

Explaining Organizational Change through Generative Mechanisms

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Abstract

Our thinking and methods for understanding organizational change should uncover the multiple processes and the different actors and factors that interact to influence the development of the organization. They should account for its initiation and emergence, its decline, transformation or even termination, along with how it progresses from a lower simpler state, to a higher more complex state. Yet these issues remain largely unanswered, as much research on organisational development and change is comparative static in nature dominated by assumptions that privilege stability over dynamics, and incremental change over discontinuous change. While much progress has been made in developing process accounts of change and innovation, in this paper I discuss the concept of generative mechanisms. I suggest identifying and individuating how these deeper processes or mechanisms attain their causal power helps us better understand the process of change.

Keywords: processual, change process, organizational change

Introduction

Static models have been useful in providing ‘snapshots’ of organisational change by offering insight into different parts of the process and the important factors influencing the change process at different points in time. However, they are silent on the process of change towards equilibrium; how plans were translated into action or how these were modified, adapted and changed; how fast or slow adjustment takes; and whether equilibrium is ever reached, especially if the organization keeps changing. Whole processes get reduced to some disconnected dimension (Mintzberg, 1992; Van de Ven and Poole, 2005), and temporal and spatial contextual factors that shaped these ‘snapshots’ are ignored (Pettigrew et al., 2001). Seeing change as an ongoing process, a stream of interaction, and a flow of situated initiatives as opposed to a set of episodic events such as unfreezing, change, refreeze (Lewin, 1952) that underlies many models of change, moves us from a ‘snapshots’ to ‘moving pictures’ view of change.

Change is a continuous process, therefore the focus should be on “changing rather than change” (Pettigrew et al., 2001: 698), and the context, content, and long-term processes and their interconnections over time, which are mobilised by actors or constrain development (Tsoukas and Chia, 2002). This requires taking time seriously, both in longitudinal terms and through research informed by more nuanced temporal theorising about cycles, pacing and event sequences that embraces notions of coevolution, feedback and emergence, and capture one off unanticipated events, tipping points and path dependence.

Processes of Change

Process thinking involves considering phenomena dynamically in terms of movement, activity and temporal evolution. It involves consideration of how and why things such as people, organizations, strategies and environments change, act and evolve over time (Langley, 2007). That is, the process of catching “reality in flight” (Pettigrew, 1992: 11).

Van de Ven (1992) suggests that process has been considered from three perspectives; (1) as a logic used to explain a causal relationship in variance theory; (2) as a category of concepts that refer to activities of individuals and organizations; and (3) as a sequence of events that describes how things change over time. It is this third approach that treats process as ‘a sequence of individual and collective events, actions and activities unfolding over time in context’ (Pettigrew, 1997: 338), that provides a dynamic account of organisational becoming, emerging, developing, transforming and decaying. That is, a process-orientated account, focusing on the unfolding of processes, actions and interactions, provides a ‘moving pictures’ explanation of change.

In an attempt to provide a more complete yet parsimonious explanation of change, Van de Ven and Poole (1995) suggest a framework that integrates alternative theories into four ideal type process theories of organizational development and change. These offer a way to untangle the diverse range of organizational change theories, identify what Poole and Van de Ven (2004) call the basic ‘*motors*’ of change, and offer insight into the relationship among diverse explanations of organizational change.

However, the four types of change theories represent a high level of abstraction of the process of change and development. Importantly, describing patterns of events does not of itself explain the underlying processes that generated the patterns (Pentland, 1999: 75). Instead, it is in the ‘arrows’ of Van de Ven and Poole’s models where the action of change is taking place (Smallman, 2008). Indeed their footnote explains “Arrows on lines represent likely sequences among events, not causation between events” (Van de Ven and Poole, 1995: 520).

Understanding change therefore requires explaining how the ‘arrows’ translate down to the more proximate processes that explain say how ‘*variation*’ takes place in the evolutionary ‘motor’, or what processes result in or are generated by ‘*implement goals*’ in a teleological ‘motor’. These are what I believe Pettigrew (1990: 270) calls the “underlying logics” and

“deeper structures” or, what Simon (1992) refers to as the driving mechanisms underlying changing and evolving entities that operate and interact with each other in context over time to produce the patterns of behaviour and change represented by the models.

In this paper I suggest that a way forward in process research is to identify these mechanisms that explain how change happens. Developing robust explanatory accounts requires providing accounts of the ‘underlying logics’ or deeper structures’ or processes to which ‘cause’ may be attributed. I draw on research from across a number of disciplines where time matters, and discussion of the concept of mechanism has been undertaken, such as sociology (Hedström, 2005; Hedström and Swedberg, 1998b), political science (Mahoney and Rueschemeyer, 2003; Tilly, 2001), and the Philosophy of Science (Bunge, 1997; Bunge, 1999).

The Nature of Explanatory Mechanisms

Precise definitions of mechanisms continue to be developed. In recent years increasing attention has been paid to understanding the nature and elements of mechanisms and how they bring about change (Bechtel and Abrahamsen, 2005; Machamer et al., 2000; Pajunen, 2008). The debate on mechanisms is contentious and confusing, arising from the different disciplinary and philosophical premises (Craver, 2001). While there is common ground, difference lays in those researchers who see mechanisms as analytic constructs, reducible to the individual’s rational behaviour (Elster, 1989; Hedström and Swedberg, 1998a), and those who see mechanisms as real processes, deriving their meaning from social time and space. In the context of social science, and in particular understanding organizational change, mechanisms have characteristics in terms of behaviour and the processes that produce the behaviour, thus distinguishing between what a mechanism is doing, and how it is doing it (Machamer et al., 2000).

Bunge (1997: 414), sees mechanisms “as a real process in a concrete systems, such that it is capable of bringing about, or preventing, some change in the system as a whole”, and that

mechanisms are activated by events of a certain kind (438), and “all mechanisms are systems specific” (450). Also that, “mechanism is to system as motion is to body” and “thinking is to brain”, “social mechanisms reside neither in persons nor in their environment – they are part of the processes that unfold in, and among social systems (Bunge, 1999: 57-59). Bechtel and Abrahamsen (2008: 423) suggest a mechanism “is a structure performing a function by virtue of its component parts, their operation and organization. The orchestrated functioning of the mechanism is responsible for one or more phenomena”.

Mechanisms therefore have a number of interrelated characteristics; they consist of component parts consisting of entities and their activities and interactions; the component parts are organised spatially and operate in a temporal sequence; they have a hierarchical structure involving multiple levels of organization; they produce something – a phenomena, outcome event, or behaviour as a result of their productive capacity (Bechtel and Abrahamsen, 2005; Pajunen, 2008).

An important issue in the individuating of mechanisms is acknowledgment that the components of a mechanism comprises both entities and activities. ‘Activities are the producers of change, entities are the things that engage in activities’ (Machamer et al., 2000: 3). It is the configuration of these entities and their action that give mechanisms their causal power and capability to bring about or prevent change (Bunge, 1997). Machamer et al. (2000), suggest both activities and entities must be included in an adequate description of how mechanisms operate, in order to provide an explanation of the phenomena they produce. This involves a dualistic philosophical approach. A process approach (Rescher, 1996) appropriately highlights the process of active types of changing. However, to understand how the mechanism operates and brings about change requires identifying the entities that engage in the activities and the capacities or properties that give them the capacity to act. The capacity to act is a product of an entity’s structure, which is the outcome of prior activities. This is a substantivist way of expressing that entities have properties that give them a capacity

at a “particular time, in a particular place or occurrence to engage in activities” (Craver, 2001: footnote 4). However it is mechanisms that ‘do things’ and are active in bringing about change, and so ought to be described in terms of the activities of the entities not merely in terms of changes in the properties which would be the case of a purely substantivist position. “It is not the penicillin that causes the pneumonia to disappear, but what the penicillin does” (Machamer et al, 2000: 6). It is actions, actually or potentially, that link the actor into the causal structure of the world (Abell, 1987).

This focus on activities is therefore important for ontic, descriptive and epistemological reasons (Machamer et al., 2000). Activities are types of causes, gaining their meaning from their spatio-temporal location to other actions and events (Machamer et al., 2000). They can also be abstracted and identified independently of entities and sometimes without reference to entities at all (Bunge, 1997). A focus on activities therefore is prior to agency, placing the causal relations in generative mechanisms outside the agent (Hornsby, 1980). Not all actions reflect intention and Abbott (2001) argues that for epistemological reasons, we should remain ‘explicitly agnostic’ about the source of purposeful actions. While some events are indeed the result of rational actions, others may well have been irrational, happen by chance or be the result of tradition or even be due to charisma.

Classification of Mechanisms

Research in general, social and natural systems suggests that there are many kinds of mechanisms in different systems that influence the way an organization evolves, including physical, chemical, biological, psychological, socio-cultural and economic, as well as formal, procedural and representational systems. Following McAdam et al. (2001), we may begin to understand the role of mechanisms in organisational development and change by identifying a general distinction among environmental, cognitive and relational mechanisms.

Environmental mechanisms are generated from external influences that operate directly on the organization through business relationships and networks. The development and evolution of business relationships and networks is a co-evolutionary process. Entities such as groups, teams, firms, organizations, and networks act as each other's environment. They act as open systems able to continually import energy from the environment and export entropy (Bar-Yam, 1997). In order to be sustainable there must be direct correlation between the entity and its environment (Emery and Emery, 1976). That is, for an adaptive relationship the structure of internal processes of the entity are aligned with processes from the environment, allowing energy such as tangible resources, including for instance technology, and intangible resources such as new ideas (Bunge, 1997), or information, to flow freely to and from the environment and other entities through various communication process (Emery and Emery, 1976). The entity must be able to adapt at a rate of change in line with the rate of change in its environment, or else it will eventually stagnate and die unable to cope with, and contribute to, the changing context in which it is embedded (Wilkinson, 2006). Innovation and adaptation processes therefore involve the entity to recognizing, developing and exploiting new ideas and opportunities in the environment.

Competition and cooperation processes also influence an organization's interaction in relationships and networks. Conflict may arise as entities seeking differential advantage compete for scarce or depleted resources in the environment. Conversely, entities may seek cooperative relationships in order to gain benefits of coordinated action, and access and share resources.

Organizations require various processes for developing successful relationships that are different from but complementary to competitive processes. Organizations may be selected for both their ability to form cooperative relationships and their competitive ability. This requires organizations in relationships to be similarly structured with coordinating process that facilitate alignment. This results in selection pressures and transmission biases for

particular subroutines and competencies that could not be explained by single processes in an isolated firm.

Cognitive mechanisms operate through the alteration of individual and collective perceptions (McAdam et al., 2001). Actions and interactions are guided by an actor's relational schema that is filtered through the processes of past experiences and learning, and through acting in conjunction with other entities (Craver, 2001). These include theories in use, sensemaking or the mental models (Weick, 1995). Through cognitive mechanisms actors regard their role in, and the nature of, relationships, including what to expect from the relationship, their ideas, beliefs about themselves and other actors involved, and their expectations regarding each other's behaviour and contribution. It also includes how organizations create context to enable action, through individual or communities of understanding, which make patterns comprehensible and manageable (Snowden, 2001). Actor bonds include processes associated with the emotions and feelings that arise through the abstraction of shared experiences, values and beliefs. These operate through formal and informal interdependent and complex networks of obligations, experiences and mutual commitment and trust that emerges naturally over time through the voluntary nature of collaboration (Snowdon, 2002).

Learning and knowledge development are examples of cogitative processes. Knowledge is not a thing, or a system, but an ephemeral, active social process of relating. Knowledge cannot therefore be stored, measured or managed (Stacey, 2001), nor therefore owned by a single entity but is instead distributed in people in many levels in an organization and around the network of relationships (Snowden, 2002). Firms therefore need business-relation mechanisms, that operate through social bonds, resources ties and activity links, for processes of knowledge sharing, interpretation, sensemaking, recognition, understanding, reinterpretation and classification of new information. These influence how knowledge and ideas flow within and between firms, networks and to-and-from the environment. It is through these processes that opportunities are discovered or are discoverable through entrepreneurial

actions. It also highlights the role of prior knowledge people and firms have, and the way new ideas come from combining and recombining existing knowledge in new ways (Wilkinson, 2006).

Relational mechanisms alter connections among interpersonal networks of people (McAdam et al., 2001), simultaneously operating in multiple entities and systems. Therefore outcomes at a higher level are themselves complex events that emerge as the consequence of multiple processes of collective or aggregative behaviour at a lower level (Abell, 2001; Poole and Van de Ven, 2004). Interaction between individuals is shaped by and shapes higher level collective behaviours or outcomes, but is not reducible to purely individualistic or purely aggregate behaviour. This may be conceptualized by adapting a Coleman diagram, depicting how interaction between individuals is both shaped by, and shapes higher level collective behaviour. In Figure 1, the relationship (4) is transitive; the outcome t_3 explained by the conjunction of type (1), (2) and (3) mechanisms. Actors /entities are situated in social context (individuals in groups, groups in organizations) that influences individual behaviour through the operation of *situational* type (1) mechanisms that may be selected or imposed from the collective level. These may be processes that form the routines or procedures that represent 'the rules of the game' that drive *action-formation* type (2) mechanisms between interdependent actors / entities at a micro-level. These may take the form of; a *pure market*, where independent actors have their own interests and goals, but have resources that can aid the realization of the interests of other actors / entities; a *hierarchy* in which the actions of one entity's actions is under the control of another and advance the other's interests; a *federation* entities linked by a common interest embodied in a set of norms governing rights and obligations. Depending on the structural relations between entities at the micro level in combining individual interests and actions this gives rise to *transformational* type (3) mechanisms and macro-structural outcomes (Hedström and Swedberg, 1998b; Poole and Van de Ven, 2004). We may extend the diagram upwards to reflect how collective group

behaviour influences organizational behaviour and outcomes and still further to reflect how collective organizational interaction in the network gives rise to particular network attractors.

It is through relational mechanisms that firms cooperate to achieve their goals. This includes the ability of the firm to form successful business relationships with suppliers, customers, complementors, and even competitors to jointly co-produce resources. Therefore, when individuals leave and join the organization this may change the dynamic of groups, teams or the firm, creating or destroying existing capabilities (Snowdon, 2002). Relational mechanisms therefore also involve processes of finding and being found by other people and firms and the mutual choice mechanisms involved (Wilkinson, 2005).

Organisational development and change therefore takes place through both planned action and chance that instigate various combinations of processes situated in environmental, cognitive and relational mechanisms. These operate within the firm and between the firm and its network of relations, along with events and processes occurring in the broader environment.

Individuating Mechanisms

Analytical accounts of mechanisms describe what it is about their structure that gives them their tendency or causal power, and under what circumstances these tendencies are impeded, enhanced or counteracted. This is typically done in terms of delineating a beginning and termination condition and decomposing the intermediate condition into the constituent parts and interactions by identifying and individuating the components comprising entities, and their functional roles and capabilities, and the activities in which they engage. For example, in explaining the mechanism for DNA replication, the DNA double helix unwinds - a beginning, producing an intermediate condition that exposes slightly charged bases to which complementary bases bond, producing, after further stages in the process, two duplicate helices- a terminating condition (Machamer et al., 2000). An explanation in terms of

mechanisms requires explanation of how an event, behaviour or outcome was produced, how the termination condition is produced by set up conditions, and how it moves through the intermediate stage (Pierson and Skocpol, 2002).

We should think of *set-up conditions* not as inputs into the mechanism but the initial event of the mechanism (Machamer et al., 2000). These may be an exogenous input from a prior or concurrent process, or actions, including purposeful actions of actors such as people, groups of people, and inanimate objects as passive actors. Initial conditions are crucial for showing what enabling conditions and spatiotemporal orientations are necessary to trigger the mechanism. It may be that certain sequences are only triggered if certain kinds of events occur. In social systems these could be a regular meeting of key staff, the availability or depletion of a new natural resource, invention of a new idea, or the intervention of the right person at the right place and time (Abbott, 1983; Bunge, 1997).

Terminating conditions are some endpoint or outcome but should not be thought of as output because nothing necessarily comes out (Bunge, 1997). They may be the convergence of processes which produce the central subject, a particular kind of entity or state of affairs that we wish to understand (Machamer et al., 2000), such as birth, death, contagion, growth or accumulation (Bunge, 1997).

Terminating conditions may be a routine set of enchainment or ongoing unitary processes, or an exogenous event in further or future mechanisms (Machamer et al., 2000). It may be an achieved or stable end point where the mechanism reaches a state of rest, equilibrium or is neutralized. There may be a number of typical endpoints to sequences (Abbott, 1983). Endpoints may also represent an oscillation point or 'critical juncture' at which feedback mechanisms may be triggered that reinforce the recurrence of particular outcomes and patterns into the future, or act as bifurcation points where new paths may be taken. These points of divergence may be small initial events that can have large longer-term effects and,

once a particular path has been followed, changing paths or reversing them may be very difficult. Events or processes occurring during and immediately following ‘critical junctures’ therefore become of central interest in a narrative for understanding the locking-in of particular trajectories, or accounting for organisational inertia. They may also show how the dynamics triggered by an event or process at one point in time reproduce themselves even in the absence of the original event or process (Bechtel and Abrahamsen, 2005; Craver, 2001; Glennan, 2002; Machamer et al., 2000; Pajunen, 2008; Sayer, 2000).

A description of *the intervening period* requires revealing the processes that play a role in shaping the pattern of events from the set up condition to the terminating condition or outcome. These may be plotted in a variety of ways to distinguish different subplots and the differing forces shaping them (Abbott, 1983). The active organization of the entities and actions determine the way they produce the phenomena– the outcome or event to be explained. Entities have to be appropriately located, structured and orientated, and activities or actions in which they engage must have a temporal order, rate and duration organized in a way that can be specified (Machamer et al., 2000). As shown in Figure 2, a mechanism M produces outcome Φ , and is explained by decomposing it into the component parts, the entities ($C_1, C_2, \dots, C_n$) and their order of acting ($\lambda_1, \lambda_2, \dots, \lambda_n$) (Craver, 2001). Components of mechanisms have a unique function and operate in combination or in a sequence to activate the mechanism. These cannot be rearranged or substituted, added too or subtracted from, without qualitatively altering their role. Components may operate cooperatively or competitively and their interactions have an excitatory and inhibitory effect. Functions are the roles played by objects and actions in their mechanism (Wimsatt, 1976; Wimsatt, 1984). Functions should be understood in terms of activities by virtue of which objects contribute to the workings of a mechanism (Heise, 1990). Description of the internal workings of a mechanism elucidates the sequence by which the components or events triggered by the initial event interact to produce the outcome event.

Conclusion

In sum, explanation by way of generative mechanisms involves identifying central subjects, individual entities such as people, groups, organizations, machines and other material artefacts and the types of events and characteristics that ‘match’ qualitative changes in the subject. It is through the combining of entities, with certain properties, in system specific processes, operating at a micro-level, and their relational connections, that generates a mechanism’s potential to affect change and bring about behaviour or outcomes. In an organizational setting this leads to the emergence of particular capabilities and organisational forms. Explanation by way of mechanisms potentially extends our understanding of process research by deconstructing ‘processes’ into their component parts of actors and entities and their activities that give causal account to change.

References

Abbott, Andrew (1990), "A Primer on Sequence Methods," *Organization Science*, 1 (4), 375-392.

Abbott, Andrew (1983), "Sequences of Social Events: Concepts and methods for the analysis of order in social processes," *Historical Methods*, 16 (4), 129-147.

Abbott, Andrew (2001), *Time Matters: On Theory and Method*. Chicago, London: The University of Chicago Press.

Abell, Peter (1984), "Comparative Narratives: Some Rules for the Study of Action," *Journal for the Theory of Social Behaviour*, 14 (3), 309-331.

Abell, Peter (2004), "Narrative Explanation: An Alternative to Variable-Centred Explanation?," *Annual Review of Sociology*, 30, 287-310.

Abell, Peter (1987), *The Syntax of Social Life: Theory and Method of Comparative Narratives*. Oxford: Oxford University Press.

Bar-Yam, Yaneer (1997), "Complexity Rising: From human beings to human civilization, a complexity profile." Cambridge MA, USA: New England Complex Systems Institute.

Bechtel, William and Adele Abrahamsen (2005), "Explanation: A Mechanist Alternative," *Studies in History and Philosophy of Biology and Biomedical*, 36 (2), 233-464.

Bunge, M. (1999), *The Sociology-Philosophy Connection*. New Brunswick, NJ: Princeton University Press.

Bunge, Mario (1997), "Mechanisms and Explanation," *Philosophy of Social Sciences*, 27 (4), 410-465.

Craver, Carl F. (2001), "Role Functions, Mechanisms, and Hierarchy," *Philosophy of Science*, 68 (March), 53-74.

Elster, Jon (1989), *Nuts and Bolts for the Social Sciences*. Cambridge: Cambridge University Press.

Emery, Fred and Merrelyn Emery (1976), *A choice of futures*. Leiden: Martinus Nijhoff Social Sciences Division.

Franzosi, Roberto (1998), "Narrative Analysis - or why (and how) sociologists should be interested in narrative," *Annual Review of Sociology*, 24, 517-554.

Gaddis, John Lewis (2002), *The Landscape of History: How Historians Map the Past*. New York: Oxford University Press.

George, Alexander L. and Andrew Bennett (2005), *Case studies and theory development in the social sciences*. Cambridge Massachusetts: MIT Press.

Gerring, John (2007), *Case Study Research*. Boston: Cambridge University Press.

Glennan, Stuart (2002), "Rethinking Mechanistic Explanation," in *Department of Philosophy and Religious Studies*: Butler University.

Hedström, Peter (2005), *Dissecting the Social: On the Principles of Analytical Sociology*. Cambridge, UK: Cambridge University Press.

Hedström, Peter and Richard Swedberg Eds. (1998a), *Social Mechanisms: An analytical approach to social theory*. Cambridge, United Kingdom: Cambridge University Press.

Hedström, Peter and Richard Swedberg (1998b), "Social Mechanisms: An introductory essay," in *Social Mechanisms: an analytical approach to social theory*, Peter Hedström and Richard Swedberg, Eds. Cambridge: Cambridge University Press.

Heise, David R. (1990), "Modeling event structures," *Journal of Mathematical Sociology*, 18 (2-3), 183-190.

Hornsby, Jennifer (1980), *Actions*. London: Routledge & Kegan Paul.

Langley, Ann (2007), "Process thinking in strategic organization," *Strategic Organization*, 5 (August), 271-282.

Lewin, K. (1952), "Group Decision and Social Change," in *Readings in Social Psychology*, T.L. Newcomb and E.L. Hartley, Eds. New York, NY: Henry Holt and Company.

Machamer, Peter, Lindley Darden, and Carl F. Craver (2000), "Thinking About Mechanisms," *Philosophy of Science*, 67 (March), 1-25.

Mahoney, James and Dietrich Rueschemeyer Eds. (2003), *Comparative Historical Analysis in the Social Sciences*. Cambridge, United Kingdom: Cambridge University Press.

McAdam, Doug, Sidney Tarrow, and Charles Tilly (2001), *Dynamics of Contention*. Cambridge, UK: Cambridge University Press.

Mintzberg, H., and F. Westerly. *Cycles of organizational change* (1992), "Cycles of organizational change," *Strategic Management Journal*, 13, 39-59.

Pajunen, Kelle (2008), "The nature of organizational mechanisms," *Organization Studies*, 29 (11), 1449-1468.

Pentland, Brian T. (1999), "Building Process Theory with Narrative: From Description to Explanation," *Academy of Management Review*, 24 (4), 711-724.

Pettigrew, A. M. , R. W. Woodman, and K. S Cameron (2001), "Studying Organizational Change and Development: Challenges for Future Research", *Academy of Management Journal*, 44 (4), 697-713.

Pettigrew, Andrew M. (1992), "The character and significance of strategy process research," *Strategic Management Journal*, 13 (Special Issue: Fundamental Themes in Strategy Process Research (Winter, 1992)), 5-16.

Pettigrew, Andrew M. (1997), "What is a Processual Analysis?," *Scandinavian Journal of Management*, 13 (4), 337-348.

Pettigrew, Andrew M. (1990), "Longitudinal Field Research on Change: Theory and Practice," *Organization Science* (1), 3.

Pierson, Paul and Theda Skocpol (2002), "Historical Institutionalism in Contemporary Political Science," in *Political Science: The State of the Discipline*, Ira Katznelson and Helen Milner, Eds. Centennial Edition ed. New York: Norton.

Poole, Marshall Scott and Andrew H. Van de Ven Eds. (2004), *Handbook of Organisational Change and Innovation*. New York, New York: Oxford University Press.

Rescher, Nicholas (1996), *Process Metaphysics*. Albany, NY.: State University of New York Press.

Sayer, Andrew (2000), *Realism and Social Science*. London: Sage Publications Inc.

Simon, H.A. (1992), "What is an "explanation" of behaviour," *Psychological Science*, 3 (3), 150-161.

Snowdon, dave (2002), "Complex acts of knowing: paradox and descriptive awareness," *Journal of Knowledge Management*, 6 (2), 100-111.

Stacey, R. (2001), *Complex Response Processes in Organizational Learning and Knowledge Creation*: Routledge.

Tilly, Charles (2001), "Mechanisms in Political Processes," *Annual Review of Political Science*, 4, 21-41.

Tsoukas, Haridimos and Robert Chia (2002), "On Organizational Becoming; Rethinking Organizational Change," *Organization Science*, 13 (5), 567-582.

Van de Ven, Andrew H. (1992), "Suggestions for Studying Strategy Process: A Research Note," *Strategic Management Journal*, 13, 169-188.

Van de Ven, Andrew H. and Marshall Scott Poole (1995), "Explaining Development and Change in Organisations," *Academy of Management Review*, 20 (3), 510-540.

Van de Ven, Andrew H. and Marshall Scott Poole (2005), "Alternative Approaches for Studying Organizational Change," *Organizational Studies*, 26 (9), 1371-1404.

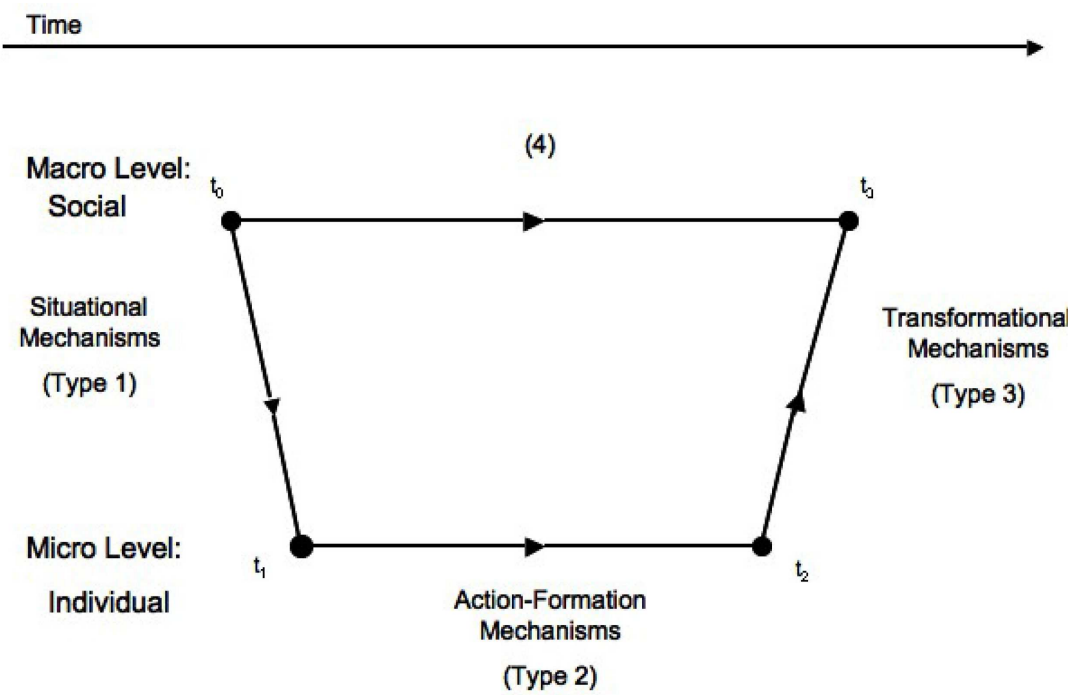
Weick, Karl (1995), *Sensemaking in Organisations*. London: Sage.

Wilkinson, Ian F. (2006), "The evolution of an evolutionary perspective on B2B business," *Journal of Business & Industrial Marketing*, 21 (7), 458-465.

Wilkinson, Ian F. (2005), "The Evolvability of Business and the Role of Antitrust," in *American Antitrust Institute Workshop - invited keynote address*. Washington DC, June 2005.

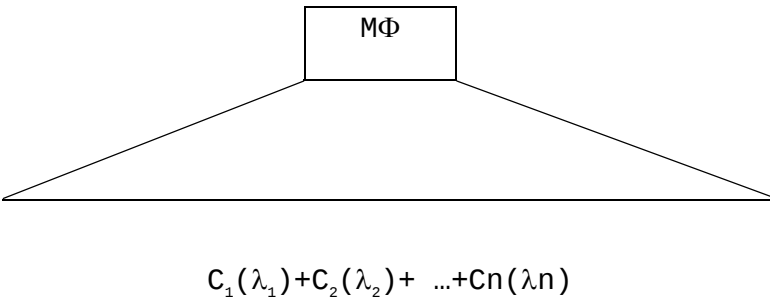
Wimsatt, W.C. (1976), "Reduction, levels of organization and the mind body problem," in *Consciousness and the Brain*, G. Globus, Ed. New York: Plenum Press.

Wimsatt, W.C. (1984), "Reductive explanation: A functional account," in *Conceptual Issues in Evolutionary Biology*, E. Sober, Ed. Cambridge, MA: MIT Press.



(Source: Adapted from Abell, 2001, p.61)

Figure 1 - Macro - Micro Inter-level Mechanisms



Source: Adapted from Craver (2001)

Figure 2 - Relation between a Mechanism and its Components