Complexity and Modern Economies

During my childhood, my parents never bought Japanese toys – they used to be cheap but of very poor quality: what a contrast to the reputation for quality the Japanese gained in the 1960s and 1970s. In fact, in the 1980s, Japanese manufacturing efficiency and quality left large segments of western industry, from automobiles to consumer electronics, unable to compete, giving birth to "Japanophobia". And, one of the major drivers of the manufacturing revolution was Toyota, the automobile manufacturer which, starting 60 years back, became the world's largest last year: "The Toyota Way" became a synonym for quality and efficiency, an icon for a nation obsessed with craftsmanship and quality.

The recall of something like 8 mn cars in the last few months has clearly damaged Toyota's reputation for quality. (In the past, American manufacturers also have recalled cars in even bigger numbers.) Have Toyota's quality standards been diluted, or has modern manufacturing become too complex for the human mind to grasp and manage? One is inclined towards the latter explanation, if only because of the problems and delays faced by other sophisticated manufacturing companies: Boeing and Europe's Airbus Industrie, for example, have faced large and costly delays in launching new aircraft.

But to come back to complexity, Kenichi Ohmae, the management Guru, recently wrote that an average Toyota has about 24,000 inputs and outputs, with 70 computer chips processing the information and sending it to other chips to operate the engine control – just imagine the sheer complexity of the needed software. Mr. Ohmae pinpoints the problem: "What the company is missing is the human factor – a single person who has a comprehensive understanding of the details of the engine and how the parts interact and work as a whole.". One also wonders whether highly complex, global supply chains also contribute to the problem. How one longs for the days when street corner car mechanics were repairing any fault!

Governance of modern societies too is having its own complexity problems: it seems the reason why the Boston bomber could not be apprehended by the U.S. security personnel despite several advance warnings, is that the National Counter Terrorism Centre (NCTC) is so inundated with data, that, despite all the computing power, they are incapable of timely interpretation. At a more mundane level, the American simplified personal tax code runs to hundreds of pages – as do many legislations!

But whatever the complexity problems of manufacturing industry and governments, they are dwarfed by the financial sector -- the way "the best and the brightest" in financial services (rating companies, banks, regulators, etc.) overlooked the risks in complex CDOs is clearly a manifestation of this. True, greed also contributed to the mess, but so, surely, did the complexity: Andrew Haldane of the Bank of England has estimated that the CDO documentation alone ran to a billion pages!

Complexity means that the human mind is incapable of having a mental image of the answers – and becomes totally dependent on what comes out of the "Black Box", with sometimes disastrous results. As an example of complexity, consider the following description of an article on option pricing in a recent issue of Asia Risk: "*Cross-asset quadratic Gaussian models have been limited in the scale of their implementation by the difficulty in ensuring the correct drift conditions to omit arbitrage. Here,… shows how to exploit the symmetries of the functional form to solve this, and implements the model to price cliquets in the presence of significant skew in the smile.*" I am sure it is a fascinating intellectual exercise but I am still struggling to understand what earthly purpose, other than to fill the pockets of the structures, such complex derivatives fulfill. Do the quants understand that liquidity and animal spirits determine prices, not mathematical models using 'n' Greeks? Has obscurantic complexity, not simplicity, commonsense and lucidity, become synonymous with modernity, knowledge and sophistication?

But why go so far? The situation is not very different in our own country. Narayanan Vaghul, one of the wisest and most brilliant bankers of my generation, told me once that

he could not understand half the things that were being presented to the ICICI Board, which he chaired, for approval. One also wonders whether regulatory requirements are not adding to the complexity of financial services, and hence the ability of the human mind to grasp and decide upon the issues. Bank board agendas often run to a couple of thousand pages, and offer documents for public issues to hundreds of pages. (Does any board member/intending investor actually read them?)

I recently decided to sell the few shares I own. The process of opening a demat account with a depository and a trading account with a broker has taken me more than two months and the process is still not over. I have perhaps signed a few dozen different forms each requiring 20+ signatures. (Incidentally, I did not read any of them, nor, I suspect, did the DP/broker employees I dealt with). The assumption seems to be that the number of signatures and the length of the form are a concrete manifestation of “due diligence”.

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