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# The Language of Systems Thinking

To really understand how systems work, you need the right vocabulary. Jon Gittings explains.

Understanding the language of systems helps people make the right decisions and create change. This is critical for any enterprise and organization, along with the executives in charge. The first step is to understand that a system isn't just a collection of things, but rather an interconnected set of elements organized to achieve a function or purpose. You also need to understand that there are implications to changing any of the elements or interconnections and, most importantly, the purpose. Although systems sound complicated, the beauty of systems thinking is actually how it can make the complex simple. And the more you understand and speak its language, the more straightforward it can become.

Take, for example, a football team, whose *purpose* is to win games. The players and the coach constitute the *elements* of this system, and they can be changed at will. The *interconnections* form the framework in which the game is played, and play is defined by physics, the rules of the game as well as how the coaches train the team to play.

So what happens if you change the system's various components? Alter the elements and you would still have a football team. It may or may not perform better, but it would still be eleven players kicking a ball. Change the interconnections, however, and the impact is much more dramatic. Create a new set of rules – allow players to handle the ball, for example – and you have a whole new ballgame. If you change the purpose of the team from winning to just having fun, you have also made a profound shift in what you are likely to see on the field (and where the team ends up in the league standings). Purpose is one of the most powerful ways to influence the behavior of a system. Why? Because it sets the direction for the system. For businesses and marketers, a poorly-defined purpose is often at the core of one's inability to direct or move the system in a desirable direction.

**The importance of time**

These terms, however, broadly define the system at a single moment in time. The true power of a system is only revealed over a period of months, years or even decades. Words that add the dimension of time to our appraisal of systems include stock, flows and feedback loops.

*Stock* is the collective noun for all the measurable elements in the system. To continue our football analogy, it represents the skill of the players and their understanding of the opposition's skill. It is

the store of resource that builds up in a system over time, whether that be tangible material or intangible knowledge. The stock will increase or decrease when there is a flow. *Flows* can be growth or decay, purchases or sales, deposits or withdrawal, and successes or failures.

Football players' skills can grow or decay as they train or get injured, while a team's skill level can improve or decrease as players' contracts are bought and sold. If a player's propensity for injury increases and he is no longer able to train as hard, that would impact the stock. But what happens if a young player joins the team, becomes an element of the system over time and improves his play? That would clearly be a positive flow.

Perhaps the best way to view a system is as a rather crazy set of plumbing. Every pipe has its own tap that can be turned on or off, but the decision to reduce the flow in one section of the system will automatically boost it elsewhere. It's these feedback processes that make it so essential for a company to operate its whole system, not just each element in isolation. After all, if attempts to reduce or increase the flow in one part results in the opposite impact in another of equal importance, then a system has not progressed toward its purpose. Moreover if the system or the pipes aren't properly connected, the result is *leakage* or *wastage* in the flow. Not only is it important to ensure that the taps are correctly positioned but your pipes need to be seamlessly linked in order to have a healthy or optimized system.

### The impact of feedback

Understanding *feedback loops* is critical to systems thinking. Some scenarios that look like they are boosting in-flows to stocks could trigger other events that have the opposite effect. For example, if working hard earns you more money, you create a positive flow to your bank account. The longer-term feedback could be a decline in motivation to work as your bank balance rises, or you may become more relaxed about spending money. These are two potential negative feedback loops.

Feedback loops come in a variety of different forms. Balancing loops – those that are ultimately self-regulating – might oscillate around a chosen level of stock, but eventually return to the same level. The other kind of feedback loop encourages more input to the stock that's already there.

In our banking example, a reinforcing loop is one where an account is paid interest according to the terms of the account. The more money in the bank, the more interest earned. As the old saying goes, the rich get richer. And as Sir Isaac Newton might have said, every action creates a reaction in a system.

### Gaining leverage

The final key term when describing a system is leverage points. *Leverage points* are the moments or places in the system where chosen actions will (or won't) propel the system toward its purpose. Insight tells us where these points are and how power should be applied.

In a communications system, marketers and strategists will understand these as the right content, right time and right place to deliver their messages. Identifying a leverage point and applying the correct change elsewhere in the system might not result in immediate action, as often systems will be buffered in some way. But over time – depending on the size of the buffer in the system – the system will move in the desired direction.

A classic example of a buffered system is the mobile phone market. Let's say Company X brings out the most technologically-advanced new handset. Although the product is competitively superior, it takes time for the company's market share to reflect the breakthrough.

This is because there are significant buffers in the system, namely the length of phone contracts and consumers' inability to change carriers without incurring massive charges. Another buffer is the company's ability to manufacture enough handsets to meet demand. In many ways, this is the scenario facing smartphone maker HTC; while the company may have started out with better technology and reviews, it continues to struggle due to a legacy of manufacturing and distribution buffers.

### Find your inner systems thinker

The best way to observe and understand how your system operates is to sit back and watch. Access your inner naturalist. Observe how the system behaves while identifying its flows, elements and the interconnections. Systems are complex. You might think you have tamed yours, but be assured that it will evolve and continue to create new challenges to be observed and met. That, after all, is one of the key pleasures of systems thinking.