tender invitation
Receive tender requirements
Decide to respond to tender invitation
Receive international price quote
Prepare contract pricing proposal
Make contract proposal
Monitor tender prospect

Negotiate contract

Customise contract framework
Monitor contract negotiation
Analyse response to proposal
Notify response to proposal
Notify response to international price quote
Receive competitors' contract terms

Maintain contract

Receive contract review request
Review contract
Notify revised standard terms of trade

[MAP] Manage a project

Manage a Project

Nominate a project leader

Prepare and validate Terms of Reference (TOR) and premisses

Establish requirements and prepare project plan

Agree on manpower, timing and deliverables and obtain management/ customer support

Prepare budget proposal and obtain budget approval and resource commitment

Nominate project team and define project organisation and roles

Schedule project activities

Initiate tasks and motivate people

Monitor quality, progress and resource utilisation

Appraise staff and contractor performance

Report on progress and results and close project

[MIP] Monitor individual performance

Assess staff competences

Define job competence requirements

Assess other competence requirements

[OMF] Operate movement facility

Plan facility usage

Review storage facility allocation

Change storage facility allocation

Select line-up/configuration

Give line-clearing advice

Determine target quantities, timing, setpoints and valve positions

Execute facility operation

Execute line clearing

Prepare line-up for movement, open/close valves

Implement setpoints

Execute movements

Route and store waste material

Monitor facility operation

Measure moved product quantities, qualities and event timing

Measure quantities and qualities of waste material

Monitor contamination and track line contents

Terminate movement

Register movement and update stock balances

Classify

Reconcile and balance stock

Measure stock quantity

Measure stock quality

Validate stock measurements

Assess stock movements

Make stock balance

Reconcile stock

Monitor movement-operations performance

Determine movement-operations performance

Review performance and make proposals for improvement

[PIP] Plan individual performance

Identify training and development opportunities

Carry out coaching and mentoring

Match development needs to course objectives

Discuss and define course timing

Manage delegation of duties during absences

Debrief staff following courses and defining actions arising

[PIT]	Plan use of information technology
	Review and establish service-level requirements
	Review/negotiate service-level agreements
	Select performance indicators
[RCV]	Receive stock
	Move stock
	Coordinate the movement of stock
	Operate facilities
	Match quantity and quality against delivery document
	Measure quantity and quality
	Compare quantity and quality
	Determine gain or loss
	Complain or reject if not acceptable
	Accept control of stock
	Record the formal receipt of physical product
	Confirm movement of stock, where appropriate
	Create bill of lading or other delivery document
	Accept ownership of stock
	Accept responsibility for stock
	Transfer ownership
	Register receipt
	Update stock balances
	Review performance and make proposals for improvements
[RLS]	Release stock
	Issue documentation
	Issue bill of lading
	Issue certificate of quality
	Transfer control of stock
	Confirm delivery
	Confirm acceptance of quantity and quality
	Create delivery receipt
	Update balances
[TRN]	Transport
	Accept load
	Accept and confirm loading of product
	Transfer and verify associated documentation
	Load
	Prepare storage facility
	Physically load product
	Inspect product received
	Agree transfer of control
	Move
	Operate transport facility
	Follow routing
	Record events and timing
	Handle incidents
	Carry out unload procedure
	Check receiving tank
	Carry out discharge procedure
	Issue and agree documentation

Unload

Ensure customer's readiness to receive product
Physically discharge product
Measure quality and quantity of product being delivered
Agree transfer of control/ownership
Load any returns

Reconcile trip

Reconcile physical trip details
Reconcile delivered quantities
Reconcile returns made

[XEW] Execute task, including engineering work

Prepare task

Move offices and provide office facilities
Expedite job
Allow contractor access
Prepare work documents
Check work location

Execute task

Obtain tools, materials and documents
Take safety measures
Execute work
Clean workplace
Return surplus material
Report on results and used resources
Obtain and evaluate feedback and update knowledge base

Monitor progress of work

Allocate hours worked to task
Verify quality of work done
Report incidents

Complete task

Verify hours spent
Approve job task or deliverable
Record resource utilisation and allocate costs
Update equipment history information
Update work information
Hand over responsibility

[P-01] Manage business

Develop long-term strategies and plans

Confirm mission, vision and objectives for the overall business
Set/reflect policy and business standards
Initiate and maintain overall business control framework
Develop a planning process
Assess internal and external constraints
Assess opportunities for business development
Assess, prioritise and select preferred strategy option(s)
Review existing and potential master plans and update or initiate
Communicate objectives and strategies
Review the planning process

Produce business plans

Reconfirm objectives and strategies in the light of internal and external constraints
Establish premisses to be used in business planning
Review strategies and set key performance indicators/ benchmarks
Consolidate master plans across the total business
Incorporate any other ongoing business activities
Define the resources needed to fulfil the plan
Plan organisational change
Produce and promote inclusions in the integrated business plan
Produce organisational/project budgets and plans
Communicate business plans

Direct and review execution of business plans

Allocate resources to implement business plans
Provide operational and project guidelines, procedures and timetables
Direct and motivate staff
Plan and select projects
Review business-control framework (audit process)
Restate key performance indicators
Implement organisational change
Review business performance against key performance indicators/benchmarks
Assess organisational effectiveness
Review organisational/project budgets and plans
Carry out PIRs (Post Implementation Reviews)
Make recommendations for improvement

Develop and sustain external relationships

Communicate with shareholders and partners
Communicate with public
Manage relationships with third parties
Recognise changing stakeholder opinions and respond when necessary

Carry out role as shareholder of subsidiary

Appoint (board) representative
Assist in the setting of strategies, plans and financial targets
Agree allocation of capital
Appraise controls and business performance

[P-02] Analyse and identify market

Analyse total market

- Establish dimensions of total market
- Identify key segmentation variables
- Determine optimum segmentation structure
- Determine current size of segments

Determine preferred segments

- Evaluate marketing mix by segment
- Evaluate competitor market share by segment
- Determine competitive strengths and weaknesses by segment
- Forecast growth prospects
- Determine market potential by segment
- Identify competitive trends
- Evaluate threats and opportunities
- Synthesise competitive position and market attractiveness by segment
- Select preferred segments

Determine customer opportunities

- Determine opportunities to increase business from existing customers
- Determine opportunities to gain new customers

[P-03] Develop marketing approach

Develop marketing proposition

- Establish costs and margins
- Assess brand development
- Develop promotions
- Develop sales support material
- Develop pricing schedules
- Develop card strategy and rules
- Develop associated product/brand support services
- Define standard terms and conditions of trade
- Create and maintain card-acquirer agreement
- Ensure third parties understand brand propositions

Develop marketing infrastructure

- Plan sales-force structure
- Plan outlet network/distributor arrangements
- Develop distribution network

[P-04] Optimise supply-chain margin

Develop and maintain planning model

- Clarify boundaries of model
- Identify business parameters
- Agree business objectives
- Build the planning model

Determine constraints on optimisation

- Identify external factors which may influence planning
- Identify internal factors which may influence planning
- Establish production, movement and storage capacities
- Establish minimum and maximum stock levels
- Identify risks and vulnerabilities

Establish supply and demand forecasts

- Define opening conditions
- Establish demand forecast
- Establish supply options and preferences
- Establish price and cost forecasts
- Establish maintenance requirements

Optimise margins

Identify initial set of options
Determine results for each option
Analyse results and generate new options
Agree preferred plan
Expand into operational plans

Monitor planning performance

Monitor actuals versus plans
Make initial proposals for improving planning process

[P-07]

Sell to customer

Plan sales operations

Review sales forecast
Estimate expected sales
Prepare operational sales plan
Plan individual performance
Plan use of information technology

Indicate requirements

Request information from supplier
Receive and assess information from supplier
Handle contact with supplier
Disengage or agree further action

Find potential customers/sales

Target customers and send out sales information
Follow up contacts and find customers
Evaluate customers
Handle customer enquiries
Track contacts with customer

Maintain schedules

Adjust price schedules
Monitor outlet/distributor competitive status

Negotiate sales/service terms

Understand detailed product and service requirements
Negotiate terms, conditions and service levels
Explore further opportunities

Implement sales/service terms

Create and maintain sales agreement
Maintain reseller agreement
Create and maintain card-account agreement
Set up customer account
Produce and maintain cards
Provide HSE data
Assess contractual risk

Take or generate order

Handle automatic order generation
Receive sales order
Accept order
Request advance payment
Handle order status query
Handle price query
Handle order amendment
Take action to fulfil order

Identify additional sales/service opportunities

Seek new orders
Encourage customers to consider expanding orders

Dispense at outlet

Check and authorise customer purchase
Capture purchase details
Handle any returns
Handle payment for products and services received
Provide HSE data
Operate outlet site
Handle complaints and queries

Dispense product at outlet

Release stock

Promote sales and service offerings

Provide promotional material
Provide information

Provide service

Provide customer service
Provide commercial road transport (CRT) information
Provide fleet information
Provide point of sale (POS) services

Promote sales and service offerings

Provide promotional material
Handle complaints and queries

Determine payment

Confirm delivery or service
Note amendments to delivery
Agree returns made
Track customer container inventory
Calculate or recalculate value of delivered product or service
Calculate or recalculate value of card purchase
Calculate value to be claimed from card acquirer

Determine reseller settlement

Calculate settlement balance

Request or make payment

Bill customer
Bill card account
Bill card acquirer
Provide credit document
Make payment to reseller/distributor
Handle query

Provide promotional material

Suggest other terms
Send out promotional material with invoice

Receive payment

Receive payment
Confirm receipt
Register receipt
Convert foreign currency
Match and allocate payment against request

Maintain account

Establish account status
Transfer inter-company accounts
Monitor status of debts
Follow up payment or non-payment
Monitor debtor performance
Review settlement terms within the agreement
Monitor agreements with resellers
Handle account-related contact with customer

Maintain customer relations

Contact customer

Visit customer

Suggest term changes

Handle customer enquiries

Monitor sales/service performance

Aggregate actual sales

Review actuals against targets by market, customer and product

Monitor individual performance

Monitor use of information technology

Identify deviation from plan

Make recommendations for improvement

[P-08]

Distribute

Plan distribution (network) operations

Analyse distribution activities for the whole network

Develop and maintain distribution-scheduling models

Assess stock and movement constraints and commitments for the distribution network

Make plans for depot operations across network

Make plans for transport operations across network

Schedule distribution

Assemble movements into despatch groups

Project distribution resources

Create movement schedule

Procure transportation service

Notify third-party carriers

Notify third-party liftings

Generate loading instructions

Collect product for transportation and storage

Prepare for collection

Load

Collect documents

Transport

Schedule receipt

Determine destination storage facilities

Determine timing

Determine internal-movement requirements

Receive at storage facility

Execute internal movement

Accept transport facility arrival

Check delivery documents

Receive stock

Schedule and administer stock in storage facility

Assign storage

Schedule internal movement

Schedule product blend

Schedule filling/packing

Maintain container inventory

Acquire containers and additional materials

Handle stock in storage facility

Operate blending, filling and packing facility

Execute internal movement

Blend

Fill containers/packing

Control product quality

Move packed product to storage

Schedule release
Schedule loading facility
Produce delivery documentation
Release from storage facility
Prepare for release
Receive transport facility
Release product
Issue documentation
Grant permission to leave
Distribute product
Transport
Handle complaints and queries
Monitor distribution performance
Develop aggregate balance
Determine and review distribution-operations performance
Determine and review transport-operations performance
Make initial proposals for improvement
Monitor receipt, production and distribution operations
Determine and review overall receipt, production and distribution performance
Assess differences between long-term performance targets and actuals
Make initial proposals for improvements

[P-09] Develop brand portfolio

Specify brand portfolio
Evaluate global core values
Define national core values
Define company brand personality and positioning
Define product brand personality and positioning by preferred segment
Generate long-term communications strategy
Institute brand-monitoring procedures
Review existing brand portfolio
Evaluate existing brand portfolio
Check brand performance against brand objectives
Monitor product/service quality against brand claims
Monitor brand infringements
Agree areas for development
Maintain ongoing brand portfolio
Set new brand objectives
Check loyalty to Shell global core values
Handle brand withdrawal
Develop short-term communication plans
Determine and review facility performance
Make initial proposals for improvement of business-process (quality) manuals

[P-12] Maintain Facility and Equipment

Plan and schedule maintenance and inspection

Plan plant shutdowns in consultation with operations
Develop thresholds and forecasts (e.g. equipment wear)
Establish scope and frequency of preventative maintenance
Record work-order requests, estimate costs and prioritise
Schedule regular inspection and preventative maintenance
Schedule breakdown inspection and associated maintenance
Schedule shutdown project
Negotiate and agree unit rates and umbrella contracts
Define material stock-levels

Supervise monitoring and inspection

Specify inspection task (e.g. work order) and allocate resources to the task
Acquire equipment, materials and contract services
Award inspection work-order
Monitor inspection progress, quality and resource utilisation
Close out task and accept work done

Monitor and inspect facility

Measure and monitor equipment condition
Shut down equipment
Inspect equipment
Start up equipment
Evaluate inspection report and decide on further maintenance or other action
Evaluate measurements and determine maintenance and inspection requirements

Supervise maintenance

Manage plant-shutdown project
Specify maintenance task (e.g. work order) and allocate resources
Acquire equipment, materials and contract services
Award maintenance work order
Monitor maintenance progress, quality and resource-utilisation
Close out task and accept work done

Execute maintenance

Shut-down facility/equipment
Prepare for maintenance (e.g. scaffolding)
Demount
Repair, clean, replace
Reconstruct
Start up facility
Manage physical item stocks

Monitor maintenance performance

Determine performance of monitoring, inspection and maintenance
Make initial proposals for improvement
Determine equipment, instrument and component reliability and facility availability
Determine cost of production lost

[P-13] Provide essential services

Plan and budget finances

Develop financial-controls framework
Set financial optimisation guidelines
Plan budget cycles
Collate corporate budget
Record approved budgets and integrate with CBP
Record corporate performance against budget

Manage funds

Plan and secure funding
Forecast and plan cash flows
Invest funds
Reconcile and maintain bank accounts
Reconcile and report receipts and payments
Manage foreign-exchange exposure
Allocate and account for interest, charges and Differences In Exchange
Review funds-management performance

Account for business activities

Maintain account structures
Process accounting postings
Account for fixed assets and investments
Reconcile and value stocks
Reconcile and balance ledgers
Account for Group/shareholder/joint-venture reporting
Account for statutory requirements
Account for fiscal, tax, duty and royalty requirements
Account for business-unit activity
Provide project and commitment reporting
Process timewriting

Provide specialist services

Provide insurance advice and services
Provide taxation advice and services
Provide other professional services
Provide investment-appraisal support

Provide health, safety and environmental support

Set health, safety and environmental standards
Monitor environmental issues
Secure and survey safety of business operation
Conduct health, safety and environment audits
Follow up incidents and accidents
Raise health, safety and environmental awareness

Provide legal services

Administer permits, licences and leases
Provide legal advice
Support contract negotiations

Support organisational development

Analyse future human resource requirements
Identify potential sources of human resources
Support the development and evaluation of jobs

Support human resources development

Analyse attractiveness of company in labour market
Recruit staff
Induct staff
Transfer staff
Deliver training
Terminate employment

Support human resources policies

Analyse competitive position of company
Administer employment policies
Administer compensation and benefit policies

Maintain employee relations

Develop communication and consultation frameworks
Monitor employee relations climate
Resolve disputes

Develop and maintain IT facilities

Deliver application portfolios
Maintain application portfolios
Develop IT infrastructure
Maintain IT infrastructure

Provide IT services

Plan IT services
Operate IT services
Monitor performance of IT services

Provide other office services

Provide and support office systems
Provide communications
Provide document storage
Distribute mail
Handle travel arrangements
Provide office consumables

[CON] Agree and maintain sales contract

Initiate contract

Make/receive initial enquiry
Assess ability to meet demand
Evaluate potential benefits
Evaluate risk

Tender contract

Pursue tender prospect
Receive tender invitation
Receive tender requirements
Decide to respond to tender invitation
Receive international price quote
Prepare contract pricing proposal
Make contract proposal
Monitor tender prospect

Negotiate contract

Customise contract framework
Monitor contract negotiation
Analyse response to proposal
Notify response to proposal
Notify response to international price quote
Receive competitors' contract terms

Maintain contract

Receive contract review request
Review contract
Notify revised standard terms of trade

[MAP]	Manage a project
	Manage a Project
	Nominate a project leader
	Prepare and validate Terms of Reference (TOR) and premisses
	Establish requirements and prepare project plan
	Agree on manpower, timing and deliverables and obtain management/ customer support
	Prepare budget proposal and obtain budget approval and resource commitment
	Nominate project team and define project organisation and roles
	Schedule project activities
	Initiate tasks and motivate people
	Monitor quality, progress and resource utilisation
	Appraise staff and contractor performance
	Report on progress and results and close project
[MIP]	Monitor individual performance
	Assess staff competences
	Define job competence requirements
	Assess other competence requirements
[OMF]	Operate movement facility
	Plan facility usage
	Review storage facility allocation
	Change storage facility allocation
	Select line-up/configuration
	Give line-clearing advice
	Determine target quantities, timing, setpoints and valve positions
	Execute facility operation
	Execute line clearing
	Prepare line-up for movement, open/close valves
	Implement setpoints
	Execute movements
	Route and store waste material
	Monitor facility operation
	Measure moved product quantities, qualities and event timing
	Measure quantities and qualities of waste material
	Monitor contamination and track line contents
	Terminate movement
	Register movement and update stock balances
	Classify
	Reconcile and balance stock
	Measure stock quantity
	Measure stock quality
	Validate stock measurements
	Assess stock movements
	Make stock balance
	Reconcile stock
	Monitor movement-operations performance
	Determine movement-operations performance
	Review performance and make proposals for improvement

[PIP] Plan individual performance

Identify training and development opportunities

Carry out coaching and mentoring

Match development needs to course objectives

Discuss and define course timing

Manage delegation of duties during absences

Debrief staff following courses and defining actions arising

[PIT] Plan use of information technology

Review and establish service-level requirements

Review/negotiate service-level agreements

Select performance indicators

[RCV] Receive stock

Move stock

Coordinate the movement of stock

Operate facilities

Match quantity and quality against delivery document

Measure quantity and quality

Compare quantity and quality

Determine gain or loss

Complain or reject if not acceptable

Accept control of stock

Record the formal receipt of physical product

Confirm movement of stock, where appropriate

Create bill of lading or other delivery document

Accept ownership of stock

Accept responsibility for stock

Transfer ownership

Register receipt

Update stock balances

Review performance and make proposals for improvements

[RLS] Release stock

Issue documentation

Issue bill of lading

Issue certificate of quality

Transfer control of stock

Confirm delivery

Confirm acceptance of quantity and quality

Create delivery receipt

Update balances

[TRN]	Transport
	Accept load
	Accept and confirm loading of product
	Transfer and verify associated documentation
	Load
	Prepare storage facility
	Physically load product
	Inspect product received
	Agree transfer of control
	Move
	Operate transport facility
	Follow routing
	Record events and timing
	Handle incidents
	Carry out unload procedure
	Check receiving tank
	Carry out discharge procedure
	Issue and agree documentation
	Unload
	Ensure customer's readiness to receive product
	Physically discharge product
	Measure quality and quantity of product being delivered
	Agree transfer of control/ownership
	Load any returns
	Reconcile trip
	Reconcile physical trip details
	Reconcile delivered quantities
	Reconcile returns made

[XEW]	Execute task, including engineering work
	Prepare task
	Move offices and provide office facilities
	Expedite job
	Allow contractor access
	Prepare work documents
	Check work location
	Execute task
	Obtain tools, materials and documents
	Take safety measures
	Execute work
	Clean workplace
	Return surplus material
	Report on results and used resources
	Obtain and evaluate feedback and update knowledge base
	Monitor progress of work
	Allocate hours worked to task
	Verify quality of work done
	Report incidents
	Complete task
	Verify hours spent
	Approve job task or deliverable
	Record resource utilisation and allocate costs
	Update equipment history information
	Update work information
	Hand over responsibility