# Understanding system innovation: the case of covid-19 pandemic strategy

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The covid-19 pandemic was an unfortunate event, but the wrong strategy of flattening the curve made it much worse. We could have saved one million lives and avoided economic losses of trillions of dollars in the US alone with my proposed reverse quarantine strategy, which would have ended the pandemic in about two months with a death toll less than 60,000 in US.

The key lesson for political and business leaders is that they could be open-minded to a system innovation from a system inventor that is fundamentally different from the opinion of mainstream experts. The consequence is significant, the rise and fall of a company, the prosperity and peace of the world, on the order of trillions of dollars.

This is a rare opportunity for a case study to discuss two important concepts: system innovation and strategy. A business strategy often has some secrets that would hinder its full understanding for outsiders, but the covid-19 pandemic is a public health event for everybody to see.

As Richard Rumelt said, a good strategy is unexpected. One would not expect a good covid-19 strategy from an independent system inventor with a PhD in materials science and engineering.

As Roger Martin said, a choice is not strategic unless the opposite is not stupid on its face. As Albert Einstein put it another way, for an idea that does not first seem insane, there is no hope. The reverse quarantine strategy is the opposite of the flattening the curve strategy. Since the flattening the curve strategy is not stupid on its face but a consensus among experts, my proposal is a strategic choice.

I have been an independent system inventor since 2000. I have a passion for system invention, and I am good at it. Previously I have worked in industry and research labs in Denmark, US, and China for 17 years. I have written a book "An inventor's vision for America" (available at amazon.com/author/hengningwu), with strategic choices in innovation, communication, transportation, environment, urban planning and organization, and world peace. We are at a critical junction in history. These fundamental system innovations will have huge impacts on civilization, essentially will affect every business and everyone.

The strategic choices and predicted consequences I gave in April and May 2020 are listed in Table 1. These strategic predictions can easily be verified today by everybody. The actual number of deaths for two years in US is about 850,000 (Omicron variant is the start of a new round of infection). I am right on target.

In the reverse quarantine strategy, healthy people would have a normal life and only people with preexisting conditions would take voluntary protection. To verify the reverse quarantine strategy, one has to look elsewhere, such as North Korea and many African countries. One may have doubts about statistical numbers from these countries, but widespread deaths within two months did not happen and this could be verified from other signs such as funerals.

Table 1 Strategic choices and predictions of deaths and economic losses for US

| Strategy | Deaths | Economic losses | Duration |
|---|---|---|---|
| Flattening the curve | 600,000~1,000,000 | on the order of $1 trillion | ~2 years |
| Reverse quarantine | 6,000~60,000 | on the order of $10 billion | ~2 months |

How could a guy with a PhD in materials science and engineering come up with a strategy for covid-19 pandemic? My PhD is just a prior background in science, but I am a system inventor. The core capacity of a system inventor is pattern recognition and system thinking. This takes talent, exercise, and practice. It took me 20 years. These are the same skills for a strategist. A system inventor is a strategist, and a system innovation is a strategy.

Even with strategic thinking skills, it takes tremendous efforts. It is extreme activity. It took me three months to realize that the experts were wrong. It took me maybe five days and nights continuously to see the pattern behind the pandemic. Most people cannot endure 120 hours of continuous and intense work, but to see the whole picture one has to see all the parts of a system at the same time. On the surface, I am not an epidemiologist, but if we go to the fundamental level, I have background and experience in all related fields to see the connections and to connect the dots into a system. Afterwards, there were continuing strategic refinements.

Why an independent system inventor? 74% of major inventions are from independent inventors. At the start, a proposal for a system innovation cannot be evaluated, and therefore cannot get funded in conventional institutions. In 2000, some people realized the importance of independent system invention and created related businesses, most have quitted in a few years, but I have persevered. Independent system inventors are people like Edison, Tesla, and Bell.

The first pattern recognition is that the predictions by experts were wrong, and this is the reason for me as a system inventor to step in. A key pattern recognition is that the death rate for healthy people is about 2 in 100,000. This is the base for the reverse quarantine strategy. Another aspect of pattern recognition is to recognize what you don't know: one of the unknowns is when the virus will mutate into a new round of infection. The remedy is to watch for the number of reinfection. Omicron variant is the start of a new round of infection.

As an example, let us look at the death rate for healthy people. The case fatality rate is a measure of the severity or deadliness of an infectious disease. The case fatality rate of covid-19 pandemic

was initially reported as 2.2% from Wuhan, China, and the majority of deaths were from people with preexisting conditions and the elderly. Asking the right question is the first step in strategic thinking. The death rate for healthy people is the right question.

Even with the right question, getting the answer is not easy. The conventional expert method is to have five million healthy people infected and count the number of deaths. I did not have the resources to do so. Even with the resources, it would be time-consuming and too late for the purpose. A strategic thinker can see the pattern from all the data, mostly unstructured data. I looked at thousands of data sources, and saw the patten behind the unstructured data. To make sense of the data, a lot of background information came into play, including my living experiences in China, USA, and Europe, my prior research on transportation and urban design, and my working experience in the department of production and planning in a factory. Not every data source is reliable, true, or complete. Some are even deliberately false and misleading. It is very challenging to see the pattern.

The death rate for healthy people if infected is about 2 in 100,000, and remains unchanged, while the apparent case fatality rate changes a lot (1000 times) from place to place and from time to time. Mainstream experts typically assume the case fatality rate, as an inherent characteristic, does not change. For the covid-19 pandemic, the death rate for healthy people and the death rate for people with preexisting conditions do not change, but the mixture ratio of the two groups in the infected pool changes, giving rise to the changes in apparent case fatality rate.

How to evaluate a strategy that is the opposite of mainstream experts? Experts routinely encounter only incremental improvements within an existing system, and can judge things by existing protocols. However, a system innovation is, by definition, outside the existing box. You need to think, from first principles, to evaluate a system innovation. Not many people have the capacity to think from first principles. It takes thinkers and significant time and effort. It may take days, weeks, or even months. Direct interaction with the system inventor can significantly speed up the process. A thinker would either get it right or say I don't know.

Let us again look at the example of the death rate for healthy people. The number of 2 in 100,000 is comparable to the probability of death from car accidents in US. Today we know covid-19 is a very small risk to healthy people, but back in April 2020 how could people verify this number? To get this number, I need a huge number of data, especially unstructured data. To invalidate this number, however, you just need a single credible fact against it. If you cannot find one credible fact against it, you should assume it is right.

A strategy may also be verified by experiment. The reverse quarantine can be verified in a small scale experiment in about two months. Actually, by the summer of 2020, data from some African countries had already verified the reverse quarantine strategy.

Sometimes it is difficult to find thinkers with the right background or to conduct experiment, and the decision makers would have to make a judgment call. When you see a doctor, you do not

have the capacity to evaluate his treatment beforehand. You trust him because he has a track record. Similarly, you need to trust a system inventor with a track record.

The media can play a significant role to let decision makers, the professional community, and the public be aware of the strategic choices and consequences. Unfortunately, the professional journals rejected my paper, and the mainstream media ignored my messages. Reporters typically do not have the capacity to judge the merits of a system innovation, but reporters are in a position to report it. If a media just reports opinions of experts but ignores messages from system inventors, it will eventually lose the trust of its readers. After all, the future is created by system innovations.

Decision makers are busy people receiving lots of messages a day, and an important message may not get the necessary attention. The media can bring the necessary attention to decision makers. Although decision makers may not necessarily have the capacity to evaluate the idea, they have the resources to find the right persons to do the evaluation and implementation.

The professional community needs to have an open-minded attitude towards a system innovation from an outsider and incorporate the better strategy. Otherwise you would lose the trust of the public. A harmful attitude is that the opinion of mainstream experts is beyond question. In addition, a desired end outcome can only be achieved when experts are organized in an effective strategy. During the covid-19 pandemic, many experts have done a great job in their narrow field, but under the flattening the curve strategy these individual achievements did not add up to a desired end outcome.

Unlike an expert who stay in the same field, a system inventor moves on to other fields of exploration. Thomas Edison invented the electric utility system, but he did not stay in the field to become an expert in electricity. The reverse quarantine strategy should be added to the textbook and become one of the tools against infectious diseases. Experts should understand the idea and make further refinement. It could save millions of lives and avoid trillions of dollars in economic losses in the future. Unfortunately, mainstream experts are still either unaware of the idea or unable to appreciate the idea.

The general public needs to know the strategic choices available and their consequences. Behind the number of deaths are real family members lost. The economic losses in US could have been only on the order of $10 billions instead of on the order of $1 trillion. On average, the economic losses per person could have been less than $100 instead of on the order of $10,000. Ordinary people will ultimately bear the burden of the economic losses, either as higher tax or higher inflation.

A key skill of a system inventor is the capability to see things fit together into a coherent system and its outcome. In the process, he has eliminated numerous options that will fail. Ideas are easy, but good ideas are hard and rare. There may be a few people thinking in the same direction, but an system inventor is perhaps the only person figuring out the whole system in the world. By

default, what is said by a system inventor is correct and significant, and worth the time and effort for a serious consideration.

As for execution, it requires strategic decisions at all levels. Details matter. Only with a clear understanding of the system can one make the right decisions. Experts need to work in a coherent system to be effective. The system inventor can play a role as a strategist to business and political leaders to make sure the details are right. This acts like an insurance against the risk of failure. For example, when China finally decided to abandon its restrictive covid-19 policy, some cities did well while other cities did not so well, and one million lives could have been saved if I were there to help.

In summary, political and business leaders could be open-minded to a fundamentally different system innovation from a system inventor. Political and business leaders could be better prepared for its evaluation and implementation. A system innovation is essentially a strategy, with significant consequences on the rise and fall of a company, or prosperity and peace of the world.

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