

# USING A SYSTEMS THINKING APPROACH TO MANAGEMENT - A NECESSARY PARADIGM SHIFT?

A BUSINESS ARCHITECT`S PERSPECTIVE

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# Executive Summary

Businesses are operating in environments that are drastically more complex than the times traditional management methods were developed for. A Systems Thinking approach to management that helps us make the transition from viewing businesses as machines to thinking of them as living organisms, from looking at the “parts” to looking at the “whole”, is considered by experts and leading organizations like OECD as the paradigm shift needed to deal with complexity. Incorporating Systems Thinking principles within Strategy, Organizational Design and Problem Solving equips leaders with the tools and perspectives needed to manage in times of complexity.

**Strategy:** A Systems Thinking approach to business strategy, as opposed to just making profits, is centered around the idea of a firm's survival through adaptation and co-evolution within the business environment. This makes the firm place greater emphasis on its ecosystem to create value for key players. Continuously changing market conditions makes it important that the firm, instead of depending entirely on a top down "deliberate" strategy, allows strategy to develop in an "emergent" manner through organizational

learning while building “strategic fitness” to pivot swiftly and cost effectively between multiple strategies, rather than committing resources exclusively to a single strategy.

**Organization Design:** In complex and uncertain environments, adaptability and resilience are critical for survival of a business. Systems Thinking helps understand the design mechanisms required for adaptive behavior. A fundamental mechanism is the ability to balance external complexity with internal complexity. Promoting self-organizing behavior allows the organization to morph into the structure required for adaptation. Striking the right balance of autonomy and cohesion allows local adaptation while remaining true to the organization’s overarching identity and purpose.

**Problem Solving:** Systems Thinking helps management avoid reactive problem solving by widening our lens to acknowledge the underlying set of factors causing a business problem. Understanding the intricate cause and effect dynamics allows us to anticipate unintended consequences of our choices, recognize common decision-making pitfalls to avoid ineffective short-term solutions and explore high leverage solution options with a more far reaching and transformational impact.

Adopting a systems mindset requires a deliberate top-down push and a change in organizational culture. Synergies with a business architecture practice can be leveraged to develop Systems Thinking as an organizational competency.

## Key principles of Systems Thinking and considerations for management



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# Introduction and Purpose

## What is Systems Thinking?

How many times do we see business decisions or actions producing results that were counterintuitive and unintended? For instance:

- Picking a cheap shipping vendor to improve the bottom line ends up affecting sales in the long run and thereby hurts the bottom line (Deeb, 2020).
- Continuing to increase marketing efforts to improve sales ends up reducing sales after a point (Kim D. ).
- Continuing to invest in established product lines while helping retain market share in the short run ultimately ends up causing a loss in market share (Gustin, 2013).
- Expediting customer orders to improve customer satisfaction ultimately ends up causing missed delivery dates and more customer complaints (Kim D. ).

What do all these cases have in common? The business thinking across these scenarios is linear, based on the assumption that we are operating in a deterministic world where a specific intervention or strategy would produce a desired effect. However, reality is far more complex where businesses are "neither fully controllable nor predictable" (Reeves & Levin, 2017). The complexity stems from the very nature of the business and the environment it operates in, which contains a large number of diverse interacting parts impacting each other. The higher the complexity, the better equipped management thinking needs to be to deal with the complexity. This is exactly what Systems Thinking allows us to do by providing a holistic approach to understand business complexity as an outcome of the interconnected relationships and dynamic interactions between constituent parts of a business (Merall & P.M.Allen, 2011). To put it simply, Systems Thinking is the art and practice of seeing the whole. (Arnold & Wade, 2015). Systems Thinking as a management discipline has existed for more than 70 years (Merall & P.M.Allen, 2011), but despite a strong business literature, Systems Thinking concepts and principles have not really made their way into business discussions (Straub,

*"Collectively we know a good deal about how to navigate complexity—but that knowledge hasn't permeated the thinking of most of today's executives or the business schools that teach tomorrow's managers" (Sargut & McGrath, 2011)*

positioned to be the champions of Systems Thinking in any organization.

## Why Systems Thinking?

### Businesses are not machines:

Management thinking can be traced back to the industrial age, when Frederick Taylor, showed how increased productivity could be achieved through standardization and division of labor (Ackoff & Wardman, 1993). Since that time, management thinking has continued evolving, drawing upon theories from different fields such as psychology and sociology, with ever increasing application of statistical and mathematical principles. However,

*"Organization as machine – this imagery from our industrial past continues to cast a long shadow over the way we think about management today." - Rita McGrath (McGrath, Management's Three Eras: A Brief History, 2014)*

despite the evolution, Professor Rita McGrath says that management thinking still is largely based on a mechanistic view of the business (McGrath, 2014). This creates the notion that if you provide the right inputs and optimize the functioning of the machine for efficiency, it is going to produce the right outputs at the

desirable level of productivity.

However, the mechanistic paradigm has a couple of fundamental flaws. Firstly, it creates the perception that a business cannot think for itself (Olson & Eoyang), which is not true for modern organizations which are perfectly capable of deciding their own courses of action. Secondly, a machine needs a stable environment to operate (Olson & Eoyang) which again is not true because businesses operate under continuously changing market conditions. Given the falsity of these assumptions, there is



increasing commentary on how businesses should in fact be viewed as living organisms (Reeves, Levin, & Ueda, 2016). The similarity, to a large part, is based on complex human choices at the

*“Reject reductionism. Stop treating the business as a machine and embrace the reality that it is a complex adaptive system of highly interdependent human processes” - Roger Martin.  
Source: Financial Times Article (Hill, 2020)*

heart of business activities, where employees acting as agents respond to the needs of their immediate environment while interacting with each other through a complex network of relationships, creating self-organizing structures and patterns that allow the business to evolve as a whole (Straub, 2017). Research shows that businesses

that operate based on the living paradigm are not only able to outperform firms that operate in a mechanistic way by gaining more market share, they are also able to better fulfill their social and environmental responsibilities (Hutchins, 2014).

### To make sense of complexity, we need to embrace complexity:

Continued growth in an interconnected global economy along with the need to support ever increasing heterogeneity of products and service offerings, customer segments, channels and increased regulatory pressure has led to an increase in the scale and complexity of operations for businesses (Koch & Windsperger, 2017). The rise in environmental complexity in recent times has largely been driven by rapid advances in Information Technology which, by reducing the cost of transactions and collaboration, has enabled a high degree of interconnectedness (Benkler, 2017). Such high levels of digital connectivity have altered the dynamics of competition, value creation and consumption as well as the internal structure of organizations. Following are some examples:

- **Information driven business models:** Availability of smart phones and digital technology has allowed companies such as Uber and Airbnb to disrupt traditional business models. Online Lodging over a decade has gathered 6x the amount of lodging capacity that Marriott built in 60 years. In 2019, Airbnb overtook Marriott (Iansiti & Lakhani, 2020).
- **Access not ownership:** The success of companies like Uber and AirBnB points to the emergence of a sharing economy which is based

on the concept of access to an asset as opposed to ownership (Laker, 2023).

- **Distribution of production capabilities:** Technology has allowed peers to pool their knowledge and resources towards shared goals without the interference of businesses or markets. Apache beating Microsoft Server for more than 20 years exemplifies the success of this new mode of organizational innovation (Benkler, 2017).
- **Changing roles of consumers:** Consumers have greater penetration into the production lifecycle, which changes their role from passive consumers into prosumers. (Alderete, 2017). E.g., GE’s collaboration platform called FirstBuild allows outsiders to share new ideas about their home appliance products (Alderete, 2017).
- **Shifting locus of innovation:** Digitization of products and services has allowed players across traditional industry boundaries to combine resources for innovation. For instance, Waymo, a subsidiary of Alphabet Inc., partnered with Jaguar to deploy the Jaguar I-PACE electric vehicles equipped with Waymo’s self-driving technology (Waymo, 2018).
- **Organizations as networks:** To respond faster to its environment, organizations have gradually morphed from the tightly controlled hierarchical model into more of a networked form that allows greater autonomy and flexibility (Allee, 2003).

While complexity of businesses has continued increasing, experts say that management practices have not evolved adequately to deal with complexity (Straub, 2013). Failure to adapt to complexity could lead to reduced innovation, collaboration, failure to seize the right opportunities at the right time and ultimately a loss of competitive advantage (Sinfield, 2019). Studies reveal that dealing effectively with complexity is not just a critical determinant of success in difficult times (Malnight & Buche, 2022) but could determine the lifespan of companies (Reeves, Levin, & Ueda, 2016). Complexity by itself is not the problem. Executives acknowledge the potential to create value from complexity (Heywood, Hillar, & Turnbull, 2010). However, dealing with complexity requires a change in the way we think about businesses, which starts with questioning our deeply entrenched assumptions and beliefs. This paradigm shift, as discussed in the next 3 sections, is made possible through a systems approach which enables a more dynamic approach to Strategy, Problem Solving and Organization Design.

# Strategy

## Why use Systems Thinking for Strategy?

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Strategic thinking to a large part over the years has been based on an economic view of a company, where the chief goal has been to make profits by effectively utilizing a core set of differentiating assets or abilities (Geus) which gave organizations their competitive advantage. However, according to Rita McGrath, organizations are unlikely to sustain their competitive advantage in the modern environment for several factors that include digital revolution, fewer barriers to entry and globalization etc. (McGrath, 2013). The traditional strategy process itself has been a linear exercise with a sequence of activities from defining objectives to formulating plans, implementing actions, and achieving outcomes (O'Donovan & Flower, 2013). The intended strategic outcomes have been defined based on a prediction of the future. This "predict and prepare" model which served strategists well in times of stability, may no longer be effective, when little about the world is predictable (Gharajedaghi, 2011). With rapidly changing market conditions and consumer behavior, the shelf life of strategic choices have decreased significantly. Moreover, the information that is needed to make strategic choices can be highly dispersed and complex in a volatile environment, making it vulnerable to the systematic biases of the decision makers (Weissenberger-Eibl, Almeida, & Seus).

A Systems Thinking approach to strategy is firmly rooted in understanding of how a firm fits within its broader environment and evolves through constant interaction with other entities in its ecosystem (Weissenberger-Eibl, Almeida, & Seus), much like a biological organism. This transforms strategy into a dynamic process that relies on continuous signals from the interplay between the business and the actors in its environment. A Systems mindset becomes especially important in understanding the inherent unpredictability of a highly connected market and economy, that is characterized by alternating periods of stagnation and dramatic transformation and where small, random changes can lead to radically different outcomes (Beinhocker, 1999). A Systems approach not only prevents management from getting lured into the

illusion of predictability but also equips them with the tools required to make more informed, adaptive, and sustainable strategic choices, enhancing the prospects for long-term success and competitiveness in a rapidly changing world. This section highlights 3 Systems Thinking principles that can be utilized within strategy planning.

## Principle 1: Ecosystem Strategy:

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The importance of business ecosystems to strategy has risen significantly with digitalization allowing businesses to combine their products, capabilities, and offerings to respond to the customer's need for more innovative solutions to their problems. Competition is no longer confined within industry boundaries. A well-developed ecosystem strategy could offer significant advantages, not only by helping businesses access diverse capabilities and knowledge of partners, but also reaping the rewards of the network economy which exceeds economies of scale associated with vertically integrated supply chains (Meyer & Williamson, 2020). A systems lens, to understand how a business exists with symbiotic value relationships with other actors in its ecosystem, provides the required foundation for an effective ecosystem strategy. Here are some examples of how organizations benefit from developing a healthy ecosystem:

- **Competitive Advantage:** Despite launching the e-reader earlier than Amazon's kindle, Sony lost to Amazon, for its failure to create a publishing ecosystem of e-books, which Amazon did successfully by compensating publishers adequately and introducing digital rights management. This meant that when Amazon launched Kindle there were more than 88000 e-books to download as compared to a mere 800 titles for Sony's e-reader (Reeves, Levin, & Ueda, 2016).
- **Resilience:** Recruit, a Japanese media company, built a multi company ecosystem in diverse areas including tourism, dining and used car sales. The strategy to promote the long-term success of ecosystem players, going beyond the focus on short term profits, allowed Recruit to grow with a CAGR of 20% between 2011 to 2016 through an economically sluggish period (Reeves & Levin, 2017).
- **Learning and Innovation:** Advanced RISC Machines (ARM), that started off as small UK based technology hardware company despite

limited resources, became an industry leader by building a unique innovation ecosystem of chip designers, chip manufacturers, chip distributors and equipment manufacturers etc. By pooling the knowledge from its partner network, ARM was able to identify the emerging trends and design innovative chip architectures that could be used by multiple customers. This also allowed ARM to spread the development cost across its customer base and offer better value to customers (Meyer & Williamson, 2020).

Recent surveys indicate that successful companies don't just realize the value of ecosystems (IBM Institute for Business Value, 2017) but are also more likely to have an ecosystem strategy in place (PwC). However, having an ecosystem strategy itself is no guarantee of success. Nokia failed in the smartphone ecosystem for focusing too narrowly on its own needs (Jacobides, 2019). IBM Watson failed to translate initial developer enthusiasm into adequate partner activity and engagement (Jacobides, 2019). A robust ecosystem strategy would require a clear vision and roadmap to attract partners, helping partners develop their capabilities

and the right strategic architecture where each partner knows their value and where they fit in. It is also important for management to realize that the amount of control that could be exercised in vertically integrated supply chains is no longer

possible, making it important to stay in sync with the pulse of the ecosystem, influence and adapt flexibly. (Meyer & Williamson, 2020)



## Principle 2: Emergent Strategy

The term "Emergent Strategy" was coined by Professor Henry Mintzberg to refer to the concept of unplanned strategy emerging over time different from what was expressly intended (Mintzberg, 1987). The term emergence here is a complexity theory concept, that refers to the development of unique aggregate level patterns from underlying interactions between individual parts (James, 2018). Contrary to the top down deliberate form of strategy where the general direction of a business is determined at an enterprise level and followed by the business units (Merali & Allen, 2011), Emergent Strategy is founded on the idea that a business has

*"Actions simply converge into patterns. They may become deliberate, of course, if the pattern is recognized and then legitimated by senior management. But that's after the fact."* Henry Mintzberg

Source: Harvard Business Review Article: Crafting Strategy (Mintzberg, 1987)

the ability to learn at all levels through feedback mechanisms that exists between the firm and its environment, to sense and detect opportunities, feed the knowledge into organizational strategy and respond fast to changing circumstances (James, 2018). The following could be considered examples of Emergent Strategy:

- In 1989, IBM recognized a demand for IT outsourcing services when Eastman Kodak Company decided to engage IBM for managing their data center. It did not take long before IBM approved a worldwide services strategy in 1991, subsequently announcing to the world the goal of making IBM a "world class services company" (IBM Corporate Archives, 2002). This was a pivotal moment in the company's evolution towards outsourcing solutions at a time when the profitability of the hardware and software businesses was becoming less attractive (Lohr, 1993).
- PayPal was first established in 1998 with the original name of Confinity to provide security software for mobile devices. However, facing low demand, in 1999 the company transformed itself to become an exclusive platform for digital payments (Stobierski, 2020).
- Amazon Web Services, the cloud computing solution that helped Amazon trump over tech giants Microsoft and Google, was initially built

as a robust internal storage and computing structure to scale up its operation in the early 2000s. The term "cloud" was not popular at that point. However, Amazon was quick to recognize the market opportunity and capitalize on it.

*"We very quickly figured out that external developers had exactly the same problems as internal developers at Amazon."* Adam Selipsky, AWS CEO

Source: Fortune.com Article: How Amazon grew an awkward side project into AWS... (Colvin, 2022)

In 2003, Amazon management decided to pursue AWS as a business idea which finally led to the launch of the first AWS service in 2006 called S3 - Simple Storage Devices (Colvin, 2022).

Fostering conditions for emergence involves empowering employees at every organizational level, to gather and interpret information about the environment, and activating the communication mechanisms to use employee inputs for shaping



strategic directions of the business (James, 2018). As compared to top-down strategy, Emergent Strategy, emphasizes the need for learning and quick adaptation to deal with the inherent complexity and uncertainty of the

business landscape. However, Emergent Strategy does not make deliberate strategy any less important, and instead can serve as a necessary complement to it in uncertain times (Stobierski, 2020).

## Principle 3: Strategic Fitness - Multiple Strategy over One Strategy

Fitness is a biological concept that explains the relative success of a living species in comparison to others in the same environment. Similar to a gene pool that maintains a healthy level of variation, when it comes to business strategy, there are a number of different possibilities that a company can pursue. Drawing similarities between business evolution and biological evolution, management theorists including Professor Eric D. Beinhocker, have made the case, that at a time when the world is inherently unpredictable, organizations instead of having "singular focused strategy", could benefit from having "populations of multiple strategies that evolve over time" (Beinhocker, 1999). The following are examples of companies which have demonstrated strategic flexibility:

- Before 2013, Dell had placed their bets on a range of computing infrastructure beyond the personal computer. This included smartphones, tablets, Chromebooks, printers, consumer PCs, commercial laptops and desktops, workstations, servers, storage, IT services, and software. In the years to come, Dell exited multiple markets to focus on its high yield PC and server portfolios, resulting in more than 3x increase in operating income between 2013 and 2020 and

increase in market value of about 420% (Mankins & Gottfredson, 2022).

- Nike made a number of investments towards a range of consumer offerings before making direct-to-consumer sales the central focus of its strategy (McGrath, 2020).
- For Amazon, while a number of experiments resulted in profitable new businesses such as Marketplace, Amazon Web Services (AWS), and Prime, others before these that were not so successful were shut down quickly including Crucible - a multiplayer gaming platform (White, 2020), Haven - a health care joint venture with Berkshire Hathaway and JPMorgan (Monica, 2021), and Spark - a shopping social network (Reichert, 2019).

Strategic flexibility built around the idea of organizations working with multiple strategies requires them to be nimble and change directions



at short notice, and at a relatively low cost by committing resources to a new course of action. This would involve changing processes, metrics, and signaling that are in place to support strategy (Reeves & Carlo, 2017).

Behaviorally, it would be important for managers to realize and question their own biases which cause inertia with a specific strategy (Shimizu & Hitt, 2004).

## Conclusion:

Uncertainty has made it difficult to predict the number of potential future states for making strategic choices with ever increasing number of change vectors and interdependencies between them (Mankins, 2022). Rather than "predict and prepare", experts believe that the modern businesses should operate on a "sense and respond" model as adaptive enterprises where strategy should be a continuous dynamic (Haeckel, 1999), self-adjusting process (Greeven M. ). This not only requires that firms develop to the ability and architecture to sense market signals and respond to them in an agile manner, but also makes it important for managers to shift from the mechanism of control, and instead create the enablers of organizational learning necessary for businesses to adapt and evolve with the changing environment.



# Organization Design

## Why use Systems Thinking for Organizational Design?

Organizational Design often gets overlooked as a critical determinant of business success. It is argued that Citigroup's collapse in 2008, amongst other reasons, may have partly resulted from a siloed structure that did not allow for necessary interactions between the employees who understood the consequences of subprime lending and those making strategic decisions (Sargut & McGrath, 2011). On the other hand, Apple's innovations could be attributed to the design and leadership model of the company, set up by Steve Jobs in 1997, that allowed the technical experts to predict which technologies and designs are likely to succeed instead of treating cost and price targets as fixed parameters for their design and engineering choices (Harvard Business Review, 2021).

Organizational Design has changed over time in response to the environment. The Functional Form was the first modern form of organizations that developed in the early industrial era where the central organizing principle was to group similar logistic activities under a function for efficient utilization of resources and reporting (Ansoff & Brandenburg, 2017). As operations grew in scale and complexity to respond to a larger and more diverse market, we saw the evolution of divisional forms, matrix forms, holding company structures, TQMs (Ansoff & Brandenburg, 2017) and most recently the network or virtual form (Daft, 2016) that is characterized by decentralization, flexibility and high degree of collaboration and interdependence (Alvarez & Ferreira, 1995). The evolution of organizational forms shows that the nature of the design problem has changed drastically. Efficiency is no longer enough. In the modern business environment, which is labeled as complex, turbulent, and uncertain (Siggelkow & Rivkin, 2005), organizations need to be designed

for adaptability, agility and resilience. Management scholars feel that the old tools of organizational design including hierarchy, command and control that were useful in stable environments may not be effective any more (Felin & Powell, 2016). Systems Thinking with its numerous branches including Management Cybernetics, Complexity Theory, General Systems Theory etc. offers an understanding of the behavior, structure, and operating logic of complex systems which by their very nature display the abilities that we want modern organizations to possess - the ability to adapt, co-evolve and sustain themselves in times of uncertainty and complexity. This section highlights certain Systems Thinking concepts that can be utilized as Organizational Design principles.

## Principle 1: Matching complexity

The Viable System Model (VSM), introduced by Stafford Beer within the field of Management Cybernetics is a conceptual model that establishes the essential conditions for "viability", which is defined as an organization's ability to maintain its separate existence in a dynamic operating environment (Espejo, 2003). An organization is viable when it can respond and adapt to its environment. A necessary condition of viability<sup>1</sup> is for the organization to match the complexity of its environment with the complexity of its operations, which in turn needs to be matched with the management's ability to deal with the operational complexity. Here, environment, operations and



Figure 1: VSM Fundamental components; Source: Book "The Fractal Organization"; Pg 46 (Hoverstadt, 2008)

management are 3 fundamental components of a VSM. To illustrate how this principle works, Patrick Hoverstadt, an experienced practitioner of the VSM, explains in his book "The Fractal Organization", how the shifts in organizational designs observable in Ford, General Motors, and Toyota (Hoverstadt, 2008) can be attributed to increasing complexity. Ford served a homogeneous market successfully through simpler operations by standardizing and simplifying its production processes and simple

<sup>1</sup> The VSM draws upon one of the most fundamental laws of Systems Science defined by Ross Ashby as the Law of Requisite

Variety which states that "Only variety can destroy variety", where variety represents complexity (Lambertz, 2020).

management structure that relied on centralized control. Gradually as the market matured, customers developed their own preferences leading to the demand for more variety of cars. General Motors matched the increased environmental complexity with a corresponding increase in the complexity of its operation by creating divisions to serve the needs of specific market segments. To manage this new structure GM had to develop new managerial practices that allowed a certain degree of autonomy to the divisions, while retaining centralized control. Toyota served an even more diverse segment by increasing the complexity of their operations using the Toyota Production System to produce many different products from the same line in quick succession and further increasing the autonomy of the operational staff to take decisions on the production line.

This law can be seen playing out for all businesses across sectors. However, not all organizations succeed balancing external and internal complexity. For example, in the face of internet disruption, newspapers businesses that retained their structural integration designed to favor efficiency failed, whereas the ones where executives



separated their established newspaper and internet businesses to embrace flexibility survived (Eisenhardt & Piezunka, 2011). To deal with environmental complexity in the form of technological advancements, changing consumer behaviors,

evolving market dynamics, etc. it will be imperative for businesses to have the right operating model and management capabilities in place.

## Principle 2: Top-down Order vs Emergent Order through Self Organization

Self-Organization is the phenomenon explaining the emergence of order and pattern at a global level through local interactions of the parts of a system, without an external agent pushing it (Heylighen, 1970). Self-organizing behavior, starting from a cellular level (Johnson & Lam, 2010), to physical, social systems, including businesses, is associated with adaptation and survival (Davies, 2018),

*“A new type of business entity is emerging: the tightly controlled, hierarchical production or distribution system with features of chaotic self-organization.”*

Source: Harvard Business Review Article: Get Self Organized (Ticoll, 2004)

(Tzafestas, 2018). However, within the realm of Organizational Design, the idea of allowing individuals to self-organize can be counter intuitive, since order in organizations is imposed top down through hierarchical design, careful planning and operationalization

(Olson & Eoyang). Regardless, the principles of self-organization can be seen gaining increasing prominence in organizations.

The RenDanHeYi model instituted by Haier (Haier.com, 2017) is perhaps the most important modern example of how self-organization challenges the conventional hierarchical thinking. In this model, the enterprise has been transformed to operate as a market facing network of 4000 (McKinsey Quarterly, 2021) self-governing microenterprises that allow employees within these microenterprises to form connections, set ambitious goals, and pursue innovation without the internal monopolies of HR, IT, Legal etc (Gordon, 2022). Another good example is British Petroleum's experiment with an intracompany marketplace for buying and selling pollution credits, which is typically a hierarchical process where the target is set by the executives. The self-organizing exchange allowed business units to leverage free market dynamics to exceed its targets, enhance reputation and save money at the same time (Ticoll, 2004). Businesses such as Zappos and Mercedes Benz have formally adopted Holocracy, which is a management free organizational model based on the principles of self-organization, where authority is replaced by a set of rules empowering employees to take decisions on projects and collaboration (Open Work, 2017) (Susanne Kopp - Mercedes Benz, 2019).

A recent quantitative survey reveals that the adoption of self-organizing principles helps companies beat their rivals in terms of entrepreneurial activity, talent attraction and retention, as well as financial performance (Krippendorff & Garcia, 2023). Understanding self-organizing dynamics starts with appreciating the complex adaptive nature of businesses, where self-organization is a default behavior which is restricted by bureaucratic structures (Jr. Coleman, 1999). Research reveals that creating the context or bounds within which individuals can exchange

diverse perspectives and influence each other through learning and sharing, can promote self-organizing behavior (Olson & Eoyang). Freedom to form networks to pursue shared objectives, not restricted by boundaries created by formal structures, is of utmost importance (Jr. Coleman, 1999). A change in organizational

culture is equally important to ensure that there is enough room for evolutionary behavior supported through employee empowerment and management trust, along with confidence in employees.

### Principle 3: Cohesion & Control vs Adaptation & Autonomy - A necessary balance

The two essential design mechanisms in a Viable System model are Cohesion and Adaptation, where cohesion is the ability of the different parts of the system to operate as a collective whole and adaptation is the ability of the system to respond and adapt to its environment. The mechanism of Cohesion and Adaptation are closely related to the question of control and autonomy respectively. (Espejo, 2003). For a business to be adaptive, business units need to operate with a high degree of autonomy to be able to make choices to respond to their own environment. However, excessive autonomy can lead to business units defining directions that are not consistent with the enterprise's purpose. To ensure that the organization stays aligned to its purpose, organizations need to function as a cohesive whole. This requires a certain amount of centralized control, too much of which again could prevent localized adaptation. The question then becomes - how much control is too much? The right balance between autonomy and control can be achieved through effective coordination mechanisms but consciously avoiding excessive interference (Espejo, 2003).

Valve corporation for example found the right balance by allowing individuals closest to action to identify and take decisions on new market opportunities, while also instituting a system of social proofing to improve coordination with

colleagues, and accountability in ensuring that ideas are properly vetted. Such organizational design had great success. Their product platform called Steam, designed for digital distribution, rights management, broadcasting etc., crystallized through discussions among creative individuals who were able to map their ideas about video software to the latest market opportunities (Felin & Powell, 2016).

Achieving cohesion, beyond exercising centralized control, to a large extent depends on understanding the capabilities of business units and enabling communication between them. Adaptation

on the other hand requires a degree of organizational intelligence (Halal, 1997) to decide on the directions and where to invest resources to stay viable over the future. That is where organization design

becomes important to institute the structure, processes and communication mechanisms needed to maintain the balance between internal cohesion and adaptation (Espejo, 2003).

### Conclusion

With increasing complexity and uncertainty over the years, it has become imperative that organizations overcome structural rigidities to adopt a more flexible and dynamic design that allows continuous adaptation to the environment. Designing such adaptive organizations may require looking beyond the traditional approach to organizational design to a Systems approach that offers new interpretive frameworks to understand adaptive behavior and the design mechanisms responsible for it. Matching the complexity of the environment, creating room for self-organization and striking the right balance between autonomy and cohesion are examples of such design principles. In the words of Stuart Kauffman, a systems scientist, "...the fate of all complex adapting systems in the biosphere - from single cells to economies - is to evolve to a natural state between order and chaos, a grand compromise between structure and surprise." (Berreby, 1996). The role of organizational design in the present business environment will be to help organizations find their own "edge of chaos" (Carroll & Burton, 2000).



# Business Problem Solving

Problems vary in their level of complexity. Appreciating the level of complexity of a problem is important to define the approach that is best suited to tackle the problem (Snowden & Boone, 2007).

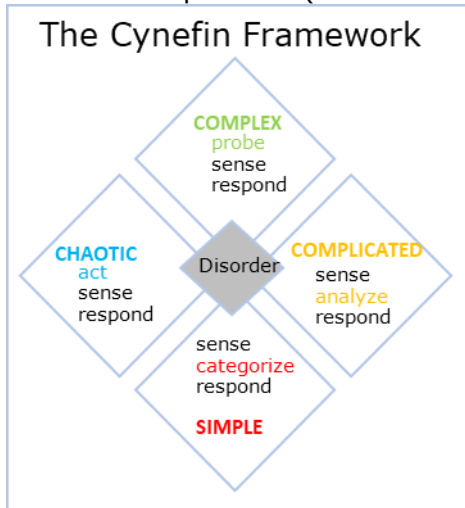


Figure 2: Source: Harvard Business Review Article "A Leader's Framework for Decision Making" by David J. Snowden and Mary E. Boone, November 2007

Business problems are inherently complex in nature. The complexity stems from the general makeup of the problem universe that includes a constantly changing environment, ill-defined goals, large number of constraints, unknowns,

uncontrollable variables, and tradeoffs between conflicting objectives (Sargut & McGrath, 2011). The number of interconnected variables makes it hard to frame up a problem using cause and effect relationships. Consider for example the following scenario:

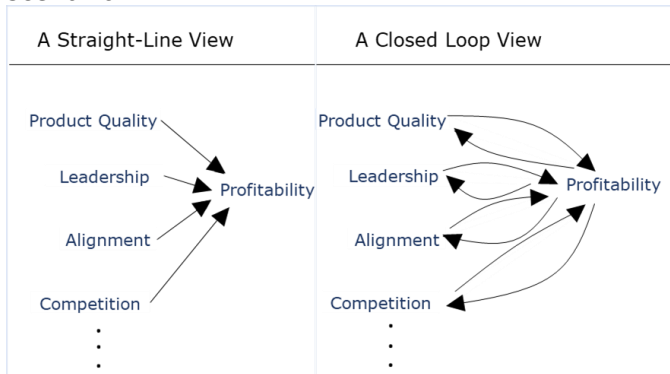


Figure 3: Source: Article - The "THINKING" in Systems Thinking: How can we make it easier to master?; Barry Richmond; Thesystemsthinker.com; March 1997

Employing linear thinking would help us reach the conclusion that each of product quality, leadership,

organizational alignment, and competition could help improve profitability but in fact each of those variables impact each other (Richmond, 1997). In addition, the impact of one variable to the other may not be immediately observable but may be observed after a delay, which according to Peter Senge can limit our ability to understand that "Today's problems come from yesterday's solutions" (Senge, 2006). Together, the interconnectedness of variables, feedback and delays create non-linear dynamics where a small change in cause can have a disproportionately large impact on the effect. For example, a decision to switch suppliers can have a cascading effect on revenue, customer loyalty, brand perception and overall success of a company.

Despite the complexity, according to experts, managements instincts to solve complex problems are still founded on "straight forward understanding of cause effect relationships" where the problems are scoped out to "fewer variables" (Straub, 2013) and solutions are engineered to the problem scenarios (Reeves & Levin, 2017). While this approach creates the illusion that management is acting purposefully, the situation might actually be made worse (Adler, 2019). Take for example, the case of the golf industry, which despite witnessing tremendous popularity and an increased demand for goods in the late 1990s, had seen a decline with an equipment manufacturer losing 75 percent of its stock value and another filing for bankruptcy. A closer look at the system dynamics reveal that this was largely due to manufacturers waiting to see if the unmet demand was real, before investing in R&D and production capacity. By the time, companies invested in production capacity, which takes time to reach full effect, backlogs worsened, frustrating customers, and eventually reduced demand (Bosque & Johnson).

Systems Thinking helps us go beyond the surface level of events and symptoms in a complex business problem, to recognize the underlying factors including the interconnected variables, feedback loops and patterns that contribute to the problem. Explanation of the underlying causes not only helps in framing up business problems more holistically, but also helps us devise better solutions by expanding our range of choices, enabling understanding of the tradeoffs between the choices and the ripple effects our choices would have on the system's collective behavior (Goodman). Below are some key principles of Systems Thinking that can reshape our approach to solving business problems.



# Principle 1: Unintended Consequence

Business decisions do not always produce the intended result. For example, Walmart's decision to enter the Japanese market was a failure (Inagaki & Lewis, 2020). So was Home Depot's decision to enter China (Shedd, 2019). Inherent to each business decision is a degree of risk that is accepted by management. However, there are times when business decisions introduce a new set of problems which could be considered as unintended consequences. Here are some examples:

| Actions  | Unintended Consequences   |
|--|---|
| Decision to prohibit alcohol.  | Increase in organized crime – smuggling; illegal production and sale of alcohol; decline in tax revenues (Thornton, 1991)   |
| Reducing investments during times of uncertainty through hiring freeze, reduced marketing spends, avoiding new market entry etc. | Reduced demand; everybody is poorer; companies not well positioned to take advantage of the next growth cycle (Jackson-Moore, Swanston, & Kande, 2020).   |
| Launching High fructose corn syrup (Nohria & Taneja, 2021)   | Environmental impact; air pollution; Population Health – diabetes (Nohria & Taneja, 2021)   |
| Cocoa plantation   | Illegal Deforestation - Experts estimate that 70% of the country's illegal deforestation is related to cocoa farming; Child labor -During the 2013-14, an estimated 2 million children were used for hazardous labor throughout Ghana and Ivory Coast (World Wildlife Magazine, 2017) |

One of the main explanations behind unintended consequences is our inability to predict how the affected individuals and groups—employees,

customers, government, etc. pursuing their own self-interests will respond to the solutions. Such limitations might be caused by inherent assumptions in our thinking including **Continuity Assumption** which leads us to believe that the situational dynamics will not change drastically in the future, and **Causality Assumption** which creates the confidence that decisions would yield the right outcomes (Adler, 2019).

Choices made by companies to respond to complex business challenges such as globalization, the advent of emerging technologies, Sarbanes-Oxley etc. have unintentionally caused performance issues in companies while making them difficult to govern (Ashkenas, 2007). While it is not possible to completely mitigate the risk of unintended consequences, adopting a Systems Thinking



mindset to carefully think about the how the effects of our decisions would interact with complex dynamic forces, that includes events and behavior of other actors, will be crucial. This would help us quickly identify decision options that could produce unintended

outcomes and focus on safer alternatives (Adler, 2019).

# Principle 2: Systems Archetypes - Stories that repeat

Research has revealed that when faced with a complex business problem, decision makers often tend to make use of heuristics or mental short cuts. The application of heuristics is even more common for recurring problems (Hammond, Keeney, & Raiffa, 1998) which we have tried and tested solutions for. However, while heuristics can help us make sense of a problem, they can also create a number of pitfalls that lead to solving the wrong

*“Successful problem solving requires finding the right solution to the right problem. We fail more often because we solve the wrong problem than because we get the solution to the right problem” – Rusell Ackoff*  
 Source: Book *Redesigning the future* (Ackoff, 1974)

problems or implementing ineffective short-term solutions. Systems Thinking archetypes (Kim D. H., 2008) are such common recurring patterns of behavior and feedback loops that are often observed in various organizational and societal contexts. The following are examples of such archetypes where well-intentioned choices made without fully understanding the dynamics, leads to worsening of the situation.

### Fixes that fail

This is a situation where quick fixes applied to solve a problem may improve the situation over the short term but ends up making matters worse in the long run. For example, a company that is trying to cut costs, picking the cheapest shipping vendor may improve the bottom-line over the near term. But if

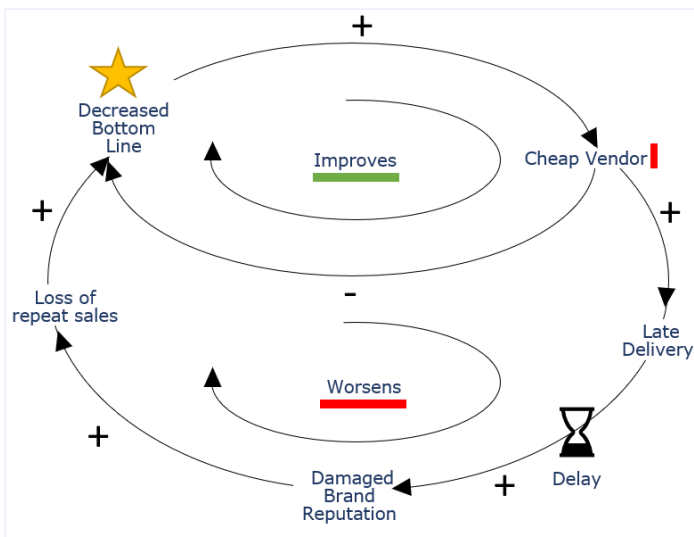


Figure 4: Fixes that fail

the vendor fails to deliver on time, this could result in loss of repeat sales and may ultimately hurt the brand image of the company (Deeb, 2020). Breaking the “Fixes that Fail” cycle requires not just an acknowledgement up front that the fix is merely alleviating a symptom but also a commitment to solve the real problem (Kim D. ).

### Shifting the burden

In this scenario, an easily implementable solution that solves the symptom of a problem leaves the real problem unaddressed or makes it worse. However, given that the temporal solution reduces the symptoms, it reinforces the need for more of the same, diverting attention from the more fundamental solution. Often, the temporal solution can introduce side effects which makes it even harder for the system to correct the real problem. Example: For an employee with performance

problems, a manager providing solutions can lead to increased dependency on the manager, thereby further reducing the confidence of the employee. The more fundamental solution in this scenario is empowering the employee with the resources and skills to be productive in her role (Senge, 2006) (Kim D. H., 2000)

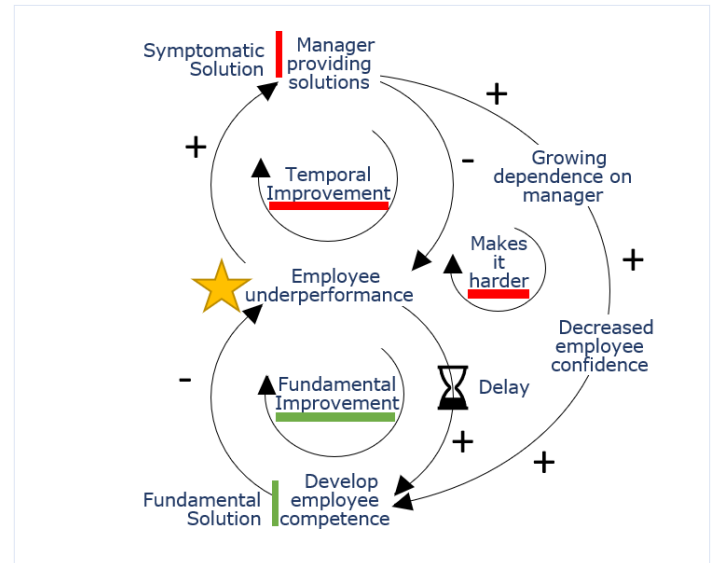


Figure 5: Shifting the burden

There are eight defined systems archetypes that represent recurring decision-making challenges. These archetypal patterns are created by multiple loops of causality, all working at the same time, simultaneously reinforcing or reducing the effectiveness of our choices (Senge, 2006). In a



multifaceted business problem, it is possible that management unknowingly gets drawn into multiple archetypes through reactive short-term solutions. An understanding of the concept of feedback loops and delay is key to

recognize these archetypes which in turn reduces the likelihood of implementing ineffective solutions.

### Principle 3: Leverage Points

Punishing a few corrupt officials will most likely fail to get rid of corruption in a country. Because corruption is deeply engrained into the structure of the system. Similarly, simply implementing an agile framework may not help achieve velocity with technology implementations if there are underlying

governance or leadership issues. In systems thinking lingo, these solutions do not have enough leverage as their effects would be overridden by the innate dynamics of the system. Donella Meadows, a prominent systems thinker, explained leverage points as the different places one could intervene in a system, "where a small shift in one thing can produce big changes" (Meadows, 1999).

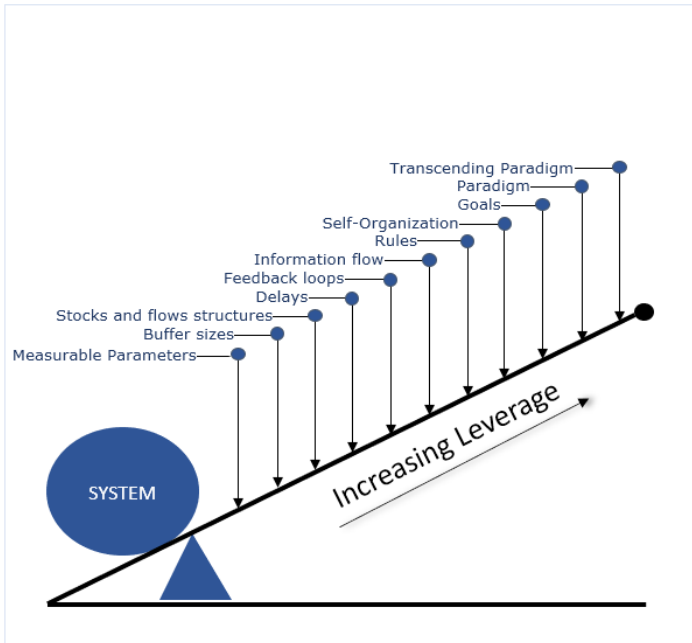


Figure 6: Source: Adapted from the article "Leverage points: Places to intervene in a system" by Donella Meadows (Meadows, 1999)

The potential impact or leverage of a solution grows gradually when we shift our focus from easily alterable factors with decisions such as downsizing the workforce, boosting R&D expenditures, expanding sustainability initiatives etc., towards more systemic considerations, including structure, environmental factors, and underlying mental models. Higher leverage solutions create impacts that are not merely incremental but more far reaching and transformational.

For example, fixing the healthcare system requires achieving a balance among cost of care, access to healthcare services, and quality in healthcare (Cox, 2009). There is a complex value dynamic between patients, healthcare providers, insurers, patient advocacy groups and government (PP, et al., 2005). Adjusting reimbursement rates for medical procedures is an example of changing system parameters, but creating mechanisms to keep costs in check, and ensuring underserved populations have equitable access, are examples of establishing the right feedback loops. Making healthcare policy decisions would be influencing the rules of the

system but a higher leverage would be changing the goal of the system from correcting illness to promoting wellness.

There may be a number of reasons behind businesses not thinking about leverage points. Firstly, as per Jay Forester, leverage points are counterintuitive (Meadows, 1999). Secondly, managers who are rewarded on short-term financial metrics may lack incentives to implement longer term high leverage solutions. There could be



other factors such as pressure from stakeholders to quickly identify a solution, or not having enough resources to thoroughly explore high leverage solution options. Encouraging management to explore innovative high leverage solutions would require

introducing the systems thinking mindset into the decision-making culture of an organization.

## Conclusion

With the ever-increasing complexity of business problems, reacting reflexively to isolated events may not be enough. It has become important that we expand our thinking to encompass broader patterns and trends to identify and address factors

*"I think we don't develop enough good systems thinkers. We tend to develop people who are very good at finance or very good at marketing or very good in specific industries. The real challenges now are going to be driven by systems thinking...."*  
 – Jeff Immelt, GE, CEO, 2013

Source: Wharton Website  
 Article: GE's Jeff Immelt on Leadership, Global Risk and Growth (Useem, 2013)

that are more fundamental to the problems at hand. A Systems Thinking approach allows us to probe into the causal relationships, identify systemic factors and be able to foresee, strategize, predict, and adapt. However, there are cognitive limitations that prevent us from being natural systems thinkers. As we see in the case of GE, adopting a Systems Thinking mindset for problem solving will require business leaders to

acknowledge our limitations and strategically establish a Systems Thinking model for problem solving across the organization (Useem, 2013).

# Why Business Architecture to advance Systems Thinking?

According to the Business Architecture Body of Knowledge: *"Business Architecture represents holistic, multidimensional business views of: capabilities, end-to-end value delivery, information, and organizational structure and the relationships among these business views and strategies, products, policies, initiatives, and stakeholders"* (BizBOK). The practice of Business Architecture strongly embodies the following core tenets of Systems Thinking:

## Big Picture - Holistic Thinking

Contrary to Reductionist thinking which breaks down the whole to analyze the parts, Systems Thinking at its core is built on the principle of synthesis which implies putting together the parts to understand the whole (Systems Innovation, 2016). Business Architecture, similarly, presents an understanding of how a business operates as a collective whole through the coordinated functioning of numerous individual aspects working behind the scenes.

## Connecting the dots

Systems Thinking emphasizes understanding the relationships between interdependent parts of a system. Within a business, different aspects are related to each other. For example: investments on initiatives improve business capabilities that enable value delivery mechanisms, ultimately realizing specific strategic objectives. Business Architecture specializes in defining and interpreting the relationships between the abstract aspect of a business and connecting the dots in a consistent manner to support business problem solving and decision making.

## Exposing mental models

Mental models are our own approximation of reality (Heng, 2023). As Peter Senge points out in his book "The Fifth Discipline", models are not perfect, but they help us make sense of the reality, think, and take action. Systems Thinking helps align our perception of realities by exposing our mental models to scrutiny by others. The need to align mental models is especially true for a business because of varying perceptions of strategic and operational realities. Questions such as

- What is our business model?
- How do we create value as a business?
- What enables our value generating mechanisms?
- What are our differentiating capabilities? etc.

can have different answers across the organization. Business Architecture blueprints such as strategy maps, capability maps, value stream maps etc. (BizBOK) create a single cognitive model of the organization, thereby aligning people's perception and providing a common grounding framework for business discussions.

## Managing complexity through abstraction

Abstraction is a crucial Systems Thinking principle (Adcock, Jackson, Singer, & Hybertson, 2023) that allows dealing with complexity by masking out non-essential details at a higher level of elevation. Lack of abstraction could cause strategic business discussions to be overloaded with unnecessary information leading to analysis paralysis and decision fatigue.

Business Architecture is abstract by design, to effectively reduce complexity by focusing on what really matters. A business capability model, for example, creates the highest-level view of "What" the business does where each individual capability can be used to aggregate the necessary operational and tactical information required for a specific business discussion.

## Conclusion

Founded strongly on the principles of Systems Thinking, Business Architecture can be used by organizations as an effective vehicle to introduce and develop a systems mindset. Integrating Business Architecture into business discussions could encourage big picture thinking, break silos, allow leaders to act based on a common understanding of the business and most importantly evaluate if the business is designed for success.



# Conclusion

With increased complexity and unpredictability of business environments, there is a growing consensus in the business world of the need to better deal with complexity, which cannot be done with our traditional reductionist approach of breaking complexity down into manageable parts (Benjamin & Komlos, 2022). In fact, the need might be for the exact opposite of a "breaking things down" mindset to a Systems Thinking approach of looking at the whole. Prominent international entities such as the United Nations (UN), Organization for Economic Co-operation and Development (OECD), United Nations Educational, Scientific and Cultural Organization (UNESCO), and World Health Organization (WHO), along with other major business have acknowledged the importance of Systems Thinking as an indispensable leadership competency (Jackson, 2019) (OECD, 2020). Despite the interest, business leaders have struggled with Systems Thinking (Koh, 2023). This might be partly because Systems Thinking is not a natural mode of thinking for us. In his renowned work "Thinking, Fast and Slow," Daniel Kahneman explains how our evolutionary brain tends to conserve energy through swift, intuitive decision-making rather than deeper contemplation (Kahneman, 2013) that is required for Systems Thinking. Hence adopting a Systems Thinking mindset will have to be a conscious choice for organizations, supported by a change in the organizational culture (Vemuri & Bellinger, 2017) and leadership style. Change in culture could be achieved by gradually building awareness of Systems Thinking concepts and reasoning, using Systems Thinking principles and tools in business discussions and incentivizing systemic thinking through effective performance management. Business leaders, the most important agents of this change, would require transitioning to a form of shared leadership that involves giving up control and orchestrating social interactions to build the collective intelligence of the organization. (Vemuri & Bellinger, 2017).

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