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From my perspective

Historical lessons from technological disruptions: Will the storm always pass?☆

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The most important lesson from 50,000 years of technological disruptions is that the storm has always passed. The disruptions have always settled down. There are no cases in which any technological disruption has been permanent and has continued to upset humankind. You have to take a hundred to a thousand year perspective to appreciate that.

Do you know what a farrier is or what a wainwright is? The farrier is the horseshoer, the wainwright is the wagon maker. Not one person in a thousand gives a hoot or a holler about the status of farriers or wainwrights, yet a hundred years ago they were among the people severely displaced by the invention of the automobile and by the earlier invention and development of the railroad. That storm passed. The farriers went on to something else, or took the 19th century equivalent of early retirement, and the wainwrights either became part of Fisher Body or went off and did something else. But in the framework of a hundred years, what was an intense concern of the moment passed. That is my thesis. That is characteristic of all technologically driven change.

Because most of us are probably committed to the short-term future, the next decades, we will turn attention to that. But first, an additional point is that the comments below are anthropocentric. Being an anthropo, it is only natural that I respond to my philogenetic status anthropocentrically: Anthropo meaning human, centric meaning centric.

Well if the wounds always heal, why worry? There are three reasons for worrying:

- First, can we accelerate and improve what makes the storms pass or mitigate the storm's severity?
- Are there technological risks coming along which we can say with high levels of confidence will not be transitional?
- Are there changes in the society that make it more fragile or susceptible to potential technologically driven disruptions?

The answer to all three questions is yes, but they don't necessarily all involve the same technologies nor the same kinds of solutions.

Why do we have so much upset about these inevitable technological developments? The answer was nicely captured by the historian of technology, the late Melvin Kranzburg. Kranzburg's Law is that technology is neither good, nor bad, nor neutral. What he means is that we can see bad things in new technology. They are easy to find. If you are a bank teller you can see automated teller machines coming along as an assault on your job. Technology is good if you are Microsoft and you have some new software to make you another billion bucks. But, the more important thing is, technology is not neutral. A significant new advance changes our values. What we see as good or bad in the short run, is entirely different from our attitudes after that technology has resorted, reorganized, rearranged society. We see our world quite differently when it is different. Consider the value changes derivative of modern contraceptives, cancer therapy, movies, nuclear weapons, and frozen foods.

Consider disruptions in the short term. After a few years or a decade, the dislocation is dealt with or over. Examples of that are oil spills. In spite of all of the aggravations about oil spills, no oil spill has ever proven to be irreparable. Every oil spill has proven to be self healing. You may still go out to wash down birds, but do not treat this incident as if the heavens had collapsed, or that life on Earth is undergoing irreversible radical change. Keep that in mind as you get aggravated about the next environmental disruption. Do not be complacent. Help. Do what you can do but do not see it as the end of the world.

Remember the children who grew up with only flipper-sized arms as a result of a new drug being inadequately tested? Within a decade that risk passed. It does not happen anymore. The source of the trouble is gone. We found out what the cause of the terrible condition was, and regulation now prevents it. The victims will still be victims for the rest of their lives.

Many readers will recall when the credit card first came into use. There were cases of people hit with eight, ten, twenty thousand dollar debts because, at that time, you were responsible for anything charged to your credit card. If it was stolen and used, you were stuck. Well, we had to have ten, fifty, a hundred, or a thousand victims before we finally got legislation that limited our liability for a stolen credit card. Now, if you were one of those that were dinged for eight thousand bucks, it really hurt. But, the point is that short-term dislocation was just short term. Furthermore, had we legislated control on credit card responsibility without experience, the outcome in all likelihood would have been worse because it would have been based on speculation, ideology, and special interest group maneuvering.

I grew up using slide rules. Now they are just antique toys. Young people marvel: “Gee, isn't it great what you can do mechanically?” I keep mine for the innocent, and I have them in several shapes and forms, to show what it was like in the “old days.” Like wainwrights, the slide rule manufacturers are history. Do you or I feel any regret, much less pain about that?

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Consider the medium-duration disruptions. They also tend to disappear. Think about sweat shops. We have a few showing up in the Chinese, Vietnamese, and Hispanic communities in New York and California. But, we do not have the ubiquitous 19th century American and British sweat shops, which were the blight on most workers' lives. We figured out how to deal with the technologically based issues leading to sweat shops and abolished them. Now we are moving to correct the current situation.

Take war and its terrible dislocations. Two of the three most economically successful countries in the world were the crushingly defeated Germany and Japan. Hardly irreversible damage. Yet, if you stood in the middle of Tokyo or Berlin in 1945, you might well have felt that was the end of those societies, their economic strength and their cultures.

Then there are the longer-range developments that bring about great change. One of the most interesting technological developments in the Middle Ages was learning how to make whiskey. It made alcohol into an international commodity. You could get rid of most of the water so expensive to ship and have something worth marketing around the then-known world. And, of course, that had other effects. The railroads of the East Coast of the United States, on to the Mississippi River, were built on a tide of whiskey fed to the Irish workers. It kept them numb and happy and put them to sleep appropriately at night, ready for another day's drudgery. Was that good? Was that bad? I don't think you could reasonably say whether it was good or bad without great qualifications and notations for whom and when. The most important thing was that it was different. We have learned to deal with whiskey as the way of narcotizing the worker.

Most of you have probably been to Hawaii, if not directly, at least through *National Geographic.* Most of those beautiful things in Hawaii are imported. Almost every plant that you “oh” and “ah” about is not indigenous to Hawaii. And yet, we tend to see whatever is as what ought to be. If today you took some island and wanted to “Hawaiianize” it by bringing in 75 new species, you would have 50 organizations fighting that as an inappropriate assault on nature. Should we back up and undo Hawaii? I don't think so.

You all have a picture in your mind of the hills of Athens, and the Parthenon, an absolutely bare landscape. If we really had historic sense, we would plant olive groves there. That is what was there in the time of Plato and Aristotle. Yet, to do that would be an affront, because what is, is what ought to be in the world in which you and I live.

The resolution of short-term and mid-term disruptions does not say that civilizations do not die. Both Spengler and Toynbee have written monumental works suggesting how and why they do. The fact that civilizations die, does not mean that people die. It does not mean that they are not accommodated. It does not mean that replacements do not occur. Assyrian, Persian, Aztec, ancient Egyptian, and Roman civilizations are gone. Good! They all fail a simple test. Would you want to live and work in any of them considering your likely social and occupational status? What do short-term and long-term disruptions result from? There are several causes (see Fig. 1). Let's note only four.

First are secondary effects. Few big disruptions are direct. Disruptions come because the market system puts no stake on looking ahead to answer the question, “What else might happen when technology X is general, familiar, widespread and low cost?” If you think about the disruptions that you do not like, most of them flow out of that unwillingness and lack of incentives to look ahead.

Second is the intersect between social and physical technologies where the failure of legislators and government to acknowledge that the things that they do are social technologies. They fail to integrate into their thinking that the social actions are just another form of technology. The tools that have become effective in exploring the consequences of physical technologies are rejected by government as irrelevant to its policy and law making. Denying that there are social technologies cripples our ability to plan.

There is nearly total failure of government to anticipate. I was associated with the Office of Technology Assessment. The Congress refused to allow the Office of Technology Assessment to deal with social technologies. The Congress had a very narrow view of what technology was, rejecting the concept that regulation, law, and legislation are social technologies. If one were allowed to examine social technology the way one examines physical technology, it might radically improve the congressional process. Put differently, consider Daniel Bell's observation that government is too big for the small problems and too small for the big problems of society. One of the issues for the future is bringing government into resonance with the size of the problems of all ranges that we and it have to deal with.

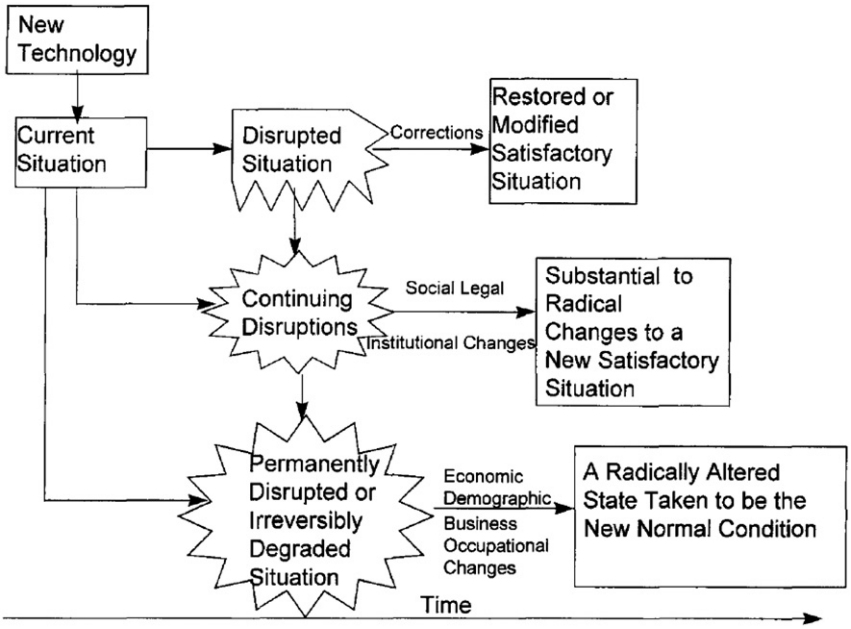

Fig. 1. The storm always passes.