

# Systems Thinking in Action



Exploring Systems Thinking Concepts  
and Applications For Business

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## ***Abstract***

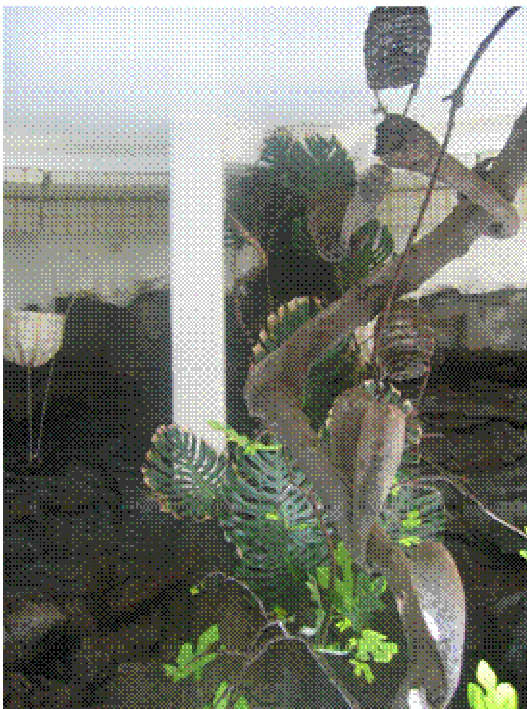
As the global context for business continues to undergo seismic shifts, we explore how Systems Thinking can help us to understand this 'Terra Incognita' and develop enduring strategic solutions.

**Conceptualization - seeing the future through imagination and system thinking**

## ***New Century; New Challenges***

As we move onwards into the twenty-first century and its mounting management challenges, many leading writers and thought-leaders are examining emerging and unprecedented situations under the conceptual banner of Mega-Trends. In the meantime, amongst these shifting sands, business managers are trying to understand what all this means and how to respond.

## ***And The Need For New Tools***



In this new environment although we are trying to cope with exceptional and unique issues we have a dearth of tools to call upon. Management is considered somewhat a science; a discipline which can be learnt. The sustained popularity of the MBA bears testament to that.

However in an era where globalisation, technology and ideology are shifting the playing field it is evolving to become an art too. There is a need to sense our way through the new landscape and look to our intuition as well as our hard analysis.

We have seen many examples where old tools and approaches are not sufficient.

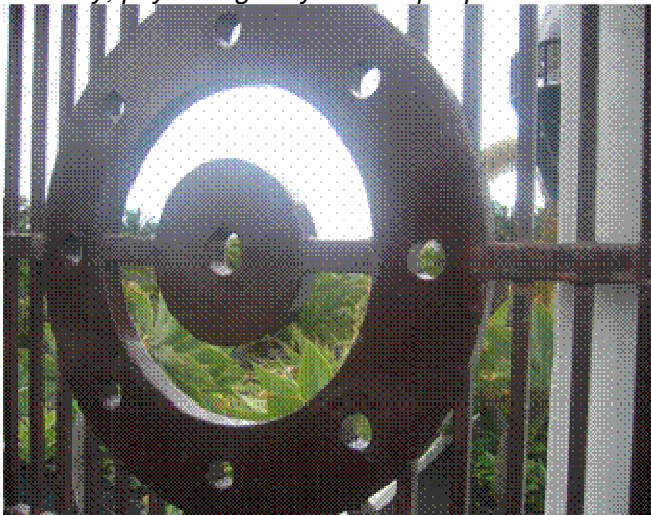
Think about the political debacle in 2006 regarding textile imports from China being halted using legacy quota systems leading to the creatively named, 'Bra Wars'. Historical learning and practices are not necessarily always appropriate in the evolving marketplace.

Often we try to apply simple models to complex issues. We think cause and effect are closely linked in time. We focus on solutions to provide immediate effect in a short time scale.

Systems Thinking challenges this approach and provides a framework for the future.

### **Future Shock**

*"In the three short decades between now and the twenty-first century, millions of ordinary, psychologically normal people will face an abrupt collision with the future."*



So reads the first sentence of Alvin Toffler's 1970 book predicting the perceived impact of technological, social, and economic change, driven by the increasing influence and development of science and technology.

Toffler's thinking has mapped our evolution from agrarian (1<sup>st</sup> wave) through the industrial revolution (2<sup>nd</sup> wave) and into the uncharted territory of the information age (3<sup>rd</sup> wave).

Where the industrial revolution built its models and concepts around mechanistic analogies, we are increasingly seeing the use and discussion of biological, organic or nature-based analogies.

***"The industrial era management model is now blowing its bolts and rivets." Alvin Toffler***

This industrial to ecological focus reflects a change in mindset and perceptions about how business needs to think. We need to dispense with the linear; where A causes B causes C and so on and think in terms of a biological network with relationships, dependencies and interactions.

This is where Systems Thinking comes in; offering an approach rooted in the study of social systems and integrating an understanding of the laws of nature which supports a much wider and deeper level of business thinking.

***Time - 'We learn best from our experience, but we never directly experience the consequences of many of our most important decisions', Peter Senge***

Systems Thinking; Theory to Application

Systems Thinking first emerged during the 1920s descending from three different fields: organismic biology, Gestalt psychology, and ecology.

These fields were all concerned in some way with living systems and Systems

Thinking has developed through the weaving together of different disciplines.



The science of ecology introduced the concept of the network and led to the insight that **the network** is a pattern common to all life.

***"Wherever we see life, we see networks." Capra***

The 1940s saw the ongoing developing of systems theories bringing in the additional disciplines of general systems theories and cybernetics.

During the 1970s a mathematical perspective was considered as chaos theory and fractal geometry developed. The development of computers helped to accelerate the evolving findings of chaos theory and revealed amazing patterns behind what seemed like chaos.

***"Chaos theory is really a theory of order, but of a new kind of order that is revealed by this new mathematics." Capra***

In the novel, **Jurassic Park**, chaos theory is referred to;  
*“Chaos theory teaches us that straight linearity...simply does not exist. Linearity is an artificial way of viewing the world. Real life isn't a series of interconnected events occurring one after the other like beads strung on a necklace. Life is actually a series of encounters in which events may change those that follow in a wholly unpredictable, even devastating way.”*



In 1956 Professor Jay Forrester of Massachusetts Institute of Technology (MIT) developed systems thinking further).

***“The crucial characteristic of the new mathematics is that it is a nonlinear mathematics... For example, the smooth flow of water in a river, in which there are no obstacles, is described by a linear equation. But when there is a rock in the river the water begins to swirl; it becomes turbulent. There are eddies; there are all kinds of vortices; and this complex motion is described by nonlinear equations. The movement of water***

One of his pupils; Peter Senge published a seminal book, in 1990, *The Fifth Discipline*, and since then there has been more development around the practice and business applications.

The art, discipline and perspective of Systems Thinking offers significant insight when applied to today's complex business challenges. Interestingly, this multi-disciplinary approach synthesizes;

- the study of pattern
- the study of structure
- art and science
- intuition and logic

Previous practices and studies which have been in opposition across the history of Western Thinking.

## **The Essence of Systems Thinking**

The concept is a simple one. Firstly let's look across some definitions;

sys·tem (sīs'təm) *n.*

1. A group of interacting, interrelated, or interdependent elements forming a complex whole.
2. A functionally related group of elements

The biologist Ludwig von Bertalanffy, states; - *A system is an entity which maintains its existence through the **mutual interaction** of its parts.*

***“A system is a perceived whole where all elements ‘hang together’ because they continually affect each other over time and operate toward a common purpose.”  
The Fifth Discipline Fieldbook, Senge.***

Systems Thinking is concerned with thinking about an expanded scope when compared with traditional, reductionist analysis. It is about looking through a different lens; one which expands the horizon of analysis rather than reduces it down into its component parts.



The key element in any definition is the element **of mutuality**; the fact that there is a two-way relationship. This is the essence of the system and what drives the dynamic.

Whilst this may seem easy on a certain level this approach works in a very different way to our traditional ways of operating and requires a shift of mindset to pursue.

***metanoia - Greek word meaning "change of mind"***

It requires us to see interrelationships rather than linear cause-effect chains, and processes of change rather than snapshots.

- Traditional Thinking = Typically reductionist and isolating; separating individual pieces of what is being studied
- Systems Thinking = Holistic and expansive; Considering the part and the whole and the interaction relationships.

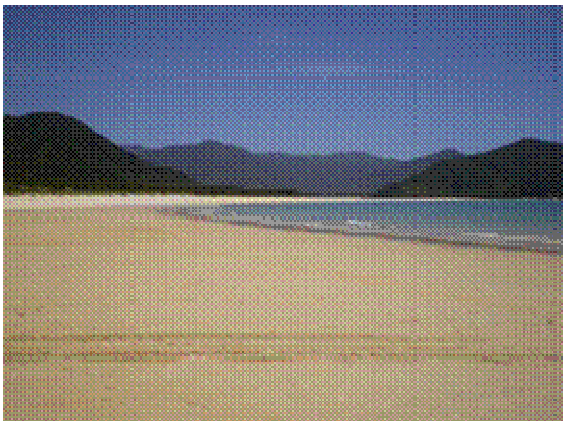
Whilst Systems thinking is a conceptual framework, the emerging applications and tools that have been developed guide us in making the full patterns clearer, and help us see how to change them effectively.

## ***The Characteristics of Systems Thinking***

Systems Thinking contains seven key concepts and ideas which we need to explore before we can start to use it as a business analysis tool.

### **1. Chaos Theory**

Chaos theory is a field of study which looks at the underlying patterns behind seemingly chaotic systems.



The system can be highly sensitive to particular events. This phenomenon is commonly called, 'The Butterfly Effect' and has inspired numerous authors and film writers to explore its creative potential.

Often chaos theory is used to study non-linear dynamic systems such as global warming, fluid activity and economics.

### **2. Expansive Not Reductionist**

Systems Theory opens up the field of analysis and considers a complete context for events to understand how the dynamics of the whole system work.

The theory views the whole as more than the sum of the parts and so, unlike traditional analysis which reduces the system to isolated parts, systems thinking considers a wide, extensive scope.

***One could study hydrogen and oxygen in isolation from each other forever and never discover the characteristic of wetness. Wetness is an emergent characteristic of the mutual interaction of hydrogen and oxygen when combined to produce the molecular form called water. One has to study the system to get a true understanding of wetness. Studying the parts will not provide an appropriate understanding. – Gene Bellinger***

### 3. Closed and Open Systems

There are many different types of systems which may help to inspire problem solving if we have a precedent of how these different systems work. For example a system may be mechanical like a car engine or organic like a body.

### 4. Feedback and the Nature of Relationships

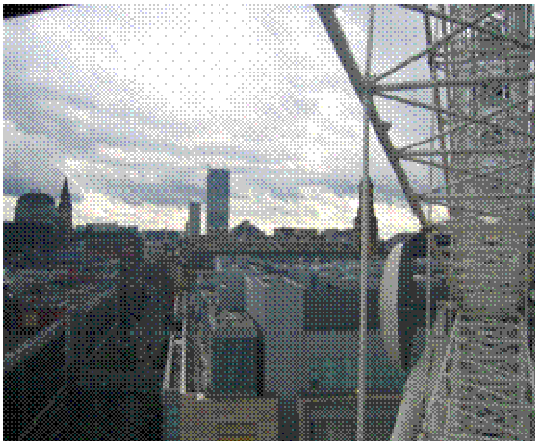
Systems by definition, are parts working together with a relationship between the parts. The nature of the relationship is vital to understand when looking at systems. In essence, the relationship is either;

**Balancing** such as when we quench our thirst and get feedback from our bodies that we have satisfied this need and don't need to drink anymore,

or **Re-inforcing**, such as when we drink alcohol. Typically the more we have; the more we want leading to escalating drinking.

### 5. Structures and Patterns (Archetypes)

Initially we may think that this is all too complex and hard to conceive.



However we must remember that we are living in a complex world and throwing simple tools at today's issues may not work. Whilst Systems Thinking is referred to as 'Complexity Science', we are guided through its applications by some helpful, pre-defined structures which many of our issues may fit into.

These patterns are called Archetypes and they are models for how many typical systems operate which we may use for inspiration and understanding.

### 6. Time

One of the key concepts of systems thinking is that of time. The modus operandi of today's businesses is to seek quick solutions that can be easily implemented and the results achieved fast.



However in complex systems there are often delays in effect and the consequences of our actions happen at a distance from the initial action.

For example, some recent analysis we conducted was looking at the effect of a Sales Force in the retail environment, understanding how they affected the performance of a

product in store. Very little statistically significant data was seen when looking at a six month period which covered an average of about 2 visits. Running the analysis again, but over a 2 year period revealed a distinct trend in performance driven by the sales visits.

Systems can take time to respond and when using it we need to be thinking about business beyond the next quarter. Its rewards are delivered through sustainable and enduring solutions.

***“The Newtonian paradigm embodies essentially a linear cause and effect relationship. A paradigm which is reinforced by the way in which we view daily events. The difficulty with this paradigm is that it provides a very limited short term perspective for understanding how things really work.” Gene Bellinger***

## 7 Leverage

Leverage is about choosing the most effective point of influence on the system. The question here is ‘where do we break into the system to change its behaviour?’



If we think about chaos theory and the butterfly effect then this looks at how a tiny influence like the flap of a butterfly's wing could alter weather patterns on the other side of the world.

Good practical business examples here are provided by the applications of systems thinking in call centres where a dynamic environment can be affected by a small change in the equilibrium such as a technology issue. The system soon starts to spiral into issues and systems thinking needs to be applied to stem huge problems from forming.

## ***The Application of Systems Thinking***

Systems Thinking requires discipline and intuition. It is not a panacea to provide the one right answer to any problem but it can be hugely insightful.

Systems Thinking should be explored for;

- Complex problems with many elements or actors involved
- Recurring issues which seem to reappear in spite of continued efforts to resolve
- Problems where the issue is part of a larger structure
- Non-obvious problems
- Problems with multiple perspectives
- Where there are patterns of movement. E.g. Growth slows over time; effectiveness diminishes over time

Its application can be invaluable in many 'marketing' areas such as;

- Developing sustainable communities
- Understanding customer management and CRM
- The concept of mutuality in market relationships
- Corporate Social Responsibility
- Call Centre Management
- Sales Force Effectiveness
- Customer Service Management



Systems Thinking is not a universal remedy which will produce an exact solution. Rather it helps the whole process of thinking about problems and gives us a much better understanding of what we are dealing with. Its tools help us to work through the concepts and we must come ready to surface more questions than answers.

Founded on basic and universal principles, it provides a wider, more accurate picture of reality

than traditional analysis. It can also flush out 'unexpected' consequences of plans leading to developing smarter solutions with enduring success.

The business challenges facing us today are embedded in **interconnected systems**. Addressing these challenges means moving beyond the limitations of the methods and tools of traditional reductionist analytics, extending our scope of thinking, pulling on different perspectives and understanding relationships in nature, time and space.

***Rapids of change***

***"The Rapids of Change are a metaphor for our times. Those who have done river-rafting are aware of the exhilaration which comes from "going with" the flow of the river. We need to develop the same skills as we are swept with the current of change. We can then begin to recognize that we can also affect the dynamics of which we are a part."***  
***Robert Theobald***



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