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The fragility that threatens the world's industrial systems

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Time and again, human beings have learned to build buffers into complex systems. We design compartments into our ships, circuit breakers into our electrical networks and minimum reserve requirements for our banks. Yet since the cold war era, we have done the exact opposite with our industrial system. Rather than conceive market-friendly methods to distribute risk and dampen shocks, we devoted ourselves to eliminating the bulkheads that have traditionally existed between nations and between companies. To evoke a more raw analogy, in our production system, we bulldozed all the levees flat.

As a result, we now live in a world where an isolated political or natural disaster on the far side of the globe can disrupt basic systems on which we all depend. Consider what would happen in the event of war on the Korean peninsula, or an uprising in south India, or an avian flu pandemic in industrial Asia.

In the first case, we would immediately lose half the global production of D-ram chips, 65 per cent of Nand flash chips and much more. At a minimum, the result would be massive disruptions in the electronics industry and in all industries that depend on electronics components. In the second case, numerous global companies, including banks, would lose their ability to process information because they have relocated key back-office operations to that region. The third case, meanwhile, presents chilling proof that the production system has evolved in directions no one expected. As a recent article in Foreign Affairs noted, one cross-border system that would collapse in the event of a pandemic is the one the US relies on for medical respiratory masks.

In each instance, an everyday disaster far away would set off potentially massive disruptions of the industrial systems on which all nations depend. This could mean the loss of jobs, both in production and in retail. It could mean store shelves empty, even of staples. It could mean the destruction of wealth if the disruptions triggered financial crashes. And it could mean the loss of lives if systems designed to manufacture drugs or process food were to break down. These are just a few among many potential disasters.

How did we end up in such a fragile world? After all, this was not the way our industrial system worked 20 years ago. More to the point, globalisation was not supposed to work this way. If anything, most of us expected globalisation to deliver the exact opposite - more companies, offering a greater variety of goods, in a system marked by greater flexibility. And so it proved, for a while, in the early and mid-1990s.

But in the past decade, three factors have changed the way companies organise their operations and hence the nature of the production system itself: First, consolidation. A steady, at times dramatic, series of mergers, acquisitions, strategic retreats and bankruptcies have enabled lead companies to reshape entirely many global marketplaces. Rarely challenged by government, the deals have led to instances of consolidated power we have not witnessed in nearly a century. Consider that Owens-Illinois now produces more than half the world's food containers. Or that Intel supplies 90 per cent of the world's demand for certain key semiconductors.

Second is the end of vertical integration. The huge, vertically-integrated companies that dominated production during most of the 20th century have been literally taken apart and the pieces merged in brand new ways. This process alters completely how responsibility and risk are apportioned among companies, and between the private sector and society.

Third is the rise of just-in-time production. Beginning in the late 1980s, many US companies began to adopt the Toyota system of production, and to apply it on a scale far grander than Toyota ever tried. The result has been efficiencies but also an unprecedented systematisation of single sourcing and the elimination of inventory.

This revolution in the organisation of the production system would have posed a problem even in a purely domestic environment, if only because of its evident fragility. The fact that the system now stretches across multiple borders - that it is "global" - simply raises the degree of risk.

After Hurricane Katrina many US systems failed. But the storm also illustrated how a well-designed system should work - energy. Despite destruction of both pumping stations and refineries, even at the worst moment Americans were forced to do without only about 10 per cent of the petrol they normally use. It was much the same three years ago after opposition forces shut the pumps in Venezuela.

Now consider the many small-scale industrial crashes of recent years due to issues including the spread of the Sars virus, the closing of borders after September 11, the US west coast port lock-out and the Taiwan earthquake of 1999. The contrast is shocking. The system built to deliver resources literally stuck in the ground is redundant, resilient, and able to deliver always roughly 90 per cent of what is normally used.

The system that humans can literally shape in any way they wish is marked by extreme concentration and specialisation, to a point where we can imagine a country losing as much as 90 per cent of its normal supply of key industrial products.

It is time to admit that our grand experiment with radical *laissez faire* management of industry has failed. The original deal was simple enough - companies would do as they wish and in exchange they would watch out for threats that might endanger the safety of the countries that depend on them. Unfortunately, it is ever more evident that today's companies are entirely different from those of 20 years ago. The radical new organisation

of industry has changed completely how and where these companies perceive system-wide risk and, in some cases, has left them all but blind.

The corollary is that it is time for governments to adjust the rules that shape how the private sector runs the production infrastructures on which all countries depend, to ensure that compartments are built back into these systems. Much can be accomplished using modified versions of policies tried and proven safe years ago. These include a more aggressive use of antitrust power; a requirement that companies dual source all components in real time; and limits on how much of any one product, component or service importers can source from any one nation. The prospect of more state involvement need not be regarded with horror; after all, rich nations did not do badly at developing their industrial systems in the half-century before radical *laissez faire*. By contrast, simply waiting to see how bad the next industrial crash will be really is a scary prospect.

The writer, a senior fellow at the New America Foundation, is author of *End of the Line: The Rise and Coming Fall of the Global Corporation* (Doubleday 2005)