SCUSA 72 Theme Paper

Disruptive Technology and American Influence in the Coming Decade

Major Mike Duda

What is Disruptive Technology?

If we are to shed some light on how the United States should advance its interests and values in this era of disruptive technology, it might be useful to establish a shared meaning of the concept. A shared, but specific understanding is particularly important since disruptive technology is a concept that runs the risk of being so broad that it loses its analytical utility. If every technological innovation is 'disruptive,' then no innovation is. In fact, lack of a consensus conceptual definition has plagued research on the topic.[1] Moreover, the term 'disruptive' has become something of a buzzword for startup companies seeking entry to an established market.[2] The use of the term seems particularly prevalent in the business and tech world as a catch-all for 'competition' or 'threat.'[3] Therefore, it is useful to identify definitional characteristics which would distinguish disruptive technologies from other types of technological innovation. Drawing from the business, economic, and security literature, I define disruptive technology as technology that changes the primary means by which actors (firms in a marketplace; states in the international system) compete. As we will see, this definition is in line with the original theoretic use of the term and has some practical advantages in analyzing the concept as an object of policy.

Within the social sciences, there has been a long history of inquiry into the causes of technological change and its effects on society.[4] However, contemporary analyses of 'disruptive technology' often point to a 1995 article in the *Harvard Business Review* by Joseph L. Bower and Clayton M. Christensen for the origination of the concept. Bower and Christensen first coined the term 'disruptive technology' in an analysis of a puzzling empirical pattern that emerged in the computer disk drive industry in the 1980's. Specifically, these authors noted that leading firms in the industry repeatedly failed to maintain their dominant position when the market was infiltrated by new technology. Why were upstart competitors consistently able to capitalize on the potential of technological change and beat out established, successful firms that held clear comparative advantages in the size of their current customer base and the amount of research and development resources at their disposal?[5]

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[1] Erwin Danneels, "Disruptive Technology Reconsidered: A Critique and Research Agenda," *Journal of Product Innovation Management* 21, no. 4 (2004): 247–250.
[2] Clayton M. Christensen et al., "Disruptive Innovation: An Intellectual History and Directions for Future Research," *Journal of Management Studies* 55, no. 7 (2018): 1044.
[3] For examples, see Matthew Yglesias, "Stop 'Disrupting 'Everything," *Slate*, May 1, 2013, https://slate.com/business/2013/05/disrupting-disruption-a-once-useful-concept-has-become-a-lame-catchphrase.html; Daniel Gelernter, "A Little Less Disruption, Please," *Wall Street Journal*, March 28, 2016, https://www.wsj.com/articles/a-little-less-disruption-please-1459207009.
[4] For an early example, see Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* (New York: Routledge, 2003), originally published in 1943.
[5] Joseph L. Bower and Clayton M. Christensen, "Disruptive Technologies: Catching the Wave," *Harvard Business Review* 73 (February 1995): 43, 45.

The core of Bower and Christensen's analysis was driven by a specific understanding of two types of technological innovation and how each relates to the incentive structure of dominant firms. The first type of innovation was based on *sustaining* technologies. Sustaining technologies improve a product along the performance characteristics which customers already value. In the example of computer disk drives, sustaining technologies allowed storage capacity to increase at a rate of 50% each year for a given size.[6] In contrast, the second type of innovation was based on *disruptive* technologies, which introduce a new package of performance characteristics that customers in the mainstream marketplace do not currently value. Therefore, disruptive technologies usually take hold in new or niche markets. However, once these disruptive technologies are established, their own sustaining innovations increase at a faster rate than those employed by firms in the mainstream marketplace, allowing them to satisfy the demands of more customers based on previously valued attributes and acceptance of the new performance characteristics these technologies can offer.[7]

In turn, the size of a firm's current market share and the uncertainty surrounding each type of innovation suggest divergent strategies for dominant firms from those of smaller, new firms. When faced with choices on how to allocate scarce resources for research and development, managers of large firms face incentives to invest in sustaining technology because doing so improves upon the specific attributes that most of the market currently values. Thus, the returns on this investment appear large and certain. Meanwhile, these same managers face disincentives to invest in the types of research that would lead to disruptive technologies, because the majority of the market is satisfied by the current performance characteristics of a product. To invest in technologies that few customers currently demand would be inherently risky.

In contrast, the returns on investments in disruptive technology are relatively larger for smaller, upstart firms with less of a foothold in the current marketplace. While the dominant firms can satisfy the majority of the market through sustaining technologies, small pockets of customers that demand alternative performance characteristics might exist. For new firms, the relative value of securing new or niche markets based on these demands is much greater than for the leading firms. Therefore, they are more likely to invest in performance attributes that are not currently dominant in the mainstream. However, these niche markets might have the potential to grow if customers come to value these alternative attributes more than they value improvement on the current ones. As this new technology begins to successfully infiltrate the market, the incentives for dominant firms to invest in the same technology become clear, but at that point they are forced to play catch up behind their competitors who quickly establish their new position of dominance in the market.[8]

Bower and Christensen's work on disruptive technology is an important starting point to help define the topic but three further notes are likely necessary for the purposes of this conference. First, Bower and Christensen's work is somewhat ambiguous as to *what* exactly a technology disrupts.[9] It could be that technology is disruptive only when it overthrows the incumbent, but this understanding reduces the concept's analytic utility since one must know the

[6] Bower and Christensen, "Disruptive Technologies: Catching the Wave," 45.
[7] Bower and Christensen, "Disruptive Technologies: Catching the Wave," 45-47.
[8] Bower and Christensen, "Disruptive Technologies: Catching the Wave," 47-48.
[9] Danneels, "Disruptive Technology Reconsidered," 247.

outcome of a competition to determine whether a technology was disruptive.[10] Rather, a more useful way to understand disruption as a possible object of analysis and policy would be to focus on the new performance attributes of technology. The former sees disruption of the *status quo* in terms of the actors, while the latter understands disruption as a change in the *status quo* along the primary means by which actors compete. While a change in means might lead to a change in the relative position of the actors, it is not a foregone conclusion that an incumbent will be deposed, creating space for possible policy solutions to disruptive technological change.

The second note coincides with the development of studies of disruption that moved the topic from a focus on 'disruptive technology' to 'disruptive innovation.' Indeed, there seems to be a dominant consensus in the field that technology itself is a neutral and passive entity. Disruptive innovation makes use of technology to manufacture and market a product that users eventually deem outperforms existing versions of the product, creating new markets or shifting the attributes which users consider important.[11] These innovations can be business, institutional, or user-generated, and only through such innovations do some technologies achieve their disruptive potential.[12] Therefore, when we think about the disruptive potential of technology, we must not only consider the material form that such technologies may take but also the political, economic, and social practices that evolve for them to take hold and operate in society.[13] A corollary point is that we should not simply see disruption as changes in material reality, but also as changes in our expectations about political, economic, and social practices.[14] In fact, technology can disrupt our expectations about a market prior to the disruption of the market itself.[15] Therefore, to understand how disruptive technology operates we must not only consider the material disturbances in the established way of doing things but also discursive elements in the framing and politicization of technology in society.

Finally, Bower and Christensen's understanding of disruptive technology seems to converge with understandings of disruption/disruptive technology in other domains of social science, which suggests its general applicability across the various domains this conference will touch upon. For example, in the economics literature, Giovanni Dorsi distinguishes between two processes of technological change, the search and selection of new technological paradigms and the technical progress within a paradigm already established. These processes, and the economic incentives that govern them, roughly mirror Bower and Christensen's distinction between disruptive technology and sustaining technology.[16] Likewise, in studies of American national security, a disruptive threat is one that seeks to achieve the status of peer competitor with the

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[10] Peter Dombrowski and Eugene Gholz, "Identifying Disruptive Innovation: Innovation Theory and the Defense Industry," *Innovations: Technology, Governance, Globalization* 4, no. 2 (April 2009): 102.
[11] Christopher Freeman and Luc Soete, *Economics of Industrial Innovation, Third Edition* (New York: Routledge, 2017), 6.
[12] Kalevi Kilkki et al., "A Disruption Framework," *Technological Forecasting and Social Change* 129 (April 2018): 276.
[13] Stefan Fritsch, "Technology and Global Affairs: Technology and Global Affairs," *International Studies Perspectives* 12, no. 1 (February 2011): 28-29.
[14] Rockie Rodriguez, "Game-Changing Military Technologies: Adoption and Governance," in *Disruptive and Game Changing Technologies in Modern Warfare: Development, Use, and Proliferation*, ed. Margaret E. Kosal (Switzerland: Springer, 2020), 16.
[15] Jacob Adam Hasselbalch, "The Contentious Politics of Disruptive Innovation: Vaping and Fracking in the European Union" PhD diss., (University of Warwick and Universite Libre de Bruxelles, 2017), 37-38.
[16] Giovanni Dosi, "Technological Paradigms and Technological Trajectories: A Suggested Interpretation of the Determinants and Directions of Technical Change," *Research Policy* 11, no. 3 (June 1, 1982): 157–158.

United States by overcoming gaps in technological and operational capabilities through asymmetric means, rather than replicating the technology and operational forms the United States currently employs.[17] Implicitly, a challenge to the dominant state through an increased capacity to employ current tactics would not be disruptive, as such a challenge would uphold the *status quo* in the parameters of competition. In contrast, competing in a disruptive manner implies an asymmetry in tactics, changing the parameters themselves which will determine the outcome.

In sum, disruptive technology changes the metrics by which firms or states compete in the marketplace or the international system, respectively. Such disruption may threaten to shift the relative positions of competitive actors, but such an outcome is not an essential characteristic of the concept. In this light, a key question emerges when considering today's dynamic environment of sweeping technological change: How can the United States maintain its dominance and competitive edge in the midst of disruptive technologies?

Maintaining the Competitive Edge

In order for the United States to advance its interests in an environment of technological change, the country must be able to harness the power and potential of new technologies. Near-peer competitors such as China and Russia are on the rise, and the United States does not want to be deposed by lesser powers in a manner analogous to the dominant firms in the computer disk industry. In line with a neorealist paradigm in international relations, we can consider technological advancement as a means to increase our relative power against potential threats.[18] In fact, some scholars have argued that the existence of a salient threat has spurred innovation.[19] Vernon W. Ruttan makes the case that war is necessary to spur technological change in both the military and civilian sectors.[20] Yet taking the growing salience of external threats somewhat as a given, what are potential targets for policy interventions that would facilitate technological innovation that, in the absence of such policies, would either not occur or occur at lower rates than the competitive, international environment might require?

Of course, arguments about the effectiveness of government intervention into research and development run the gamut between extremes. Writing in 1962, Michael Polanyi argued that scientific inquiry can and should operate according to a market mechanism.[21] An example of more contemporary variants of such arguments suggests that government intervention in research and development threatens the scientific enterprise, creating maladaptive distortions for the current environment of research and inquiry.[22] Towards the other end of the spectrum, Mariana Mazzucato argues that the state should perform a proactive entrepreneurial role in research and development "envisioning new technological opportunities in high-growth areas; undertaking the very early risky investments that lay the groundwork for future exploration of these areas;

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[17] Michael J. Meese, Suzanne C. Nielsen, and Rachel M. Sondheimer, *American National Security* (JHU Press, 2018), 351.
[18] For neorealism, see Kenneth N. Waltz, Theory of International Politics (Waveland Press, 2010) and John J. Mearsheimer, The Tragedy of Great Power Politics (WW Norton & Company, 2001).
[19] Matthew Brummer, "Innovation and Threats," *Defence and Peace Economics*, (2020): 1–22.
[20] Vernon W. Ruttan, *Is War Necessary for Economic Growth?: Military Procurement and Technology Development* (Oxford University Press, 2006).
[21] Michael Polanyi, "The Republic of Science: Its Political and Economic Theory," *Minerva* 38, no. 1 (2000): 1–32.
[22] William N. Butos and Thomas J. McQuade, "Government and Science: A Dangerous Liaison?," *The Independent Review* 11, no. 2 (2006): 177–208.

funding new start-ups that commercialize the innovations; and in some cases even bringing the product to market."[23]

However, much of the scholarship on the political economy of innovation has sought a more nuanced position regarding government intervention in research and development. One thread of this scholarship emerged soon after the end of World War II, a conflict in which the national government had expanded its role in research and development immensely.[24] The fundamental claim of these scholars was that scientific research was susceptible to a variety of market failures, justifying the need for policy intervention. For example, Robert R. Nelson argued that scientific knowledge, upon which applied research was built, is not easy to patent or own, reducing the profit that would motivate such research.[25] In a similar argument, Kenneth Arrow claimed that firms face a collective action problem due to the nature of innovation in which no firm would pay the costs to innovate since it could expect to free-ride on the innovations of others. The collective result would be a suboptimal investment in research efforts.[26] Scholars who developed these frameworks believed that government policy could target incentive structures to help overcome these market failures, motivating private actors to engage in research.

Later studies built on the market failure approach to highlight other ways in which research and development did not seem to operate as one would expect in a perfectly competitive marketplace. These studies were comparative in nature, seeking institutional explanations for differing rates of development across countries, particularly focusing on the transferability of research and innovation. Researchers found that information was 'sticky'; that is, it did not flow easily across geographic and cultural barriers, resulting in systems of knowledge and innovation that were specifically localized.[27] Similarly, the utility of research available to actors in an increasingly globalized world depended on their ability to absorb that knowledge.[28] As technological development increased in complexity, anyone who wished to make use of these developments increasingly required more specialization and expertise to do so.[29] Scholars that identified the negative trends in the transferability of research argued that government policy could effectively intervene to increase the general education of its society, develop bridging institutions between scientific and applied research, and facilitate the role of government agencies, such as the military, in focusing research in strategic industries.[30]

Overall, while technological innovation might have some characteristics of 'happy accidents,' we must consider what role government policy can play in setting the conditions for

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[23] Mariana Mazzucato, "The Entrepreneurial State," *Renewal : A Journal of Labour Politics* 19, no. 3/4 (2011): 132.
[24] Johan Schot and W. Edward Steinmueller, "Three Frames for Innovation Policy: R&D, Systems of Innovation and Transformative Change," *Research Policy* 47, no. 9 (November 2018): 1556.
[25] Richard R. Nelson, "The Simple Economics of Basic Scientific Research," *Journal of Political Economy* 67, no. 3 (1959): 302-304.
[26] Kenneth Arrow, "Economic Welfare and the Allocation of Resources for Invention," in *The Rate and Direction of Inventive Activity: Economic and Social Factors*, ed. Richard R. Nelson (Princeton University Press, 1962), 609–626.
[27] Eric von Hippel, "'Sticky Information' and the Locus of Problem Solving: Implications for Innovation," *Management Science* 40, no. 4 (April 1994): 429–39.
[28] Wesley M. Cohen and Daniel A. Levinthal, "Innovation and Learning: The Two Faces of R & D," *The Economic Journal* 99, no. 397 (1989): 569–96.
[29] Freeman and Soete, *Economics of Industrial Innovation,* 9-10.
[30] Giovanni Dosi, "Technological Paradigms and Technological Trajectories: A Suggested Interpretation of the Determinants and Directions of Technical Change," *Research Policy* 11, no. 3 (June 1, 1982): 155, 160.

such 'accidents' to occur. Is research and development best left to the private sector? If not, what is an efficient level of government involvement in these research efforts? Are there policy interventions which would motivate private actors in a way that would give the U.S. a competitive advantage in comparison to potential rivals' research efforts? These are questions with which we must grapple if America is to harness the potential of the technological change that is currently underway.

The Politics of Disruptive Technology

The preceding section rests on an implicit assumption of a unitary, national interest. At this aggregate level, the United States should pursue technological development to maintain its security against threats in the international system. Yet, the costs and benefits of technological progress are not evenly distributed across actors in society. While fostering disruptive technology can improve aggregate measures of United States power and wealth, the same technology can result in consistent harm to some groups in society or redistribute power and wealth among different types of actors. These distributional consequences form the material bases around which disruptive technologies can become politically salient issues.[31]

Similar to ways in which disruptive technology threatens to redistribute power among actors at the international level, technology can redistribute material capabilities among actors in domestic society as well. One particular area of concern is the redistribution of wealth which follows technological progress that favors capital over labor in the United States. In capitalist economies, research and development operates under strong selection effects which incentivizes the substitution of costly labor with cheaper machines.[32] In the long run, it can be cheaper for firms to invest in labor-saving innovations in automation than to employ workers who might demand higher wages. Therefore, economic incentives lead firms to invest in automation, but over the past 30 years we have seen that automation has significantly displaced labor in the United States, impacting the distribution of wealth in American society. While technology has the potential to replace lost jobs by creating new ones, so far, studies have shown that the growth of these new jobs has not occurred at a rate necessary to provide work for the number of Americans who are unemployed due to automation.[33]

Likewise technological innovation can also introduce processes which are broadly harmful to the general welfare. The recent political salience of the conflict of interests in the expansion of hydraulic fracking is a case in point. Certainly, energy security and production is of vital interest to the United States, but many feel that the benefits of fracking are captured disproportionately by the oil and gas industry, while society, in general, bears the harmful ecological and social consequences of this new technological capability.[34]

Another area of concern in terms of the distributional effects of technology in society is the power between the state and its citizens. In fact, contrary to the optimistic view of the 1990's that the rise of the internet would lead to a diffusion of power in societies, the number and

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[31] Hasselbalch, "The Contentious Politics of Disruptive Innovation: Vaping and Fracking in the European Union," 40.
[32] Dosi, "Technological Paradigms and Technological Trajectories," 155.
[33] Daron Acemoglu and Pascual Restrepo, "Automation and New Tasks: How Technology Displaces and Reinstates Labor," *Journal of Economic Perspectives* 33, no. 2 (May 1, 2019): 3–30.
[34] Anna Willow and Sara Wylie, "Politics, Ecology, and the New Anthropology of Energy: Exploring the Emerging Frontiers of Hydraulic Fracking," *Journal of Political Ecology* 21, no. 1 (December 1, 2014).

longevity of authoritarian regimes has increased. Enabled by developments in artificial intelligence, authoritarian leaders have used technology to consolidate their power and enhance the repression of opposition within their states.[35] Concerns with the rise of artificial intelligence are seen in recent remarks by the United Nations High Commissioner for Human Rights, who spoke of the "negative, even catastrophic" risks these technologies posed to "rights to privacy, to a fair trial, to freedom from arbitrary arrest and detention and the right to life."[36]

While the mature institutions of the West would likely prove more resilient, even the employment of high-tech capabilities by some democratic governments has not gone without controversy. For example, after the attacks of September 11, 2001, many European governments developed the capabilities and the legal frameworks to conduct wide-ranging surveillance of the internet activities of individual citizens, threatening the right to privacy that the same democracies claim to uphold.[37] The United States has not been immune from similar criticisms, as seen from the fallout of the 2014 leak of classified documents that detailed a robust surveillance program operated by the National Security Agency.[38]

Concerns of consolidation of state power in relation to the individual can also be seen in debates about appropriate regulation of today's information environment. Over the last decade, social media seems to have latched on to every aspect of American society and grown as a source of news for many citizens. While these platforms have the potential to connect the world in a way that has never been possible in the past, they have also been the location of targeted disinformation campaigns with ever-increasing technological sophistication.[39] Such efforts have, at times, seemed to tear at the very fabric of American society to the point that many cannot even trust in facts. Concerned that this type of social dysfunction threatens the health of our democracy, many have called for the regulation of social media platforms and news stories presented on them. Yet, many are similarly concerned with entrusting regulatory agencies in the government the power to decide what information that citizens should, or should not, be allowed to see.[40]

In contrast to its role in empowering the state, digital technology has also empowered new actors and provided new ways for actors to challenge state power. For example, the hacker group Anonymous has combined computer hacking and political activism, targeting individuals and organizations with disruptions in online activities and threatening to leak private information.[41] In fact, cyber-operations, whether conducted by individuals and groups or by state

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[35] Andrea Kendall-Taylor, Erica Frantz, and Joseph Wright, "The Digital Dictators: How Technology Strengthens Autocracy Essays," *Foreign Affairs* 99, no. 2 (2020): 103–15.
[36] Scott Neuman, "The U.N. Warns That AI Can Pose A Threat To Human Rights," *NPR*, September 16, 2021.
[37] Ian Brown and Douwe Korff, "Terrorism and the Proportionality of Internet Surveillance," *European Journal of Criminology* 6, no. 2 (March 1, 2009): 120.
[38] See "Edward Snowden: Leaks That Exposed US Spy Programme," *BBC News*, January 17, 2014, sec. US & Canada, https://www.bbc.com/news/world-us-canada-23123964; "NSA Surveillance Exposed by Snowden Ruled Unlawful," *BBC News*, September 3, 2020, sec. Technology, https://www.bbc.com/news/technology-54013527.
[39] Robert Chesney and Danielle Citron, "Deepfakes and the New Disinformation War: The Coming Age of Post-Truth Geopolitics Essays," *Foreign Affairs* 98, no. 1 (2019): 147–55.
[40] Francis Fukuyama, Barak Richman, and Ashish Goel, "How to Save Democracy from Technology: Ending Big Tech's Information Monopoly Essays," *Foreign Affairs* 100, no. 1 (2021): 98–110.
[41] Luke Goode, "Anonymous and the Political Ethos of Hacktivism," *Popular Communication* 13, no. 1 (January 2, 2015): 75-79.

operatives themselves, represent a significant disruption in the means of competition. Cyber-attacks are easy to deny, scale, and blur the lines between war and peace.[42]

Enduring Values?

On August 6, 1961, the Soviet Union launched Vostok II into orbit, the second flight of a person into space.[43] While such an accomplishment was important in terms of the 'space race', American policymakers also saw the launch as a demonstration of military capabilities, particularly in orbital reconnaissance and missile-launching.[44] In fact, in an interview weeks after his return, the pilot, Major Gherman Titov, made a point to note that the technology that had launched him into orbit was capable of delivering nuclear warheads anywhere in the world.[45] Today, armed with the certainty of our own hindsight, we might fail to consider the disruptive nature of this event and the uncertainty that followed.[46] That some scholars may now refer to the Cold War as the 'Long Peace' should not cause us to forget that the period likely seemed anything but long-lasting or peaceful for those alive at the time.[47]

In January 1962, an article appeared in *Foreign Affairs* reflecting on the launch of Vostok II, penned by Caryl P. Haskins, president of the Carnegie Institute of Washington, a member of the President's Science Advisory Committee, and an advisor to the Research and Development Board of the Army and the Navy, the Secretary of Defense, and the Secretary of State. Haskins wrote that the Soviet launch had taught America three valuable lessons regarding science and technology. The first of these lessons was the importance of individual freedom, autonomy, and plurality in scientific inquiry, just as in other domains of the American way of life. While the central planning of the U.S.S.R. might seem to some impressively efficient in its ability to resource technological advancement, Haskins argued that this approach could not be sustained and warned that attempts to mirror their system would bring lasting harm to our own scientific processes.[48] While Haskins went on to praise many aspects of the expanded role of the Federal government in scientific research, he emphasized the role of individual liberty at the core of any American policy towards innovation.

The second lesson was the vital importance of solidarity with the democracies of Western Europe. Haskins argued that the survival of the free world rested on its ability to maintain its technical edge against competitors but to do so was beyond the means of any one state independently. Rather, pooling and coordinating research efforts among our allies in Western Europe would allow the U.S. and its allies to build the capabilities and capacities to protect our interests and way of life.[49]

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[42] Michele Flournoy and Michael Sulmeyer, "Battlefield Internet: A Plan for Securing Cyberspace World War Web," *Foreign Affairs* 97, no. 5 (2018): 41.
[43] Theodore Shabad, "Russians Acclaim Astronaut After Flight of 435,000 Miles," *The New York Times*, August 8, 1961.
[44] John W. Finney, "CALL FOR URGENCY IS EXPECTED IN U.S.," *The New York Times*, August 7, 1961.
[45] Caryl P. Haskins, "Technology, Science and American Foreign Policy," *Foreign Affairs* 40, no. 2 (1962): 224.
[46] Aroop Mukharji and Richard Zeckhauser, "Bound to Happen: Explanation Bias in Historical Analysis," *Journal of Applied History* 1, no. 1–2 (December 10, 2019): 6-7.
[47] John Lewis Gaddis, "The Long Peace: Elements of Stability in the Postwar International System," *International Security* 10, no. 4 (1986): 99–100.
[48] Caryl P. Haskins, "Technology, Science and American Foreign Policy," *Foreign Affairs* 40, no. 2 (1962): 225–226.
[49] Haskins, "Technology, Science and American Foreign Policy," 228.

Haskin's final lesson was the importance of the U.S. and the West to share the benefits of technology to those who did not possess those benefits but desperately required them. While technological capacity was concentrated in a minority of Western countries, the launch of Vostok II would serve as a powerful symbol of Soviet technological capacity to the five-sixths of the world's population that did not live in the West. Many of these people faced dire poverty, hunger, and disease but were citizens of new or underdeveloped states which lacked the capacity to meet these challenges effectively.[50] Haskins argued that failure of the world's democracies to provide them with the technical assistance that would help alleviate these burdens would risk the long-term survivability and legitimacy of the liberal international order that the United States had helped construct after the end of World War II.[51]

In times of uncertainty, clear values, principles, and norms can create expectations about future behavior that allow actors to navigate their environments.[52] The principles Haskins identified in 1962 might have served the United States well during the Cold War. To be sure, the impact of disruptive technology on today's strategic environment differs in fundamental ways from the disruptive impacts of technology in the past, but Haskin's lessons might still serve as a useful starting point for inquiry of our values regarding technology in the current context. Do we still see the importance and value of individual freedom in scientific research, even in comparison to the significant scientific achievements of authoritarian states? Do we still believe that cooperation and coordination on research and development among our allies is a key to maintaining our technological advantage and democratic way of life? Should we still find value in sharing the benefits of technology with those who either lack access but may need it the most or are harmed by trends in technological development? And how might these values interact with our interests in the coming decade?

These and many other questions will be addressed during SCUSA 72. To prompt contemplation and discussion, we identify other important issues in the background papers keyed to each of the individual roundtables.

[50] Haskins, "Technology, Science and American Foreign Policy," 231-232.
[51] G. John Ikenberry, *Liberal Leviathan* (Princeton University Press, 2011).
[52] Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton, N.J: Princeton University Press, 1984), 57.