Where The Machine Model Ends

Would you hope that your organization will run like a well-oiled machine? Would you like to have a secret recipe that makes your business forever Number 1 in your industry? If your answer to either of these questions is yes, sooner or later your business will probably become a victim of your wishful thinking? Yes, scientifically, this is wishful thinking.

But don't feel too bad because it is not your fault and you are definitely not alone. As a matter of fact, I lied a little bit because science itself is one of the reasons why we think and act this way in the first place. From our childhood, in order to learn something, all of us have to start with something easy and simple. Through our early education, almost all of us only concentrated on learning rules and procedures. Then we think the best things we can learn about our world are all related to some form of logical thinking and reasoning. This view of our world has been in our blood for generations.

Successful machines, particularly those that are automated, are reassuring and further enhancing our impressions about the power of our logical thinking and reasoning. Machines are manifestations of computation, i.e., physical and electronic instantiation of our logical thinking and reasoning. It is natural for us to think that sooner or later we will discover more and more complete, computable formulae so that machines will eventually do everything that humans can do, including thinking. I compare this belief in the unbounded potential of the machine to the belief in a perpetual motion machine in years past.

An award-winning mathematician in the last century, Kurt Gödel, shattered the foundation of this seemingly logical reasoning. He discovered with his rigorous mathematical approach that the seemingly ultimate provider of our logical reasoning, modern mathematics, is itself in default of completeness. That is to say, Gödel has proved that mathematics, as we know it today, will never be able to provide all the logic and rules of computation we wish to have, simply because they don't and can't exist.

Many mathematicians appreciated very much the true genius of the approach Gödel took to develop his Incompleteness theorems, but they didn't appreciate his conclusions. For all kinds of reasons including our learning biases noted above, some of them even try to diminish the significance of his conclusions. Yet, while the implication of Gödel's discovery is unpleasant to the ears of the believers of computability, Gödel really proved that even scientists may not be so scientific any more.

But not all scientists were mystified with what to do with Gödel's non-computability proof. Professor Robert Rosen, a biologist and mathematician, later incorporated Gödel's results into his lifetime study on "life." Rosen mathematically demonstrated that organisms, including human beings, are among those that are beyond the computability of mathematics. Organisms are not computable, exactly because of their abilities to self-adapt, self-evolve, and self-sustain in a changing environment. Since Rosen has also demonstrated that there is a machine inside each organism, what Rosen has found can be paraphrased as, if a machine became a self-sustainable and self-adaptive organism, it would no longer be computable. In other words, the current machines and technologies that produce the machines will never be able to deliver the organic features such as adaptability and sustainability as claimed by their believers. They are not even close.

Rosen's research is not as abstract as Gödel's. Therefore in the academic world, his conclusions ran into more resistance, some of which even came from his colleagues in biology who firmly believed organisms are just a variation of the machine. More than one attempt has been made to show something is wrong with Rosen's research. But every time, these negative publications just demonstrate that their authors don't quite understand what Rosen is talking about, and their own mathematics is wrong.

Now as you see, you are indeed not alone if you wish that there should be a machine that could do everything for you. It is now also more understandable why such a wish can be easily extended to our organizational and business thinking as already mentioned. If there should be a computable formula for everything, why don't we have rules and formulas for organizations and businesses?

As a matter of fact, the machine model was one of the earliest organizational models offered by systems science and systems engineering after the end of WWII. As mentioned in the beginning of this article, the image of an organization under the machine model is a well-oiled and calibrated machine. People working in the organization are parts of the machine. All they need to know and have to do is to follow orders, job descriptions, and predesigned procedures. Even the decision-making process at the top level of the organization should follow the pre-planned procedures and metrics.

This organizational model is so desirable in the real world, also because it seems that it follows the old wisdom "keep it simple." Particularly if we assume that in general, people don't like their jobs, they don't want to learn anything new, or they don't like to be paid to think, a machine organization, including each job associated with it, should be an ideal solution, sort of like a utopia. Again how many managers and executives do you know share this idea or something similar?

If all of our organizations and people in the world today were not more than machines, the machine model would be a perfect solution for everything, because everything would be predicable or computable. Yes, as you can see, this is a model based on predictability and computability. But what if among all things on earth, machines are the only ones that have 100% predictability and computability?

At present, we at least know that our business world is 100% unpredictable and non-computable. So why should we have so much addiction to machine models when we know our world is not a machine? One of the explanations is perception. We still hope someday and somewhere, someone would find the scientific rules and scientific formulae we need. Some of us are afraid of missing the opportunities and have jumped into every possibility when similar claims are made for killer applications. Many people have no idea that this blind love for machines is not scientific at all.

What makes the machine model an ineffective and defective organizational model goes beyond the challenges of the changing business environment. It is the people working within the organizations that will never be able to make the utopian metaphor work. To make a machine out of human is something that has never been successfully achieved and never will in a modern society. One of the pioneers of modern systems science, Professor Robert L. Flood compared the common belief of machine organizations with the reality of organizations to explain how machine models can be conceptual traps. The following Table is a presentation modified and paraphrased by us, based on Flood's original discussions in 1997.

Table A Comparison between Machine Model and Organizational Reality

Conceptual Traps of Machine Models	**Reality of Organizations that Needs to be Considered by Organizational Models**
Organizations are like machines. They have problems that have to be and can be fixed.	There is no such thing as a problem or a solution. It is necessary to recognize that people come to organizations with different material, psychological, spiritual, cultural, and social needs and background, which they may or may not openly share with others. They always create new issues and problems while they think they are solving problems. Where there are humans, there are always challenges.
The correct problem solving approach is required to relieve management of all their troubles and struggles with their organizations.	There is no single problem solving approach correct for all circumstances. Frequently, what we know may never be enough to give us the right to say we know. Predictability and computability are always relative terms.

Organizations must be well-aligned with, maintained in, or restored to, normal trouble-free life.	There is no such thing as normal organizational life. Once we understand that life is unpredictable and non-computable, we should acknowledge that changes and conflicts may be the norms of our organizational life.

To recognize the false hope promised by machine models as shown in the Table above doesn't mean we have to give up our effort to improve our organizational life. But if we hide ourselves inside this box of machine-thinking, we will never discover anything different. We will never know that the challenges we face in reality are much bigger than any machine model can handle.

To create the awareness of the real organizational life beyond the machine models doesn't mean that we are hopeless in facing its challenges. Successful companies and projects in industry have actually demonstrated effects that are quite the contrary. For example, according to a report from Fortune magazine in February 2006, a former GE executive who stayed with GE for more than 10 years made the following comments, "GE, like anywhere else, has a little bit of politics, a little bit of personal stuff and all that, but compared with all the other organizations I know, it's minimized. It's upfront. You know what you have to do to succeed."

The report was titled "What Makes GE Great?" to discuss why GE was named the number 1 Most Admired Companies in the world during a time when its stock price was down. Although the report did not give a clear answer, it correctly pointed out that GE had always taken the lead in business to implement new business ideas and then "enthusiastically destroyed" them, so that it has been constantly reinventing itself. Do you know any machine that can destroy itself and then reinvent itself afterwards? In the theories of Gödel and Rosen, that will never be scientifically possibly.

The author of the Fortune report was honest. He did not pretend to know the answers to his questions. Instead, he just summarized the major facts he knew. He was correct by taking on this approach because many of our popular science and scientific theories are developed only for machines that require predictability and computability. They can never tell why and how successful companies like GE have made it such a long way in their journeys.

Unfortunately, many of our top scientists and technologists today are still worshiping machines and machine models, and are trapped inside the machine box. They still refuse to look deeper into the direction which Gödel and Rosen have rigorously and scientifically demonstrated to us. This is why they, and therefore many of us, have been hijacked by wishful thinking that a self-renovating machine, a new version of a "perpetual motion machine," is possible. Without the scientific theories we need, however, everyone will continue to unnecessarily pay high tuitions to learn the real lessons of successful businesses in a much harder way.