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Technological Ambivalence and International Relations

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STEFAN FRITSCH, FEB 24 2016

Technology is linked to many key phenomena of international relations, including conflict, economics, and culture. Yet it has only recently been effectively incorporated into the study of International Relations (IR). The link between technology and (global) politics has been and remains under-appreciated. For millennia, though, technological evolution has deeply impacted global politics, security, economics, culture and the environment. For example, the diffusion of the stirrup in the Middle Ages allowed for development of mounted shock combat in connection with a feudalistic society revolving around chivalry.[i] Introduction of the Swiss pikemen during the Renaissance initiated an incremental shift towards standing armies, which in turn could only be maintained by modern states with vastly improved administrative and organizational capabilities.[ii] Rapid evolution of shipping technology and navigation during the sixteenth century provided European states with pivotal technological advantages to accelerate their colonial overseas endeavors against the resistance of primarily Arab maritime merchants. Technological superiority over colonized territories was finally achieved with the help of vastly improved firearms, cannons and new medical discoveries to cope with tropical diseases.[iii]

Modernity is deeply connected to technological progress. For instance, the invention, improvement and diffusion of the steam engine in the industrial revolution subsequently contributed to British hegemony during the 19th century.[iv] Prussia's adaptation of railroad technology for military purposes and subsequent victories against the Habsburg Empire and France demonstrated the advantages of rapid and orderly troop relocations via efficient transportation networks.[v] Nuclear weapons and the Cold War symbolized globalization of military power-projection capabilities of a limited number of states paired with the prospect of nuclear annihilation of humankind.[vi] Such weapons rendered direct military confrontation between the superpowers virtually unthinkable. During the late 20th and early 21st century, information and communication technologies (ICTs) encouraged transitions from industrial to post-industrial information societies that are characterized by new forms of transnational production and distribution processes, the pervasive application of ICTs in an expanding range of products and services, as well as conflict forms that are cyber-, drone- or robot-dependent.[vii] State as well as non-state actors have developed new strategies, policies and tools to cope with these technology-driven challenges, to shape technological evolution itself, or to capitalize on new opportunities in realizing their specific goals.[viii] This selection of examples demonstrates that technology indeed does matter for global affairs. And yet, the academic discipline of IR has only recently begun to seriously and systematically engage the topic. Why has it taken so long?

Technology, IR and Interdisciplinarity

The multifaceted character of technology has motivated different social and humanities disciplines such as history, sociology, philosophy, economics, geography and anthropology to investigate its origins, evolution and consequences for humanity. IR also has addressed technology-related issues in one way or another since its inception in the 1920s. Unfortunately, a number of early – and mostly policy-oriented – studies of technological issues in world politics remained at the discipline's periphery.[ix] However, recent macro-trends such as economic and military globalization along with the associated enhanced interdependence, time-space compression, and emergence of new non-state actors as well as policy challenges highlight the discipline's difficulties in conceptualizing technology's role therein. The main reason for this surprising challenge lies in the discipline's decades-long conceptualization of technology as a factor external to the international system.[x] Often, technology's theoretical role was that of a residual variable, i.e. if all other explanations for structural and process change in global

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affairs had been exhausted, technology was introduced as the remaining variable that could explain the observed changes.[xi]

Since the early 1990s, though, IR scholars have begun to systematically explore the impact of technology on specific policy-areas as well as for global affairs more generally. In order to develop a better theoretical understanding of what technology actually is, does and how it is shaped by (international) politics and vice versa, scholars have incrementally developed more interdisciplinary approaches to address the growing technologically mediated complexities in our world. Such challenges include the growing social, political, economic and cultural interconnections between individuals and societies around the planet, as well as the technological and environmental risks and opportunities often associated with “progress.” IR scholarship has begun to engage systematically with an interdisciplinary field termed Science and Technology Studies (S&TS) to better understand the driving forces behind technological evolution and global socio-technical change.[xii] S&TS, itself an interdisciplinary research program, offers a wide range of useful concepts and insights that have been incorporated into IR’s theoretical frameworks and empirical research in ways that help us to understand the often ambivalent character of technology.

The Ambivalent Impact of Technology on Global Affairs

However, the impact of technological evolution is not uniform across the system and its sub-units. I have recently argued that “due to predominantly narrow conceptions of technology as apolitical ‘tool’ [...] our discipline underestimates its ambivalent character in global affairs.”[xiii] Different actors can use the same technology for very different purposes. In their global totality, large sociotechnical systems, especially in their advanced development stages (which often are defined by path-dependencies), take on quasi-actor qualities in that they profoundly shape systemic interaction capacities and opportunities, time-space relations, and the ability of various actors to act as well as react in this increasingly techno-mediated world. Within this general development path towards growing complexity, various actors (states, companies, NGOs, individuals) can use or try to shape technology in different ways, depending on their own interests, needs and wants within technology-based limitations, thereby furthering the ambivalence of technology in global affairs.

Take for example the ambivalent impact of information and communication technologies (ICTs) on education and individuals’ ability to interact with each other, share ideas and coordinate political activities more efficiently on the global level. ICTs also are used extensively by other non-state actors, such as terrorist groups, to coordinate, plan, and execute attacks and for new member recruiting. The increasing asymmetry of conflicts between states and non-state actors has ironically also extended the lifetime of older technologies such as video or music tapes, which are harder to locate than mobile phones. Even older communication forms such as human messengers have seen a renaissance in various conflicts. The higher the level of asymmetry, the stronger the imperative of the technologically weaker conflict party to rely on low-tech tools.

With regard to questions of national macro-economic governance, innovation patterns and the institutional settings in which these activities take place, countries do not necessarily converge towards one ideal model of a political economy of market relations or national innovation system in reaction to common technological pressures, as postulated by neoclassical economics and its IR pendant of hyperglobalism. Instead, a rapidly growing comparative political economy literature points to persistent institutional and policy differences among countries and regions. The persistence of these varieties of capitalism and innovation outcomes calls into question deterministic assumptions about the homogenizing powers of techno-globalization. These differences have mainly been explained by institutional and historical path dependencies, country-specific labour relations, extent of government regulation and societal norms and values. Technology might exert similar adaptive pressures around the world, yet each society filters those pressures differently.

Future Research Avenues

Due to this research field’s young history, a complete list of possible future research avenues seems impossible. Instead, a few examples will demonstrate the continuing need to explore technology-related topics in IR. Ethical, legal and other issues of governance in relation to the increasing use of robots and potentially autonomous weapon

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systems on the postmodern battlefield raise normative and ethical questions about human control of human-made technology. Such normative questions are an important – yet still peripheral – issue from both an IR as well as an S&TS perspective, especially, since technological development paths are still open.[xiv] These questions are also important to address in emerging policy areas such as the large scale and systematic collection and exchange of citizens' communication data by national security agencies as well as in analyzing the constantly evolving political and regulatory relationship between government agencies and private actors over access to data, the shaping of critical national infrastructure and related security architectures.

One of the most pressing issues that will impact future research is the rise of Big Data, the large-scale application of statistical analysis to a wide range of increasingly quantifiable dimensions of humanity (social, economic, political, etc.) in order to better understand events and improve decision-making and prediction. While Big Data technology has the potential to positively impact many aspects of human life, it also creates new vulnerabilities for humanity (e.g. privacy, transparency etc.). The availability of data, either publicly or via collaboration with private enterprises, also creates new opportunities as well as challenges for economic research (methodology; privacy/confidentiality). The Internet of Things, the convergence of ICTs with other sociotechnical systems such as energy production and distribution, transportation, as well as the production of goods and services, remains in its early stages. Yet, scholars are wondering how these interdependent transformations – again driven by economies of scale and scope – will impact the current predominating socio-economic and political structures and processes associated with informational capitalism. Optimists predict a further transfer of economic agency to individuals and local communities and a weakening of national or transnational corporate organizations.

The prevailing economics of global information and communication have enabled the development of new business models collectively known as the “sharing economy.” E-commerce businesses such as the taxi service Uber or virtual market places like Airbnb represent examples of “collaborative consumption,” which is based on the peer-to-peer access to information, goods and services. Such new developments initiate rounds of “creative destruction” that challenge traditional notions of capitalist exchange and economic governance processes in an information economy that is currently dominated by certain states and companies. The intensifying distributional conflicts created by such techno-economic developments will likely remain a hot topic for the IR community.

The academic community seems to have accepted the growing relevance of technology. The attentive observer can discover a trend to include an ever-growing number of technology-related papers and panels in conferences as well as publication outlets.[xv] A recent step towards the firm establishment of S&TS within the field of IR is the creation of a new section within the International Studies Association, entitled “Science, Technology and Art in International Relations.”[xvi]

Notes

[i] Lynn White, *Medieval Technology and Social Change* (Oxford: The Clarendon Press, 1962).

[ii] Martin van Creveld, *The Rise and Decline of the State* (Cambridge: Cambridge, 1999)

[iii] Daniel R. Headrick, *Power Over Peoples: Technology, Environments, and Western Imperialism, 1400 to the Present* (Princeton: Princeton University Press, 2010)

[iv] David Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present* (Cambridge: Cambridge University Press, 1972)

[v] William H. McNeill, *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000* (Chicago: The University of Chicago Press, 1982)

[vi] David Held, Anthony McGrew, David Goldblatt, and Anthony Perraton, *Global Transformations: Politics, Economics, and Culture* (Cambridge: Polity Press, 1999)

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- [vii] Manuel Castells, *The Information Age: Economy, Society and Culture, Part 1: The Rise of the Network Society* (Cambridge, MA: Blackwell Publishers, 2000). For robots and autonomous weapon systems see P.W. Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century* (New York: Penguin Books, 2009)
- [viii] Craig Warkentin, *Reshaping World Politics: NGOs, the Internet, and Global Civil Society* (Lanham, MD: Rowman & Littlefield, 2001)
- [ix] Eugene B. Skolnikoff, *The Elusive Transformation: Science, Technology, and the Evolution of International Politics* (Princeton: Princeton University Press, 1993)
- [x] James Rosenau, *Turbulence in World Politics* (Princeton: Princeton University Press, 1990)
- [xi] Eugene Skolnikoff, *The Elusive Transformation: Science, Technology, and the Evolution of International Politics* (Princeton: Princeton University Press, 1993)
- [xii] For a good overview of the field see Maximilian Mayer, Mariana Carpes and Ruth Knoblich (eds.), *The Global Politics of Science and Technology* Vol. 1 and 2 (Heidelberg: Springer, 2014)
- [xiii] Stefan Fritsch, Conceptualizing the Ambivalent Role of Technology in International Relations: Between Systemic Change and Continuity, in *The Global Politics of Science and Technology* Vol. 1, edited by Maximilian Mayer, Mariana Carpes and Ruth Knoblich (Heidelberg: Springer, 2014), p. 116.
- [xiv] Kenneth Anderson and Matthew Waxman, *Law and Ethics for Robot Soldiers*, Policy Review Dec 2012/Jan 2013. <http://www.hoover.org/research/law-and-ethics-robot-soldiers>. Accessed: 8/10/2014.
- [xv] Beth Simmons, "International Studies in the Global Information Age", *International Studies Quarterly* 55: 589-599, 2011.
- [xvi] <http://www.isanet.org/ISA/Sections/STAIR>

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Stefan Fritsch is assistant professor of International Relations in the Department of Political Science at Bowling Green State University. His research focuses on issues of international relations, international political economy and comparative politics. He is particularly interested in the relationship between technology and international affairs, the political economy of technological innovation, global trade issues, globalization, theories of International Political Economy, Multinational Corporations, and European integration.