### 1

#### Biotech industry strong now.

Cancherini et al. 4/30 [(Laura, Engagement Manager @ McKinsey & Company, Joseph Lydon, Associate Partner @ McKinsey & Company, Jorge Santos Da Silva, Senior Partner at McKinsey & Company, and Alexandra Zemp, Partner at McKinsey & Company), “What’s ahead for biotech: Another wave or low tide?“, McKinsey & Company, 4-30-2021, <https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/whats-ahead-for-biotech-another-wave-or-low-tide>] TDI

As the pandemic spread across the globe in early 2020, biotech leaders were initially pessimistic, reassessing their cash position and financing constraints. When McKinsey and BioCentury interviewed representatives from 106 biotech companies in May 2020,4 half of those interviewed were expecting delays in financing, and about 80 percent were tight on cash for the next two years and considering trade-offs such as deferring IPOs and acquisitions. Executives feared that valuations would decline because of lower revenue projections and concerns about clinical-trial delays, salesforce-effectiveness gaps, and other operational issues.

Belying this downbeat mood, biotech has in fact had one of its best years so far. By January 2021, venture capitalists had invested some 60 percent more than they had in January 2020, with more than $3 billion invested worldwide in January 2021 alone.5 IPO activity grew strongly: there were 19 more closures than in the same period in 2020, with an average of $150 million per raise, 17 percent more than in 2020. Other deals have also had a bumper start to 2021, with the average deal size reaching more than $500 million, up by more than 66 percent on the 2020 average (Exhibit 3).6

What about SPACs?

The analysis above does not include special-purpose acquisition companies (SPACs), which have recently become significant in IPOs in several industries. Some biotech investors we interviewed believe that SPACs represent a route to an IPO. How SPACs will evolve remains to be seen, but biotechs may be part of their story.

Fundamentals continue strong

When we asked executives and investors why the biotech sector had stayed so resilient during the worst economic crisis in decades, they cited innovation as the main reason. The number of assets transitioning to clinical phases is still rising, and further waves of innovation are on the horizon, driven by the convergence of biological and technological advances.

In the present day, many biotechs, along with the wider pharmaceutical industry, are taking steps to address the COVID-19 pandemic. Together, biotechs and pharma companies have [more than 250 vaccine candidates in their pipelines](https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/on-pins-and-needles-will-covid-19-vaccines-save-the-world), along with a similar number of therapeutics. What’s more, the crisis has shone a spotlight on pharma as the public seeks to understand the roadblocks involved in delivering a vaccine at speed and the measures needed to maintain safety and efficacy standards. To that extent, the world has been living through a time of mass education in science research and development.

Biotech has also benefited from its innate financial resilience. Healthcare as a whole is less dependent on economic cycles than most other industries. Biotech is an innovator, actively identifying and addressing patients’ unmet needs. In addition, biotechs’ top-line revenues have been less affected by lockdowns than is the case in most other industries.

Another factor acting in the sector’s favor is that larger pharmaceutical companies still rely on biotechs as a source of innovation. With the [top dozen pharma companies](https://www.mckinsey.com/business-functions/m-and-a/our-insights/a-new-prescription-for-m-and-a-in-pharma) having more than $170 billion in excess reserves that could be available for spending on M&A, the prospects for further financing and deal making look promising.

For these and other reasons, many investors regard biotech as a safe haven. One interviewee felt it had benefited from a halo effect during the pandemic.

More innovation on the horizon

The investors and executives we interviewed agreed that biotech innovation continues to increase in quality and quantity despite the macroeconomic environment. Evidence can be seen in the accelerating pace of assets transitioning across the development lifecycle. When we tracked the number of assets transitioning to Phase I, Phase II, and Phase III clinical trials, we found that Phase I and Phase II assets have transitioned 50 percent faster since 2018 than between 2013 and 2018, whereas Phase III assets have maintained much the same pace. There could be many reasons for this, but it is worth noting that biotechs with Phase I and Phase II assets as their lead assets have accounted for more than half of biotech IPOs. Having an early IPO gives a biotech earlier access to capital and leaves it with more scope to concentrate on science.

Looking forward, the combination of advances in biological science and accelerating developments in technology and artificial intelligence has the potential to take innovation to a new level. A [recent report](https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/the-bio-revolution-innovations-transforming-economies-societies-and-our-lives) from the McKinsey Global Institute analyzed the profound economic and social impact of biological innovation and found that biomolecules, biosystems, biomachines, and biocomputing could collectively produce up to 60 percent of the physical inputs to the global economy. The applications of this “Bio Revolution” range from agriculture (such as the production of nonanimal meat) to energy and materials, and from consumer goods (such as multi-omics tailored diets) to a multitude of health applications.

#### IPR key to innovation.

Bacchus 20 [(James, member of the Herbert A. Stiefel Center for Trade Policy Studies, the Distinguished University Professor of Global Affairs and director of the Center for Global Economic and Environmental Opportunity at the University of Central Florida. He was a founding judge and was twice the chairman—the chief judge—of the highest court of world trade, the Appellate Body of the World Trade Organization in Geneva, Switzerland) "An Unnecessary Proposal: A WTO Waiver of Intellectual Property Rights for COVID-19 Vaccines," Cato Institute, 12-16-2020, https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines] TDI

At the heart of this emerging trade debate is a belief by many people worldwide that all medicines should be “global public goods.” There is little room in such a belief for consideration of any rights to IP. As one group of United Nations human rights experts expressed: “There is no room for … profitability in decision‐​making about access to vaccines, essential tests and treatments, and all other medical goods, services and supplies that are at the heart of the right to the highest attainable standard of health for all.”[16](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref16)

This view is myopic. Subordinating IP rights temporarily to pressing public needs during a pandemic or other global health emergency is one thing. Eliminating any consideration of “profitability” in all policymaking relating to “access to vaccines, essential tests and treatments, and all other medical goods, services and supplies” is quite another.[17](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref17) To be sure, there is a superficial moral appeal in such a view. But does this moral appeal hold up if such a “human rights” approach does not result in meeting those urgent public needs?

With the belief that medicines should be “public goods,” there is literally no support in some quarters for the application of the WTO TRIPS Agreement to IP rights in medicines. Any protection of the IP rights in such goods is viewed as a violation of human rights and of the overall public interest. This view, though, does not reflect the practical reality of a world in which many medicines would simply not exist if it were not for the existence of IP rights and the protections they are afforded.

Technically, IP rights are exceptions to free trade. A long‐​standing general discussion in the WTO has been about when these exceptions to free trade should be allowed and how far they should be extended. The continuing debate over IP rights in medicines is only the most emotional part of this overall conversation. Because developed countries have, historically, been the principal sources of IP rights, this lengthy WTO dispute has largely been between developed countries trying to uphold IP rights and developing countries trying to limit them. The debate over the discovery and the distribution of vaccines for COVID-19 is but the latest global occasion for this ongoing discussion.

The primary justification for granting and protecting IP rights is that they are incentives for innovation, which is the main source for long‐​term economic growth and enhancements in the quality of human life. IP rights spark innovation by “enabling innovators to capture enough of the benefits of their own innovative activity to justify taking considerable risks.”[18](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref18) The knowledge from innovations inspired by IP rights spills over to inspire other innovations. The protection of IP rights promotes the diffusion, domestically and internationally, of innovative technologies and new know‐​how. Historically, the principal factors of production have been land, labor, and capital. In the new pandemic world, perhaps an even more vital factor[to innovation] is the creation of knowledge, which adds enormously to “the wealth of nations.” Digital and other economic growth in the 21st century is increasingly ideas‐​based and knowledge intensive. Without IP rights as incentives, there would be less new knowledge and thus less innovation.

In the short term, undermining private IP rights may accelerate distribution of goods and services—where the novel knowledge that went into making them already exists. But in the long term, undermining private IP rights would eliminate the incentives that inspire innovation, thus preventing the discovery and development of knowledge for new goods and services that the world needs. This widespread dismissal of the link between private IP rights and innovation is perhaps best reflected in the fact that although the United Nations Sustainable Development Goals for 2030 aspire to “foster innovation,” they make no mention of IP rights.[19](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref19)

As Stephen Ezell and Nigel Cory of the Information Technology and Innovation Foundation wrote, “A fundamental fault line in the debate over intellectual property pertains to the need to achieve a reasoned balance between access and exclusive rights.”[20](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref20) This fault line is much on display in the WTO rules on IP rights. These rules recognize that “intellectual property rights are private rights” and that rules and disciplines are necessary for “the provision of effective and appropriate means for the enforcement of trade‐​related intellectual property rights.”[21](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref21) Yet, where social and economic welfare is at stake, WTO members have sought to strike a balance in these rules between upholding IP rights and fulfilling immediate domestic needs.

#### Biopharmaceutical innovation is key to prevent future pandemics and bioterror.

Marjanovic and Feijao 20 [(Sonja Marjanovic, Ph.D., Judge Business School, University of Cambridge. Carolina Feijao, Ph.D. in biochemistry, University of Cambridge; M.Sc. in quantitative biology, Imperial College London; B.Sc. in biology, University of Lisbon.) "How to Best Enable Pharma Innovation Beyond the COVID-19 Crisis," RAND Corporation, 05-2020, https://www.rand.org/pubs/perspectives/PEA407-1.html] TDI

As key actors in the healthcare innovation landscape, pharmaceutical and life sciences companies have been called on to develop medicines, vaccines and diagnostics for pressing public health challenges. The COVID-19 crisis is one such challenge, but there are many others. For example, MERS, SARS, Ebola, Zika and avian and swine flu are also infectious diseases that represent public health threats. Infectious agents such as anthrax, smallpox and tularemia could present threats in a bioterrorism context.1 The general threat to public health that is posed by antimicrobial resistance is also well-recognised as an area in need of pharmaceutical innovation. Innovating in response to these challenges does not always align well with pharmaceutical industry commercial models, shareholder expectations and competition within the industry. However, the expertise, networks and infrastructure that industry has within its reach, as well as public expectations and the moral imperative, make pharmaceutical companies and the wider life sciences sector an indispensable partner in the search for solutions that save lives. This perspective argues for the need to establish more sustainable and scalable ways of incentivising pharmaceutical innovation in response to infectious disease threats to public health. It considers both past and current examples of efforts to mobilise pharmaceutical innovation in high commercial risk areas, including in the context of current efforts to respond to the COVID-19 pandemic. In global pandemic crises like COVID-19, the urgency and scale of the crisis – as well as the spotlight placed on pharmaceutical companies – mean that contributing to the search for effective medicines, vaccines or diagnostics is essential for socially responsible companies in the sector. 2 It is therefore unsurprising that we are seeing industry-wide efforts unfold at unprecedented scale and pace. Whereas there is always scope for more activity, industry is currently contributing in a variety of ways. Examples include pharmaceutical companies donating existing compounds to assess their utility in the fight against COVID19; screening existing compound libraries in-house or with partners to see if they can be repurposed; accelerating trials for potentially effective medicine or vaccine candidates; and in some cases rapidly accelerating in-house research and development to discover new treatments or vaccine agents and develop diagnostics tests.3,4 Pharmaceutical companies are collaborating with each other in some of these efforts and participating in global R&D partnerships (such as the Innovative Medicines Initiative effort to accelerate the development of potential therapies for COVID-19) and supporting national efforts to expand diagnosis and testing capacity and ensure affordable and ready access to potential solutions.3,5,6 The primary purpose of such innovation is to benefit patients and wider population health. Although there are also reputational benefits from involvement that can be realised across the industry, there are likely to be relatively few companies that are ‘commercial’ winners. Those who might gain substantial revenues will be under pressure not to be seen as profiting from the pandemic. In the United Kingdom for example, GSK has stated that it does not expect to profit from its COVID-19 related activities and that any gains will be invested in supporting research and long-term pandemic preparedness, as well as in developing products that would be affordable in the world’s poorest countries.7 Similarly, in the United States AbbVie has waived intellectual property rights for an existing combination product that is being tested for therapeutic potential against COVID-19, which would support affordability and allow for a supply of generics.8,9 Johnson & Johnson has stated that its potential vaccine – which is expected to begin trials – will be available on a not-for-profit basis during the pandemic.10 Pharma is mobilising substantial efforts to rise to the COVID-19 challenge at hand. However, we need to consider how pharmaceutical innovation for responding to emerging infectious diseases can best be enabled beyond the current crisis. Many public health threats (including those associated with other infectious diseases, bioterrorism agents and antimicrobial resistance) are urgently in need of pharmaceutical innovation, even if their impacts are not as visible to society as COVID-19 is in the immediate term. The pharmaceutical industry has responded to previous public health emergencies associated with infectious disease in recent times – for example those associated with Ebola and Zika outbreaks.11 However, it has done so to a lesser scale than for COVID-19 and with contributions from fewer companies. Similarly, levels of activity in response to the threat of antimicrobial resistance are still low.12 There are important policy questions as to whether – and how – industry could engage with such public health threats to an even greater extent under improved innovation conditions.

#### Bioterror causes extinction, bioweapons uniquely appeal to terrorists.

Krstić '17 [Marko; January 2017; assistant professor of microelectronics and physics at the University of Belgrade, PhD in Electrical Engineering and Computer Science from the University of Belgrade; "Tendency of using chemical, biological, radiological and nuclear weapons for terrorist purposes," Military Technical Courier, Vol. 65, No. 2, p. 481-498] SC SD

The studies of a few cases of earlier CBRN actions have led experts to identify the key characteristics **of** terrorist groups **that could potentially have an interest to** use **these** weapons. It is thought that conservatism is inherent in terrorist organizations, but it must not be forgotten that **some terrorists are inclined to** innovations **in** weapons **and** tactics**, as well as to** taking risks **in actions or in the choice of weapons.** Many experts agree that most terrorist organizations want to use proven methods to achieve desired effects. Innovations, especially in the field of CBRN weapons, often indicate **terrorists are likely to be led by other factors rather than by pure curiosity and desire to experiment**. For some individuals, repression and democratic and strong rule of law are positive determinants of the emergence of CBRN actions which points to a new and more complex global security environment with an increasing risk of terrorists trying to perform a CBRN attack. It is a frightening fact that **a** single **terrorist or isolated terrorist group could improvise a** biological weapon **or use other ways to spread** anthrax, smallpox **or other biological agents and thereby cause** mass casualties and destroy the health care system of a state. CBRN weapons are secretly shipped to terrorists or hostile governments and represent a significant and growing threat to many countries. Although the threat of CBRN attacks is widely recognized as the central issue of national security, most analysts assume that the primary danger is a threat of the military use of these weapons in conventional wars with traditional military means while the threat of covert attacks, which includeterrorism**, is rashly and unfairly neglected**. Covert attacks are difficult to deter or prevent and CBRN weapons suitable for this type of attack are available to a growing number of enemy states and groups. At the same time, restrictions on their use appear to be diminishing, and so-called new terrorists do not always escalate and become apparent only by using unconventional weapons. These **weapons** are easily spread or transmitted from person to person, **have a** high mortality rate **and a potential impact on public health,** causing mass casualties that can crush health systems and cause public panic and social disruption, thus requiring special efforts to suppress them. When assessing the threat of CBRN weapons, we should take into account the change in capacity to carry out terrorist attacks that are on the rise among countries and non-government elements. Analysts believe that the fear of chemical and biological terrorist attacks is excessive, they point out that, in the past, very few attacks involved these weapons, and even those few attempts that have occurred were mostly thwarted by the authorities. A relative ease with which biological weapons can be obtained, along with other current changes and turbulences in the world, sets the stage for another type of warfare in the 21st century. The potential for CBRN terrorism has widely grown since 11 September, when some of these materials were used. The danger of terrorist use of nuclear weapons and other weapons of mass destruction represents a very serious threat for many countries; **if a terrorist group could gain access to this weapon, it is** highly likely it would use it, or threaten to use it. Although there is very little information on terrorists and their ability to come into possession of nuclear weapons or on their intentions to get them, the risk of CBRN weapons has certainly increased since the terrorists started to become more familiar with these agents and their harmful consequences. Discovering the nature of the threat of biological weapons, as well as the appropriate response to them requires an emphasis on the biological characteristics of these instruments of war and terror. Preparing for a terrorist attack may seem daunting and there are a small number of people with practical experience and a good knowledge of CBRN weapons, because until recently there was no need to own them. In the past, most of the planning regarding emergency response to terrorism concentrated on the concerns of open attacks (bombing). However, the threats of CBRN weapons are taken seriously, especially in the USA, where media, fascinated by new weapons of mass destruction, encourage a growing fear for public safety. Terrorists who have significant human and material resources are much more likely to realize their intentions than lone perpetrators or small terrorist groups. A CBRN terrorism threat is certainly a matter of concern; however, terrorists will face many obstacles in the implementation of an attack of this kind. This includes the acquisition of materials and preparation for spreading them as well as a selection and a survey of a chosen objective and a correct dose required to achieve a desired effect. The growing threat of CBRN terrorism Terrorism can be defined as a deliberate act of violence intended to cause damage, but also to create an appropriate political and ideological situation, so that the use of these non-traditional weapons of terror outside the context is obvious, and the goals will not be military, but civilian ones (Bioterrorism, chemical weapons, and radiation terrorism, nd). Toxic substances, regardless of whether they are of animal, vegetable or mineral origin, were used throughout the history for political assassinations and sabotage; despite the risk of severe penalties, the prospects for success favoured the use of toxic substances. Such use has always been reduced, however, since only a small number of people had access to substances and possessed the ability of learn how to use them (Pascal, 1999). CBRN weapons are rightly viewed with a special sense of horror, their effects can be devastating and indiscriminating, and they take the most stringent toll among the most vulnerable population, non-combatants (e.g. a biological attack cannot be detected sufficiently fast after the disease spreads through the population). Moreover, chemical **and** biological **weapons are a particularly** attractive alternative for groups that do not have the ability to produce nuclear weapons, and this risk raises complex but important ethical issues (London, 2003). The common name for CBRN terrorism which causes the death of a large number of people, large scale damage and a strong echo worldwide is post-industrial or hyper-terrorism. This means that non-state elements possess and dispose of assets that were previously held only by states, but unlike them, which often fear reprisals after WMD attacks, terrorists, having no geographical location, are ready to use WMD with much less scrupulousness and fear (Kurmnik, Ribnikar, 2003). Some authors have described the factors that make chemical, biological, radiological and nuclear terrorist attacks in many ways unique and demanding, such as an element of surprise, invisible agents, ordnance, the risk of repetition and new types of risks (Ruggiero, Voss, 2015). In the past 30 years, the use of CBRN weapons has become a major concern for many nations around the world. The public has become insensitive to traditional terrorist attacks that seem to be a less efficient way for terrorist organizations to achieve their goals. What causes shock and fear is actually presenting the properties of weapons which can be used by terrorist organizations to enhance their efforts and the effectiveness of attacks. CBRN terrorism is often a synonym for weapons of mass destruction, although this form of terrorism and related incidents do not require attacks and inflicting harm to large numbers of people they do not even require deadly attacks at all. The number of studies on this type of terrorism is limited due to the lack of available data on this terrorism type. There is a very small number of databases of CBRN incidents, and even the existing ones have relatively little to do with them and they are compared to conventional terrorism (Jesse, 2012). Some experts emphasize the factors that promote such attacks and these factors include the availability of information and expertise, increased frustration of terrorists, demonization of the target population, as well as a millennial, apocalyptic or messianic vision. Experts also differ in opinion when it comes to possible perpetrators of CBRN incidents, and include religious fundamentalists and cults1 as possible perpetrators of such attacks, especially when these groups address to ethereal audience, emphasizing the hatred of unbelievers (Ivanova, Sandler, 2007). Concerns about super terrorism which involves the use of CBRN weapons are mainly focused on what terrorists can do in the context of our social reality, with an emphasis on terrorist motivations, initiatives and limitations. When considering which terrorist groups may be inclined to commit CBRN terrorism, it is important to recognize the spectrum of these acts, as well as to analyze the following categorization: (a) massive casualty events produced by conventional weapons; (b) CBRN scams; (c) conventional attack on a nuclear facility; (d) limited-scale chemical or biological attack or a radiological dispersion; (e) large scale chemical or biological attack or a radiological dispersion; and (f) CBRN strikes (super terrorism) that can lead to thousands of victims. In addition to the motivation and willingness to inflict mass casualties in any way, terrorists must have technical and financial capabilities to come into possession of material and acquire skills for these types of weapons and materials and carry out a successful attack. Chemical and biological weapons can pose a risk to terrorists thus deterring them from using such weapons (Post, 2005, pp.148-151). The possibility that terrorists use chemical or biological substances may increase over the next decade, according to US intelligence agencies. According to CIA2, an interest among non-state actors, including terrorists**, for biological and chemical materials is real and growing, and** the number of potential perpetrators is increasing. The agency also noted that many of these groups had developed an international network and did not need to rely on state sponsors for financial and technical support. However, it is believed that it is less likely that terrorists would choose chemical and biological weapons over conventional explosives, because these weapons are difficult to control and their results are unpredictable (Condesman, Burke, 2001). The risk of CBRN weapons is growing since terrorists are better acquainted with these agents and their potential for causing harm3. These agents possess desirable characteristics as **weapons** of terror; they **are biologically invisible to the naked eye,** odorless **and potentially** lethal **in the form of particles**; natural organisms are so readily available, and can be "camouflaged" in natural disasters and used to spread fear and various diseases. Chemical agents quickly attack the critical physiological centers of the body, disabling or killing the victim. Biological and chemical weapons require the application of huge amounts of resources and result in different effects, causing fear and panic in the contaminated areas. Often referred to as "weapons of mass destruction", but, in medical terms, they are weapons of potential mass casualties because they can lead to massive death toll in the absence of preventive measures and timely response (Meyer, Spinella, 2014, pp.645-656). "Bioterrorism is the intentional use of microorganisms or toxins derived from living organisms used for hostile purposes intended to cause disease or death in man, animals and plants, on which they depend". The threat of bioterrorist attacks is real, and each individual is a potential terrorist, when terrorists are "invisible" prior to an attack which also can be "invisible" in the form of causing infectious diseases or epidemics. Citizens who are not aware they are infected are potential safety hazard and so-called dangerous bodies (Mijalković, 2011). In the last ten years, the issue of CBRN weapons has attracted the attention of experts, but a list of priorities by the heads of states has never been established. Biological weapons almost became forgotten after they had been banned by the 1972 Convention on Biological Weapons. A significant attention was paid to them during the 90s of the last century. The important thing is that biological weapons attract much less attention than other similar weapons, but probably represent the greatest danger, and in addition to their use in war, they are available as instruments of terror in peace. Some countries showed willingness to use such weapons against defenseless populations to achieve strategic objectives, and in this regard, some analysts believe that those who attacked the World Trade Center in 1993 applied cyanide on their bombs (this was not confirmed, but a large amount of cyanide was found in possession of the perpetrators). Such a group will prove to be less inefficient, because if terrorists decide to shock and surprise the government by inflicting enormous damage, CBRN weapons will become more attractive and more accessible (Bettis, 1998). Motives and forms of behavior of individuals and groups who acquired or used CBRN weapons have existed since long ago and there is no doubt that modern society is vulnerable to such attacks (Tucker, 2000). Fear of biological terrorism is certainly greater than the fear of the conventional forms of terrorism; some of these fears are justified and some are often exaggerated. Some agents are really very contagious and deadly, and if used properly, have a potential to result in casualties similar to those in a nuclear attack. Perhaps the scariest aspect of biological weapons is that the body is attacked without warning, people are afraid of the threat as it is invisible, and cannot be heard or felt. The history of warfare, terrorism and crime involving biological agents in the last century is considerably less dangerous and more deadly than the history of conventional warfare (Parachini, 2001). Today, some states and some terrorist groups can more easily overcome technological barriers due to the increased flow of information and access to previously unavailable technologies. Along with nuclear and chemical weapons, biological weapons are part of an unholy trinity of weapons of mass destruction (Davis, Johnson-Winegar, 2000, pp.15-28). The **society is now faced with the threat of an** apocalyptic and asymmetric war **scenario** in which kamikaze attackers are able to arm themselves with WMD4 without even having to have a "physical" weapon to create fear; they probably still prefer simple, proven methods: a stampede in an enclosed place, or just an explosive device, which will kill many people5 (Palmer, 2004, pp.3-9). Early detection and response to biological or chemical terrorism are crucial to solving this problem (U.S. Congress House, 2003, p.117).

### 2

#### Despite growing rivalry, US-China economic interdependence strong now– but it can easily collapse.

Hass 8/12 [Ryan Hass (Senior Fellow - Foreign Policy, Center for East Asia Policy Studies, John L. Thornton China Center The Michael H. Armacost Chair Chen-Fu and Cecilia Yen Koo Chair in Taiwan Studies Nonresident Fellow, Paul Tsai China Center, Yale Law School), 8-12-2021, "The “new normal” in US-China relations: Hardening competition and deep interdependence," Brookings, <https://www.brookings.edu/blog/order-from-chaos/2021/08/12/the-new-normal-in-us-china-relations-hardening-competition-and-deep-interdependence/> // belle]

The intensification of U.S.-China competition has captured significant attention in recent years. American attitudes toward China have become more negative during this period, as anger has built over disruptions resulting from the COVID-19 pandemic, Beijing’s trampling of Hong Kong’s autonomy, human rights violations in Xinjiang, and job losses to China.

Amidst this focus on great power competition, two broader trends in the U.S.-China relationship have commanded relatively less attention. The first has been the widening gap in America’s and China’s overall national power relative to every other country in the world. The second has been the continuing thick interdependence between the United States and China, even amidst their growing rivalry. Even on economic issues, where rhetoric and actions around decoupling command the most attention, trade and investment data continue to point stubbornly in the direction of deep interdependence. These trends will impact how competition is conducted between the U.S. and China in the coming years.

SEPARATING FROM THE PACK

As America’s unipolarity in the international system has waned, there has been renewed focus on the role of major powers in the international system, including the European Union, Russia, India, and Japan. Each of these powers has a major population and substantial economic weight or military heft, but as my Brookings colleague Bruce Jones has observed, none have all. Only the United States and China possess all these attributes.

The U.S. and China are likely to continue amassing disproportionate weight in the international system going forward. Their growing role in the global economy is fueled largely by both countries’ technology sectors. These two countries have unique traits. These include world-class research expertise, deep capital pools, data abundance, and highly competitive innovation ecosystems. Both are benefitting disproportionately from a clustering effect around technology hubs. For example, of the roughly 4,500 artificial intelligence-involved companies in the world, about half operate in the U.S. and one-third operate in China. According to a widely cited study by PricewaterhouseCoopers, the U.S. and China are set to capture 70% of the $15.7 trillion windfall that AI is expected to add to the global economy by 2030.

The United States and China have been reinvesting their economic gains to varying degrees into research and development for new and emerging technologies that will continue to propel them forward. While it is not foregone that the U.S. and China will remain at the frontier of innovation indefinitely, it also is not clear which other countries might displace them or on what timeline. Overall, China’s economy likely will cool in the coming years relative to its blistering pace of growth in recent decades, but it is not likely to collapse.

DEEP INTERDEPENDENCE

At the same time, bilateral competition between the United States and China also is intensifying. Even so, rising bilateral friction has not – at least not yet – undone the deep interdependencies that have built up between the two powers over decades.

In the economic realm, trade and investment ties remain significant, even as both countries continue to take steps to limit vulnerabilities from the other. For example, Chinese regulators have been asserting greater control over when and where Chinese companies raise capital; Beijing’s recent probe of ride-hailing app Didi Chuxing provides but the latest example. China’s top leaders have been emphasizing the need for greater technology “self-sufficiency” and have been pouring billions of dollars of state capital into this drive. Meanwhile, U.S. officials have been seeking to limit American investments from going to Chinese companies linked to the military or surveillance sectors. The Security and Exchange Commission’s scrutiny of initial public offerings for Chinese companies and its focus on ensuring Chinese companies meet American accounting standards could result in some currently listed Chinese companies being removed from U.S. exchanges. Both countries have sought to disentangle supply chains around sensitive technologies with national security, and in the American case, human rights dimensions. U.S. officials have sought to raise awareness of the risks for American firms of doing business in Hong Kong and Xinjiang.

Even so, U.S.-China trade and investment ties remain robust. In 2020, China was America’s largest goods trading partner, third largest export market, and largest source of imports. Exports to China supported an estimated 1.2 million jobs in the United States in 2019. Most U.S. companies operating in China report being committed to the China market for the long term.

U.S. investment firms have been increasing their positions in China, following a global trend. BlackRock, J.P. Morgan Chase, Goldman Sachs, and Morgan Stanley have all increased their exposure in China, matching similar efforts by UBS, Nomura Holdings, Credit Suisse, and AXA. The Rhodium Group estimates that U.S. investors held $1.1 trillion in equities issued by Chinese companies, and that there was as much as $3.3 trillion in U.S.-China two-way equity and bond holdings at the end of 2020.

One leg of the U.S.-China economic relationship that has atrophied in recent years has been China’s flow of investment into the United States. This has largely been a product of tightened capital controls in China, growing Chinese government scrutiny of its companies’ offshore investments, and enhanced U.S. screening of Chinese investments for national security concerns.

Another area of U.S.-China interdependence has been knowledge production. As U.S.-China technology expert Matt Sheehan has observed, “With the rise of Chinese talent and capital, the exchange of technological know-how between the United States and China now takes place among private businesses and between individuals.” Leading technology companies in both countries have been building research centers in the other. Alibaba, Baidu, and Tencent have all opened research centers in the United States, just as Apple, Microsoft, Tesla, and other major American technology companies rely upon engineering talent in China.

In science collaboration, The Nature Index ranks the joint research between the two countries as the world’s most academically fertile. U.S.-China scientific collaboration grew by more than 10% each year on average between 2015 and 2019. Even following the global spread of COVID-19, American and Chinese experts collaborated more during the past year than over the previous five years combined. This has led to over 100 co-authored articles in leading scientific journals and frequent joint appearances in science-focused workshops and webinars.

China also is the largest source of international students in the United States. In the 2019-20 year, there were over 370,000 Chinese students in the U.S., representing 34% of international students in colleges and universities. Up until now, many of the top Chinese students have stayed in the United States following graduation and contributed to America’s scientific, technological, and economic development. It remains to be seen whether this trend will continue.

COMPETITIVE INTERDEPENDENCE

The scale of American and Chinese interests implicated will likely induce sobriety over time in Washington and Beijing as to how the relationship is managed. The U.S. policy focus for the foreseeable future is not likely to be seeking to “defeat” China or compel the collapse of the Chinese Communist Party. Rather, the focus will be on taking steps at home and with partners abroad to strengthen America’s long-term competitiveness vis-à-vis China. At the same time, American leaders will continue to push their Chinese counterparts to improve the treatment of their citizens. Such efforts are definitional to America’s self-identity as a champion of values.

The dense webs formed by trade, financial, scientific, and academic links between the United States and China will make it difficult for one side to inflict harm on the other without hurting itself in the process. As Joe Nye has written, “America can decouple security risks like Huawei from its 5G telecommunications network, but trying to curtail all trade with China would be too costly. And even if breaking apart economic interdependence were possible, we cannot decouple the ecological interdependence that obeys the laws of biology and physics, not politics.”

President Joe Biden likely will use the challenges posed by China as a spur for his domestic resilience agenda. He is not an ideologue, though, and is unlikely to limit his own flexibility by painting the world with permanent black and white dividing lines. The Biden team knows it will be harder to realize progress on serious global challenges like climate change, pandemics, and inclusive global economic recovery without pragmatic dealings with non-democratic states.

Major near-term improvements to the U.S.-China relationship are unlikely, barring an unexpected moderation in Beijing’s behavior. At the same time, the relationship is also unlikely to tip into outright hostility, barring an unforeseen dramatic event, such as a Chinese act of aggression against an American security partner.

U.S.-China relations are going to be hard-nosed and tense. Neither side is likely to offer concessions in service of smoother relations. At the same time, the balance of interests on both sides likely will control hostile impulses, placing the relationship in a state of hardening competition that coexists alongside a mutual awareness that both sides will be impacted — for good or ill — by their capacity to address common challenges.

#### Plan hurts US-China relations – means China goes back on it’s promise to regulate IP violations and draws in U.S. crackdown.

Shape 2/19 [Steven M. Shape; registered patent attorney and electrical engineer who has represented preeminent technology companies in complex, high-stakes Intellectual Property litigation; 2-19-2021, "IP Law Looms Large Over U.S.-China Relations," No Publication, [https://www.mondaq.com/trademark/1038030/ip-law-looms-large-over-us-china-relations //](https://www.mondaq.com/trademark/1038030/ip-law-looms-large-over-us-china-relations%20//) belle]

The U.S. and China were indisputably the two largest parties in the global trade war that consumed much of the last several years. Particularly between early 2018 and late 2019, it seemed as if one could hardly go a week, if that, without hearing something about tariffs, exports, imports, steel, soybeans, then-President Donald Trump, President Xi Jinping and the like. Accusations regarding violations of Intellectual Property law were among the biggest flashpoints, and ultimately, China announced new regulations concerning IP protection in November 2019 as a conciliatory move. Nearly 14 months later, newly inaugurated President Joe Biden has yet to fully clarify his administration's stance toward China. However, it is inevitable that IP rights and their preservation will factor into negotiations between the two economic giants. A look back at the proposed reforms (and their effects) Reports from CNN at the time claimed that China's prospective IP law reforms focused on making the penalties for IP infringement more strict. It would also put the government's increasingly modernized tech infrastructure to use in the discovery and prosecution of such crimes. Beyond that, the proposal carried few specifics. Although it is unclear whether Beijing's gambit worked as the deciding factor for Washington, it certainly did not fail. The two nations agreed in principle on "Phase One" of a new trade agreement December 12, 2019, per The Washington Post, and formalized the deal about a month later. The U.S. pledged not to impose further tariffs and roll back existing import taxes in return for China's IP reforms and agreement to buy American goods. In the 14 months that followed, so much changed. COVID-19's devastating impact on human life and the global economy made it difficult to gauge the positive effects of the tariff relief or IP reform. A report by the South China Morning Post found that China did not meet its import goal for 2020, with some analysts concluding the Phase One target was unrealistic. On the IP front, a Hong Kong news provider noted that Beijing had drafted some specific guidance to protect pharmaceutical patents, trade secrets and copyrights, but it was unclear how well they were being implemented. Additionally, a January 2021 report by the U.S. Patent and Trademark Office (USPTO) found that Chinese policies which offered subsidies for certain trademark and patent applications helped motivate a glut of fraudulent and bad-faith filings in the last few years. The bigger picture of China's IP law A casual observer or someone just learning of this issue might assume that until recently, China had little or no IP laws on the books. Of course, that is not true. However, there are many factors at play complicating the matter of Chinese IP protection policies. As noted in Harvard Business Review, China is quite strict in certain aspects of IP protection: Beijing allows (and encourages) all businesses to impose non-compete agreements to help protect trade secrets and other IP assets. In addition, according to the National Law Review, two new measures were passed in 2020 specifically to combat bad-faith trademark applications, in addition to the other new guidelines being imposed by the China National Intellectual Property Administration (CNIPA) in accordance with the Phase One agreement. All that said, it would be inaccurate to describe Chinese IP law as thoroughly protective for either domestic or foreign innovators. Along with the aforementioned trademark and patent subsidies, considerable controversy stems from "forced technology transfer" policies. According to the University of Oxford's Business Law Blog, foreign companies looking to do business in China must turn over their technology to local firms or be denied the right to operate within China. This effectively means turning over the blueprints (literal or otherwise) to such technology - which is all but equivalent to surrendering the IP. It creates considerable opportunities for infringement, fraud and corruption. Also, in disputes with foreign firms, some local IP courts still markedly favor domestic organizations. Chinese government representatives often resent such accusations of bias or corruption. In their view, the deals represent friendly agreements between businesses, and courts' decisions are not politically motivated. While Oxford noted that FTT guidelines are not as pervasive now as they were a few years ago, they have yet to disappear altogether. The Biden approach: Not dissimilar, but multilateral If the new U.S. Secretary of the Treasury, Janet Yellen, is to be believed, the Biden administration will not tolerate any signs of lapses in China's IP protections. "We need to take on China's abusive, unfair and illegal practices," Yellen said to the Senate Finance Committee at her confirmation hearings. As reported by Bloomberg, she added, "[China has] been stealing intellectual property and engaging practices that give it an unfair technological advantage, including forced technology transfers. And these . are practices that we're prepared to use the full array of tools to address." Biden had expressed similar sentiments during a December interview with The New York Times. However, he also said that they would work with ally nations to "develop a coherent strategy" for addressing cases of IP infringement and other issues - a stance Yellen echoed before the Senate - instead of taking China on in a unilateral and bellicose manner. This more nuanced approach could yield greater cooperation from Beijing and help repair U.S.-China trade relations, but we will likely not know one way or the other for some time. As we saw with the trade war, conflicts between the U.S. and China can quickly escalate and have ripple effects throughout the world. It would thus be wise for all organizations doing business in China to keep themselves abreast of the country's evolving IP regulations and work with a reliable IP services provider to help establish strong protection for their intangible assets.

#### Maintaining US-China relations key to confidence building, dialogue measures, and address mutual anxieties about nukes -- that prevents nuke war.

CSIS ’13 [CSIS (CSIS is a nonprofit organization headquartered in Washington, D.C. The Center’s 220 full- time staff and large network of affiliated scholars conduct research and analysis and develop policy initiatives that look into the future and anticipate change), March 2013, " Nuclear Weapons and U.S.-China Relations a way forward," Center for Strategic and International Studies, <https://csis-website-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/130307_Colby_USChinaNuclear_Web.pdf> // belle]

The United States has long seen China as a central factor in its strategy in Asia. Since the 1970s, U.S. policy has sought to encourage China’s economic reforms and development and to integrate China into the existing international political and economic order. While hopeful that China will develop into a constructive stakeholder, the United States and much of the Asia-Pacific region share continuing concerns about some aspects of China’s behavior that, it is feared, could undermine regional stability and U.S. interests in the Asia-Pacific.

Unfortunately, significant sources of tension and disagreement between the United States and its allies, on the one hand, and China, on the other, remain. These sources of discord could, in the worst case, lead to conflict. Needless to say, a large-scale conventional war between the United States and China would be incredibly dangerous and likely tremendously damaging. Nuclear war between the two would be devastating for all involved. Even though a conventional war between the two nations currently seems unlikely and nuclear war even more so, the possibility that war could break out, posing dramatic dangers and damage, clearly indicates that active steps should be taken to avoid conflict and successfully manage U.S.-China nuclear dynamics.

Significance and Objectives of U.S.-China Nuclear Relations

Maintaining stability in U.S.-China nuclear relations will be critical to the interests of the United States and those of its allies and security partners in the coming years. The Working Group judges that the nuclear dynamics between the United States and China are relatively stable at this time, primarily because both sides have or will soon have a nuclear deterrent of the size and scope they determine they need, and China appears committed to a relatively restrained posture oriented around a “lean and effective” nuclear force and its no-first-use policy. Yet the Working Group is concerned that the changing conventional military balance of power in the region, the current sources of tension and possible conflict, and the expansion of the quality and quantity of China’s nuclear arsenal raise serious questions about the future stability of U.S-China nuclear relations. The recommendations contained in this report are therefore focused on enhancing nuclear stabil- ity between the United States and China, primarily by advocating a series of both bilateral and unilat- eral policy and posture adjustments that would enhance crisis stability and arms race stability, while also laying the groundwork for future bilateral and multilateral nuclear engagement.

Because the current nuclear dynamics are broadly stabilizing and should be sustained, the Working Group recommends that U.S.-China nuclear relations be oriented toward sustaining these dynamics and avoiding decisions by either side that could erode stability. We therefore recommend a robust but realistically tailored program of engagement and dialogue on nuclear issues that reinforce China’s nuclear restraint and advance U.S. interests in stability, dialogue, transparency, and prog- ress toward arms control. The Working Group recognizes, however, the limited success attempts at dialogue and cooperation have thus far yielded. The Group’s recommendations are therefore de- signed to be ambitious but realistic, and are structured in such a way that, in the event that Beijing is unwilling to engage in earnest along the lines the Group advocates, the United States would be left with a powerful strategic capability and in the strong political position of having proffered a serious, fair-minded path forward in bilateral nuclear weapons relations that China had rebuffed.

The Working Group also recommends that the United States adopt a policy of accepting China’s possession of an assured second-strike nuclear capability, and thus avoid attempting to acquire the capability to negate China’s nuclear retaliatory capabilities. This judgment relies on the fundamental determination that the United States cannot realistically hope to deny China’s second-strike capability, that a failed attempt to deny it would be costly and counterproductive, and that Beijing’s possession of a reliable retaliatory capability promotes stability rather than detracts from it. In addition, this approach could reinforce China’s nuclear restraint. The Working Group is, however, divided on whether the United States should publicly and formally announce this acceptance.

The Working Group believes that some of the concepts associated with the idea of “strategic stability” provide an appropriate framework for U.S.-China engagement on nuclear weapons is- sues, although the specific meaning of the term is the subject of a long-running debate that has never been definitively settled. In order to gain the benefits of strategic stability, the Working Group believes that nuclear relations between the United States and China should emphasize two complementary approaches: crisis stability and arms race stability.

Stability can emerge between the United States and China if each fields forces that are capable of surviving a first strike and if each is able to credibly demonstrate to the other side that its cur- rent and future capabilities are not capable of denying the other side a viable strategic deterrent. As a result, fear of preemption and the need to launch weapons early become irrelevant, either as irri- tants in crisis or as dangers in conflict. In this way, the benefits of deterrence can be retained, while minimizing the chances of nuclear escalation and avoiding a competition in the development of offensive and defensive strategic arms that would intensify uncertainties for both sides.

Both sides could derive value from cooperation on nuclear weapons issues grounded in the stability concept. The United States worries about the composition of China’s nuclear force, China’s views on escalation and plans for nuclear use, and the future trajectory of China’s strategic posture. China, meanwhile, worries about the ability of the United States to deny it a second-strike capa- bility; the scope and sophistication of future U.S. nuclear, conventional prompt global strike, and missile defense programs; and U.S. unwillingness to acknowledge a condition of mutual vulner- ability between the two nations. A stability-grounded model could help address these anxiet- ies—on the U.S. side by providing greater insight into China’s current and future force structure and deeper insight into China’s ways of thinking about nuclear strategy, and on the Chinese side by providing similar insight into U.S. developments and a greater degree of assurance about U.S. acknowledgment of the survivability of the Chinese force. Concurrently, such an approach would have the added benefit of building confidence on both sides, thereby enhancing strategic trust more broadly. Finally, such a model could also provide a satisfactory way in which both nations could see something approximating their current force size, posture, and doctrine as satisfactory and compatible with stability.

### 3

**The United States federal government should:**

**- substantially increase production and global distribution of the COVID-19 Vaccine, specifically providing all necessary vaccines to developing nations**

**- cooperate with allies to achieve increased production and global distribution of the COVID-19 Vaccine.**