

Making Globalization Good by Reducing the Chance of Normal Accidents

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Abstract

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The process of globalization is potentially risky. The present paper discusses how a conceptual framework developed by Perrow to evaluate the riskiness of a wide variety of technologies can also be used to identify the risks associated with globalizing different types of activities (financial markets, production activities). It outlines an agenda for researching this important issue and using the results to inform the globalization process.

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Introduction

Globalization has been a pervasive force in the world for the last 50 years. It is reshaping the design of the world, making us increasingly interdependent in ways that few are aware of and probably no one fully understands. This has produced anxiety and fear in many quarters (Hertz, 2003). At the same time, others see many good things coming from globalization, including the diffusion of new technologies and knowledge, and stronger economic growth (Eden and Lenway, 2001). To a great extent these two camps, the anti-globalization camp and the pro-globalization camp, tend to talk past each other. Neither influences the other, and there has been little or no reconciliation of their divergent viewpoints. This is unfortunate, since many probably believe that globalization in some cases can be good and in other cases it should be avoided. This latter viewpoint suggests that there should be more rational design to globalization, as opposed to just letting it emerge. The rational design approach, however, requires a strong logic to support evaluating and deciding where globalization would be good (or at least not risky) and where it would be bad (very risky). Such a logic is currently lacking, and it is the subject this paper wants to address.

Our approach is straightforward. We propose taking a conceptual framework from another context and using it to evaluate the riskiness of globalizing different kinds of activities. In 1984 Perrow published a book titled Normal Accidents, which was republished in 1999 with an Afterword. In the book Perrow develops a conceptual framework for evaluating the riskiness of a wide variety of technologies (nuclear power technology, aircraft technology). We believe this same conceptual framework, its

concepts and logic, can be applied to the process of globalization and used to evaluate the relative riskiness of globalizing different types of activities.

Before proceeding, we want to present our view of globalization. We view globalization as the process of globally dispersing and coordinating a variety of economic activities, including: finance activities, production activities, marketing activities, and innovation activities. The purpose of globalization is to create some economic advantages by optimizing factor costs on a global basis, realizing larger economies of scale, and globally leveraging knowledge (Porter, 1986). The primary actors in the globalization process are: MNCs, national governments, and NGOs (non-governmental organizations) like labor unions.

The next section describes the conceptual framework developed by Perrow (1999) for evaluating the riskiness of technologies. We will refer to this framework as the Theory of Normal Accidents. The following section applies the Theory to the process of globalization. It identifies some broad areas where risks appear high, and it discusses the danger of allowing globalization to proceed under an emergent design as opposed to a more rationally planned design. The final section discusses how the conceptual framework can be applied to a more extensive agenda of research and how the results of such research can help to shift the process of globalization from its emergent design to a more rationally planned design.

Perrow's Theory of Normal Accidents

Most high-risk systems have some special characteristics... that make accidents in them inevitable, even "normal." This has to do with the way failures can interact and the way the system is tied together. (Perrow, 1999:4)

The above quote reflects Perrow's (1999) view that certain technologies (especially new technologies like those associated with nuclear power or recombinant DNA) can be extremely dangerous to society. They involve a system with complex interdependencies, whereby failures in different parts of the system interact in ways that cannot be anticipated or readily understood when they occur. If the various parts of the system are tightly coupled (Orton and Weick, 1990), the disturbance spreads and destruction can be catastrophic. Perrow is concerned that we are continuing to develop technologies in the physical sciences that possess these high-risk characteristics. Analogously, our paper suggests that the process of globalization is also developing new systems of economic, social, and political interdependency that may possess these same high-risk characteristics. Our concern is that catastrophic accidents in these domains may even be more likely today than in the physical science domain.

The basic elements of Perrow's (1999) theory of normal accidents are as follows:

1. A system with many components (parts, procedures, operators).
2. Failures, which occur in two or more of the components, interact in some unexpected way (no one could anticipate it, no one can readily understand it after it occurs).

This is a key concept of the theory, and Perrow refers to the potential for it to occur as the "interactive complexity" of the system.

3. The components of the system are tightly coupled (processes happen very fast and can't be turned off, the failed parts cannot be isolated from other parts).

Tight coupling is the second key concept of the theory. It implies that recovery from the initial disturbance is not possible; it spreads and develops into a full-blown normal or systems accident.

When such a normal accident is occurring, intervention by human operators or automated safety devices often makes the problem worse, since the interactions that are occurring

are not properly understood by either the human operators or the automated safety devices. Perrow's detailed description of the accident at the Three Mile Island Nuclear Power Plant in 1979, where a partial meltdown of the nuclear core occurred, illustrates the above situation.

Technologies and other systems that convert inputs into outputs via some kind of transformation process (nuclear power generation, chemical plants) generally have more interactive complexity than those that use fabrication (automobile assembly). Perrow (1999) distinguishes between linear interactions and complex interactions. Linear interactions occur in an expected sequence, while complex interactions occur in an unexpected sequence. Transformation processes generally lack transparency and contain more complex interactions with more feedback loops to confuse designers and operators (Stubbart, 1987). Fabrication processes tend to involve linear interactions, which facilitate understanding and intervention, even if there are large numbers of such interactions in a system.

Applying the Theory to Aspects of Globalization

In order to conduct systematic empirical research with the Theory one would have to consider a specific set of activities that are being considered for globalization (a particular financial market, the production for a specific industry or set of products). The system to be investigated would generally consist of the operators or people engaged in the activities, the design and organization of the activities (from organization structure down to procedures and decision processes), the tangible facilities, equipment, and materials that might be relevant to the activities, and the relevant environment that

interacts with the activities (this could include customers, suppliers, government regulators, and other parts of the organization within which the activities reside). This list parallels that used by Perrow (1999) when he studied the activities and decisions associated with a specific technology.

Since we haven't attempted such a specific empirical study, we will instead discuss the more generic application of the Theory to consider the globalization of financial activities and the globalization of production activities. Then we want to discuss the implications of trying to more rationally plan globalization as opposed to letting it largely emerge through market forces.

The globalization of financial activities

The routine lending and borrowing of money by banks and companies would seem to involve largely linear interactions with limited tight coupling, assuming the activity is appropriately managed. This should be true whether the scope is domestic or global. While failures in specific programs and transactions will occur, the cause will usually be understandable, as will the appropriate intervention. Perrow (1999) would call these discrete failures "incidents." When incidents occur under conditions of interactive complexity and tight coupling, they can trigger normal accidents. Given the conditions described above, one would not expect a lot of normal accidents in this area of financial activities.

If one shifts the focus to financial market activities, however, the situation appears quite different. While specific financial markets vary, an investment in a financial market will generally be subject to more complex interactions than in the previous example. It is not clear who is going to win or lose, or by how much. Nor is it usually

clear what is driving the results and what type of intervention is most appropriate. The above is a description of domestic or national financial markets. But what happens if such markets become global markets. The interaction complexity might go up some as a wider range of investors with a wider range of strategies engages in the market. But the most certain change is that all previously separate or loosely-coupled national markets are now tightly coupled in a single global market. While it would appear that normal accidents could occur in national or global financial markets, tight coupling is going to make accidents in the global market much more catastrophic than in national markets.

Another important consideration is that the interface of government regulators with financial markets is very different between national markets and global markets. Financial regulators generally try to study and understand to some degree the interactive complexity of the markets they regulate. They may even attempt to eliminate or restrain complexity that they can't understand and consider dangerous. Obviously the ability of national regulators to intervene to avoid normal accidents or to keep them from spreading is severely curtailed when a market becomes global. While national regulators sometimes attempt to coordinate their interventions on a global basis, their national charters and the speed of complex interactions in the marketplace make this a questionable response when normal accidents are imminent.

The globalization of production activities

The globalization of production activities involves changing such activities from a domestic or multidomestic configuration to one that follows the global criteria of globally optimizing factor costs, achieving more global economies of scale, and globally leveraging knowledge (Porter, 1986). For MNCs a global production strategy involves

tighter coupling within the production system than under a domestic or multidomestic strategy. But interactive complexity within the production activities won't necessarily increase with globalization, so it should remain feasible to understand failures and intervene when necessary to correct them. There is little reason to expect more normal accidents in MNCs as a result of globalizing production activities.

But a bigger problem and greater risk of normal accidents probably occurs in the environments of MNCs when they globalize production activities. Interactive complexity between the globalization goals and decisions of MNCs and the goals and decisions of national and local governments can become very high, and lead to situations the governments cannot successfully respond to. When MNCs concentrate production activities at fewer locations, as occurs under a global strategy, more governments are going to experience negative FDI effects, negative balance of payments effects, and negative employment effects. If governments cannot offset these losses with other gains, they can readily escalate into a kind of normal accident at the national or local economy and government level.

It is interesting to further analyze and better understand the deficiencies of the decision process that accompanies this kind of normal accident. Typically MNCs make decisions to globalize production based solely on their own costs and savings. Unless a local government specifies very high severance payments (equal to the full costs that will be borne by the local economy) these costs do not become part of the decision process. From the perspective of society and its governments (not the MNC), this has the potential to create a serious normal accident or systems accident. It occurs because the decision process fails to take all of the interactive complexity into account. It ignores the

substantial direct (unemployment compensation, retraining expense) and indirect (anxiety and depression in the society, crime, social unrest) costs related to unemployment that are largely borne by society. Thus, our brief analysis highlights a potentially important interaction between the globalization of production activities and the high costs of dealing with the resulting unemployment problem that is generally not being properly taken into account. The risk to society in this case is that too much uneconomic globalization of production occurs, resulting in too much unemployment, and society is forced to deal with catastrophic levels of unemployment costs. [While we won't do it here, a similar argument can be made for the balance of payments problem, which is aggravated by global production strategies, and where the costs are borne by society, not MNCs.]

Questioning the emergent way globalization is being embraced

An important issue suggested by the Theory of Normal Accidents concerns the type of innovation that is best for society. In societies attracted to free markets and open economies, innovation has usually followed a trial-and-error or natural selection process. This encourages the development of many new technologies, and the competitive marketplace selects the winners and losers, usually based on its actual experience with the technologies. Under this emergent model, comprehensive study and regulation of a technology only occurs after accidents develop and the need for regulation becomes obvious. This emergent way of obtaining and selecting innovation is widely preferred. But, when technologies have catastrophic potential, a different approach is required. Such technologies need to be identified early and rational public regulation needs to guide their subsequent development. As Perrow (1999) indicates, many new

technologies are of this type. They tend to be transformative technologies, with high levels of interactive complexity and often tight coupling.

We have argued that many aspects of globalization share these same characteristics, which makes them potentially high-risk innovations. To the extent that this is true, it raises serious questions about the way the world seems to be embracing globalization. While governments do study and attempt to regulate aspects of globalization, much of this seems to be reactive. It focuses on problems that have already occurred. This leads one to conclude that the world is largely pursuing an emergent or market-driven strategy with regard to globalization. Global financial products and systems are a good example of this. Most new products and systems seem to emerge from the incremental decisions of the industry participants, as each seeks to maximize its own interest. This has led to many new financial products with extremely high levels of interactive complexity that regularly trade in global markets (collateralized debt obligations, credit default swaps, and a wide variety of other derivative-like products). A more comprehensive study of the situation and regulation usually comes after some serious accident has occurred. This is clearly the wrong way to design a new global system that has catastrophic potential.

In summary, the application of Perrow's Theory of Normal Accidents to the process of globalization seems to hold considerable promise. Its key concepts of interactive complexity and tight coupling seem especially appropriate for penetrating the opaqueness of globalization and facilitating a more rational discussion of how it needs to be managed. Perrow (1999) recommends modifying dangerous technologies either by

reducing their interactive complexity or their tight coupling. Where this is not feasible, he suggests society should do without the product or service the technology provides.

We think this is probably good advice for globalization as well. While a few special interests may benefit from a riskier world, society at large does not. Implementing such action will require strong arguments that can be understood by most people.

Practical Implications for Research and Practice

Consistent with the above discussion, the following is a proposed research and action agenda for business schools:

- Conduct a series of systematic research studies to identify the potential for catastrophic accidents in different areas involved with globalization. Use a common conceptual framework for all studies (Perrow's Theory of Normal Accidents or some other framework).
- Advise governments and business of where risk lies and where government needs to play a major regulating and monitoring role – and where government doesn't.
- Work with governments and businesses to better design new global processes so they minimize the risk of normal accidents.

While views about globalization within business schools vary, most outsiders probably view business schools as an ally of MNCs and business interests. The above agenda calls for business schools to become more of a neutral NGO on the issue of globalization. At present no other institution effectively fills this role, and there is a strong public need for it. Business schools, with their globally-shared networks, values and goals, cultures, work methods and conceptual logics, are best positioned to fill this role. They should be able to provide neutral, rational knowledge to the more polarized

and local political process in each country, which will ultimately decide how to manage globalization.

Globalization should become an important battleground between special interests and the common interests of a global society. We believe the proposed line of research both provides transparency to this issue and points toward a constructive way for research to begin to address it.

[Note: More has to be done with this paper to bring it into the conventional form. But I think the ideas and arguments are very presentable and ready to discuss.]

References

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