

IV-28 Innovation Diffusion

Science thrives best in glass house, where everyone can look in. When the windows are blacked out, as in war, the weeds take over. When secrecy muffles criticism, charlatans and cranks flourish.

- *Max Perutz*

Tools and innovations build on information. Methods to learn from the study of natural phenomena, including the human behaviors, are widely used even by those who object to the value of the irrelevant technologies and mindless consumption. Consider the extent of impact of some of the simple innovations like sliced bread, home appliances, contraception, antibiotics, immunization and public hygiene. If one believes that the best of science is the triumph of reason, certainly it can not be construed to triumph over the reasonable. In its microcosm science may not be concerned with changing social, political and economic fashions, but such concerns about asymmetry and non-equilibrium in the information, innovation and resources are integral part of the enterprise. Science depends on social support, and such innovations diffuse in the public commons. How can methods of science guide a rational course for political decisions?

As an enduring lesson of History: Violent upheavals replace one form of tyrannies with others to serve those who pretend to know-all. Propelled by controlled information, minds regress to protect self-interests. Reactions follow if the philosophies are perceived to be recipe for tyranny, such as the philosophy of a predetermined path in the Plato's recipe for

authoritarian *rule of the wise few over the stupid multitude*. Plato eulogized the noble class, and relegated peasants and slaves as the *plaything of the god* or the tribal dictator. In trying to imagine perfect philosophical ruler his political thesis prepares the grounds for the conquest of feudalism: Whosoever comes in authority grabs the garb of the wise for controlling the flow of information and resources.

Innovations have to be accountable. All group efforts are information-seeking processes. Reliability of information is of crucial importance not only for the methodology of science, but also a valid social concern. Efficiency and pragmatism come later. Establishing reliability requires wading through levels of cognitive difficulties. Evaluation and elaboration of the available information in elaborate details is a necessary first step. Next come issues of limitations of the knowledge, controversial issues, and the unknowns. Consensus emerges if the qualified opinions converge or areas of disagreement are identified.

Information transforms the decision problem. Use of information for decision making depends on complex relations. Perfect information exists only as what worked. Considerations for relevant information include: Precision and scope; reliability of the source and utility; nature of the evidence; awareness of the problems that surface with practice; and cost of sufficient information. Being informed is about having a question answered. Misinformation can lead to regret. Ultimately decision and consequences of contemplated actions bear on prediction and the study of future behavior with goal relevant choices. In the game-theory sense this may be a regress of the type *he knows that I know he knows*.

Relevant information is knowledge. Natural laws emerge as hypothesis is guided through practice with feedback from the

users. The end and means arguments for ethical concerns are necessary part of the use of incomplete knowledge. Thus knowledge is always provisional.

Scientific reasoning is a kind of dialog between the possible and the actual, between what might be and what is in fact the case. Along these lines, it is said that information relative to a problem, whatever that means in the sum-total, leads to better decisions for future action. Unintended consequences from this arguably justifiable belief in one desire or the other include: population problem from improvement in the survival rate; over use of resources built into the criteria for economic progress; social instabilities rooted in duplicitous international policies.

Rarely can one wipe the slate clean and start over again. Little can be done to undo the past. Past actions often continue to bear consequences. There are many ways in which the past and present information impinges on the decision making process. Timely reform from the inside is all one can expect if we take lessons of history to our heart. Attitudes from inside and out determine the nature of future relationships. Therefore, consequences of tinkering complex systems, including the reforms, will always be uncertain. Starting from the best case scenario, pragmatism calls for gradual, non-violent, and non-coercive changes.

Room for Doubt

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