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### *Conditioned Emergence: A Dissipative Structures Approach to Transformation*

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# *Conditioned Emergence:*

# *A Dissipative Structures Approach to Transformation*

**Abstract**

This paper presents a novel framework for the management of organisational transformation, defined here as a relatively rapid transition from one archetype to another. The concept of dissipative structures, from the field of complexity theory, is used to develop and explain a specific sequence of activities which underpin effective transformation. This sequence integrates selected concepts from the literatures on strategic change, organisational learning and business processes; in so doing, it introduces a degree of prescriptiveness which differentiates it from other managerial interpretations of complexity theory. Specifically, it proposes a three-stage process: first, the organisation conditions the outcome of the transformation process by articulating and reconfiguring the rules which underpin its deep structure; second, it takes steps to move from its current equilibrium and, finally, it moves into a period where positive and negative feedback loops become the focus of managerial attention. The paper argues that by managing at the level of deep structure in social systems, organisations can gain some influence over self-organising processes which are typically regarded as unpredictable in the natural sciences. However, the paper further argues that this influence is limited to archetypal features and that detailed forms and behaviours are emergent properties of the system. Two illustrative case-vignettes are presented to give an insight into the practical application of the model before conclusions are reached which speculate on the implications of this approach for strategy research.


**Key words**:  business process re-engineering, complexity theory, dissipative structures, organisational learning, transformation

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## Introduction

The historical division of strategy into content and process is of growing concern to scholars and practitioners of strategy (Schendel 1992). The first represents the view of strategy which focuses on the development of competitive superiority through the reconfiguration of resources, competencies and linkages. The second approach is primarily concerned with the management processes which underpin strategic change and innovation.

Whilst the need for meaningful reconciliation of strategy formulation and implementation is broadly agreed, (Pettigrew 1992), it nevertheless presents major challenges; the content-driven approach - which remains largely dominated by notions of equilibrium and control - does not sit comfortably with the assumptions of dynamism and emergence associated with the process school. A combination of this and other tensions which we will introduce produces the kind of paradoxical landscape which we are encouraged to explore in search of novel ways of conceptualising important issues and problems (Van de Ven and Poole 1988, Abrahamson 1991).

It was in attempting to reconcile some difficult elements of choice and change that we encountered complexity theory. The specifics will be laid out in the course of this paper, but we should like to make it clear at the outset that the paper's structure, and the somewhat positivist assumptions that it may suggest, should not be interpreted as reflecting the way in which the research was actually conducted. Although our presentation attempts to lay out a literature review, construct a model and then report on its application, the reality of our work was somewhat different (as detailed later in the paper).

In practice we experienced a good deal more by way of hindsight and dead-end streets than the sequence of our delivery would suggest.  We did not consciously set out with view of applying complexity theory - it simply became our established template as a number of influences operated over the period of the research.  We nevertheless believe that we have arrived at a rich, if somewhat personal, understanding of strategic change which addresses the challenge of integrating strategy process and content.  At this stage we feel it would be more fruitful to attempt to convey our understanding in the form of a model than to synthesise a self-consistent account of what happened.  As such, we will begin by examining the existing strategy literature before developing our model and relating its application through case study accounts.

**Strategic Change**

As stated in the introduction, research in strategy falls loosely into two domains, content and process (Schendel 1992).

The former is strongly influenced by concepts developed in the field of economics. Accordingly, the debate tends to centre around management activities which aim to achieve a predetermined, optimum and a rationally derived set of objectives, with profit maximisation traditionally foremost.  Within this school one can discern three main streams.  First there is the strategy-structure-performance contingent which is mainly concerned with the scale, scope and form of corporations (Chandler 1962, Rumelt 1982).  Second there is its counterpart which grew out of work at Harvard on industrial organisation, the most influential of which is Michael Porter's development of the structure-conduct-performance model (Bain 1956) into his influential theories of position and market power (Porter 1980 and 1985).  The third and final stream can be traced back to the late 1950s (Penrose 1959, Chandler 1962, Selznick 1957) and has been developed by various authors in the 1980s (Rumelt 1984, Barney 1991,

Wernerfelt 1984) into what has become termed the Resource-Based View. This stream of research has been popularised by Prahalad and Hamel in the form of Core Competencies. (Prahalad and Hamel 1990).

A detailed discussion of developments in these three areas and their implications would be inappropriate here, however some general considerations do have a bearing on the substance of our case. On the one hand, the three approaches are, to some extent at least, united by origin. The modernist paradigm from which they spring for the most part binds them together through assumptions of economic rationality and Newtonian conceptions of equilibrium and stability. On the other hand, it is noteworthy that, at the present time, the focus would appear to be moving somewhat from the demand side to the supply side, with the increasing recognition of the importance of key organisational attributes and resources.

In particular, a growing concern with intangible resources such as tactic knowledge (Nonaka 1991, Spender 1996), learning (Argyris 1990), strategic intent (Hamel and Prahalad 1989) and intelligence (Penrose 1959) may signal a movement towards a model of firm behaviour which draws on a more evolutionary view of economics (Nelson and Winter 1982). This may accord with exhortations to adopt a more dynamic perspective (Porter 1991); it is certainly true that key protagonists of the resource-based view are also issuing calls for a "new paradigm" which must entail a break from the entrenched limitations of current mindsets (Hamel and Prahalad 1996). We would argue that this "movement" on the part of resource-based scholars is toward a process perspective and that the new paradigm which is sought is essentially one which reintegrates process and content.

The process-driven school is more eclectic in its make up and origins, with influences from biology, psychology, sociology, systems dynamics and evolutionary economics

amongst others. The unifying factor among these diverse influences is the suspicion that economic rationality is not the primary determinant of strategic behaviour (March and Simon 1958). Rather, the focus of this school is the extent to which strategy and change are dominated by events and activities which typically emerge from a wide variety of influences.

As with its strategy content counterpart, the process school has internal divisions. In the main, these are manifest as two broad streams (Pettigrew 1992). First there are the researchers who are primarily concerned with the way in which strategic decisions are made. In contrast with the content school, the focus of this work is not on what constitutes an optimum decision, but how cognitive and social phenomena such as bounded rationality, politics and chance influence the decision process in organisations (see Cyert and March 1963, Pettigrew 1973, Cohen at al 1972, Mintzberg 1978, 1994 Pfeffer 1981, Quinn 1980).

The second main stream of strategy process research is focused on the management of strategic change. That is to say that in the context of the content-process split, it is focused on implementation. In addition to a growth in popular prescriptive works (e.g. Peters and Waterman 1982, Kanter 1983) there emerged a body of academic work which aimed to draw attention to strategy implementation issues in attempt to tackle implementation failure (Pettigrew 1992).

This work (e.g. Johnson 1987, Pettigrew and Whipp 1991, Mintzberg 1994) varies in terms of implications ranging from notions of organisational culture and cultural fit as important inputs to an improved choice process, through participation and flexibility to views of strategic behaviour as a phenomenon which emerges in an unpredictable way from the networks of influence and interaction in the organisation. Thus one sees evidence of attempts to improve failure rates with solutions which range from design-

for-implementation to facilitation of emergence. Quinn's notion of logical incrementalism (Quinn 1980) incorporates elements of design at a broad level with some of the flexibility of the emergent approach and in so doing, one could argue, comes closer to closing the content-process split than many of his peers.

As the term would suggest, the literature on strategic change deals with implementation on a variety of dimensions and timescales. Mintzberg and Westley (1992) classify changes according to their nature and context within the organisation. The former addresses the extent of adjustment to the direction and state of the organisation at the conceptual and "concrete" levels, whilst the latter refers to the scope of the change in question, from incremental through to all-encompassing or revolutionary. A similar scheme is used by Greenwood and Hinings (1996) who describe change on two dimensions; the first, essentially a question of pace, deals with whether the change is evolutionary or revolutionary whilst the second is concerned with whether the change is convergent or radical.

This latter issue capitalises on the concept of archetypes. For some authors, use of the term denotes subscription to a belief that the relationship between structure and process is manifest in a finite number of possible types or configurations with distinctive behavioural implications (e.g. Miles and Snow 1978, Mintzberg 1983, Miller and Friesen 1984). Greenwood and Hinings (1988 and 1993) add the concept of "interpretative schemes" to emphasise the cognitive dimension of archetypal behaviour.

The concept of archetypes is important here for a number of reasons. We are primarily concerned with change which is radical, all-encompassing and rapid. The concept of switching from one archetype to another (Greenwood and Hinings 1988) is a useful way of capturing the essence of the transformation process which has been

described in different ways by a variety of authors (see Miller 1982, Abernathy and Clarke 1985,  Pettigrew 1985, Nadler and Tushman 1989).  We have chosen to work with the concept of archetypes rather than the more familiar notion of culture (e.g. Schein 1985) or paradigm (Kuhn 1962 Pascale 1990) because our framework describes transitions between discrete and distinct organisational forms as opposed to movement along a continuum.  Also, Greenwood and Hinings' definition of an archetype as a "set of structures and systems that reflects a single interpretative scheme" suggests a level of detail which is consistent with our prescribed sequence of interventions i.e. the elements of their definition represent the focal points of our model.

It is clear that in many respects the content and process views of strategy are complementary if taken as a set or incomplete if treated as individual elements.  If one likens the issue to a journey, the content approach has a clear destination but the means of transport is indeterminate whereas with the process approach the transport is known and in motion, but the journey is something of a "mystery tour."

One could argue that if a complete theory of strategy is in fact needed, why not just use the two approaches as appropriate as is indeed the practice in many institutions.  It is our belief however that an overall framework which transforms and reconciles the mutually contradictory assumptions of each approach would constitute a significant step forward, in both practical and scholarly terms.

Moreover, we feel that the need to reintegrate process and content is essentially the same need as that which relates to calls for a more dynamic view of strategy.  It is unsurprising therefore that in our view the means to effecting the kind of synthesis to which we refer lies in the explicit use of time and sequencing as a dimension.  This approach, borrowed in our case from the natural sciences, will allow temporal

coexistence of spatially contradictory explanations. Before laying out our approach and a brief review of the theories on which it is based, we will conclude this section by explaining why we feel that the timing is right for such a development.

The need for a proven approach to the management of corporate renewal is becoming increasingly evident in most sectors of today's developed economy. Some attribute the current preoccupation with strategic innovation to attempts to come to terms with a new era of industrial organisation along post-Fordist, information-intensive lines (Best 1990, Storper and Scott 1992) described variously as flexible specialisation (Piore and Sable 1984) or mass-customisation (Pine 1993). Another view is that we are experiencing a short-term adjustment to the globalisation of markets and the influence of powerful new technologies (Staber and Sharma 1994). Both explanations acknowledge the increasing importance with which organisations view the role of innovation and the management technologies required to foster it.

These pressures are perhaps responsible for the growing literature on transformation and strategic innovation in an organisational context. Institutional theory has provided powerful insights into how new structures and processes are absorbed from the environmental context and become legitimate, persistent features of the organisation (Zucker 1977, Powell and di Maggio 1991). More recently, work has focused on how change can occur through deinstitutionalization (Oliver 1992, Greenwood and Hinings 1996) and on structurationist conceptions of managerial agency (Whittington, 1992). Insights from population ecology have highlighted the difficulties of change at the level of groups of organisations (Hannan and Freeman, 1977) whilst evolutionary theories (Nelson and Winter 1982, Hodgson 1993, Baum and Singh, 1994, Barnett and Burgleman 1996) have drawn attention not only to selection pressures, but to the processes by which variety is created and the

importance of initial conditions and genetic traits and routines. Knowledge management (Spender and Grant 1996, Moingeon and Edmonson 1996) is combining elements of the above with resource-based thinking and learning theory in pursuit of a dynamic view of strategy that befits the "knowledge age."

Such endeavours have not explicitly addressed the split between content and process in strategy, though their dynamic focus has to some extent caused a blurring of the boundaries. We would argue however, that content and process have to be reintegrated in a way that is meaningful for both academics and practitioners and that in essence this means provision of a framework that offers guidance on what decisions to make, how to make them and how to act upon them to realise aims. In short it has to combine academic validity with business logic (Beer and Eisenstat 1996, Beer et al 1990). It is for this reason that we have turned to complexity theory.

We should state that we are not claiming to have developed a grand new dynamic theory of strategy; rather we are proposing an overarching framework based on the new science of complexity. We argue that it provides some justification for integrating specific elements of existing theories into a dynamic whole and thus provides a template for the management of transformation.


**Complexity Theory**

In the natural sciences, the past two or three decades have witnessed a growing interest in what has been billed as an alternative to the classical perspective. The Nobel-prize winning work of Belgian physicist Ilya Prigogine and colleagues, in the field of non-equilibrium thermodynamics (Prigogine and Stengers 1984), sought to explain the existence and development of order in the world - as opposed to the

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ongoing deterioration and run-down of systems implied by the second law of thermodynamics.

Rather than viewing the world as essentially static, with equilibrium only occasionally disturbed, Prigogine regards the world as dynamic and characterised by systems in which normal Newtonian laws may apply, but only in a minority of situations. That is to say that whilst such systems can exist in equilibrium, change and transformation are associated with non-equilibrium conditions and are subject to a different set of laws. The evolution of non-equilibrium systems is influenced by a combination of a complex network of non-linear system relationships and random developments, which combine to create new system configurations in a way which is largely indeterminate. In extreme cases, the system can be so far from equilibrium that structure breaks down and the system becomes chaotic. In such circumstances, the operation of simple rules in conjunction with non-linear processes (i.e. the action of positive feedback on small and possibly random events) can give rise to the emergence of new, qualitatively different, structures. Since Prigogine's work focused on phenomena such as phase transitions in matter, his work is characterised by descriptions of systems moving progressively further from equilibrium to the 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 (a measure of disorder) as a new structure takes shape in accordance with the operations of a set of simple order-generating rules. Since, in physics, heat is the most entropic form of energy, the system is said to be dissipative, in that the entropy exportation is characterised by heat loss. The system is thus termed a "dissipative structure".

In biology, the search for an explanation of the complexity of living systems focused attention on processes of adaptation and the conditions under which new order is

created. In this field, attention is focused not on the emergence of order from chaos, but on the continual adaptation of systems on "the edge of chaos" (Kaufmann 1993, 1995). Again, explanations of complex structures developing around the repeated application of simple rules relies on concepts such as non-linearity, interconnectedness and far-from-equilibrium conditions (Kaufmann 1993). In the mid 1980s, the Santa-Fe Institute was established in New Mexico bringing together researchers from a variety of disciplines including physics, biology, economics and computer science with a view to developing and applying the "new science of complexity" (Waldrop 1992).This process where a new order spontaneously emerges out of a chaotic state is sometimes referred to as self-organisation (Kaufmann 1993, Coveney and Highfield 1995).

Whilst the exact form of such emergent structures cannot be predicted, the range of broad possibilities is to some extent contained within the set of simple rules which was applied to generate the new order. Mathematical modelling of the repeated application of simple rules in a variety of contexts, has given rise to the visual representation of order-creation through the intricate patterns of fractals (Mandelbrot 1977, Coveney and Highfield 1995).

Although different in their focal points, the various applications of complexity theory demonstrate the central concepts around which the subject is organised, namely the operation of non-linear feedback on generative rules in densely interconnected, non-equilibrium systems. The dynamics and evolution of such a system are influenced by the operation of any number of positive and negative feedback loops within the system. Some signals are amplified and others damped down so that the initial configuration and conditions determine the future unfolding of the system's behaviour. The potential importance of even the faintest of signals to the subsequent

chain of events in such far from equilibrium conditions means that at a given point in time, a system's future may unfold in any one of a number of possible directions for a given level of energy input. This point at which multiple, equally probable trajectories extend into the future is associated with high levels of uncertainty and instability. It is the contrast between the above characteristics and those of more simple, mechanistic counterparts which has given rise to application of the term "complex" in relation to non-equilibrium systems.

The development of complexity theory, as it has been popularly titled, is regarded by some as signalling the arrival of a new scientific paradigm in the Kuhnian sense (Kuhn 1962). Jantsch was among the first to see applications in social science in general and in management in particular (Jantsch 1980). In terms of organisation, the world is a myriad of self-organising, interacting and co-evolving systems and subsystems. This gives rise to an essentially dynamic system in which change and innovation become key feature of organisational life. The apparent fit between complexity theory and the practical manifestation of many of the themes which this paper introduced in the review of strategic change, first led us to explore its application to the management of organisational transformation.

**Dissipative Structures and Organisations**

In the previous section, two broad sub-themes within complexity theory were introduced. On the one hand was the concept of "dissipative structures," with the implied sequence of stability giving way to chaos out of which new order emerges; on the other was the "edge of chaos" view, in which living systems are conceptualised as constantly adapting and self-organising in a zone which, although far from equilibrium, stops short of the "descent into chaos."

If one accepts the notion that systems are not only complex and adaptive, but that their complexity and adaptiveness can itself change, then one can see different implications for the evolution of organisations. On the one hand, organisations might be relatively stationary on a spectrum from simple static through to complex adaptive with innovative organisations existing more towards the latter extreme, perhaps on the "edge of chaos." On the other hand, organisations might move about this spectrum, or possibly through a cycle, where adaptedness gradually displaces adaptiveness and complexity gives way to complication. In this "dissipative structures" perspective, organisations are likely to go through cycles of evolution and revolution; from stable order into chaos out of which emerges a new dynamic order which in turn eventually congeals and so on. The paper now looks briefly at the organisational counterparts of these two models before detailing our interpretation of dissipative structures which forms the basis of the remaining sections.

Recent years have seen a steady trickle of papers on applications of complexity theory in the management literature. In broad (and perhaps somewhat crude) terms, such work can be categorised according to whether it subscribes to the "edge of chaos" or "dissipative structures" frameworks which although overlapping, typically emphasise different conceptual themes as detailed above. This polarisation is akin to the issue of evolutionary versus revolutionary change developed by Miller (1982) and others, as discussed earlier in this paper.

The "edge of chaos" viewpoint tends to focus on issues such as instability, interconnectedness and self-organisation which is spontaneous and unpredictable. In a previous issue of this journal, Stacey elaborated some of the managerial implications associated with this view (Stacey 1995). Brown and Eisenhardt further argue that innovative organisations exist on the "edge of chaos" and thus avoid the

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chaos and upheaval implied by the dissipative structures view (Brown and Eisenhardt 1997).

In contrast with "edge of chaos" interpretations, management writings based on "dissipative structures" have a somewhat broader focus; some authors are concerned with modelling organisations using chaos theory either by simulation (Levy 1994) or analogy (Thietart and Forgues 1997) whilst others present more detailed examinations of the ways in which order can emerge from chaos through the interaction of rules, deep structures and organisational processes (Drazin and Sandelands 1992, Gersick 1991, Leifer 1989).

Work on the application to social systems of a "dissipative structures" framework to organisational transformation appears to predate its "edge of chaos" counterpart, and is traceable back to the work of Prigogine (Prigogine and Stengers 1984) and, more directly, to Jantsch (Jantsch 1980). Smith and Gemmill have applied the concept to change in small groups (1991) and to organisations in general (Gemmill and Smith 1985, Smith 1986), the latter also being the subject of Leifer's work (Leifer 1989). This work shares a reliance on a view in which organisations undergoing transformation experience a common set of related events. First, the organisation is moved out of its normal equilibrium state, due either to internal or external fluctuations; whilst in non-equilibrium conditions, it experiences a breakdown of its existing structures and some symmetry-breaking event which serves to irreversibly sever the possibility of reconstructing them; there follows a period of experimentation during which the organisation selects a new form of behaviour which "aligns" with its deep-structure and order emerges in the system as the new behaviour "resonates" across subsystem boundaries.

The concept of deep-structure is important in distinguishing dissipative structures thinking from its edge-of chaos counterpart. Whilst it appears to play no role in the latter, dissipative structures rely on it as a quasi-permanent, invisible substructure which remains largely intact whilst manifest, observable structures break down. As such it forms the basis for the self-referencing processes which occur during self-organisation (see Smith 1986 for a more detailed discussion).

Our work develops the above concepts though our resulting framework differs in some fundamental and important ways. We largely adopt the sequence presented above, though we adopt a more prescriptive position and detail managerial interventions associated with each stage - in our case presented as a three-stage sequence. In particular, we make use of the concept of deep structure but we link it explicitly to organisational rules i.e. we propose that the deep structure of organisation can be expressed as a set of simple "rules" which comprise organising principles and business logic. As is described later in the paper, these rules are surfaced, reframed and enacted as a key part of the transformation sequence; as such the prescriptive aspect of our process is based on "management" of deep structure, or organisational rules which remain visible during the "chaotic" period of a transformation process.

Most importantly perhaps, we use the above differences to justify an approach to transformation in which limited influence over the outcomes of so-called self-organisation is obtained by focusing on deep-structure. In so doing, we accept the possibility but reject the necessity of "pure" self-organisation in social systems and, thereby clearly differentiate our work from the majority of other writers concerned with organisational applications of complexity theory.

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We have adopted the dissipative structures approach since it is better suited to dealing with the kind of radical transformation with which we are concerned. We also feel that it fits well with much current thinking on strategic change and it offers a route to integrating process and content in a dynamic framework. We will attempt to show this using the example below. We will first present a simple transformation trajectory set in the terminology of dissipative structures and then attempt to relate our description to the more recent management literature discussed earlier in the paper.

Consider the case of an organisation which is stagnant, under-performing and facing increasing pressure to improve its situation. In the most simple case, it is faced with two equally probable trajectories where there is either a successful response to the situation or performance continues to decline, see figure 1. The decision-point is termed the bifurcation point and could be interpreted as a crisis brought about by the failure of the organisation's current systems to cope with the internal or external situation. In a successful response, the system becomes open, blurring its boundaries with the environment in a bid to import the energy required to sustain future growth and export the entropy or disorder which has arisen from its overwhelmed control systems. This net release of disorder into the environment gives rise to the term "dissipative" as the organisation is essentially absorbing useful energy and expelling the useless energy caused mainly by relatively inefficient conversion processes. The inefficiency of these conversion processes is associated with the breakdown of old mechanisms and the experimentation of emerging ones seeking to establish dynamic (as opposed to static) efficiency in order to cope with the new, unstable conditions.

Before the bifurcation point the organisation is, for the most part, in equilibrium with its environment, having adapted itself to its institutional context (Powell and de Maggio 1991, Zucker 1977) with a well defined archetypal form (Miller and Friesen

1984, Greenwood and Hinings 1993). As it proceeds towards the bifurcation point, deinstitutionalising pressures begin to mount (Oliver 1992, Greenwood and Hinings 1996), taken for granted assumptions are increasingly questioned, and new interpretative schemes (Greenwood and Hinings 1988) or mental models (Senge 1990) emerge as entropy increases and organisational coherence is stretched. These deinstitutionalising pressures increase entropy (Oliver 1992), weakening existing structures and promoting instability.

At the bifurcation point, organisational equilibrium is destroyed and a chaotic period ensues. During this time, individual and collective learning (Senge 1990) occurs as the organisation experiments with new ways of doing things - by developing and applying new rules associated with both the old and alternative, new interpretative schemes. A variety of influences such as external pressures, internal politics and random couplings combine as a new archetype attempts to establish itself in the face of resistance from defensive routines (Argyris 1990).

As the chaos subsides, the new archetype begins to take shape, but negative feedback exerts continuous pressure to revert to the previous archetype. Switching or schizoid behaviour ensues (Greenwood and Hinings 1988) but, in the case of a successful transformation, the new archetype eventually prevails. Generative learning continues until institutional pressures and inertia cause adaptive learning to dominate. Eventually the organisation becomes adapted to the point where it begins to stagnate again and the cycle repeats. As such, the cycle is reminiscent of the concept of punctuated equilibrium (Tushman and Anderson 1986, Gersick 1991) but, as is argued below, it affords a more detailed examination of discontinuous change.

**Conditioned Emergence**

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Applying the concepts of complexity theory, dissipative structures, self-organisation and bi-stable states to the organisational context we have amended the bifurcation diagram shown in figure 1 to provide a more realistic view of how organisations behave in the face of declining performance. In the amended bifurcation diagram, see figure 2, declining performance eventually precipitates a crisis causing the organisation to move to far from equilibrium conditions, at the bifurcation zone, where feedback mechanisms will eventually determine the trajectory followed. In the remainder of this section we will further explain the two trajectories in the amended bifurcation diagram then focus on the role of conditioning in influencing the trajectory followed.

The two trajectories shown in figure 2 represent different reactions to the crisis, one where a new archetype is adopted and the other where the old archetype is maintained. It is worth stressing that we are using the notion of archetypes merely to signal a transformation having taken place and not for the purposes of producing a typology of archetypes as has been done elsewhere (see for example Miller and Friesen, 1984). Trajectory [1] represents a typical managerial response to the crisis, where energy and attention are focused on resolving the performance problem. This often involves raising the level of control, which might be characterised as pushing the old systems harder, but does not involve a change in archetype. In the short term, such a response will often improve performance. However, if the problem arose from a mismatch between the organisation's systems, routines and procedures and the environment in which they operate, this short term response is unlikely to have addressed the underlying issues. In the longer term, the organisation's performance will continue to decline as the current archetype persists.

The alternative, is to pursue long term success by changing archetype and following trajectory [2]. While this provides the longer term benefits that any transformation programme aims to deliver, the organisation must accept a dip in performance as it learns to adopt a new archetype and experiments with ways of dealing with the conditions it encounters far from the old equilibrium.

In reality, the prospect of immediate gains in the face of a looming crisis will tend to force most candidates for transformation onto trajectory [1]. Those organisations which do embark on trajectory [2] will experience switching pressure to revert to the old archetype as individuals within the organisation realise that performance, in the short term at least, is getting worse, not better. This is simply a statement of the known difficulties of strategic change viewed through the lens of complexity theory and dissipative structures. The justification for taking this particular view is that it informs the specific sequence we have developed to reduce the risk of  erroneously embarking on, or switching to, trajectory [1].

We have created a framework for conditioned emergence with a specific sequence of three stages which we believe characterise successful transformation programmes (i.e. managed progression along trajectory [2] resulting in the adoption of a new archetype). The emphasis is on early conditioning as a means of influencing the order which emerges from the transformation process. The conditioned emergence sequence is as follows:

**Stage 1**    _Conditioning_

A central feature of complexity theory is the emergence of order through the repeated application of simple rules. Prior to undertaking a transformation from one archetype to another, the organisation must identify the deep structure and rules which underpin its current

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archetype, in much the same way that Senge highlights the importance of surfacing assumptions and sharing mental models (1990). The deep structure and rules are often barely articulated views on what the organisation represents and how it operates, e.g. the kind of business which is taken on or the type of people recruited. As such these rules relate to issues of both content and process and must be moved from the tacit to the codified domain. The organisation can then formulate a new deep structure which may involve some, but not all, of the old rules alongside some new ones. Again these new rules may be process oriented (e.g. the way things are done), content-oriented (what kind of business is conducted) or both. The old rules which are rejected are usually defensive routines which might impede any significant change and these are outlawed by consensus. The new rules are typically a mixture of primary rules (about what should be done) and secondary rules (about how the rules themselves should be maintained and updated).

**Stage 2**     *Creating Far-from-Equilibrium Conditions*

Having done the conditioning work, the organisation must now move to far from equilibrium conditions in order to create the space for the new deep structure to take hold. The onset of a crisis, either real or precipitated, should involve a fundamental change in the codified domain, radically altering the way in which things are done. A typical

mechanism for achieving this would be a major restructuring exercise. While the organisation resides in such unfamiliar territory it typically becomes more open, often developing a capacity to import energy and export entropy. During this period, a new order based on the new deep structure will seek to impose itself. Again this order will reflect both content and process aspirations as broadly defined by the rules.

**Stage 3**     _Managing the feedback processes_

As the new archetype begins to emerge, positive and negative feedback must be applied as appropriate. Traces of the old archetype will inevitably remain and there will be pressure to apply negative feedback to restore the old equilibrium. During this stage, the key managerial task is to look for small signals consistent with the new deep structure agreed in stage 1. Positive feedback, applied to these signals, provides the multiplier effect which causes the non-linear development of new systems. Anything which reinforces the new rules should be encouraged in order that the effects may be amplified allowing the new archetype to take hold. During this stage the organisation will be somewhat unstable as the two trajectories compete with each other, this will be particularly true at the outset since, according to figure 2, it will appear obvious that reverting to discarded practices will realise short term performance gains.

We believe that the pattern of events represented in this sequence offers some important insights into the process of successful organisational transformation. Consistent with the concepts of complexity theory and self-organisation presented earlier, we believe that the eventual outcome of a transformation programme is

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extremely sensitive to the initial conditions under which the transformation is undertaken. However, our model of conditioned emergence differs significantly from those used in the natural sciences in that we do not believe that the process of self-organisation has to be spontaneous, random and unpredictable.

We believe that the key difference in applying complexity theory and dissipative structures to organisations as opposed to organisms is that organisations have the capacity to bring about a change in archetype through consciously creating the conditions in which successful transformation can occur. Those within the organisation can, to some extent, choose the primary rules which govern the deep structure. Furthermore, they know the status of these rules at any given point in time and are able to define secondary rules which specify how the rules will be developed and maintained in the future.

Two criteria appear to be key to the onset of successful self-organisation; on the one hand the system must promote experimentation, error and introspection whilst on the other hand being far from equilibrium, fluid, open to its surroundings, etc. The conditioned emergence model is an attempt to ensure that both of these criteria are met. An obvious counter argument is that issues such as power and politics can stop transformation occurring. While this is undeniably true, the conditioned emergence model does attempt to deal with this by moving some of these issues from the tacit to the codified domain then moving far enough from current equilibrium conditions that old power and political structures are less able to operate effectively.

In the conditioned emergence model the focus is on redesigning the deep structure as opposed to the operational systems and procedures. By working with rules governing the deep structure we believe it is possible to determine the characteristics of the new archetype without necessarily prescribing its exact form. The form comes through the

repeated application of the deep structure rules and is random only within bounded limits. This places a particular focus on managing the process rather than the content of the transformation. We will now examine some managerial technologies to see how they might be used to operationalise the conditioned emergence model.

**Organisational Learning**

There are many traits in the field of OL which are consistent with the processual model of strategic change. The initial work by Argyris and Schon (1978), Hedberg (1981) and Peddler et al (1990), which has since been popularised by Senge (1990), does not sit comfortably with the Newtonian rationality of optimal designs for business processes. Following Kolb's view of individual learning as the process whereby knowledge is created through the transformation of experience (Kolb et al 1971), Argyris and Schon argue that learning is demonstrated by new, and replicable, behaviour. If learning means reacting to the same stimulus in new ways, proponents of OL claim that most organisations suppress learning by reacting to different stimuli in the same way. Argyris explains this behaviour as the organisation reacting to new situations by habitually enacting defensive routines (Argyris 1990) which are widely accepted, if often inappropriate, responses that were extremely successful at some stage in the past.

Routines are an important part of organisational life and to some extent act as the organisation's memory or the repository of past learning. They become dangerous when repeated use of the same routine institutionalises it to the point where it is applied even when the environment is radically different. Argyris uses another useful concept to distinguish between different types of learning, which he labels single and double loop learning (Argyris 1992). An example of single loop learning might be the refinement of an existing routine whereas double loop learning would involve

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fundamentally questioning the assumptions underpinning a particular routine and perhaps introducing a completely new one. However, routines also offer way of capturing, codifying and sharing information on procedures and best practice. This introduces a tension between the need to codify current learning and the tendency to produce new defensive routines. Leavitt and March (1988) highlight this tension, commenting on the irony that long term survival requires organisations to avoid competency traps by periodically stepping out of smooth running routines which have been created and reinforced by past successes. Innovation lies in the exceptions not the routines but there is a risk associated with this.

In the strategic management literature, the resource based view is increasingly focusing on the importance of intelligence (Penrose 1959). Prahalad and Hamel state that an organisation's capacity to improve existing skills and learn new ones offers the most defensible competitive advantage of all (1990). Barney focuses specifically on tacit knowledge as the key feature of an organisation's competitive advantage (Barney 1986). However, there is a substantial difference between acknowledging the importance of learning processes and putting the theory into practice. As Wheatley observes, how many of us today would risk reading even a work related book during business hours ? (interviewed in Training and Development 1994)

The field of OL is attempting to provide organisations with the tools to proactively manage these learning processes and their tacit knowledge base but the theory of OL is still at an embryonic stage, particularly in relation to the distinction(s) between individual and collective learning (Kim 1993). There is a limited amount of work which is immediately transferable from the conceptual to the practical domain. However, OL techniques would appear well suited to the conditioning stage of the

conditioned emergence model in that they offer a structure by which to understand and manipulate the deep structure and rules which define an organisation's archetype.

**Business Process Re-engineering**

The second management technology we will examine is Business Process Re-engineering (BPR).  In recent years, new entrants to many markets, with the benefits of greenfield sites, have been using information technology (IT) to enable powerful new ways of doing business.  In the last decade IT has tended not to produce spectacular performance improvements despite large capital investments.  In the US service sector IT investment per white collar worker has more than doubled to $12000 per annum while productivity has only increased by approximately 0.5% per annum (Roach 1991).  It is claimed that this is because IT has traditionally been used to hasten work not transform it (Davenport 1993).

BPR emerged in the early 1990s as a management technique which used the power of IT to enable new ways of managing and operating businesses.  The main proponents of BPR claim that organisations adopted functional structures which were appropriate when they were originally introduced but which artificially sub-divide business processes so that no-one is responsible for the performance of the complete process. (Hammer 1990, Davenport and Short 1990, Hammer and Champy 1993).  Initial BPR work focused on operational business processes such as product design and order fulfilment but more recently managerial processes have also been considered (Champy 1995).

BPR's popularity has been chronicled in a number of surveys which have been conducted to assess the level of interest in BPR. Following the emergence of the approach, large numbers of organisations undertook business process applications under the broad heading of BPR projects.  A series of surveys showed high levels of

BPR activity in North America, Europe and the UK (see Cafasso 1993, Pearson and Skinner 1993, Preece and Edwards 1993, CSC Index 1994, Harvey 1994, Pitney Bowes 1995, Sockalingham and Doswell 1996). While the statistics varied from survey to survey, there was undoubtedly a high level of interest in the concepts and large numbers of organisations were attempting to implement them.

As data became available on these implementations, it has become increasingly clear that translating the concepts into practice is far from straightforward. Failure rates in the region of 70% are regularly reported for BPR projects, even by proponents of the approach (see Rothschild 1992 and CSC Index 1994). In addition, it has been claimed that firms implementing BPR projects reduced their staffing levels by an average of 21% in the areas affected by the project (CSC Index 1994). While the blame for this has been attached to the business processes concept, such job losses may simply be an extension of the seemingly inexorable trend of doing more with less. During the period 1969 to 1991 the UK's manufacturing output rose by 10% while the number of workers was halved (Accountancy Age 1997).

It is now widely accepted that the majority of business process projects fail to live up to expectations, although there are some surveys which show more encouraging results (Sockalingham and Doswell 1996). Davenport has stated that he believes the issue of failure rates to be a red herring (Davenport 1995). Indeed, BPR might be thought of as following an established pattern of poor implementation, a recent survey indicated that 85% of companies using TQM had been disappointed with the results (Oates 1993).

Perhaps in response to these high failure rates, there has been a change in the language used to describe the BPR. In his recent work, Hammer claims that he was wrong to focus on the radical nature of the change required and that he should have

emphasised the move to a process, as opposed to task, centred mode of operation (Hammer 1996).

BPR has tended to focus on the systems and procedures of work and is a powerful tool for breaking with historical working practices. As such it is a useful mechanism for creating far from equilibrium conditions as discussed in stage 2 of the conditioned emergence model. It may also provide some new rules to do with a process-oriented organisational structure and a customer focus which may affect the deep structure of the organisation. We believe that BPR's focus on codified as opposed to tacit knowledge means that the new process oriented structure may be successfully used for a short period but in the longer term, elements of the old processes and old behaviours will re-emerge.

**Illustrative Case Studies**

We have proposed Conditioned Emergence as a three stage model for successful transformation and identified OL and BPR as appropriate managerial technologies for the first and second stages of the model. We now present some illustrative case study material to develop a deeper understanding of how the model translates into practice. We begin by presenting an account of an extended transformation programme which we conducted with a Scottish food manufacturing company and we then present a short historical review of the transformation achieved by the Rover Group in recent years. These accounts are not presented as definitive empirical evidence in support of Conditioned Emergence. Rather, it is hoped that their inclusion might provide a richer understanding of the pattern implied by Conditioned Emergence.

The first example involves a well established food manufacturing company located in the west of Scotland.  Founded in the early part of this century, the company is now run by the third generation of owner-managers and employs approximately 250 people.

The company operates in mature markets, with demand for many of its traditional products experiencing declining demand.  Although buoyant for much of its existence, recent years had brought a downturn in company performance.  Organised along traditional command-and-control lines, management processes and structures had remained largely unchanged for several decades and the organisation had struggled to respond to a worsening competitive climate which had seen a number of its major competitors disappear in the past 3 years.  One of the company's most significant problems had been its failure to introduce new products in recent years.  Consequently, business orders had been secured on the basis of price or historical relationships and margins had shrunk to the point where long-term viability was in question.

Originally, we were contacted with a view to helping the company address some of the problems outlined above.  The directors of the company stated a wish to see the company not only perform better, but undergo radical transformation and develop a progressive approach to management.  They were firmly of the view that they did not want a "quick-fix," consultancy-driven approach, preferring lower key, process-oriented help that would encourage individual and collective initiatives and leave the company able to sustain its own continued development.

Our interaction with the transformation process therefore took the form of intermittent site visits along with hosting off-site meetings, workshops, etc. over a period of approximately 18 months.  The programme of activities was supported by a local

economic development agency who had an interest in assessing a novel form of management development. However, the bulk of the funding and resources were provided by the company itself. Essentially the programme represented a test of the Conditioned Emergence model along action-research lines (Easterby-Smith et al 1991), i.e. the programme required our involvement on issues of process and to some extent constituted a form of experimental intervention. We made no direct contribution to issues of content, though of course our involvement in process issues may have had some influence on emergent content.

The owners of the organisation were aware of the risks of this approach but were of the view that some radical action was required and felt that our approach was appropriate in the circumstances. From a research standpoint we are of the opinion that such process interventions are entirely consistent with the nature of the Conditioned Emergence model in that we are attempting to investigate an approach which combines strategy process with a degree of prescription more normally associated with the content school. Our focus on process, coupled with the organisation's concern for content in the form of business results allowed for the kind of marriage of academic research and business logic described by Beer and Eisenstat (1996) and mentioned in the literature review of this paper.

Following the structure of the model, we will now attempt to summarise the key events in what transpired to be an 18 month programme.

*Stage 1: Conditioning*

According to the model, this is the stage at which the "conditioning" in Conditioned Emergence occurs. The organisation conditioned itself for the forthcoming transformation process by identifying its current rules, constructing new rules and outlawing the use of particular defensive routines which might

inhibit progress. To promote this process we made extensive use of organisational learning techniques (see Senge, 1990).

We used a combination of theory sessions, seminars, workshops and computer profiling to help the organisation identify its current rules. Individuals were encouraged to articulate their assumptions about the business, their roles in it and their aspirations for both. The construction of the new rules was initiated in teams comprising all the senior and middle managers. An iterative process of comparing responses led to the development of a corporate view of the organisation's current rules.

From an agreement of the current rules, the organisation began to develop a shared view of what it might become and what kind of behaviours and attitudes would be required to get it there. In essence, this part of the exercise amounted to the construction of a new set a desired operating rules for the company and visualisation of an alternative archetype.

It was widely recognised that operationalising these rules on a day-to-day basis would be problematic as the rigours of continued business operation inevitably locked the organisation into existing practices. Outdoor simulations were used to allow the management team to experience the operation of defensive routines in unfamiliar situations. Having experienced defensive routines at the behavioural level, workshops and brainstorming were used to identify organisational equivalents of these defensive routines. These defensive routines were then outlawed by consensus.

Interestingly, our initial process design included a harmonisation process intended to develop a single set of new rules from those produced by the various teams involved. In practice this proved to be unnecessary as we found that the

rules produced by different teams were broadly similar. Our first conclusion was that the similarities reflected a particularly uniform culture within the organisation, consistent with its level of maturity. However, subsequent analysis revealed that the similarities extended beyond the company to the large number of teams we have dealt with from other organisations. This may point to some prescriptive feature of the process interventions we apply, or perhaps to the existence of team archetypes. New rules tend to be more aspirational and generic in nature, typically identifying desirable behaviours, etc. Old rules and defensive routines are usually far more context specific in that they often relate to particular instances in an organisation's history which have significantly influenced its development.

By the end of this stage the broad scope of the feedback processes had been determined; positive feedback would be applied to amplify actions consistent with the new rules and the management team would intervene to stifle attempts to enact the outlawed defensive routines. The next stage in the process would require movement away from organisation's current equilibrium to enable the redefined rule set to guide the emergence of a new archetype.

*Stage 2: Creating Far From Equilibrium Conditions*

This stage, is typically where prescriptive managerial intervention on content issues occurs, and maximum organisational discomfort is felt as current equilibria are destroyed. In the Conditioned Emergence model, this phase centres around the bifurcation zone, beyond which a range of possible archetypal trajectories extend into the future.

In the case study, this area proved to be the most problematic. This is perhaps unsurprising in that it sets in motion the departure from existing practices,

removing many of the reference points on which negative feedback would traditionally operate.

The first approach was to restructure the organisation, creating two separate units serving different markets. The organisation considered this too risky and opted to introduce a cross-functional team structure, overlaid on the existing organisational arrangements. Three project teams were put in place, each one charged with effecting major performance improvements in selected areas of the business. Each one could be described as strategic in scope, indeed one team had a particular remit to restructuring the company in the medium term, using BPR technologies. Each team was intended as a far-from-equilibrium zone and all activities relating the projects were managed in accordance with the new rules. After a promising start, in which the teams made a number of incremental improvements in their respective areas, progress gradually ground to a halt as old practices overwhelmed new activities. We considered two possible explanations of this; either, we had been unsuccessful in effecting a sufficient departure from the current equilibrium, or feedback mechanisms had restored the old rules. It is perhaps worth observing that in this instance feedback on both the old and the new rules operated through the same channel, namely the managers. For example, one of the old rules which had been identified and then outlawed was that machine breakdowns which interrupted production were resolved by director level intervention. The corresponding new rule was that the management team would resolve such problems without the assistance of directors. In the early stages of this phase delivery deadlines resulted in pressure to enact the old rule and solve the immediate problem. Any managerial feedback which encouraged

the usage of the old rule set to solve immediate problems automatically resulted in decreased usage of the new rules.

To a large extent, which of the two possible effects was the actual source of failure was overshadowed by the fact that the exiting archetype had reasserted itself, thus requiring a second attempt to create far from equilibrium conditions. In the second attempt, a more dramatic restructuring along business process lines was initiated and the  project teams relaunched.  This attempt also failed, though more quickly than its predecessor.   The new organisational structure was accepted in principle then rejected in practice by some members of the board of directors.

The third attempt was finally successful and the organisation became more "open."  Taking soundings from a range of associates in financial and business spheres, the company formed a clear view that decisive action was overdue and an air of impending crisis began to emerge.  A new structure was adopted and there were departures at the managerial level, including one of the directors.  At this point, the teams spontaneously reactivated themselves and began to tackle the projects with renewed vigour.  The production area was reorganised and, according to representatives from the company, there existed a general conviction that the organisation was in upheaval.  The key lesson for us was that sustainable experimentation and reconfiguration was only possible following a dramatic break from the organisation's established equilibrium.  This achieved, feedback mechanisms would determine whether the reconfiguration was permanent or temporary.

*Stage 3: Managing the Feedback Processes*

In the final stage of the Conditioned Emergence model, feedback is applied to amplify actions consistent with the new rules and archetype. Feedback must also be used to damp actions or behaviours which belong to the old rules and archetype.

The new rules are reasonably visible in the organisation, being displayed in the boardroom and some offices. The example of resolving production problems, quoted earlier, illustrates one feedback mechanism which was used to encourage the new rules and discourage reverting to the old archetype. The managing director, who would historically intervene to resolve most production problems, now displays the organisation's new rules on the overalls he wears when on the shopfloor. These rules clearly state that he should not intervene in such matters when on the shopfloor. Our assessment is that the organisation is now moving beyond the bi-stable state with the new archetype beginning to take hold. A number of small signals indicate that the organisation has changed and their financial performance is beginning to improve as they develop new products and break into markets which had long eluded them.

Interestingly, the "openness" referred to in the account of stage two has been followed by what appears to be a qualitative change in the company's operating environment. It is now active in new and different markets (e.g. large multiple retailers), has redefined its supply base and has a growing network of associated businesses. The new archetype represents a new set of organisational arrangements, structured around business processes as opposed to the functionally based, command and control organisation which had represented the old archetype. The organisation is now less inward looking and is more proactive in its relationship with other parts of the supply chain. Innovation and

organisational learning are now regarded as key priorities within the company. In practical terms the directors and managers are being encouraged to gain new skills which are consistent with this new archetype. This is partially driven by the higher demands placed on the company by some major new accounts which have recently been won. The management team is being made more accountable for its performance against key competitive criteria whilst also being afforded greater freedom to achieve its targets.

At the time of writing our involvement in the transformation programme is coming to an end and our role is changing to that of periodic observers. We believe that it may be too early to claim that the organisation has effected an irreversible switch in archetypes. Whilst evidence of old behaviour and rules appears to be declining, there are occasional tendencies for individuals to revert to pre-transformation practices. These are perhaps most evident when applying old rules which have been incorporated into the new archetype. These old rules may well have strong habitual associations with other old but outlawed rules (defensive routines) indicating that it is difficult to operate some old rules whilst suppressing others. This possibility is supported by the fact that old behaviours are most evident in areas of the company where old operating rules are most active such as finance (e.g. pricing products). An alternative explanation is that these areas do not have the same degree of external connection with company's redefined operating environment. As long as such isolated tendencies exist, one cannot discount the possibility of their extension and re-establishment during some period of instability. However, in our judgement, this is becoming increasingly unlikely and the new archetype is continuing to flourish.

For our second illustrative case study we examine the experiences of the Rover Group. Although Rover did not explicitly follow the Conditioned Emergence model, discussions with those in the organisation have led us to believe that their experience is consistent with the overall pattern implied by it. Until comparatively recently, Rover represented all that was bad about manufacturing in the UK. The publicity they received during the 1970s and early 1980s was generally for poor quality products (Done, 1993) and strained industrial relations (Goodhart, 1993). The last decade has seen a distinct upturn in Rover's fortunes with a string of successful new products from Land Rover's Discovery to the revival of the MG brand with the critically acclaimed MGF. In managerial terms they have adopted a number of techniques including Total Quality, concurrent engineering, OL and BPR.

A former Chief Executive of the Rover Group points to the company's Total Quality initiative in 1986 as the genesis of the transformation process (Towers 1996). A company wide survey undertaken at that time might be interpreted as part of the conditioning process to identify existing attitudes and rules. The survey revealed a wealth of creative talent amongst the employees, which was only being utilised outside the workplace. The company identified learning as a fundamentally important activity for its employees and began to look for ways in which to stimulate learning within the organisation. Again, this might be viewed as creating a new set of rules for the organisation based around innovation and learning processes. Rover Learning Business was established in 1989 as a wholly owned subsidiary with specific responsibility to develop education and training programmes for the Rover Group (Farish 1994). In May 1990, the company made a further commitment to these new rules with the Rover Employees Assisted Learning (REAL) scheme which offered all employees £100 per year to spend on any form of training (Bower 1994). With

anything from ballroom dancing to golf lessons being funded the organisation took a leap of faith that encouraging employees to learn in any subject area would have a positive impact on their willingness to learn in the business context.

Any one of a number of significant changes, experienced by Rover during the 1980s, could be viewed as having created far from equilibrium conditions (e.g. changes in ownership, new working practices and organisational structure). During the 1990s Rover used BPR to great effect in breaking down historical working procedures and now operates with a substantially different, more process oriented, organisational structure (Harvey 1994). However, we believe that it is no coincidence that their successful re-engineering efforts were preceded by the application of OL techniques. Rover Learning Business was established the year before the term BPR had even been coined.

Discussions with the organisation have led us to believe that the management team were successful in continuing to apply feedback signals which encouraged behaviours consistent with the new rules while inhibiting use of the old rules.

**Concluding Remarks**

In developing the Conditioned Emergence model we have made assumptions and observations which are at least different from, and in some cases contrary to, corresponding observations made by others working in the field. We have therefore chosen to examine the contribution of Conditioned Emergence to the integration of strategy process and content under a dynamic framework - the issue on which we opened the paper - before closing with a series of detailed questions arising from each of the stages in our model.

Conditioned Emergence employs a specific sequence to introduce time as a dimension in organisational transformation and encourages planning at the level of deep

structure and processes, whilst allowing emergence at the level of particular outcomes.  Our model builds upon some established concepts yet contravenes others. We have argued in favour of a long term view of strategy but focus on deep structure and the rules which underpin it.   We have used the concept of emergence but introduce an element of coherence and collective intention through managing at the deep structural level.  We have accepted that issues of content are important but propose that they should be managed at the level of the rules which generate outcomes rather than at the level of the outcomes themselves.   We recognise the importance of positioning since an organisation can be thought of as part of a co-evolving network of mutually interacting entities.   However, we acknowledge the central role of resources in organisational transformation because the self-organising processes which we describe involve self-referencing in relation to the organisation's deep structure.  Our model also addresses the issue of dynamism through the use of sequencing and feedback mechanisms.  We have considered the nature and purpose of positive feedback in far from equilibrium conditions but also accept the role of negative feedback and the natural drive towards stability associated with single loop learning.   Indeed, our sequence depicts a change in emphasis, from one form of feedback to the other, over time.

Our research has led us to question the continued validity of strategy as it is currently conceived.   Viewed in the context of our model, we believe that many of the dichotomies with which the strategy literature seems to be increasingly concerned (e.g. static vs. dynamic, process vs. content, positioning vs. resources, planning vs. emergence) could be symptomatic of the decreasing relevance of current conceptions of strategy in the so called "knowledge age."  We believe strategy researchers should now concern themselves with the management of deep structure, instability and

feedback loops as more general headings for the three stages of the Conditioned Emergence model. However, there are a number of inter-related areas for further research under each of these headings.

*Management of Deep Structure*

We have already highlighted that there are differing interpretations of complexity theory being applied to organisational problems. Conditioned Emergence utilises the concept of dissipative structures and implies that organisations move through a cycle of gradual evolution, stagnation, radical upheaval and self-organisation. As an organisation evolves through repetition of this cycle, we believe that awareness of its accumulated learning, as reflected in its relatively stable deep structure, which provides a degree of irreversibility to the evolutionary process. The edge of chaos view, as an alternative interpretation of complexity theory, proposes that organisations are capable of perpetually reconfiguring themselves to meet changing needs as self-organising processes facilitate the emergence of new order. Whilst we acknowledge that this is an attractive proposition we remain unconvinced of its validity in an organisational setting. For us, there appears to be some contradiction between the notion of naturally occurring self-organising processes and the implied need for some managerial intervention to position organisations on the edge of chaos. It would appear that the different interpretations of complexity theory operate with different assumptions about organisations; further research is needed to clarify the nature and implications of these differing assumptions.

*Management of Instability*

A key question arising from our work is whether the periodic upheaval it implies can be predicted (or indeed precipitated) by managerial intervention. Research to identify a range of indicators which might signal the onset, nature and magnitude of instability

would be extremely valuable and might in turn clarify the types of management interventions which would be required to deliberately trigger instability. Having dealt with the onset of instability, self-organisation raises further questions. It is traditionally viewed as an unpredictable process where eventual outcomes are highly sensitive to random events and initial conditions. In self-organisation, new order emerges from the repeated application of rules and Conditioned Emergence implies an element of control through development and management of the rule set. We have argued that it is possible to influence the outcome of self-organising processes because in organisations as opposed to organisms there is an element of choice in terms of which rules to enact and which to discard. The influence of cognitive processes, awareness and choice in surfacing and shaping the rule set(s) raise interesting questions which link to another concern with the model as presented here i.e. is the bi-stablility in our model a limiting case what is generally a multi-stable phenomenon characterised by lower degrees of acrhetypal uniformity when there is less overt management of deep structure and rules?

### *Management of Feedback Loops*

We have identified feedback mechanisms as having an important impact on which rules are enacted. However, this has been an area of some conceptual difficulty for us. Amplifying behaviours consistent with the new rules could be viewed as positive feedback to encourage the non-linear effects often associated with complexity theory and self-organisation. However, at the deep structural level, the same actions could be viewed as negative feedback to ensure convergence on the new rules. This introduces the possibility of different organisational strata (e.g. deep structrure and manifest structure) being subject to varying levels and types of stability and feedback. Further research is needed to investigate linkages between types of feedback, time lag

effects and archetypal structures, perhaps re-examining previous work on classification systems and archetypes using the concepts of rules.

We believe that the concept of dissipative structures as presented in this paper is pointing towards a new conceptualisation of strategy, which we believe addresses Jantsch's call for "an end to the dualism between the planner and the planned."

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**References**

Abernathy, W. J. and  K. B. Clarke (1985) 'Innovation - Mapping the winds of creative destruction,' *Research Policy*, **14**, pp 3 - 22

Abrahamson, E. (1991) 'Managerial Fads and Fashions: the diffusion and rejection of innovations,' *Academy of Management Review*,  **16** (3), pp 586 - 612

Accountancy Age (1997) 'UK: the rights and wrongs of BPR,' 20 February 1997, p 18

Argyris, C. And D.A. Schon (1978) *Organisational Learning: a theory of action perspective*, Addison Wesley, Reading - Massachusetts

Argyris, C. (1990) *Overcoming Organisational Defences: facilitating organisational learning*, Prentice Hall, New Jersey

Argyris, C. (1992) *On Organisational Learning*, Blackwell Publishers, Cambridge Massachusetts

Bain, J. (1956) *Barriers in New Competition:  their character and consequences in manufacturing industries,* Harvard University Press, Cambridge MA

Barnett, W.P. and R.A. Burgleman (1996) 'Evolutionary Perspectives on Strategy,' *Strategic Management Journal*, **17** (s), pp 5 - 19.

Barney, J. (1986) 'Organisational Culture: can it be a source of sustained competitive advantage ?' *Academy of Management Review*, **11**, pp 656 - 665

Barney, J. (1991) 'Firm Resources and Sustained Competitive Advantage' *Journal of Management*,  **17**, pp 99 - 120

Baum, J.A.C. and J.V. Singh (1994) (eds) *Evolutionary Dynamics of Organisations*, Oxford University Press, New York

Beer, M., R.A. Eisenstat, B.Spector (1990) 'Why Change Programs Don't Produce Change' *Harvard Business Review*,   **68** (6), pp 158-166.

Beer, M. and R.A. Eistenstat (1996) 'Developing an Organisation Capable of Implementing Strategy and Learning,' *Human Relations*, **49** (5), pp 597 - 619

Best, M. H. (1990) *The New Competition*, Polity Press, Cambridge

Bower, D.G. (1994) 'Unleashing the Potential of People,' *Journal of European Industrial Training*, **18** (7) pp 30 - 36

Brown, S. L. and K. M. Eisenhardt (1997) 'The Art of Continuous Change: linking and time-paced evolution in relentlessly shifting organisations,' *Administrative Science Quarterly*, **42**, pp: 1 - 34

Cafasso, R. (1993) 'Rethinking Re-engineering,' *Computerworld*, 15 March 1993, pp 102 -105

Champy, J. (1995) *Re-engineering Management*, Harper Collins, London

Chandler, A.D. Jr. (1962) *Strategy and Structure: Chapter in the History of the Industrial Enterprise.* MIT Press, Cambridge, MA.

Cohen, M.D., J. G. March and J. P. Olsen. (1972) 'A Garbage-Can Model of Organisations Choice' *Administrative Science Quarterly* **17** pp 1 - 25

Coveney, P. and Highfield, R. (1995) *Frontiers of Complexity*, Faber and Faber, London

CSC Index (1994) *State of Re-engineering Report*, Published by CSC Index, Cambridge, Massachusetts

Cyert, R. M. and J. G. March. (1963) *A Behavioural Theory of the Firm*, Prentice Hall, Englewood Cliffs NJ

Davenport, T.H. and J. E. Short (1990) 'The New Industrial Engineering: information technology and business process redesign,' *Sloan Management Review*, Summer 1990, pp 11 - 27

Davenport, T.H. (1993), *Process Innovation*, Harvard Business School Press, 1993

_____

Davenport, T.H. (1995) 'Re-engineering Perceptions,' *Informationweek*, Issue 518, 13 March 1995, p90

Done, K. 'Road Map to Rover's Return,' *Financial Times*, 7 April 1993, London, p19

Drazin, R. and L. Sandelands (1992) 'Autogenesis: a perspective on the process of organising,' *Organisation Science*, **3** (2), pp 231 - 249

Easterby-Smith, M., R. Thorpe and A. Lowe (1991) *Management Research - an introduction*, Sage Publications, London

Farish, M. (1994) 'Back to the School Desk with Rover,' *The Financial Times, Engineering Review*, 25 March 1994, London, p7

Gemmill, G. and Smith, C. (1985) "A Dissipative Structure Model of Organization Transformation," *Human Relations* **38** (8) pp 751-766

Gersick, C. J. G. (1991) 'Revolutionary Change Theory: a multilevel exploration of the punctuated equilibrium paradigm,' *Academy of Management Review* **32**, pp 274 - 309

Goodhart, D. (1993) 'Scanlon Admits Damage Done by Unions,' *Financial Times*, 7 January 1993, London, p16

Greenwood, R. and C. R. Hinings. (1988) 'Organisational Design Types, Tracks and the Dynamic of Strategic Change,' *Organisation Studies*, **9** (3), pp 293-316

Greenwood, R. and C. R. Hinings (1993) 'Understanding Strategic Change: the contribution of archetypes,' *Academy of Management Journal*, **36** (5), pp 1052 - 1081

Greenwood, R. and C. R. Hinings (1996) 'Understanding Radical Organisational Change: bringing together the old and the new institutionalism,' *Academy of Management Review*. **21** (4), pp 1022 - 1054

Hamel, G. L. and C. K. Prahalad. (1989) 'Strategic Intent,' *Harvard Business Review*, May-June, pp 63 - 76

Hamel, G. L. and C. K. Prahalad. (1996) 'Competing in the New Economy: managing out of bounds,' *Strategic Management Journal*, **17** (3), pp 237 - 242

Hammer, M. (1990) 'Re-engineering Work: don't automate, obliterate,' *Harvard Business Review*, July - August 1990, pp 104 - 112

Hammer, M. and J. Champy (1993*) Re-engineering the Corporation - a manifesto for business revolution*, Nicholas Brealey Publishing Ltd

Hammer, M. (1996) *Beyond Re-engineering: how the process-centred organisation is changing our work and  our lives*, Harper Collins Business, London.

Hannan, M. and J. Freeman (1997) 'The Population Ecology of Organisations,' *American Journal of Sociology*,  **82**, pp: 929-964

Harvey, D. (1994) *Re-engineering: the critical success factors*, Business Intelligence

Hedberg, B. (1981) 'How Organisations Learn and Unlearn,' in P. Nystrom and W. Strabuck (eds) *Handbook of Organisational Design*, Oxford University Press, pp 1-27

Hodgson, G.M. (1993) *Economics and Evolution*, Polity Press, Cambridge

Jantsch, E. (1980) *The Self-Organising Universe*, George Braziller Publishers, New York

Johnson, G. (1987)  *Strategy and the Management Process*, Basil Blackwell, Oxford

Kanter, R. M. (1983) *The Change Masters: corporate entrepreneurs at work*, Simon and Schuster, New York

Kauffman, S. A. (1993) *The Origins of Order: self organisation and selection in evolution*,  Oxford University Press, Oxford

Kauffman S. A. (1995) *At home in the Universe*, Penguin, London

_____

Kim, D. (1993) 'The Link Between Individual and Organisational Learning,' *Sloan Management Review*, Fall, pp 37 - 50

Kolb, D.A., I.M. Rubin and J.M. McIntyre (1971) *Organisational Psychology: an experiential approach*, Prentice Hall, 1971

Kuhn, T. S. (1962) *The Structure of Scientific Revolutions*, University of Chicago Press, Chicago, IL

Leavitt, B. and J.G. March (1988) 'Organisational Learning,' *Annual Review of Sociology*, **14**, pp 319 - 340

Leifer, R. (1989) 'Understanding Organisational Transformation Using A Dissipative Structures Model,' *Human Relations*, **42** (10), pp 899 - 916

Levy, D. (1994) 'Chaos Theory and Strategy:  theory application  and managerial implications,' *Strategic Management Journal*,  **15** (s) pp 167 - 178

Mandelbrot, B. (1977) *Fractals:  form, chance and dimension*,  Freeman, San Francisco

March, J. G. and H. A. Simon. (1958) *Organisations*, John Wiley & Sons, New York

Miles, R. and C. Snow (1978) *Organisation Strategy Structure and Processes*, McGraw-Hill, New York

Miller, D. (1982). 'Evolution and Revolution:  a quantum view of structural change in organisations,' *Journal of Management Studies*,  **19** (2),  pp 131 - 151

Miller, D. and P. Friesen (1984) *Organisations - a quantum view*,  Prentice Hall, Englewood Cliffs, N J.

Mintzberg, H. (1978) 'Patterns in Strategy Formulation,'  *Management Science*,  **24** (9), pp 934 - 948

Mintzberg, H. (1983) *Structures in Fives: designing effective organisations*,  Prentice Hall, Englewood Cliffs, N J.

Mintzberg, H. and F. Westley (1992) 'Cycles of Organisational Change,' *Strategic Management Journal*, **13** (s), pp 39 - 59

Mintzberg, H. (1994) *The Rise and Fall of Strategic Planning*, Prentice Hall, UK

Moingeon, B. and A. Edmonson (1996) (eds) *Organisational Learning and Competitive Advantage*, Sage Publications, London

Nadler, D. A. and M. L. Tushman. (1989) 'Organisational Frame Bending: principles for managing re-orientation,' *The Academy of Management Executive*, **3** (3), pp 194 - 204

Nelson, R. R. and S. G. Winter (1982) *An Evolutionary Theory of Economic Change*, Belknap Press, Cambridge, MA

Nonaka, I. (1991) 'The Knowledge-Creating Company,' *Harvard Business Review*, pp 96 - 104

Oates, D. (1993) 'Buzzwords: learning the language of business,' *Accountancy*, **112** (1200), p38

Oliver, C. (1992) 'The Antecedents of Deinstitutionalization,' *Organisational Studies*, **13** (4), pp 563 -588

Pascale, R. T. (1990) *Managing on the Edge*, Simon and Schuster, New York

Pearson, J.R.W. and C. Skinner (1993) *Business Process Re-engineering in the UK Financial Services Industry: the first research into BPR programmes in UK financial services*, University of Bristol Press, Bristol

Pedler, M., J. Burgoyne and T. Boydell (eds) (1990) *Self-Development in Organisations*, McGraw-Hill, London

Penrose, E. (1959) *A Theory of Growth of the Firm*, Blackwell, Oxford

Peters, T.J. and R.H. Waterman (1982) *In Search of Excellence*, Harper and Row, New York and London

Pettigrew, A. M. (1973) *Politics of Organisational Decision Making*, Tavistock, London

Pettigrew, A. M. (1985) *The Awakening Giant*, Basil Blackwell, Oxford

Pettigrew, A. M and R. Whipp (1991) *Managing Change for Comprehensive Success*, Basil Blackwell, Oxford

Pettigrew, A. M. (1992) 'The Character and Significance of Strategy Process Research,' *Strategic Management Journal*, **13** (s), pp 5-16

Pfeffer, J. (1981) *Power in Organisations*, Pitman Publishing, Marshfield, MA

Pine, B.J. II (1993) *Mass Customisation: the new frontier in business competition*, Harvard Business School Press, Boston

Piore, J.M. and C. Sabel (1984*) The Second Industrial Divide: possibilities for prosperity*, The Free Press, New York

Pitney Bowes Management Services (1995) 'Re-engineering Among the Fortune 500: focus on change management,' *Cases in Business Process Re-engineering*, **14**, May 1995, Armstrong Information Ltd, London, pp 12 - 14

Porter, M.E. (1980) *Competitive Strategy*, The Free Press, New York

Porter, M.E. (1985) *Competitive Advantage - creating and sustaining superior performance*, The Free Press, New York

Porter, M. E. (1991) 'Toward a Dynamic Theory of Strategy,' *Strategic Management Journal*, **12** (s), pp 95 - 117

Powell, W.W. and P.J. DiMaggio (eds) (1991*) The New Institutionalism in Organisational Analysis*, University of Chicago Press, USA

Prahalad, C.K. and G. Hamel (1990) 'The Core Competence of the Corporation,' *Harvard Business Review*, May/June, pp 79 - 93

Preece, I. and C. Edwards (1993) *A Survey of BPR Activity in the UK*, Working Paper, Version 2.4 Ref: BPR-Ian/2, School of Management, Cranfield University

Prigogine, I. and I. Stengers (1984*) Order out of Chaos: man's new dialogue with nature*, Bantam, New York

Quinn, J. B. (1980). *Strategic for Change: Logical Incrementalism.* Irwin, Homwood IL.

Roach, S.S. (1991) 'Services Under Siege: the restructuring imperative,' *Harvard Business Review*, September/October 1991, pp 83-91

Rothschild, M. (1992) 'How to be a High IQ Company,' *Forbes*, Issue Supplement, 7 December 1992, pp 17-18

Rumelt, R. P. (1982) 'Diversification Strategy and Profitability,' *Strategic Management Journal* **3** pp: 359-369.

Rumelt, R. P. (1984) 'Towards A Strategic Theory of the Firm,' in R. B. Lamb (ed) *Competitive Strategic Management* Englewood Cliffs, NJ: Prentice Hall pp: 556-570

Schein, E.H. (1985) *Organisational Culture and Leadership*, Jossey-Bass, San Francisco

Schendel, D. (1992) 'Introduction to the Winter 1992 Special Issue on Fundamental Themes in Strategy Process Research,' *Strategic Management Journal*, **13** (s), pp 1 - 3

Schumpeter, J. (1943) *Capitalism, Socialism and Democracy*, Unwin University Books, London

Selznick, P. (1957) *Leadership in Administration: a sociological interpretation*, Harper and Row, New York

Senge, P. (1990) *The Fifth Discipline: the art and practice of the learning organisation*, Currency/Doubleday, New York

_____

Smith, C. (1986) 'Transformation and Regeneration in Social Systems: a dissipative structure perspective,' *Systems Research*, **3** (4), pp 203-213

Smith, C. and Gemmill, G. (1991) 'Change in the Small Group: A Dissipative Structure Perspective,' *Human Relations*, **44** (7), pp 697-715

Sockalingham, S. and A.Doswell, 'Business Process Re-engineering in Scotland: survey and comparison,' *Business Change and Re-engineering*, **3** (4), pp 33 - 44

Spender, J.C. (1996) 'Competitive Advantage from Tacit Knowledge ? unpacking the concept and its strategic implications,' in Moingeon, B. And A. Edmonson (eds) *Organisational Learning and Competitive Advantage*, Sage Publications, London, pp 56 -73

Spender, J. C. and R.M. Grant (1996) 'Knowledge and the Firm: overview,' *Strategic Management Journal*, **17** (winter special issue), pp 5 - 9

Staber, U. and B. Sharma (1994) 'The Employment Regimes of Industrial Districts: promises, myths and realities,' *Industrielle Beziehungen*, **1** (4), pp 321 - 345

Stacey, R. (1993) *Strategic Management and Organisational Dynamics*, Pitman Publishing, London

Stacey, R. (1995) 'The Science of Complexity: an alternative perspective for strategic change processes,' *Strategic Management Journal*, **16** (6), pp 477 - 495

Storper, M and A, J. Scott (eds) (1992*) Pathways to Industrialisation and Regional Development*, Routledge, London

Thietart, RA and B. Forgues (1997) 'Action, Structure and Chaos' *Organisational Studies*. **18**(1) pp 119-143

Training and Development (1994) 'The Future of Workplace Learning and Performance,' Training and Development **48** (5), May 1994, pp 36 - 47

Towers, J. (1996) 'Who Needs Learning?' *Manufacturing Engineer*, June 1996, pp 144-146

Tushman, M.L. and P. Anderson (1986) 'Technological Discontinuities and Organisational Environments,' *Administrative Science Quarterly* **31** (3), pp 439 - 465

Van de Ven, A. and M. S. Poole.(1988) 'Paradoxical Requirement for a Theory of Change,' in Quinn, R.E. and K.S. Cameron (eds)., *Paradox and Transformation: towards theory of change in Organisation and Management*, pp 19 - 63  Ballinger, Cambridge MA

Waldrop, W. M. (1992) *Complexity: the emerging science at the edge of order and chaos*, Touchstone, New York.

Wernerfelt, B. (1984) 'A Resource-based View of the Firm'  *Strategic Management Journal* **5**, pp 171 -181

Whittington, R. (1992) 'Putting Giddens Into Action: social systems and management agency,' *Journal of Management Studies*, **29** (6), November 1992, 693 - 712

Zucker, L. G. (1977) 'The role of Institutionalisation in Cultural Persistence,' *American Sociology Review*,  **42**, pp:  726-743
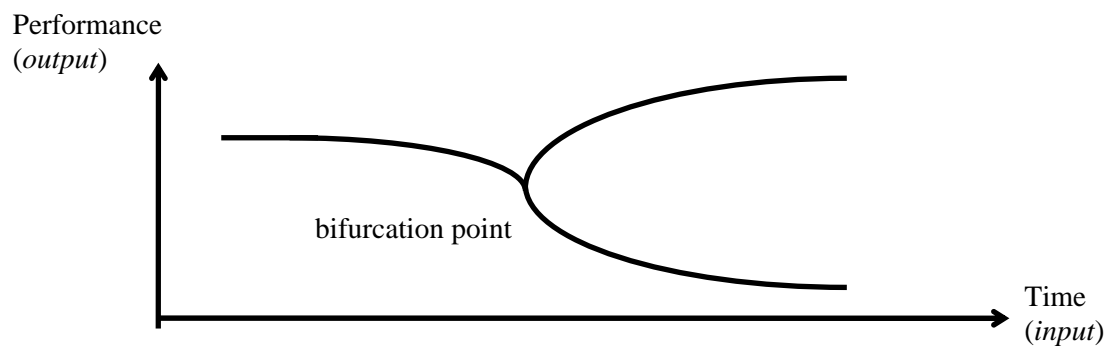
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Performance
(*output*)



Time
(*input*)

bifurcation point

*Figure 1 : The Bifurcation diagram* [adapted from Leifer 1989]
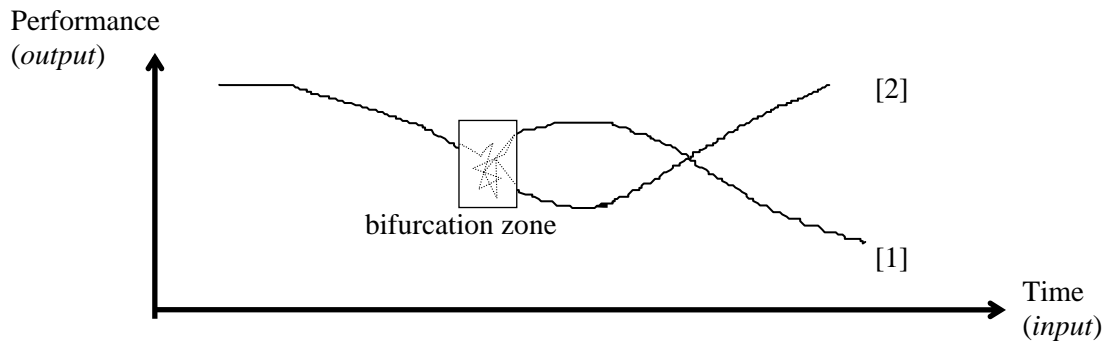
Performance
(*output*)

bifurcation zone

[2]

[1]

Time
(*input*)

**Figure 2: Amended Bifurcation Diagram**