

Why important innovations stall; understanding obstacles to change is key to future

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A new Harvard University study, entitled *Innovation and Its Enemies: Why People Resist New Technology* is being launched July 6, 2016. Credit: Oxford University Press

Disruptive, transformative technologies are being introduced at an accelerating pace, fuelling opposition that impedes forms of innovation needed to meet profound challenges such as climate change, poverty and world hunger, says a new study from Harvard University.

Innovation and Its Enemies: Why People Resist New Technology, by Prof. Calestous Juma of the Harvard Kennedy School's Belfer Center for Science and International Affairs, chronicles the history of opposition to change—from tractors and certain uses of the printing press to coffee and margarine—and its underlying reasons.

Such understanding is critical, he argues, to the successful introduction and adoption of technological innovations needed to cope with humanity's most serious economic and environmental challenges.

Published as a book by Oxford University Press, the 16-year study says fear and perceptions of lost employment, identity, and power drive impediment to innovation, and describes the widening gap between the pace of technological advancement and slow rate at which society adjusts.

Says Dr. Juma: "To meet the needs of a growing world population on a warming planet, humanity's hopes are pinned on the introduction of transformative technologies but progress can be impeded by unreasonable obstruction to change."

The study acknowledges the need to address legitimate health and environmental concerns related to new products and technologies and underlines that transparency, inclusiveness and caution in the handling of scientific uncertainty as critical elements of public trust.

The study chronicles the extraordinary measures taken by opponents to change, and the tenacity of entrepreneurs and technologists who overcame it.

Drawing on nearly 600 years of controversies, the study presents in-depth case studies of opposition to innovation, including printing of the Koran by the Ottomans, alternating current, refrigeration, recorded

music, and, more recently, robotics, artificial intelligence and agricultural biotechnology.

Both coffee and tractors, for instance, were the targets of smear campaigns. Other tactics included demonization, rumours, slander, efforts to restrict use through legislation, and outright bans.

Parallels through history are striking. Transgenic crops have been dubbed "Frankenfoods." In 17th century Italy, coffee was called "Satan's Drink" and "Junior Alcohol" in 20th century southern India. In England, France, and Germany, coffee was said to cause sterility.

Calling refrigerated products "Embalmed Foods" had a chilling effect on consumers. Swedes dubbed the early telephone the "Devil's Instrument." Margarine was derided as "Bull Butter" in America and accused of causing sterility, male baldness, and stunting.

"Common to all these cases is fear and opponents excluded from the benefits of [new technology](#)," says Dr. Juma.

Launch of the study takes place Wednesday July 6 at the 16th International Joseph A. Schumpeter Society Conference in Montreal. Dr. Schumpeter, an early 20th Century Austrian economist introduced the idea of "creative destruction" and was equally concerned about resistance to change.

The study says that in many cases objections and social responses to innovation fall into one or more of four categories: intuition, vested interests, intellectual arguments, and psychological factors.

- Intuitive responses, often expressed as disgust, reflect patterns of behaviour that rely on deeper evolutionary roots of our fears and phobias. New foods, for example, may be seen as a threat to

human health.

- Vested interests are illustrated with a well-known example of Luddites, early 19th century British textile workers, popularly portrayed as machine breakers who were simply opposed to change. But the reality was a clash of competing economic world views and moral values.
- Intellectual challenges to new technologies include philosophical objections to the manipulation of nature or the use of robotics in manufacturing, considered by some as "dehumanizing" and changing how we see ourselves as humans.
- Finally, business models that aim to alter the psychology of health and nutrition choices face strong opposition.

Innovation and Its Enemies advocates more timely scientific assessments of the benefits and risks of new technologies, swift adjustment of social institutions to keep pace with technological advancement, and greater public awareness and citizen engagement.

Inclusive innovation is critical for acceptance of new controversial technologies, Dr. Juma says.

This entails greater involvement of public institutions to provide training in the emerging fields, creation of joint ventures, equitable management of intellectual property rights, segmentation of markets to enable a technology to be used for noncompetitive products, and improvement of the policy environment to support long-term technology partnerships.

Building local capabilities and fostering public engagement in technology development are critical. The absence of inclusive strategies leads to intense debates over questions of justice, equity, corporate control and challenges to intellectual property system.

Also needed: strong, entrepreneurial decision-makers and leaders who

can use available knowledge to assess a situation, take informed executive action in a timely manner, and monitor technological advances and their impacts. Leaders must be able to rely on advice from both scientific academies as well as complementary advisory institutions in executive offices.

Finally, says Dr. Juma, public education is critical in determining the pace and patterns of technological adoption. Many programs alienate the public by assuming that the root cause of social concern over new technology is ignorance. To the contrary, concerns commonly come from well-informed sections of the population. Public education should aim to enhance the legitimacy and quality of risk assessment processes. Ultimately, the goal is to manage risk perception and foster trust.

"People are more likely to accept the risks of new technologies if they have been part of the process of deciding on their use," says Dr. Juma.

Provided by Harvard Kennedy School Belfer Center for Science and International Affairs

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