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This chapter is about the need to liberate the enterprise from the grip of the mechanistic model and the criticality of treating a business as a living system. The chapter also covers the key characteristics of living systems and their implications for a company.

For decades, enterprises have been modeled as closed-ended systems, the rationale for which is discussed in this chapter. Closed-ended systems, for example, machines, are largely insulated from the external environment and incapable of learning on their own. Hence, although they are highly predictable and stable, systems are not capable of sensing, responding, and adapting to changes in the environment. Open-ended systems, also known as living systems, on the other hand, interact with the environment through the exchange of information, learn from interactions with the environment and, therefore, are able to evolve by adapting and responding to change, for example, humans have evolved from apes.

It can be concluded that organizations modeled as close-ended

However, the most critical element of any enterprise is its people and unlike machines, people have feelings and aspirations, are curious and, being naturally social in nature, like to engage with other people. Employees get VcfYX Xc]b[˙fYdYH]hj Y kcf_"˙ A UW]bYg Xc˙ bcĥ˙ A UW]bYg. Vm˙XYÚb]H]cbž

Processes and methods should drive ways of working

This implies that standardization is important, and not creativity, that most work-related circumstances and instances can be predicted in advance, and will have minimum variations or exceptions, and that people should not apply their own mind. Most importantly, the statement suggests that people are easily replicable like cogs in a wheel, and processes and methods are robust enough to smooth out the disruptions arising from people churn.

These beliefs, especially the "thinker versus doer" separation, are the primary reason for an organization to become mechanistic in nature, and h˙YˊfY˙m˙h˙YdˊYcdˊYk˙]h˙]b˙h˙YÚfaˊ˙VˊWˊa˙Ya˙YWˊUb]g˙H˙Wˊf˙Ygˊc˙f˙Wˊgˊ˙UˊgˊkˊY˚"˙ While Taylor's theory was revolutionary in helping businesses to scale their activities, it is a huge impediment to enterprise agility in the following ways:

- The "thinkers," that is, the leaders and middle managers are removed from the customers, as they are largely kept busy preparing reports and plans and attending endless internal meetings.
- The "doers" have very little or no autonomy to make any decision that might please the customer. They are expected to follow the standard operating procedure and have to seek approval for deviations. Sometimes, the deviation has to traverse multiple levels up in the hierarchy for the decision to be made.
- It forces people to organize activities around specializations, rather than around outcomes and the delivery of value, which is almost always not optimal from the perspective of the customer and therefore for the enterprise as well.
- By the time the information has traversed the hierarchy and has reached the manager, it usually has become diluted and also outdated. Decisions made on information which may not reflect the context at that moment are likely to be suboptimal, especially considering that the manager may have very little information about the ground-level realities.
- The "doers" do not get a voice in defining and shaping strategy, which leads to them not feeling engaged with their work. There is no incentive for people to be passionate about their work, which severely limits excellence. Customers will likely feel the indifference of the "doers."

- If the number of managers becomes large, then more managers are needed to manage these managers, thereby adding more unproductive layers to the hierarchy of managers. The value these additional layers in hierarchy bring to the enterprise is highly questionable, as the managers in these middle layers are mere channels to pass information between the hierarchy layers.
- The extreme importance given to compliance and adherence to processes leaves no incentive to innovate.

8 cYgh\g\a d`mh Uhk Yg\ci `Xg\a d`mtVubXcb\h Yg\ymbh]Úvd UbU[Ya Ybh\ theory? Of course not. It would be akin to "throwing the baby out with the

The Enterprise as a Living System

Businesses have always evolved and will continue to evolve in order to adapt to the changing environment. Some enterprises, such as Toyota, despite being a purely manufacturing-oriented business, began recognizing the importance of people much earlier than many organizations of that gWU Y UbX gjnY˙H\ ]g]a dcfUbW]g fYˆYWXˈ]b˙ *The Toyota Way* [v], which has several principles that are people-centric. However, the issue is that the mechanistic model is so deeply embedded in many enterprises that they are ÚbX]b[˙]h XˌZˊUW˙h ˙hc ˙Yj c˙j YUh˙h YgdYˈXˈUh ˙i k˙]W˙h ˙Y Y˙Yl ˙h˙fbU˙Yb j]fcba Ybh is changing. This is creating a sustainability gap for companies, which is getting wider with the onset of the digital age. Businesses looking at a wide sustainability gap face a threat to their survivability.
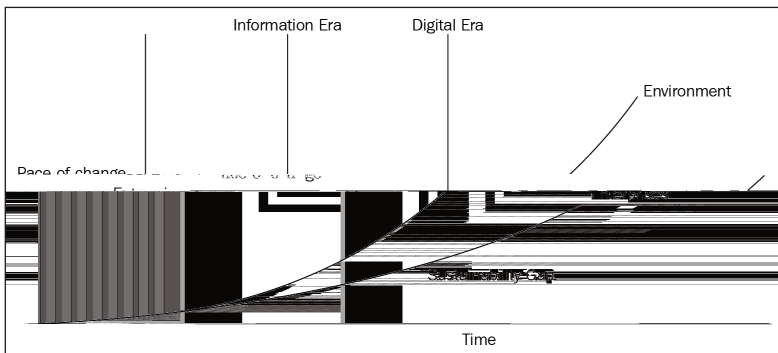

Figure 3.1: The sustainability gap facing enterprises

The preceding diagram depicts the widening off the sustainability gap due to enterprises being unable to keep up with the pace of change of the environment. The gap has been widening at a faster rate, especially after the start of the digital era.

9a d]f]W˙ Y]XYbWˈ g˙[[Y˙g˙g˙ h˙Ui Vˈa dUb]Yg˙ UˈY ÚbX]b[˙]h XˌZˊUW˙h to bridge the sustainability gap. According to Wouter Aghina, a partner at McKinsey & Co.:

"When machine organizations have tried to engage with the new environment, it has not worked out well for many. A very small number of companies have thrived over time; fewer than 10 percent of the non-financial S&P 500 companies in 1983 remained in the S&P 500 in 2013. From what we have observed, machine organizations also experience constant internal churn. According to our research with 1,900 executives, they are adapting their strategy (and their organizational structure) with greater frequency than in the past. Eighty-two percent of them went through a redesign in the last three years. However, most of these redesign efforts fail — only 23 percent were implemented successfully."

Complex adaptive systems (CAS) –
a proven model of high agility

The challenges of environments becoming highly dynamic, interconnected, and unpredictable might be new in the context of business, but they are widely dfYjUYbh]b`ŽYUbXgcV]U`gm]bWgUbX\ĺJYY`]g\ĺXgĺbWYY`fb]h`]hˇDfcaˇ]bYbĺ examples are humans, ecology

The Enterprise as a Living System

The preceding diagram

There is no single centralized control mechanism that governs the behavior of the agents or the system itself. Agents have the autonomy lc ́VX\ U ́Y Ug ́h Ym XY a ́Ut ̌g V ̆Y ̌Y ̌hc ́Vci bXf]Y ́UbX gc a Y f Y ̇h f]W ̌cb g ̌ for example, humans have the freedom to decide when to marry, but will be punished if they threaten someone into marriage.

Loosely-coupled agents

The agents in a CAS are loosely coupled. This implies that when some agents are removed or when a part of the system fails, the rest of the system is either not impacted or recovers quickly, for example, if some investors leave the stock market, the market continues to function normally. When a large ⓊbⒶbⓌⒿⓊ ⌐]bg]]i]cb ⌐]_Yh Y@Y\a Ⓐb ˙6fch Yg˙ⓌⒶⓐgⓍĝⱬ]ha][\hⓋf]b[˙Ⓧckˑbˑ a few other institutions with it and make the economy wobble a bit. However, the economy will eventually recover.

H\Y_Yḿhc˙VⱲ]b[˙˙ccgYṁWⒾi d˙YⓍˑ]g˙ŨⱲ]Ⓥ]`hṁ]b˙h˙Yghfi ⱲifY cZˑh˙Y system and the diversity of behavior of the agents. If the agents behave in a coordinated or unidirectional manner, the system's behavior will change to being tightly coupled. A stock market crash leading to panic selling and a run on a bank are examples of tightly coupled behaviors.

Variety is a source of strength

The more variety there is in a CAS, the stronger it is. The diversity in a CAS leads to ambiguity and paradox. However, a CAS uses contradictions and uncertainty to create new possibilities to evolve with and adapt to the environment. This reinforces the idea of bounded instability or the edge of chaos that is characterized by a state of paradox: stability and instability, Wa dYⱨ]h]cb˙ⒶbⓍˑWⱲcdⓎfⒾⱨ]cbžⱬcfⓍY˙ⒶbⓍ˙]gⱱcfⓍYf˙˙8˙Yⱥ˙c WⒶWⱨⓊbⓍˑ ⱮⒶbⓌⒿⓊˑ markets are examples of 3.317. 90C0mparadoesystem's p̌en strengt,

A poignant example is that if we were to take all the food shops in a town and divide all the food by the number of people living there, we kci `X ÚbX Ud UIhIf b `h Uih YfY]g`Uk Ung`cbY!hc!hkc `k YY_gfik cfh `cZ ZccX supply in the town. However, this is achieved without a food plan for the town or a formal controlling process.

Another example is of a termite hill that has an amazing architecture, with a maze of interconnecting passages, large caverns, ventilation tunnels, and much more. Yet there is no grand plan, the hill just emerges as a result of the termites following a few simple rules.

The nonlinear relationship between cause and effect

In a CAS, the relationship between cause and effect is not necessarily linear, and sometimes not even correlated. Small changes can have a surprisingly profound impact on overall behavior, or vice versa, a huge upset to the system may not affect it. An example of a nonlinear relationship is how Bearings Bank was brought to closure by the actions of just one person, Nick Leeson. H\ YÛu` Ihf]b[ `cZ Vi` IhfÛ Yg`]b `6fÛh] `Wl g]b[`IcfbUXcYg]b `h YgIIhYcZ H!M `Ug in the USA [xiii] is an example of a lack of direct correlation between cause and effect. Hence, the causes of many effects may be found only in hindsight, which then may lead to interpreting them over a period of time as patterns.

H\ YfY]gUÚbY]bYVVIhk YYb`cfXYfUbXVUcg`5`gng Ya `]bYei`]`Mf]i a `XcYg`not have the internal dynamics to enable it to respond to its environment and it will slowly (or quickly) die. Too much order implies too many constraints UbX`h Uigh]ÛYg`]bbcj` Uhcb`UbX`WYUhj`]h m!5`Ui` hca cVY`g]g`Ub`Y`la`dYcZ`an orderly system, which (usually) behaves in a very predictable manner. A system in 0044005m0051004A00034.1 005700520055≥20.3 00510044004s 4.w8ly) ZEA7K

In a CAS, the rules governing the functioning of the system are quite simple. A classic example is that all the water systems in the world (all the ghˉYˋaˊgˇfˈjˊYˈgˇˋUˍYgˇˋcWˋUbgˇkˋUˋYˍZUˋgˇˋUbXˉaˋUbˊmaˋcfˇZkˋ]hˋˋhˋYˋf]bˊUb]hˋY beauty, power, and variety) are governed by the simple principle that kˋUˋYˋˋUbXgˋ]hgˋckbˋˋYˋYˋˋHˋYˋgˊaˋd`Wˋhˊmˋ]bˋfiˋYgˋYbUˋYgˊgˇYˋZcfˋUb]nUˋcbˇ which is the key to the system being on the edge of order and chaos, and YZZWˋjˋYbYggˋcjˋYfˋYZU˝Y]bˋWˋh

A CAS, once it has reached the state of "being good enough," that is, the energy wasted is less than the energy spent on improving itself, will trade cZZˋ]bWˋgˋgˇYXˋYZU˝Y]bˋWˋhˊYfˋYfmˊˋaˋY]bˋZjˋcfˋcZˋ[ˋfYUˋYfˋYZZWˋjˋYbYgg"5ˋgˊaˋd`Y example is the human body, which will start burning stored fat in the absence of food.

Patterns of behavior

Tˆ˜˝˜ˋ˜˜F-HIIHFW0b˝ˋˋtari3sˋˋ0037

Implications for enterprises

The characteristics of a CAS

Responsive structure

The enterprise needs to have a structure that supports autonomous, decentralized, and outcome-oriented teams, which will facilitate interoperability and information sharing among people. This structure should have a wider periphery, which facilitates closer interaction with the environment and therefore enables the company to be more responsive.

5 WⴰfX]b[ˈⴰc ˈB]YgDⱢU][ ]b[žⱮ h⌐cfˈcZ *Organize for Complexity*.

"It is the periphery that learns from the market easiest. That can best adapt to and respond to markets — quickly and intelligently. In complexity, the center loses its information monopoly, its competence advantage: it can hardly issue any meaningful commands anymore. The coupling between periphery and center must consequently be designed in a way that enables the organization to absorb and process market dynamics. For that, the periphery must o   A

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Amplify success stories

Stories too are agents, albeit logical and in an enterprise, and hence success

Link purpose to work

The purpose of the enterprise, broken down into vision, mission, strategy, and initiatives, must be socialized across the business such that the agents, namely, people in the enterprise, are able to establish a connection between the work they are doing and the purpose of the company. Staff being aligned with an organization's purpose is a necessary condition to be able to effectively deliver value-driven outcomes. Besides autonomy and mastery, purpose is a key factor in intrinsically motivating people who are knowledge workers. This topic will be discussed in more detail in *Chapter 6*, *Structure* and *Chapter 8*, *Process.*

Balance proximity and modularity

Given the criticality of the interaction between the agents in shaping the outcomes and evolution of the system, it is important to ensure that no agent remains disconnected or connected weakly with the agents they are supposed

Standardization consequently leads to homogeneity, which is the opposite of diversity. However, biological species are known to become more vulnerable as they become more genetically homogenous. Nature has therefore put in a mechanism of sexual reproduction, which leads to the random matching of chromosome pairings. This results in more permutations and more variety in offspring. According to William Hamilton,

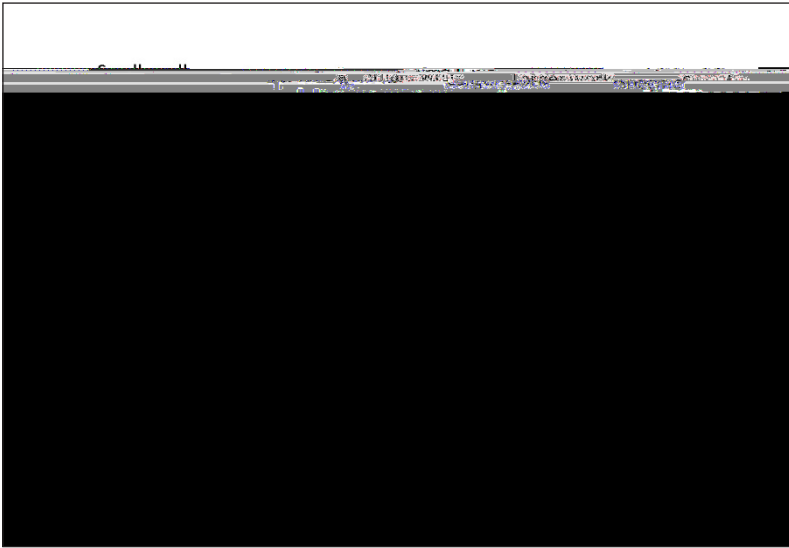The following diagram is a visual depiction of a rolling wave plan:

Figure 3.3: Rolling wave plan

⸫⸫⸫ to be done closest to the current time.

The parts of a CAS cohere around common goals and hence the plan ⸫⸫⸫ conducive conditions and do what it takes to achieve the goals. Building on emergence implies that the goals and outcomes may also need to undergo change, based on changes in the external environment. In such a case, the ⸫⸫⸫ means to achieve the outcomes.

Another critical aspect of emergence is to work with "just enough" ⸫⸫⸫ it should be adequate to conform to an existing pattern or to form a new pattern. Seeing information as patterns is especially important as it is quite easy to get lost in data, which is available in abundance.

Experiment with lever points

Most management theories and practices are based on a deterministic cause and effect principles, for example, incentivize employees with more money and they will deliver more/work harder. However, one of the core properties of a CAS is nonlinear or disproportionate causation, that is, a small action resulting in a disproportionate effect and vice versa. Actions that are inexpensive but lead to g[[b]ÚW̌bhdcg]hj Yci hW̌a YgˈǓYW̌ˈYX̌

"ȞˋYgˌYˋdc]bhgˋW̌bˋVYˌ]X̌bhˌÚ̌YX̌ˌhˋfci[\ˋˌY]ˌďYf]aˌY̌bhˌǓf]cbˋcfˋ`YǎfbYX̌ based on patterns of empirical evidence.

Agile practices have many such lever points, which enhance agility, for example, putting up a visual board to depict the pipeline of work in a process usually has a highly positive impact in terms of identifying blockers, managing dependencies, and focusing on higher priority items. Another example is a daily stand-up meeting.

@ˌYˌYfˋdc]bhgˋW̌bˋUgˋˈVYˋiˋgˌYX̌ˌei˓]hˋYˌZˌZˌW̌ˌjˌYm̌]b̌ˌ]bÛ̌iˋYbW̌b̌b̌ˌ̌W̌ȟǐfY change. A senior leader could participate in a retrospective exercise to learn about why something failed and then encourage the team to learn from that mistake, sending positive signals across the enterprise, especially if the employees of that business are generally afraid of failure. Socializing success stories is another lever point that has usually resulted in broad-based positive outcomes across companies.

Balance order and chaos

In order to deal with change, enterprises, like a CAS, need to undergo change themselves. This change can be in the form of reorganization, selective destruction and renewal, reshaping or something else. As mentioned earlier, UÚ̌fǎˌW̌bbchVYˌǓhˌYei˓]ˋ]M̌f]ǐǎˌŽcfˋǓbˋm̌ǎˌYUˌb̌]bˋ[ˌZˌˋ`dYf]cX̌ZˌǓgˋȟˌYZcfW̌gˋUW̌]b̌ˋǐdcb̌ˋ]ȟǓYWǓb̌]]b̌ˌˋW̌b̌ghǓbȟm̌ˌiˌȞˋYjˋYfm̌ǓgˌW̌X̌YǓb̌]ȟ]cbˌcfˌZˌYeǐ]]M̌f]ǐǎˌˈ]g that "it is a state of an object in which all forces acting upon it are balanced."

Essentially, a CAS will do "whatever it takes" to survive under changing conditions. All CAS appear to follow this pattern. It is only by being in this "sweet spot" that CASs are able to deal most effectively with change.

The implications for enterprises are as follows.

Selective destruction

5b˙Ÿ U a d˙YcZ˙gŸ YWJ˙ YXÿ hfi Wçÿbˇ]bˇ U75G˙]g˙\ck ˙ZˇfŸ ghÚÍ˙Yˇg˙\Û˙ YˇVYÝˇb˙
found to be a crucial factor in regenerating healthy forests. The key takeaway

Simple rules

As stated earlier, all CASs operate on simple and minimal rules. For an enterprise, this means setting appropriate boundaries and keeping the rules simple and minimal. It also means letting the people, and networks of people, interact among themselves and with the environment to organize through an iterative process of creative exploration and selective destruction. Agility is most effective when the people who are closest to the environment have the space and freedom to interact with the environment as they deem Uddfcdf]Uh Ubˆ a U_Y hˈY bˈWˈggˈUfˈm a cXˈ[ˈUˈWhˈcbgˈ]bˈ hˈY gˈghˈYˈ ˉˈ : cfˈ example, an organization that is recognized for successfully transforming to Agile has only two rules for the teams: iteration length should be two weeks and the shared electronic tool should be updated with all relevant data on a real-time basis.

Safe to fail experiments

The disruptions caused by change, particularly change that is technology related, mean that a business will repeatedly encounter unprecedented situations, for example, blockchain, which was perhaps unimaginable a decade ago. It can be a threat or an opportunity, depending on how a bank deals with it.

An enterprise must have the culture of innovation, if it is to spot and also create opportunities that a changing environment presents. Innovation can come only from experimentation. To foster a culture of innovation, the business should encourage people to stay away from the "we have always done it this way" mindset and more toward a culture of trying something new.

However, risk and experimentation go together, and if risk is not understood and contained, it can be disastrous for the company. The Ford Edsel car is a classic case study in this regard. Ford wanted to develop UdfˈYaˈ]iˈ aˈ ˈWˈˈZcfˈa]XXYWˈLˈgˈ5a YflWˈbgˈˈ: cfXˈk Lˈgˈgc ˈWˈbˈÚˈXˈbhˈUˈvci hˈh ˈY car that it planned to introduce 18 variants of the car at launch. At launch, the car was too expensive, was a "gas guzzler," and was mocked in the press. Ford had to write off $350 million for this failure, which in today's terms is close to $3 billion.

Some ideas can be just ahead of their time (for example, the Newton A Ygg U YDUX]bhfcXi WX]bh YYUʹm% - §gĻk \ʹYh YWghca Yga Unga dʹmbch ʹ_Ygca YXYUgʹfkfʹYl UaʹdʹYž7fngh UʹDYdgLʹ: fcaʹUbʹYbhfdfʹgYdYfgdYWjʹYž there are two takeaways: 1) it's important to get feedback as early as possible to know whether something should move forward or should be stopped, and 2) risks should be taken only to the extent where it is possible to recover quickly from failure and ensure that the risk does not prove fatal for the company. ═bʹglʹaaUfmžUbʹYbhfdfʹgYʹaʹighghfʹjYhcʹghfʹ_Yhʹ UʹiYʹUUbW Yfhk Yybʹ order and chaos, as too much order impedes agility and chaos destroys agility.

Prioritize effectiveness over efﬁciency

Under perfect conditions of stability, trade-offs may not be necessary VYhkʹYYbʹ YZZWhjʹYbYggʹUbXʹYZÚ]YbWhʹ< ckʹYjʹYfžʹ]bʹfYU]hžž]hʹghfUXYʹcZZʹʹ]g UkUghʹYfʹ AcghʹʹiʹgbYggžžžʹUgʹUfiʹYcZʹhʹiaʹVžUddYfʹhcʹZjcfʹYZÚ]YbWh over effectiveness. Some of the key reasons for this include the following:

- Manufacturing orientation, where identical things are produced in large quantities
- Short-term profit maximization orientation, due to pressure to show increasing profits every quarter

H\ʹgʹVWcaʹYggʹghUfʹ_ʹmWUfʹk\Ybʹ Y]Uaʹ]b]bʹ]hʹY? D═gʹWcgʹYbʹhcʹXYUbY success and also those based on which C-level executives are incentivized and rewarded. A CAS, however, prioritizes effectiveness cjʹYfʹYZÚ]YbWhk\ʹYbʹhʹY trade-off has to be made. This is perhaps the best way to deal with a changing environment when survival is at stake.

Enterprises need to change their orientation to prioritize effectiveness cjʹYfʹYZÚ]YbWhk\ʹYbʹhʹYʹYfʹ]gʹUbYhggʹhmʹhcʹaʹUʹYhʹYʹhfʹUXʹYcZZʹʹ5ʹViʹgʹbYggʹ aʹUmʹYYʹ]fʹ\ʹmYZÚ]YbWhʹYbhʹVmʹdfcXiʹWbʹ]ʹ]hgʹdfcXiʹWhgʹUhʹhʹYʹckʹYghʹidcggʹVYʹWcghž but, to save costs, it may not spend on learning about the customers' changing dfYXfʹYbWghʹʹ5gʹUfʹYgʹ]hžʹh\ʹYʹWcaʹdUbmʹWbʹʹUWʹYjʹY\ʹ][ʹYfʹdfcﬁÚUʹ]hmʹ]bʹhʹYʹ short run, but will lose customers in the long run, thereby losing both revenue UbXʹdfcﬁhžʹH\ʹYgkʹ]ZhʹXckbʹZUʹʹcZ6ʹcʹVVʹigʹhʹYfʹ0jʹ]]]Gžkʹh\ʹWʹkʹUgʹhʹYʹYUXʹYfʹ]bʹ the video rental industry, is a case in point. A critical part of its revenue model kUgʹVUʹYʹʹ]bʹʹhʹYʹZYʹZgʹhcʹWghʹaʹYfgžʹK\ʹYbʹBYﬂÚ]ʹʹWaʹYʹidʹkʹ]hʹʹUaʹcYʹ which made late fees redundant, Blockbuster went bankrupt in no time.

An organization must spend, as needed, time, effort, and money on enabling a learning and knowledge-driven culture, which helps its people to effectively adapt and respond to the fast-changing environment. Knowledge workers should primarily be accountable for effectiveness, that is, getting the XYgfʹYXʹciʹhWʹaʹYžʹUbXʹgʹWcbXʹUʹʹ]ʹmžcfʹYZÚ]YbWhʹih\ʹUhžʹXcʹ]bʹʹ]hʹbʹgʹthʹY least cost.

Monitor and leverage patterns

The emergent nature of CAS implies that patterns will surface at all levels of the enterprise, which will be based on the behavior of the agents, as well as the behavior of the system itself, for example, people becoming tense during performance appraisal periods could be a pattern. These patterns can lead to outcomes that are both desirable and not desirable. An example of an undesirable pattern is that decisions are being made by the (stands for,   ). Hence, patterns need to be monitored on a continuous basis, to encourage behaviors that lead to desired outcomes and conversely discourage behaviors that lead to undesirable outcomes.

It is also important to examine patterns that have become mental models, and challenge them, as some may be impediments to change. These ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚ additional changes. Unless the feedback is a one-off, feedback should be consolidated ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚ getting lost in the details. While details are important, not everyone should ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚ more consumable, thereby aiding the speed of communication, as well as ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚ leadership, which will be covered in *Chapter 5*, *Leadership*.

Summary

In this chapter, we learned that today enterprises are facing challenges which CASs have dealt with since time immemorial very effectively. They have been able to do so as they have all the capabilities of agility, only because they are living systems.

Understanding CAS modeling and embracing it, in order to infuse life ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚ as they embark/continue their journey toward agility. It will create a strong foundation that will support all other measures to boost agility.

The next chapter is the second of the three chapters in the foundation ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

References

[i] http://atheistnexus.org/forum/topics/golden-age-of-capitalism-1945-1971

[ii] https://thelawdictionary.org/mechanistic-organization/

[iii] http://www.economist.com/node/13092819

[iv] https://hbr.org/2014/10/what-peter-drucker-knew-about-2020

[v] https://en.wikipedia.org/wiki/The_Toyota_Way

[vi] http://www.managementexchange.com/hack/organizations-living-systems-crafting-new-story-life-center-its-plot

[vii] https://hbr.org/2016/01/the-biology-of-corporate-survival

[viii] http://www.businessdictionary.com/definition/complex-adaptive-system-CAS.html

[ix] https://en.wikiquote.org/wiki/Complex_adaptive_systems

[x] https://en.wikipedia.org/wiki/Complex_adaptive_system

[xi] https://commons.wikimedia.org/wiki/File:Complex_adaptive_system.svg

[xii] https://garden.org/courseweb/course2/week2/page18.htm

[xiii] https://en.wikipedia.org/wiki/Butterfly_effect

[xiv] https://www.news24.com/mynews24/yourstory/rules-for-driving-in-johannesburg-20110727

[xv] https://www.linkedin.com/pulse/flat-hierarchies-just-another-step-wrong-direction-niels-pflaeging

[xvi] http://www.full-stackagile.com/2016/02/14/team-organisation-squads-chapters-tribes-and-guilds/

[xvii] http://rogerlmartin.com/thought-pillars/integrative-thinking

[xviii] https://www.forbes.com/sites/gregsatell/2014/09/05/a-look-back-at-why-blockbuster-really-failed-and-why-it-didnt-have-to/#80977c51d64a