

## TECHNICAL INFORMATION TRADE DEFICITS: IS THIS INFORMATION MERCANTILISM?

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The fundamental idea behind global standards collaboration is that standardization needs to work seamlessly across borders and organizations in order to succeed. Of course, seamless standardization requires information exchanges among engineers and entities in countries and regions with different geopolitical viewpoints. Contrary to this spirit are some recent events that tend to impede the movement of technological information related to standards development across borders even when the information is already public or is destined for public release. One wonders: Are we seeing the rise of information mercantilism?

Mercantilism was the dominant economic theory practiced by nations in the 17th and 18th Centuries. This theory held sway until Adam Smith, in "The Wealth of Nations," and the economists who followed him, such as David Ricardo, pretty much demolished the edifice of mercantilism as an economic theory. According to mercantilism, nations should control their trade tightly, because when they export either goods or specie (i.e., gold or silver), the recipient nation would be richer by the amount received and the donor nation would be poorer by exactly the same amount. This theory led to such outcomes as the race for colonies among the European nations, as each wanted to internalize trade and avoid relying on their economic competitors for raw materials or manufactured goods. This idea and the trade systems it favored did not stand the test of time as theory or as practice and, as two World Wars demonstrated, had serious negative consequences.

Ricardo, in particular, introduced the concept of "comparative advantage," pointing out that, when nations or entities exchanged goods that each produced more efficiently (or at a minimized opportunity cost) than the other, both parties to the trade benefitted [1]. Trade was enriching, rather than impoverishing. Each entity received the goods it needed at a minimum price, while maximizing their own returns.

Technical information, as a trade good, is a bit peculiar. It is not produced by natural resource extraction or manufactured in factories (unless you consider universities factories), but conceived in the minds of engineers and scientists. Participants in the creation of new concepts benefit from the ideas of those who have come before, and each exchange of information leaves both parties a little richer for the experience. Even such an original thinker as Isaac Newton acknowledged this when he said, "If I have seen further it is by standing on the shoulders of Giants."

Unfortunately, we are now hearing suggestions that standards-relevant technical information should not be freely traded, sometimes based on a claim that doing so poses a danger to national sovereignty and security. When an engineer in France reads a paper by a scientist in the U.S., and then does some new work that is then published and read by a technologist in China, who in turn makes a contribution to an international standard that builds on the information received, have the U.S., France, and China all experienced an information trade deficit, since they

all exported information, or have all gained by the knowledge accumulated by their citizens and turned that into a standard that will result in products that all can buy? Information creation is not a zero-sum game where one party must necessarily lose if another gains. As the work of Nobel-winning psychologist Daniel Kahneman and others point out, humans' fear of loss is more potent than their desire for gain [2]. That reaction is not necessarily logical, however.

Some think that barriers to trade will improve a country's economy because displacing foreign goods in the marketplace will create a demand for domestic equivalents, and employment producing those domestic equivalents will therefore increase. The theory of comparative advantage suggests instead that using domestic resources to produce goods that could be made more efficiently elsewhere is a waste of resources and unnecessarily reduces the gross output of the economy.

In the case of information exchange, the theory of comparative advantage may hold even more strongly. When available information is limited to that which is produced domestically, the cycle of technological improvement, where one improvement builds on another, will necessarily be slower because fewer engineers and scientists are contributing to it. The best technical standards reflect a diversity of thought that is contributed, reviewed, and tested by a global community of technical experts.

The IEEE Standards Association is an organic part of IEEE and is thus dedicated to advancing technology for humanity. We do this by using global collaboration to create open platforms for the exchange of technological information. Unconditional global openness and inclusivity are the pillars of our bottom-up consensus-building ecosystem. All technical information formally submitted to the IEEE Standards Association at any level (working groups, standardization committees, or governance bodies) is ultimately intended to become public. In addition to producing standards, the voluntary disclosure of technical information by users of our platforms allows that information to become globally available and hence contributes to the global public good.

These collaborative and global public good aspects of the IEEE standards process are particularly important if we want technology to serve humanity as a whole and not merely to serve as another aspect of the drive for competitive advantage by companies and countries. For this reason, the IEEE Standards Association will continue to honor its principles of unconditional and unrestricted openness and inclusiveness, and it will continue to be receptive to the support provided to these principles by our inclusive and global democracy of technical experts.

### REFERENCES

- [1] D. Ricardo, *On the Principles of Political Economy and Taxation*, London: John Murray, 1821.
- [2] D. Kahneman, *Thinking Fast and Slow*, New York: Farrar, Straus and Giroux, 2011.