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## Emergence in Organisations

*Richard Seel.*

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*In this article I offer some reflections on emergence in organisations and suggest seven 'conditions' which might help to facilitate emergent change. I also outline a process-'emergent inquiry'-which can be used to help emergent creativity.*

### The nature of emergence

According to Jeffrey Goldstein's helpful overview (1999), the term 'emergence' was first used by the English philosopher G. H. Lewes well over 100 years ago. The term was taken up in the 1920s by "a loosely joined movement in the sciences, philosophy and theology known as emergent evolutionism..." (Goldstein 1999:53). But the process of emergence itself remained, for them, unknown and unknowable. It was not until the advent of 'complexity theory' (see Waldrop 1993 or Lewin 1993 for a popular introduction) that emergence became prominent again. Experiments with computer programs known as cellular automata showed that simple interactions between simple 'agents' could give rise to surprisingly complex behaviour (Langton 1986, Holland 1995, Kauffman 1996).

Emergence became thought of as one of the defining properties of complex systems and over the last twenty years there has been a wide-ranging debate about its nature and causes. However, although emergence may be a defining property of complex systems but it is itself far from easy to define. Despite the title of his book (*Emergence* 1998), John Holland declines the challenge:

*It is unlikely that a topic as complicated as emergence will submit meekly to a concise definition, and I have no such definition to offer.*  
(Holland 1998:3)

Kevin Mihata and Ralph Stacey are braver and come up with some striking similarities:

*...the process by which patterns or global-level structures arise from interactive local-level processes. This "structure" or "pattern" cannot be understood or predicted from the behavior or properties of the component units alone. (Mihata 1997:31)*

*Emergence is the production of global patterns of behaviour by agents in a complex system interacting according to their own local rules of behaviour, without intending the global patterns of behaviour that come about. In emergence, global patterns cannot be predicted from the local rules of behaviour that produce them. To put it another way, global patterns cannot be reduced to individual behaviour. (Stacey 1996:287)*

There is scope here for both intentionality and pre-formation (a less theologically loaded word than predestination). The fact—if it is a fact—that there are only a finite number of possible configurations for a given organisation does not preclude choice and free will. It does however have a significant influence on the nature of the choices which can be exercised ("There's a divinity that shapes our ends, rough-hew them how we will" Hamlet V:ii).

Emergence, then, cannot be control, predicted or managed. There are no 'levers' which can be pulled to give us a particular kind of emergent result. But still two questions remain, which are key for those interested in organisational life and change: can emergence be facilitated and can it be influenced?

## Seven ' conditions for emergence'

If emergence could be facilitated, it is legitimate to ask whether it is more likely to occur under certain conditions. I believe that it is and I present below seven factors which seem to be relevant. There is nothing magical about the number seven (though George Miller's classic paper (1956) might lead us to believe otherwise) but this ' magnificent seven' seems to me to be worth exploring further.

### Connectivity

The first three conditions—connectivity, diversity of agents, and rate of information flow—are derived from the work done on agent-based simulations by people such as Chris Langton (1986), Stuart Kauffman (1996) & John Holland (1995, 1999) and largely associated with the Santa Fe Institute.

I am working on the premise that change in an organisation is a change in the patterns of relationships between those who are members of the organisations (and also new patterns of interaction with the environment). Connectivity thus becomes crucial. Existing patterns of connection ' ossify' and without more connectivity they cannot change.

Although Kauffman's work indicates that in simple Boolean networks too much connectivity can inhibit emergence, this is rarely an issue in organisations. Building connections—especially across boundaries—is vital for preparing an organisation for change.

Some recent work on networks may have a bearing here (Barabási 2002; for a somewhat more technical account see Hayes 2000a&b). It appears that in many networks connectivity is not evenly distributed. Instead, most 'nodes' in the network have few connections, while a few have many connections (in many networks this appears to conform to some kind of power law). Many researchers argue that this leads to stability, since removing a node at random is not likely to affect many other nodes (since most nodes have few connections). However, if even a few multiply-connected

I once had a debate with another consultant about a piece of work I was doing. "This is not a change-ready client", she claimed and therefore I should not be attempting a major intervention. I agreed with her diagnosis but not her conclusion. The purpose of the intervention was not to 'change' the client, but to help it become change-ready.

### Diversity

Diversity is crucial for emergent change to occur. Strictly speaking, it is an *increase* in diversity which is required for change to occur. The greater the diversity in an organisation, the greater the 'possibility space' which it can explore. What is needed is diversity of all kinds—cultural, intellectual and emotional. Diversity, on its own, will not give rise to emergent patterns; indeed, it can lead to anarchy and conflict. But in concert with the other conditions it has a vital part to play.

### Rate of Information Flow

If connectivity specifies the *possibility* for effective communication, it is still necessary for actual transactions to take place between individuals. John and his manager are connected if they meet once a year for a so-called 'appraisal'. But unless the frequency and quality of interactions are high they are not connected in any meaningful sense.

It would seem that organisations are analogous to 'dissipative systems' (Prigogine & Stengers 1984). In such systems, there is a constant throughput of energy and stable(ish) structures are able to form in far from equilibrium conditions.

When a dissipative structure leaps into a new order, it requires more energy or information to sustain it than the simpler structure it replaced. In terms of the flow of information, a stable system can be sustained with a sluggish flow, but a much more vigorous and richer flow is necessary for a system operating far-from-equilibrium.

## Lack of inhibitors

The fourth condition—lack of inhibitors—comes from personal experience and from Stacey's work on complexity in organisations (1996). (He argues that too much or too little contained anxiety inhibits emergence. Furthermore, if the levels of power differentials in the system are too high or too low, emergence can also be inhibited.)

Emergence can be suppressed by those who have power and who feel threatened (possibly accurately) by the possibilities implicit in new forms of organisation. People will also resist if they feel too anxious about change or if they feel that the change threatens the core organisational identity to which they have become attached.

## Good Boundaries

Good boundaries seem to be necessary for emergence to occur. These may be deadlines, clear goals and intentions, prescriptions about length or size, and so on. The common factor seems to be that there is a well-bounded 'space' within which the emergence can occur.

An example from my editing experience may help indicate this. Documentary film editing is essentially the process of 'discovering' the story which lies latent within the rushes. This may match the director's intent very closely or it may be quite different. The process is one of facilitating the emergence of form and I have learned a lot about emergence from my own experiences as an editor.

When editing a fifty-minute documentary, it was quite common for an apparently finished structure to end up at about sixty minutes. Neither the director nor I could see any way to shorten the film without doing serious damage to its integrity.

The solution was to apply for an expanded transmission slot. Occasionally this was granted but the more common response was a simple 'no'. Strangely enough, when this decision was made it suddenly became clear how to cut the film down. The new structure seemed no worse than the previous—and in many cases was tighter and flowed better.

I believe that it was the clarity of the boundary which aided the process of creativity. Before, there was always the possibility of running at the longer time and so the emergence of the shorter form was more difficult to facilitate. Once the edict had been given the new pattern seemed to present itself with little difficulty.

There is, for me, some link here with Transactional Analysis—at least as an explanatory mechanism. The creative artist cannot create without giving the

Child free rein. Yet if the demands of the Parent are not heard and taken into account there is likely to be self-indulgence rather than art. The role of the Adult is to freely let go of control and yet to still retain enough autonomy to be able to 'referee' when required.

In an organisational context, my experience is that the giving of clear boundaries can be liberating. A simple example may suffice. I recently facilitated a meeting of the 'top fifty' managers in a local authority. I arranged the seating in the room in ten circles, each with six chairs. Naturally, as people came in, they tended to sit with people they knew. Since I wanted to get the maximum diversity and connectivity in the room (the events had always been very formal before, chairs in rows, etc.) I needed to find a process to form new groups. I gave some simple rules:

- In ten minutes' time everybody must be in a group.
- No group may have more than six members.
- No group may have fewer than four members.
- Each group must be as diverse as possible in terms of grade, age, length of service, department, etc.

It took just seven minutes for everyone to be in a group. The noise and energy in the room was wonderful to behold. Everyone was having brief conversations, sharing information and generally having a good time. In the afternoon I repeated the exercise—only this time I only gave the rules were slightly different:

- In five minutes' time everybody must be in a group.
- No group may have more than six members.
- No group may have fewer than four members.
- No-one may work with the same people they worked with in the morning.

This time it took three minutes! This is not an example of emergence as such because the desired pattern was prescribed but it is an example of self-organisation. I am convinced that it is facilitated by a combination of two things: the unambiguous boundary conditions (the first three prescriptive rules in each case) together with the permissive fourth rule which gives a clear goal but leaves all details of operation to the participants.

In fact, I believe that this is a crucial principle for the management of self-organisation in corporate life. It is closely related to Mark White's (1999) notion of 'Common Law' rules. White suggests that the difference between Roman Law and Common Law can be characterised as "Whatever is not permitted is prohibited" versus "Whatever is not prohibited is permitted". The latter is equivalent to my formulation for self-organisation in adaptive organisations: that is, lay down very strict boundaries specifying what is not permitted, add a clear goal, and then give freedom to experiment within those parameters. Great

Harvest Bakery in the US is an example of an organisation which is explicit about this way of organising. Its franchise agreement states that, "ANYTHING not expressly prohibited by the language of this agreement IS ALLOWED."

### Intentionality

Intention seems to play a part in emergence in human systems, especially in encouraging a particular kind of outcome. David Cooperrider's work (1990) on the way positive intentions can lead to positive outcomes suggests that it is possible to influence the broad general direction of emergence although not to control or specify it. Indeed this is the whole basis of Appreciative Inquiry (Watkins & Mohr 2001).

However, it has to be recognised that intention is not a simple intrinsic property of human agents. Instead, it is often—perhaps always—co-created as a result of interactions with other people. Intention, therefore, can be thought of as an emergent property created from the interactions within a human system which then feeds back into the system and influences its future development. In particular, it influences the way in which at least one of the complex agents in the system will behave in future.

### Watchful Anticipation

Finally, but not least in importance, is the need for watchful anticipation. Premature closure can inhibit emergence, or at least prevent its full blossoming and subsequent feeding down into the continuing development of the system. The desire for action in human systems may be almost overwhelming but emergence cannot be rushed; it requires a kind of expectant waiting and a sensitivity to the unfolding moment—a state often referred to in the literature on creativity.

In an organisational context this condition is the hardest of all to find. Most organisations have some deep seated cultural rules which say things like, "Be busy", "Never leave first" or "Long hours are heroic". One of my favourite slogans is, "Don't just do something, stand there!" but it is really hard in modern organisational life. The problem is that most organisations are only prepared to attempt the path of change if they can travel in ways which actually reinforce the existing patterns—to do different and be different is really hard.

### Emergent inquiry

I have recently been experimenting with some of these principles in organisational life. I have been using what I currently call *emergent inquiry* to explore the possibilities of facilitating emergence in an organisational context. Emergent inquiry is a form of participative collaborative inquiry (Reason 1994, 1997) which takes the 'seven conditions' above and tries to apply them to, at

present, small-scale inquiry. Table 1 gives an overview of the procedure. Behind this lies one fundamental injunction:

**Do not try to answer the question; wait till the question answers itself.**

<b>Process</b>	<b>' Condition'</b>
Everyone speaks with many others	Connectivity
Relevant & ' irrelevant' inputs	Diversity
Many short ' rounds'	Rate of information flow
Safe, egalitarian environment	Lack of inhibitors
Clear question, tight time-keeping	Good boundaries
Relevant topic, desire for answer	Intention
Wait for the question...	Watchful anticipation

Table 1 Emergent inquiry characteristics

So far the experiments have been small-scale but the results have been promising. For instance, a colleague and I were working with a team of eight managers responsible for implementing a new organisation. They had previously decided that self-managed teams were the way ahead for the organisation but were obviously still very hazy about the concept. I suggested an quick emergent inquiry and they agreed to give it a try.

They agreed on a relevant and specific question: "How do we enable self-managed teams in the organisation?" We then gave them a brief handout on self-managed teams. They had two minutes to scan it and then broke into pairs for five minutes (exactly) to discuss the issue. We gave them another handout on the same topic, another two minutes to scan, then five minutes in a different pairing.

Next we brought everyone together and I offered some ' diverse' input on ' simple rules' by way of *Boids* (Reynolds 1987) and also the ' seven conditions for emergence'. I made no connections with the task in hand, so in one sense these offerings were a *non sequitur*. However, a spontaneous discussion started about whether the question should really be, "What is a self-managed team?" I said that this might come up in their discussions. My colleague then offered a third question: "Why self-managed teams?"

Two more five-minute rounds followed, each with a new partner. When they reconvened we debriefed each of the three questions. They had lots of clarity about the ' what'—which had not been true in previous discussions), a good sense of the ' why' (also a first) and some clear and practical steps to start the ' how'.

The whole inquiry took thirty minutes and produced some impressive results, given the lack of clarity and consensus which existed before it was undertaken.

## Implications for organisations

Emergent inquiry is still in its infancy. Applying the 'emergent perspective' to wider organisational change is even further off. The command and control paradigm, with its desire for certainty and belief in the possibility of 'making things happen' is still dominant. The process of working out the practical implications of the 'emergent organisation' paradigm is still under way. The table below offers some indications of the sorts of changes which will be required to shift from one to the other. Some are being tried—some are being implemented—in organisations. What has been lacking is an overarching framework to justify them. This paper hopes to offer 'one more brick in the wall.'

Command & control paradigm	Emergent paradigm
Keep people in 'silos'	Build connectivity (1)
Ensure everyone 'salutes the flag'	Encourage diversity (2)
Manage communication initiatives	Have conversations in corridors (3)
Blame people for failures	Learn from events (4)
Make it clear who's in charge	Give everyone leadership opportunities (4)
Tell people what to do	Tell people what not to do (5)
Set objectives	Agree clear goals (6)
Keep busy	Wait expectantly (7)

Table 2. Command & Control vs. Emergent Organisations. The numbers in parentheses refer to the 'seven conditions'

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Send mail to [richard@new-paradigm.co.uk](mailto:richard@new-paradigm.co.uk) with questions or comments about this web site.

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