

# AUTOPOIESIS IN ORGANISATIONS

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Organisations are open systems that are subject to diverse external and internal forces, the combination of which gives birth to chaotic organisational dynamics. If managers and employees are unable to cope with these dynamics, organisations are inevitably thrown either into a fixed order and rigidity or into an uncontrollable chaos and collapse.

In order to exist, organisations must be able to reproduce their specific organisational dynamics and at the same time to evolve and shape themselves in a vital *structural coupling* with the ever changing dynamics of their environments. We refer to this crucial survival process of the interlocked adjustment of internal chaotic dynamics to the chaotic dynamics of the environment as: *organisational autopoiesis*.

The main characteristics of organisational autopoiesis are the following:

## 1. Sensitivity to Initial Conditions

In chaotic dynamics small, seemingly insignificant decisions can cause large effects. Insignificant decisions usually produce slight changes in the initial conditions of apparently similar decision-making processes, but these changes can eventually lead to entirely different problem situations. In chaos theory, such a phenomenon is called *extreme sensitivity to initial conditions* or the **butterfly effect**.

The butterfly effect reveals the unpredictability of organisational autopoiesis. Since one can never succeed in a precise identification of initial conditions of even the simplest decision-making processes in an organisation, one can never succeed in predicting long-term organisational behaviour influenced by these processes.

## 2. Strange attractors

In its everyday manifestation, chaotic organisational dynamics are attracted by 'islands' of relative stability (called '**strange attractors**') within the sea of chaos. These islands of dynamic stability represent specific kinds of settled organisational activity (for instance, activity oriented towards technological innovation, market share expansion, introduction of new products, etc). Each kind of activity represents a specific pattern in overall organisational dynamics. One cannot predict exactly how a given kind of activity will evolve in time. The waves of chaos around each 'island of strange attraction' continually interfere with the scrupulous plans of the managers. Qualitative descriptions of the attractors can be produced, however. Attractors in organisations are "*organisational configurations which demonstrate regularities in their macro-characteristics even though they may reveal large differences in their internal processes.*" (Thiéart, 1995).

The strange attractor represents the outward manifestations of organisational autopoiesis.

### 3. Non-linear Dynamics

Organisational autopoiesis displays many of the key characteristics required of **nonlinear dynamic systems**. One of these key characteristics is the *lack of linear cause-effect relationships*. So interwoven and entangled are the factors influencing organisational dynamics that it is hardly possible to define which factor (or combination of factors) caused the observed effect. The emphasis is on understanding the process whereby a multitude of factors influence organisational dynamics.

In chaotic systems, one cannot pass through the same coordinates twice. In organisational management, a decision will never be made in the same set of circumstances under which previous decisions have been made, either by the same organisation or by another organisation. This creates problems in management practice (Gajendragadkar and Johnston, 1977). The implications of this are twofold:

- (1) Decisions that have led to beneficial results in the past will not necessarily lead to beneficial results in the future;
- (2) A constant innovation process is necessary in order to remain successful.

### 4. Fractal Structure

In their chaotic domain, organisations should sustain a **fractal** structure. For instance, several layers of similar structural patterns and configurations should be observed at the overall organisational level, at sub-organisational levels, at group levels and at the level of the individual.

What is essential for the fractal structure is that it does not become simpler when one goes from a higher to a lower level. The whole of the organisational structure consists of 'wholes' of sub-organisational structures. The complexity of an individual employee is at least as large as the complexity of the whole organisation. When one deals with chaotic dynamics, reduction never simplifies.

Both external and internal fluctuations test the stability of existing organisational structures. The fluctuations can produce two different effects. First, the structures can fight off the fluctuations using some appropriate negative feedback mechanisms. Second, the fluctuations can be amplified through a positive feedback mechanism creating a critical stage in the functioning of the organisation.

The fractal structure is vital for realisation of the reproductive mechanism embedded in the process of organisational autopoiesis.

### 5. Edge of Chaos

When in a critical stage, organisational behaviour is thrown into an out-of-equilibrium zone - a special zone between order and disorder, where the emergence of new

qualitative states may take place, and transformation of the organisation as a whole may occur. This zone is called the *Edge of Chaos* .

The Edge of Chaos is an important place for any organisation. One step further and the organisation falls into a deep chaos in which it may be overwhelmed with change. One step back and organisation is in the region of order. Being in order, the organisation is not able to adapt sufficiently to remain viable. It is just on the frontier between these two regions - at the Edge of Chaos - where a delicate, dynamic balance between random chaos and rigid order can emerge. This state of balance is impregnated with the seeds of innovative transformations.

While managers cannot be masters of organisational transformation at the Edge of Chaos, they need not be slaves to it. They can co-create it. This is an entirely new and challenging way of perceiving the role of managers in the age of 'living with Chaos.'

***"In a recursive, complexly interwoven world, whatever one does propagates outward, returns, recycles and comes back in a completely unpredictable form. We can never fully know to what results our action leads. We take action, the action can have a very potent shaping effect. Then we relax the drive to control and allow the process to unfold - the process learns, shapes and changes itself through all its inseparable components, not under the direction of one of them only. Together with overall changes in the process, we also change, almost unnoticeably, without any strain" ... (Goerner, 1994).***

The Edge of Chaos is where organisational autopoiesis reveals its creative ability.

## **6. Self-organisation**

The turbulence of non-linear dynamics produces vortices (like whirlpools in troubled waters or tornados in a fierce sky). Each vortex is impregnated with energy, out of which a self-organising ('sucking') force may emerge. The self-organising force of a vortex cannot appear, however, unless the participating streams - either masses of running water or turbulent air (or flows of irritating ideas in the human brain, burning emotions in the human heart, etc.), are both:

- (i) permanently in motion (i.e. out of equilibrium), and
- (ii) interacting intensively with each other.

When these two conditions are satisfied, the powerful self-organising force at the centre of the vortex spontaneously emerges. Vortices of immense energy are hidden in organisational dynamics. It is a noble challenge for organisational leaders and managers to wake them to life.

The following table (see Gajendragadkar and Johnston, 1977) summarises different approaches to problems taken by an organisation seeking to maintain equilibrium versus an organisation seeking to achieve advancement through continuous self-renewal.

<i>Organisational Attribute</i>	<i>Equilibrium-Seeking Organisation</i>	<i>Self-organising Organisation</i>
<i>Strategy</i>	Balance Preserving	Allows Emergence
<i>Planning</i>	Fixed Goals	Open for Qualitative Changes (Bifurcations)
<i>Fluctuations</i>	Damping	Creative Responses at the Edge of Chaos
<i>Change Process</i>	Incremental	Perpetual Innovation
<i>Chaos</i>	As an Excuse	As an Opportunity for Growth

In order to be prepared for critical decision-making, managers must cultivate a self-organising organisation - one that maintains a constant self-renewal process. This type of management acknowledges that chaos and instability are the sources of its renewal.

*"A self-organising organisation can survive discontinuous changes and make the transformation necessary to organise itself into more complex forms. The self-organising agency does not respond to every fluctuation from inside or outside the organisation. Instead, it possesses the internal potential and energy to break with existing symmetries and methods when positive fluctuations occur. This internal potential is the basic resource of the self-organising agency that managers foster and develop" (Kiel, 1994).*

Self-organisation is the essential force in the process of organisational autopoiesis. If there is no self-organising ability, there is no autopoiesis in organisations and therefore they are not sustainable.

## **Conclusion**

The concept of organisational autopoiesis can help managers to understand the operations of their organisations better: to avoid wasting time and energy trying to force complex organisational development in a pre-planned, non-negotiable direction; instead to ***learn how to nudge from within the organisation, how to manage and guide from inside of its chaotic dynamics.***

The unpredictability of complex behaviour is not then considered to be an obstacle to dealing with this behaviour. On the contrary, by exploring the unpredictable dynamics of organisational autopoiesis, managers and employees can gain insights with enormous predictive power. Here are some insights that are helpful in understanding and working with organisational autopoiesis.

(1) *There are no trivial or non-valuable actions:* even randomly chosen and seemingly insignificant actions can lock-in, accelerate and amplify beyond any human ability to control their future directions; because of this effect, complex organisations are permanently driven out of equilibrium.

What are the implications of this for managers? It shows the need to open minds and hearts to see and feel the subtleties in their organisation, particularly in human relations; these subtleties could be crucial for understanding changes in organisational dynamics. Giving employees greater control over day to day decisions and other organisational matters can help the organisation to become more responsive and flexible to chaotic events.

(2) In contrast to equilibrium physics and mechanics, where a critical state is an exception, in the far-from-equilibrium reality of organisations, *a critical state is the typical state of matter.*

Therefore managers can forget any dreams of 'blissful' steady states in organisational dynamics and concentrate on learning how to deal with critical states. It is the critical state (edge of chaos) where the practical ability of a manager is tested, not in the steady state of affairs. The latter simply does not exist in the ever-changing flow of organisational events.

(3) *Chaotic dynamics are 'ruled' by strange attractors:* emerging phenomena with whimsically strange forms (seen when mapped geometrically). On this map, anything that is not on the strange attractor is 'folded' towards it, but anything that is on it is 'stretched' in an unpredictable way - except that one thing is predictable: it always stays on the attractor.

When dealing with organisational complexity, managers need to understand what kind of strange attractors are naturally propelling the autopoiesis in their organisations. They need to discover what fields of activity could attract, inspire and concentrate the energy of the employees, what are the regions where this energy dissipates and if there are any hidden forces responsible for bringing forth specific organisational dynamics. If it happens that the present strange attractors are detrimental for organisational survival, the managers must work out how to catalyse the emergence of new attractors which are in favour of organisational (and individual) growth.

(4) *Chaos is ubiquitous:* a chaotic orbit can come arbitrarily close to any conceivable point in the space of organisational activity.

Since chaos can occur on all size scales of human activity, both managers and employees can use instabilities in order to manipulate the energy in organisations on a very large scale. This becomes possible due to the butterfly effect of organisational autopoiesis: small changes can bring forth significant results. The butterfly effect gives great power to the hands, brains and hearts of people working in organisations. When properly used, this power can produce the improvements that are most essential.

(5) *The Edge of Chaos provides the opportunities for self-organisation.*

A successful organisation is one that is constantly innovating and producing new solutions to old and new problems. Managers should realise that self-organisation never emerges in organisations that seek to maintain equilibrium. Autopoiesis and equilibrium are incompatible. However, if an organisation functions at the edge of

chaos, the vortices of self-organising and revitalising force inevitably emerge, opening an almost unlimited space for the best outcomes of organisational autopoiesis - collective and personal creativity and growth.

*The ability of participants in an organisation mutually to inspire and ignite imagination, to warm hearts and awaken hopes and aspirations, to radiate joy and stimulate new thoughts and vision - this is what fires organisational autopoiesis. If this happens with honesty and humility, good will and the sincere desire to help and support, organisational autopoiesis will liberate the potential of people and organisations for creativity and growth.*

### **References**

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