5. IP RIGHTS AND ECONOMIC ACTIVITY

Ready for the next revolution? Correlating readiness for the 4th Industrial Revolution and the protection of IP

Today's global economy is interlinked, interdependent, and open for business in a way that was impossible logistically, politically, or financially a generation ago. Indeed, the sum of the technological, cultural, political, and socio-economic changes of the past three decades amounts to what is truly a paradigm shift. In 1990, the Internet was not a commercially or publicly available entity. The Soviet Union, although crumbling, was still the world's second most important geopolitical bloc and one of its largest economies. The value of world trade in goods in 1990 was an estimated USD3.5 trillion.[20] Today, the value of global trade in goods is roughly 5 times that amount, and this is not counting trade in services, which has grown exponentially over the past two decades.[21] In 1990, it cost a residential U.S. AT&T customer USD5.53 to place a 3-minute long distance telephone call to Japan and USD4.61 for the same three minutes to Colombia.[22] Today, those calls can be made for pennies or for free over the internet. Just-in-time manufacturing and the use of international supply chains was not industry standard and the basis for much of modern commerce. Today, artificial intelligence is used everywhere from the cloud to autonomous vehicles to smartphones to the identification of cancer cells; nanotechnology and digital fabrication are applied in material and biomedical sciences; and quantum computing technologies enable Big Data analysis to be used on everything from drug development to market analysis to the prediction of consumer preferences.

These new technologies are already challenging "traditional" business models across the globe by increasing global integration of value chains and enhancing consumer engagement, customer expectations and experience, and product durability. They are also fundamentally changing production models by requiring extensive use of knowledge and skills, a complex infrastructure, and an enabling environment for R&D collaboration and investments. The sum of all these changes is what Professor Klaus Schwab—founder and executive chairman of the World Economic Forum—has termed the "Fourth Industrial Revolution." In Professor Schwab's words, not only are the technologies of the Fourth Industrial Revolution new but the speed at which change is happening is truly unique and characterized by "a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres."[23]

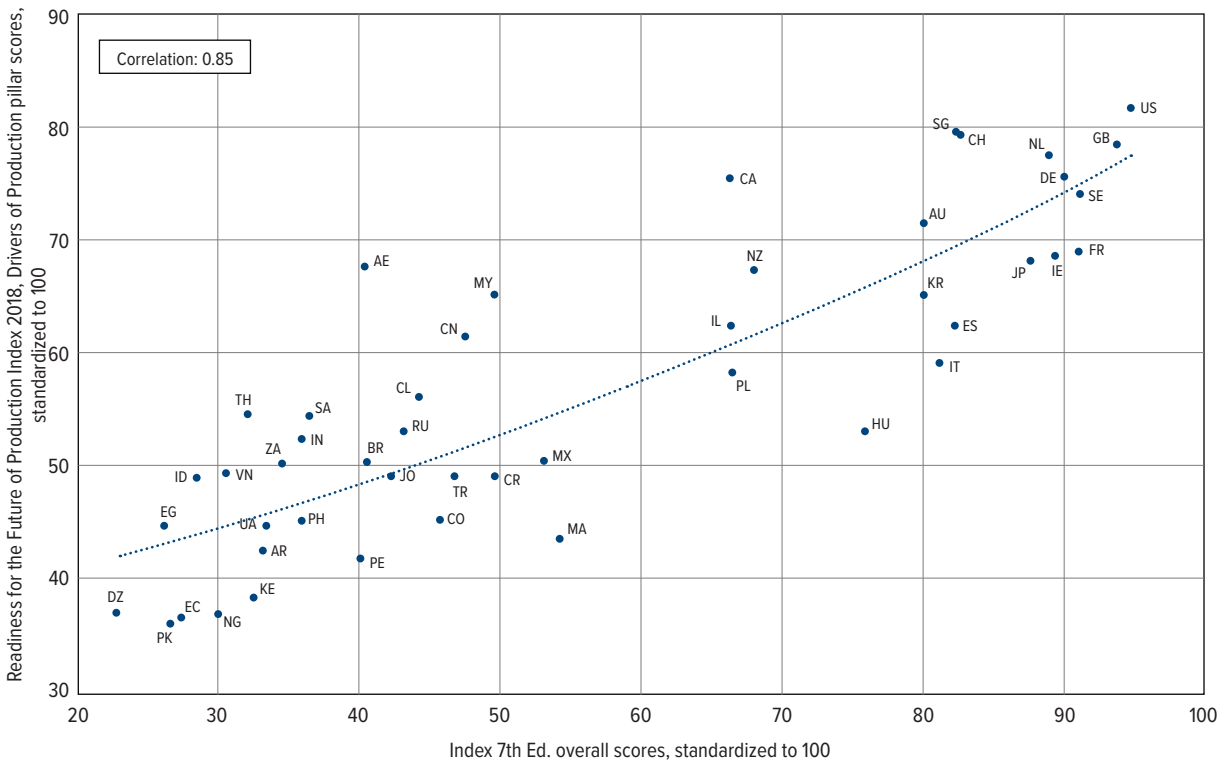
In the face of such upheaval, how do policymakers and governments around the world prepare themselves and their economies to succeed?

Last year, the World Economic Forum published the 1st edition of the *Readiness for the Future of Production Report*—a global metric covering 100 economies and comprised of 59 indicators that gauge economies' current production capabilities and the existence and levels of drivers of production that position economies to capitalize on the Fourth Industrial Revolution. These indicators—which together constitute a Readiness for the Future of Production Assessment" —include the overall quality of ICT and R&D infrastructure, innovation capacity, venture capital activity, international openness, and quality of human capital.[24] The Readiness for the Future of Production Assessment results reveal that some economies are better positioned to seize these opportunities and gain competitiveness in new data-driven, knowledge-intensive global value chains.

Over the past 4 editions, the Index's *Statistical Annex* has shown the strong, direct, and statistically significant relationship between IP protection and innovation—ranging from attractiveness to venture capital and R&D investments to a magnitude of innovative activities, outputs, and early adoption of technologies. It is therefore useful to explore the association between the overall strength of economies' IP environments and economies' preparedness for the future of production. Are economies with a stronger national IP environment more or less likely to succeed in the face of the Fourth Industrial Revolution?

Figure 7 shows the results of the correlation between overall Index scores and the overall results of the Readiness for the Future of Production Assessment.

Figure 7: Association between the Index scores and the Readiness for the Future of Production Assessment, Drivers of Production pillar scores[25]

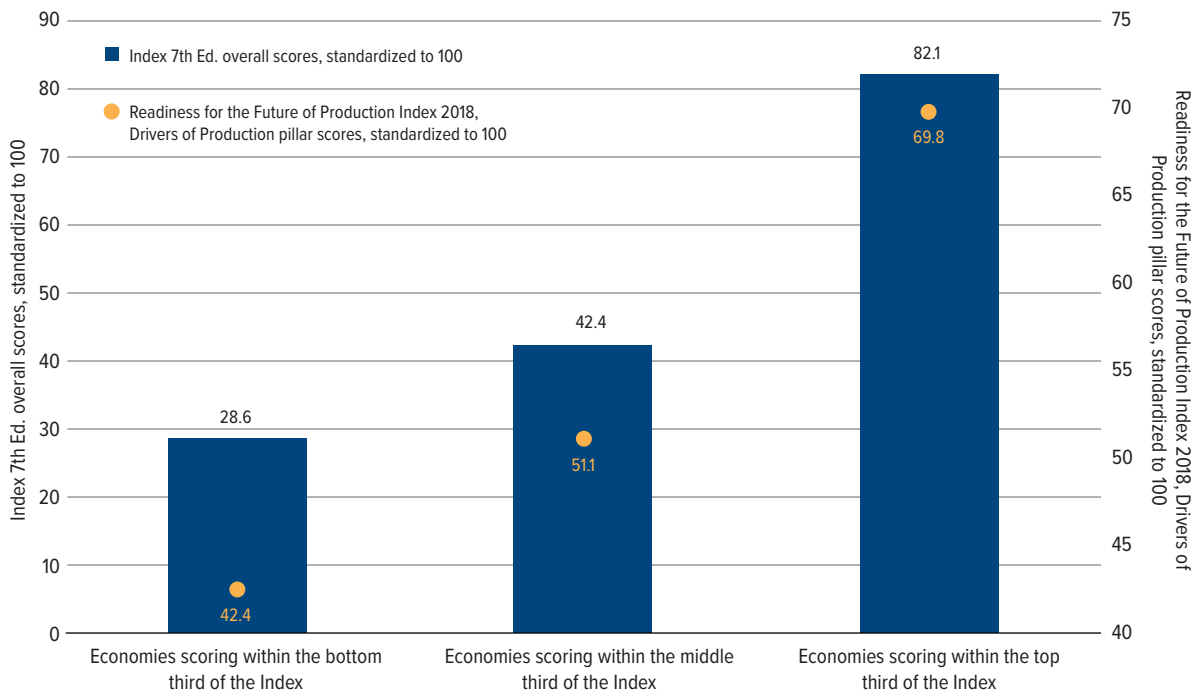


Sources: World Economic Forum (2018); Global Innovation Policy Center (2019)
Data NA for Brunei, Taiwan, and Venezuela

Inspiring Tomorrow

The Readiness for the Future of Production Assessment's Drivers of Production pillar scores—gauging economies' performance in key sectors and themes that enable economies to capitalize on emerging technologies in order to compete in future production systems—display a very strong association with the Index scores. Economies that are judged as being ready to compete and have success during the Fourth Industrial Revolution by and large also have strong national IP environments in place. In fact, a positive stepwise improvement can be seen across both measures. As Figure 8 illustrates, economies with robust IP environments (scoring in the top third of the Index) are on average 37% more likely to secure new growth opportunities and be ready for the Fourth Industrial Revolution compared with economies whose IP environments require improvement (scoring in the middle third of the Index). The economies with the most effective IP protection are in turn are 20% more competitive and better positioned for taking advantage of technological shifts compared with economies scoring in the bottom third of the Index.

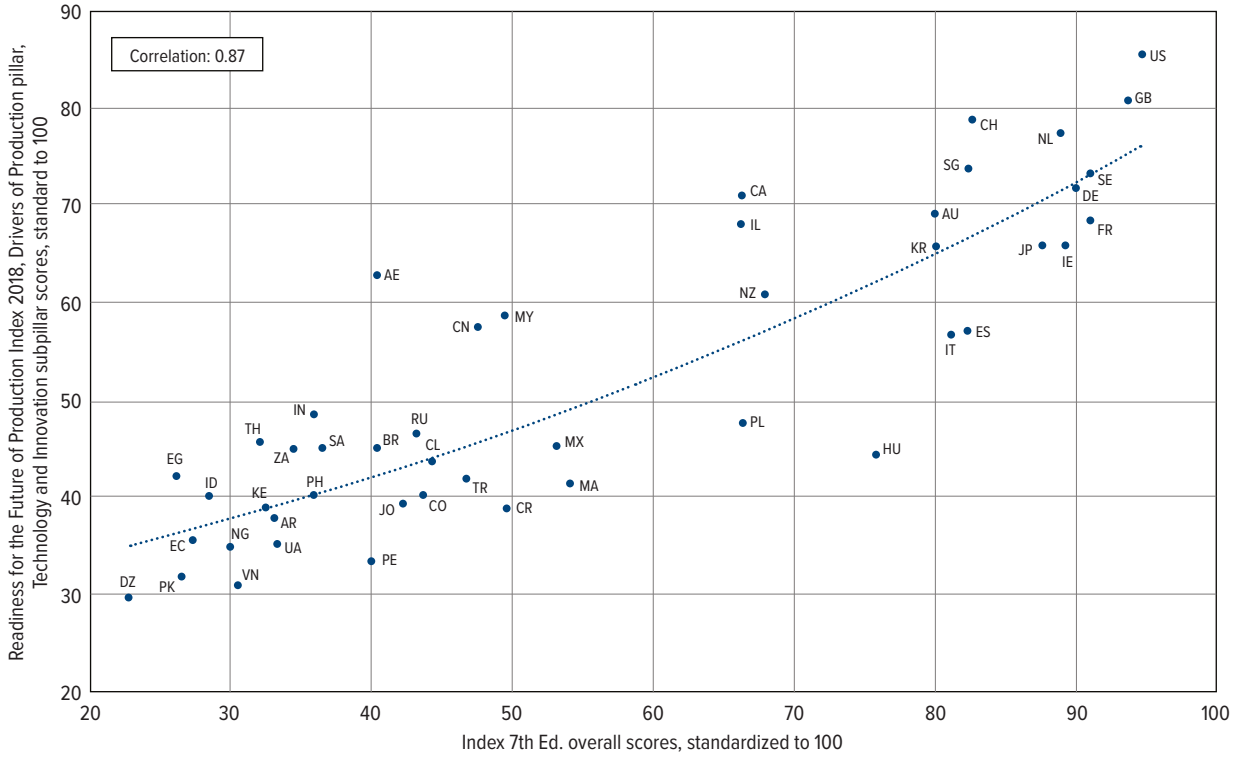
Figure 8: Association between the Index scores and the Readiness for the Future of Production Assessment 2018, Driver of Production pillar scores: Division by thirds in Index scores



Sources: World Economic Forum (2018); GIPC (2019)

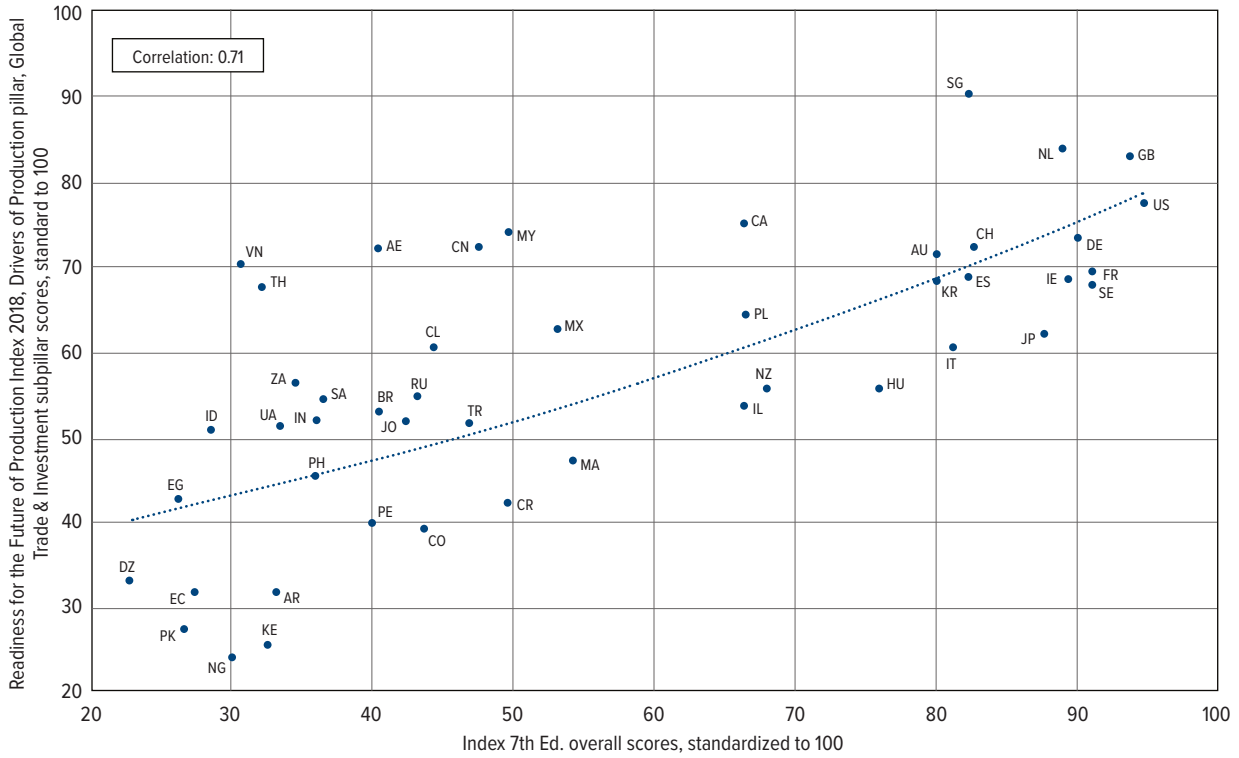
The strength of this relationship is also clear when looking at some of the subcategories of the Readiness for the Future of Production Assessment. For example, as Figures 9 and 10 show, regarding both the Technology & Innovation subpillar score and Global Trade & Investment subpillar score, there is a strong to very strong correlation between Index scores and scores on both subpillars.

Figure 9: Association between the Index scores and the Readiness for the Future of Production Index, Drivers of Production pillar, Technology & Innovation subpillar scores[26]



Sources: World Economic Forum (2018); GIPC (2019)
Data NA for Brunei, Taiwan, and Venezuela

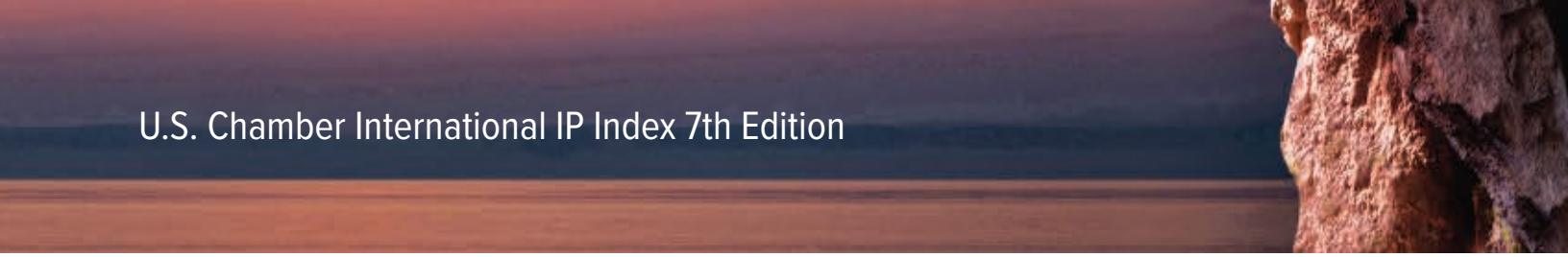
Figure 10: Association between the Index scores and the Readiness for the Future of Production Index, Global Trade & Investment subpillar scores[27]



Sources: World Economic Forum (2018); GIPC (2019)
Data NA for Brunei, Taiwan, and Venezuela

The Readiness for the Future of Production's Technology & Innovation subpillar measures how advanced, digitally secure, and globally connected and interoperable the production system is a critical element for economies' ability to foster and commercialize innovative technologies in their production systems. The Index shows a very strong correlation of 0.87 to the Technology & Innovation subpillar scores, indicating that economies' technological capabilities and capacity for innovation is strongly linked to the strength of their national IP environments. Similarly, the Readiness for the Future of Production's Global Trade & Investment subpillar, which measures economies' levels of openness to international trade and availability of capital directed to production-related development, shows a strong relationship (at a correlation strength of 0.71) to the Index scores.

Having examined the Fourth Industrial Revolution and its relationship to the Index scores, this section now shifts focus to a different set of sectors that together



constitute a growing share of global economic output: the creative economy.

Creative Economy Spotlight

Mapping the creative economy

Until recently, the concept of the creative economy was not broadly appreciated or studied. In both academic and policy circles there was a limited interest and understanding of the economic contribution of creativity and the growing importance of this sector. However, during the late 1990s and early 2000s, several works appeared that attempted to conceptualize, study, and understand the creative economy and its constituents.[28] In academia the most famous work is perhaps that by Richard Florida, who developed ideas about the links between thriving cities and rates of creativity, social tolerance, and culture in the early 2000s. Later, he and his research team sought to more systematically measure these traits at a national level in the Global Creativity Index.[29]

Similarly, during this time, governments began to more methodically analyze the creative economy and its contributions to national economic output. In 1998, the UK government's Department of Culture, Media and Sport (DCMS) published "Creative Industries Mapping Document 1998."[30] This document sought to understand the breadth and spread of the creative industries as well as their economic activity in the UK. The document emanated from the desire of the new Labour Government under Tony Blair to focus on the creative sector and industries, measuring performance as well as understanding what policies could be put in place to encourage further growth. The DCMS study was in many ways path-breaking and was replicated by governments at all levels around the world. Hong Kong, New Zealand, Singapore, and Australia all carried out similar exercises attempting to measure and quantify the size and contributions of the creative economy within their respective jurisdictions.

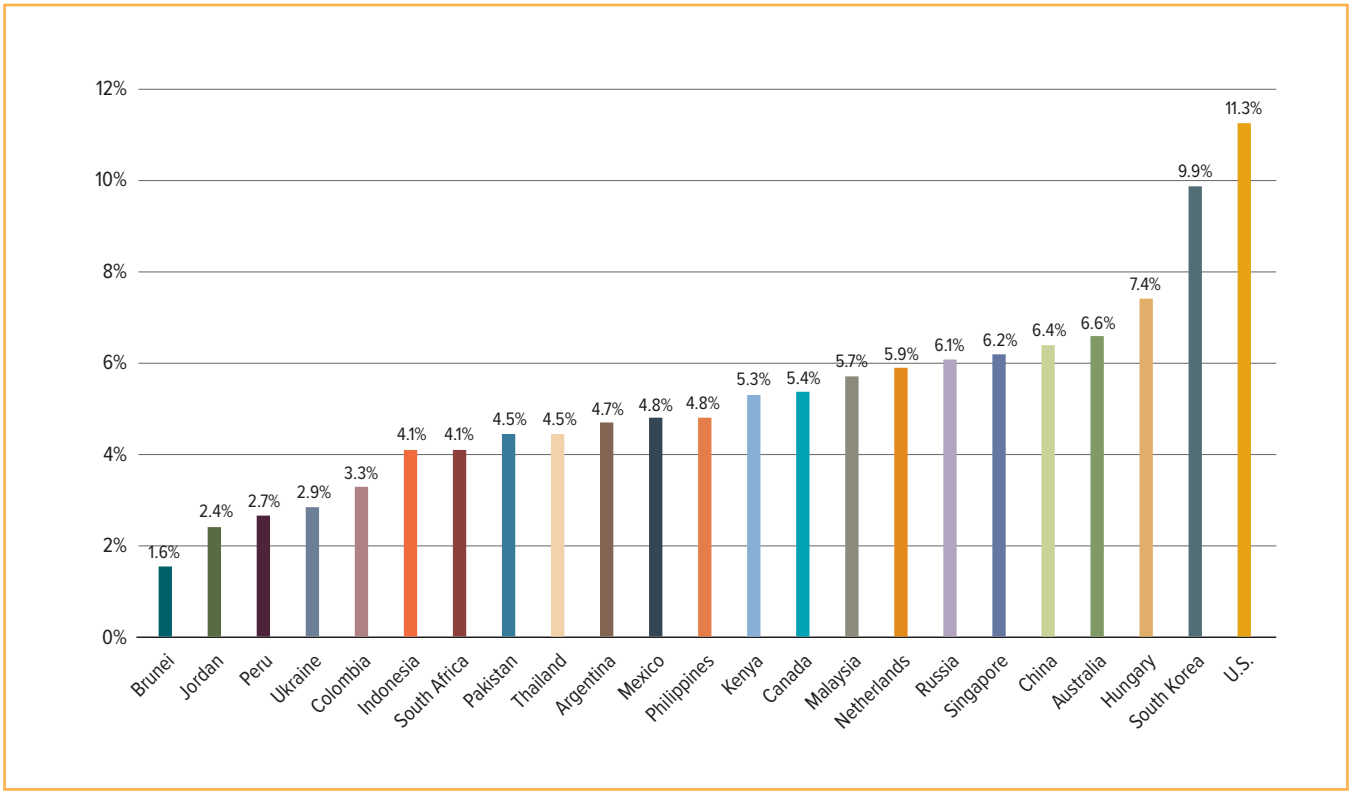
International institutions such as the United Nations Conference on Trade and Development and WIPO have also placed a greater emphasis on the study and definition of the creative economy over the past 2 decades. UNCTAD—which began focusing on the creative economy in the mid- to late 2000s—published the *Creative Economy Report 2008*, a comprehensive analysis of the creative economy from an international and economic development perspective.[31] This study was followed up in 2010 with the *Creative Economy Report 2010*, which updated much of the data used in the 2008 report and sharpened the focus on developing and emerging economies.[32] The latest edition in this series, *Creative Economy Outlook and Country Profiles: Trends in International Trade in Creative Industries*, was published in 2016.[33] In the early 2000s, WIPO began to study the creative economy but under the rubric of "copyright-based industries." In 2003, it published the *Guide on Surveying the Economic Contribution of the Copyright-Based Industries*, which was followed by several country-specific assessments of the economic contributions of these industries.[34] This Guide was revised and updated in 2015. So far, WIPO and member economies have produced studies in 42 economies, many of which are middle- and low-income economies.

Is the creative economy the economy of the future?

In its 2008 report, UNCTAD described the creative economy and the creative industries as a "leading component of economic growth, employment, trade, innovation and social cohesion in most advanced economies" and as "emerging high-growth areas of the world economy."[35] Similarly, WIPO described the creative economy, and specifically copyright, as "a powerful source of economic growth, creating jobs and stimulating trade."[36]

Looking at some of the major headline data affirms these statements, the size and value of the creative economy is perhaps best captured in its contribution to national GDP. While there are limitations with this measure—such as the lack of granularity regarding the exact composition of the creative economy in a given economy—it provides an easy-to-understand baseline. As mentioned, since the early 2000s, WIPO has helped a growing number of economies perform studies estimating the economic contribution of their domestic copyright-based industries to national GDP. It is clear from these data that the copyright industries make up a significant portion of national economic output around the world. Figure 11 shows the estimated percentage contribution of the copyright-based industries (as defined by WIPO) to GDP for the 23 Index economies for which WIPO studies have been carried out.

Figure 11: Percentage contribution of copyright-based industries to GDP, selected WIPO economy studies 2004–2013[37]



Sources: World Economic Forum (2018); GIPC (2019)
Data NA for Brunei, Taiwan, and Venezuela

What stands out in Figure 11 is the wide range of estimated contribution to GDP. On the one hand, in economies like South Korea and the U.S., the copyright industries are real engines of economic activity, accounting for roughly 10% of national output. Conversely, on the other end of the spectrum, economies such as Jordan, Brunei, the Ukraine, and Peru generate a much smaller share of their economic output from these industries. (As is detailed below, within this context the effective protection and enforcement of copyright and related rights play an important role in helping stimulate this activity. Economies with stronger copyright protection and enforcement tend, on average, to also see higher levels of creative outputs.)

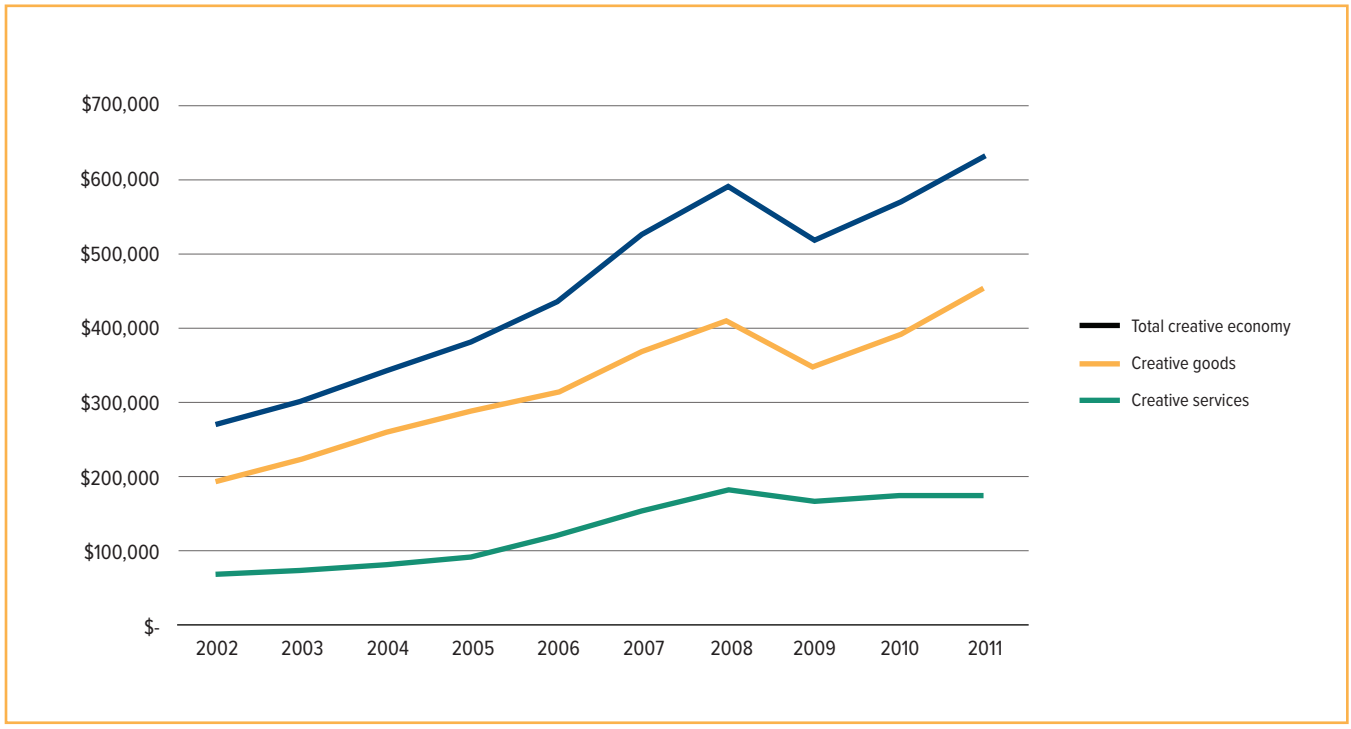
The importance of the creative economy is also illustrated by the strong growth in the international trade of creative goods and services. The most recent data from UNCTAD show how creative goods and services constitute a substantial—and growing—share of global trade. In 2015, UNCTAD estimated that the total value of creative goods—a category of goods that includes everything from clothes, furniture, and arts and crafts to video games, cinema, and books—exported globally was just under USD510 billion.[38] In 2002, this value was less than USD200 billion. Significantly, quite a few low- and middle-income economies have successfully built themselves into world-leading producers and exporters of creative goods. For example, in 2012, China exported over USD150 billion of creative goods, nearly one-third of the global total.[39] Impressively, this had grown from a base value of just over USD38 billion in 2003. Similarly, other economies, such as India, Taiwan, Thailand, and Malaysia, have also seen impressive growth during the same time period. Yet, digging a little deeper into these data, it is not clear if the majority of these goods entail a particularly high level of creativity or innovation. In China, for example, historically most creative goods exported are from the Design category of UNCTAD's goods classification. In 2012, this category amounted to more than USD105 billion of the over USD150 billion—70%—in total creative goods exported from China.[40] According to UNCTAD's classification system, Design is by far the largest category or subgroup of creative goods, containing 102 codes or types of goods.[41] Some of the most notable codes include Fashion, Interior, and Jewelry and include goods such as "handbags, belts, accessories … furniture (living room, bedroom, kitchen, bathroom), tableware, table linen, wallpaper."[42] Unlike for many other creative goods or services there is no clear evidence that the majority of these goods were *created* domestically or within the borders from which they were exported. Instead, it is likely that these goods were created in other economies but *manufactured* for export in these economies. Consequently, exporting a large amount of creative goods from the Design category is not necessarily indicative of high levels of creativity, technical complexity, or economic added value.

But what about creative services?

Measuring the trade in creative services is a relatively recent phenomenon. Creative services—as measured by both UNCTAD and WIPO—include services ranging from advertising and marketing to R&D services, engineering, recreational and cultural services, architectural services, and audiovisual services. While UNCTAD does not disaggregate or categorize creative services to the same detailed level as the creative goods category, the available data still offer good insight into the size and contribution of these services to global trade, especially when examined next to the data for creative goods. Unfortunately, as of 2012 UNCTAD no longer collects and publishes data on creative services. The latest year for which figures are available for both creative goods and services is 2011, when the total value of global trade in creative goods and services was an estimated USD631 billion.[43] While trade in creative services was growing rapidly—exports

of creative services had grown by close to 250% from a value of USD72 billion in 2002 to a total of over USD177 billion in 2011—the largest proportion of this global trade consisted of creative goods exports, which were valued at USD454 billion in 2011.[44] Figure 12 shows the growth of both creative goods exports globally and creative services between 2002 and 2011.

Figure 12: Values and shares of total creative economy, creative goods and creative services exports, annual, USD at current prices and current exchange rates in millions, 2002–2011[45]

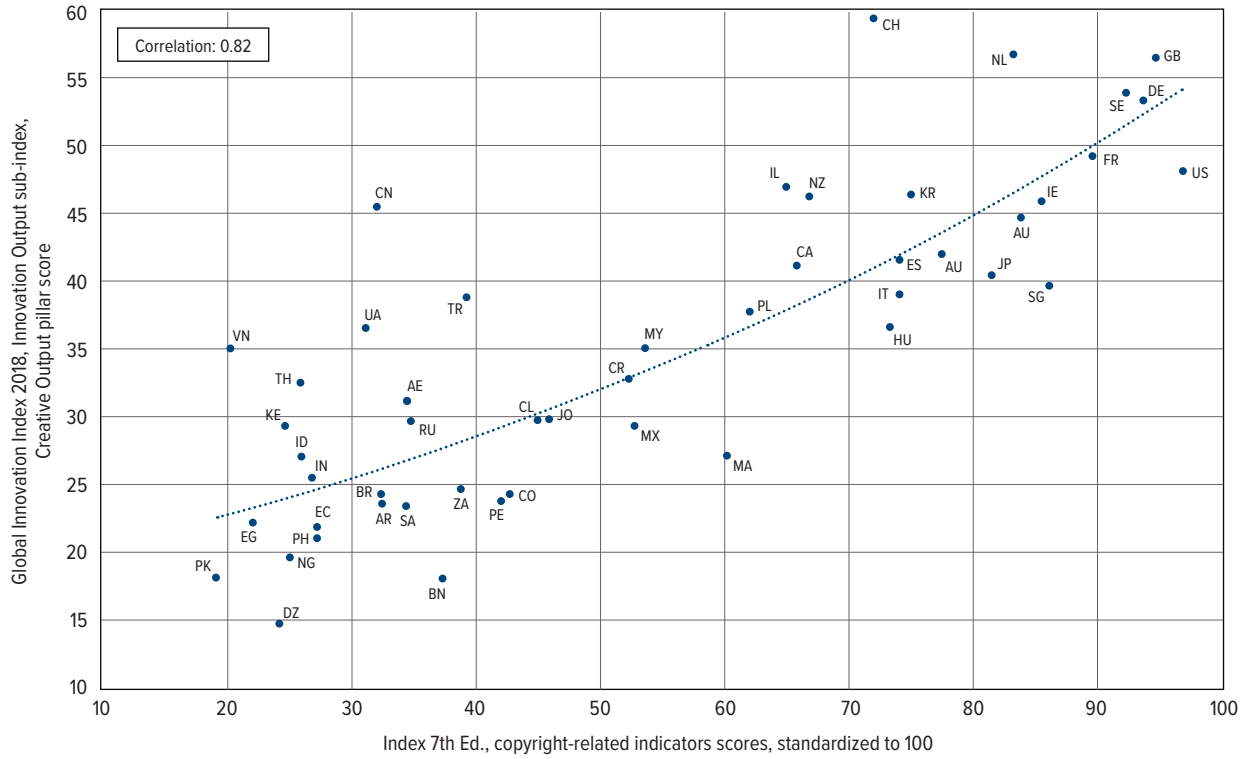


Source: UNCTAD statistics, Values and shares of creative goods, exports, annual, 2002–2011

Creative outputs and IP protection: A symbiotic relationship?

Since 2015, the Index's *Statistical Annex* has included several correlations examining the relationship between creative outputs and the strength of protection and enforcement for copyright and related rights. These correlations strongly suggest that the availability and application of copyright are critical to stimulating creativity and creative output. Figure 13 shows the relationship between the protection and enforcement of copyright and related rights and creative output as measured by the Global Innovation Index (GII). Creative outputs measured by the GII include exports of creative services, entertainment, media and ICT spending, and local creation of webpages and audiovisual content.

Figure 13: Association between Index copyright-related indicators scores and the Global Innovation Index, Innovation Output subindex, Creative Output pillar scores[46]

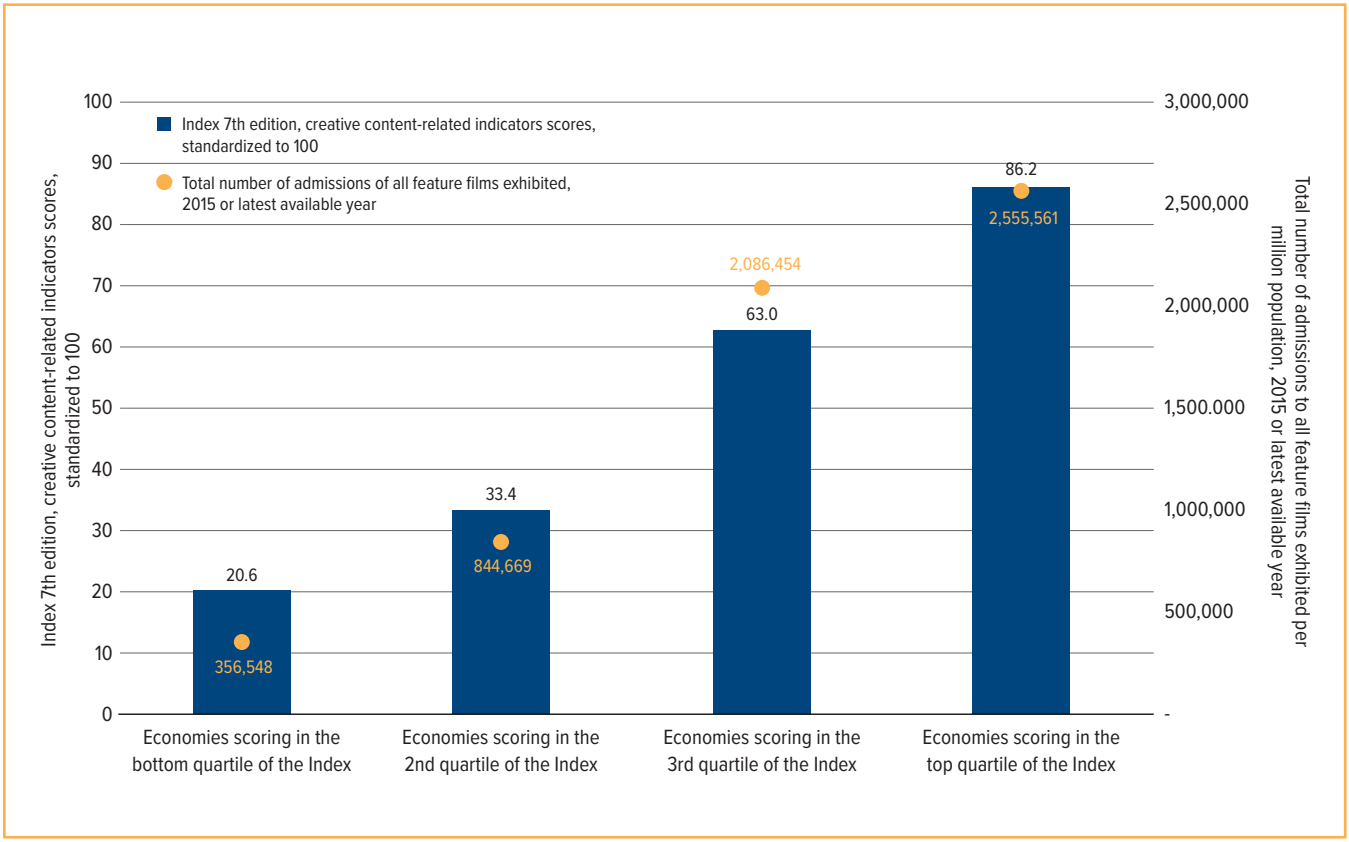


Sources: Cornell/INSEAD/WIPO (2018); GIPC (2019)
Data NA for Taiwan and Venezuela

As Figure 13 suggests, economies with a stronger IP environment tend also to see higher levels of creative outputs. Economies scoring above the median on the Index's copyright-related indicators are 64% more likely to see higher levels of creative outputs than economies scoring in the bottom half of the Index.

Rates of movie theater admissions and copyright protection show similar results. Economies where film content can be, and is, protected through copyright and related rights tend also to see higher per capita rates of theater admissions. Figure 14 shows the results of this correlation for 2019.

Figure 14: Association between Index creative content-related indicators scores and the number of admissions to all feature films exhibited per million population[47]

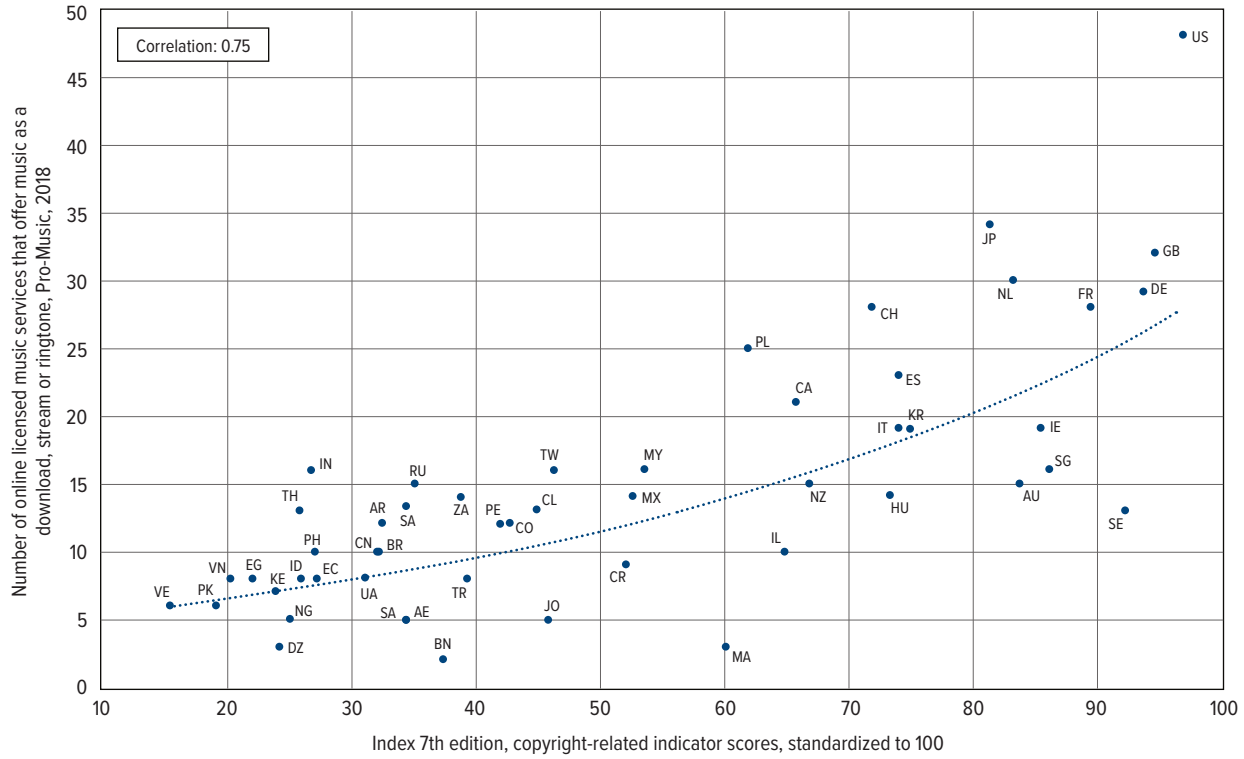


Sources: World Economic Forum (2018); GIPC (2019)

The Index creative content–related indicators scores display a strong correlation of 0.72 to theater screenings of feature films per million population. Consumers in economies in the top half of the Index are nearly 3 times more likely to go to a movie theater than consumers in economies scoring below the median.

Last, looking at the volume of legitimate online music outlets, there is a strong association between the protection and enforcement of copyright and related rights and the number of legitimate online music outlets. Figure 15 shows the results of this correlation for the 50 Index economies.

Figure 15: Association between the Index copyright-related indicators scores and volume of licensed online music services[48]



Sources: Pro-Music.org (2018); GIPC (2019)

As Figure 15 shows, there is a strong correlation of 0.75 between Index copyright-related indicators scores and the number of online licensed music services as measured by Pro-Music.org, indicating that access to legitimate music content and streaming services is greater where robust IP policies, specifically strong copyright protection, are in place.

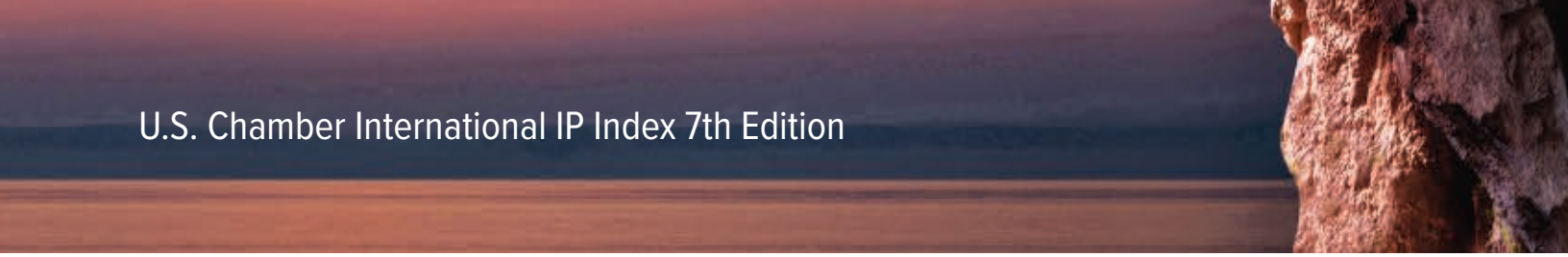
Getting in the way: How barriers to licensing are holding back innovation and economic activity

This year, the Index includes 3 new indicators relating to the commercialization of IP assets. The new metrics measure barriers to technology transfer (indicator 26), registration and disclosure requirements of licensing deals (indicator 27), and direct government intervention in setting licensing terms (indicator 28). These three indicators replace what was a larger indicator (indicator 25) in previous editions. These new indicators allow us to better examine more facets of the environment for technology transfer, licensing, and the commercialization of IP assets in a given economy.

Driving innovation: Tech transfer and licensing

New technologies can contribute to economic activity only if they are successfully developed into real-life, useful products that can be commercialized in the marketplace. A brilliant invention or technology that sits on the proverbial shelf is unlikely to be economically productive. Technology transfer and licensing are critical mechanisms for commercializing and transferring research from public and governmental bodies to private entities and private-to-private entities for the purpose of developing usable products and commercially available technologies. They also provide a significant and distinct contribution to the economic strength and well-being of the economies in which they take place. For universities and public research organizations the transfer process enables them to obtain access to commercial research funds, state-of-the-art equipment, and cutting-edge technologies, while allowing industry to benefit from the extensive knowledge and ingenuity of academic researchers. For less developed economies, international licensing of technology can provide the basis for local technological development and building a more sophisticated absorptive capacity. Global technology flows and the commercialization of IP assets are thus crucial drivers of innovation. Through licensing, technology is transferred to other actors (public and private) and eventually to the public in the form of new products. In other words, licensing facilitates technology diffusion by making usable technologies and content widely available. However, licensing and technology transfer rely on a supportive and efficient regulatory environment and IP frameworks that minimize red tape, facilitate market-based partnerships, and uphold the integrity of partnerships.

Many governments—in developed and developing economies alike—understand this and dedicate significant resources to enhance innovation and technological development and transfer. Innovation-led growth is a strategic and, in many cases, existential goal for many economies. In the Gulf, both **Saudi Arabia** and the **UAE** are betting on becoming 21st century knowledge-intensive, high-tech economies in order to reduce their dependency on oil. **Turkey** has set a target of becoming 1 of the 30 most innovative nations by 2023.[49] **Malaysia** has recognized the capacity to translate innovation into wealth as one of the game changers needed to achieve high-income status by 2020.[50] Similarly, **Colombia** aims to become 1 of the 3 most competitive economies in Latin America by 2032 through exporting high-added-value goods and innovation.[51] The BRIC economies have all made innovation-driven growth a strategic priority. In **Brazil**, several important government institutions and agencies, such as the Brazilian Development Bank and the Brazilian Innovation Agency, have been supporting innovation and investment in Brazil since the 1970s and successive governments have promoted innovation laws and national policies.[52] Similarly, both **India** and **Russia** have launched general and sector-specific initiatives. Perhaps most ambitious of all is **China**. Over the past 2 decades, China has made massive gains in terms of its science, technology, and innovation capacity, and is today the world's number 1 producer of undergraduates with degrees in science and engineering.[53] Among more mature economies, innovation is central to economic policy. For decades, innovation has been at the top of the EU's policy



agenda, first with the Lisbon Agenda and more recently with initiatives such as Horizon 2020 and Innovation Union. Similarly, in the U.S., support for innovation has been part and parcel of government policy for decades both at the federal and state levels. In Asia, too, innovation-driven growth is an integral part of public decision making, with perhaps the best examples being in **South Korea**, **Singapore**, and **Japan**.

Yet, in many respects, economies are failing to provide the necessary regulatory and IP-specific infrastructure to help incentivize and better facilitate domestic and cross-border licensing and technology transfer. In some cases, governments are doing the exact opposite by imposing new and additional hurdles and barriers. The purpose of the three new licensing and technology transfer indicators added to the Index this year is to attempt to better measure and quantify these barriers.

Unleashing or impeding technology diffusion?

One of the most significant barriers to all facets of licensing and technology transfer—domestic and cross-border—is direct government intervention and setting of licensing terms. Such intervention consists of a centralized, top-down approach that seeks to mandate when and how licensing and technology transfer take place. These interventions can involve burdensome and costly administrative procedures or comprise legal rules and policies that discriminate against rights holders. The manner and extent of these interventions vary from economy to economy, but they often involve the mandatory disclosure and review of all licensing agreements by a government authority. Usually, this review includes setting contractual terms (including royalty rates) and, in some cases, coercing licensors into sharing their technology with local partners.

Arguably, no economy is more concerned with technology transfer and generating domestic innovation than **China**. But China's model has diverged from international standards through direct government intervention and the use of coercive licensing and other barriers. As noted, rights holders in China face a growing number of regulatory and procedural barriers and inflexible terms to licensing that impede technology flows and R&D cooperation. In general, licensing agreements must receive government approval. In addition, China restricts the ability of foreign IP rights holders to freely negotiate market-based contractual terms in licensing and other technology-related contracts concerning the transfer of technology to China. The Technology Import/Export Regulations involve discriminatory conditions for foreign licensors. The regulations include indemnification of Chinese licensees against third-party infringement and transfer of ownership of future improvements on a licensed technology to the licensee, whereas a Chinese IP owner can negotiate different terms. This restricts the ability of foreign companies to negotiate licensing and technology contracts on market terms and to fully commercialize their technology in China. Under the Joint Venture regime, licenses and tech transfer contracts cannot last more than 10 years, after which the licensee retains the right to use the transferred technology, although this might still be under a term of exclusivity. More recently, the Working Measures for Outbound Transfer of Intellectual Property Rights, which were adopted in 2018, tighten the scrutiny on outbound transfer of technology and IP. Both the U.S. and the EU have filed complaints with the World Trade Organization (WTO) against China over its technology licensing practices.

Like China, **Indonesia** has in place substantial barriers to both licensing and technology transfer. While investment and technology transfer have become a clear priority for the Indonesian government over the past several years, it has largely relied on restrictive measures that have made the investment climate increasingly complex and difficult. In 2016, the Indonesian Parliament (People's Representative Council) passed a new wide-ranging patent law (Law 13 2016). While aiming at strengthening Indonesia's innovation infrastructure and encouraging more high-

tech economic development through the creation and use of new technologies, overall, the law did not improve what was already a challenging patenting environment. Article 20 of the law seemed to make the granting of a patent conditional on localizing manufacturing and/or R&D in Indonesia. Specifically, it mandated that all patent rights holders "make" the patented product or process within Indonesia. Subsection (2) of this article stated that this production should support Indonesia's industrial and development policies, specifically the "transfer of technology, investment absorption and/or employment." No further details were provided about the meaning or legal definition of "make" in this context. In July 2018, the government published long-awaited Patent Regulations aimed at explaining what Article 20 means in practice. While maintaining these localization requirements, the new regulations do provide the possibility of indefinitely postponing them. More broadly, in 2014, Indonesia adopted a new industrial law (3/2014) aimed at fostering growth by developing local production capabilities. The law specifically targeted the localization of production, use of domestic products, implementation of national standards, and greater power to restrict imports and exports. Additionally, a comprehensive trade law (7/2014) passed in 2014 reiterated the top-down approach to achieving investment. The law outlined the government's broad powers to oversee trade in order to protect domestic interests. Protective measures in place spanned from requirements to partner with Indonesian companies to local content and technology transfer requirements, restrictions on imports and exports, and equity ownership limitations in certain sectors.

The biopharmaceutical sector has arguably been the most drastically targeted by the Indonesian authorities. Decree 1010/2008 requires companies to set up a manufacturing plant or partner with an existing local manufacturer and transfer know-how and other commercially sensitive information in order to receive market authorization. In addition, products with patent expirations of more than 5 years (or off-patent products that have been imported into the country for more than 5 years) must be produced locally. Under Decree 1799/2010, the manufacturing requirement was relaxed slightly, permitting domestic labeling and packaging activities to qualify as domestic production, but recent actions, including the local content policies as part of health system and procurement reforms, have created more uncertainty. As a result, these localization policies heavily influence the technology transfer and licensing environment, and there are considerable barriers to the practical execution of licensing agreements and effective technology transfer for foreigners as well as Indonesians. To begin with, to be valid and legally recognized, licensing agreements for all major IP rights must be registered with the Indonesian IP authorities. As part of this registration, rights holders must submit the fully executed licensing contract. Unless registered with the relevant authorities, licensing agreements have no legal standing vis-à-vis third parties. All licensing agreements are also subject to review by the Indonesian authorities. Article 78 of the Patent Act is clear that any licensing agreement should not adversely affect the Indonesia economy or national interest. Failure to fulfill these criteria will result in the authorities refusing registration, thereby rendering the agreement legally void and unenforceable versus third parties. Last, unlike most other jurisdictions, Indonesia requires the registration of licensing agreements regarding trade secrets. Despite their inherently confidential nature, the licensing and licensed transfer of trade secrets are subject to the same requirements as all other IP rights, including registration and official publication.

Like both China and Indonesia, **Nigeria** has in place significant barriers to both technology transfer and licensing activities. The National Office for Technology Acquisition and Promotion oversees all technology transfer and licensing between Nigerian entities and foreign licensors. The agency has the power to evaluate and approve or disapprove technology transfer

agreements, including evaluating royalty amounts. The agency, for example, sets and approves royalty rates for all major forms of IP licensing. Royalty rates vary from 0.5% up to 5% of net sales depending on the technology and type of IP right. Furthermore, Section 23(6) of the Patents and Designs Act provides a broad and unclear remit for the Nigerian government to cancel any foreign royalty payments and licensing contracts on the ground of national interest and economic development.

Other economies also have in place substantial hurdles for licensing activity.

Like other member states of the Andean Community trading bloc, **Ecuador**'s IP laws are subject to decisions made by the Community. Andean Decision 291 provides an overview of requirements for licensing technologies. Article 12 states that the respective national authorities must record and evaluate all licensing activity. Specifically, Community members shall "evaluate the effective contribution of the imported technology by estimating the probable profits or the price of the goods that incorporate technology, or through other specific methods of quantifying the effect of the imported technology." As a fellow Andean Community member, **Colombia** also has in place substantial barriers to licensing and technology transfer, including government review of licensing contracts and terms and conditions.

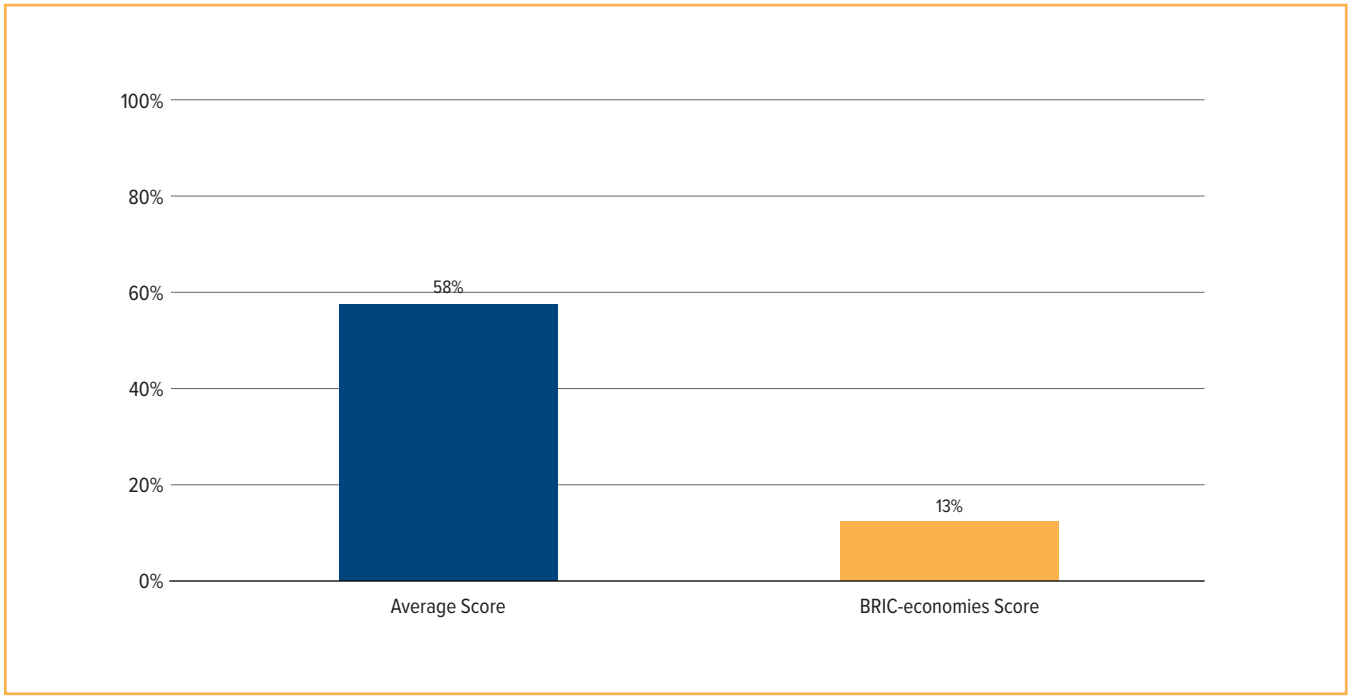
How do we measure barriers to licensing? Case study: Registration requirements for licensing deals

Fundamentally, the new Index indicators relating to licensing and technology transfer seek to investigate the degree to which the rules and regulations in a given economy impede and place a restriction on licensing parties' economic freedom and freedom to operate. As described above, this can range from direct government regulation of licensing terms to registration and disclosure requirements of licensing transactions. Looking at the latter, a surprisingly large number of economies require licensing agreements to be recorded and registered with national IP offices. The reasons for this requirement vary, ranging from the relatively innocuous, whereby registration and recording is a way of ensuring third-party awareness and clarity on legal licensing rights in case of future disputes, to the more intrusive, whereby registration requirements are part of a broader effort of governments to impose control and direct oversight of licensing terms. Registration requirements are not contingent on or related to an economy's overall level of development; both developed OECD economies and emerging markets have these requirements in place.

To measure and provide a quantitative score on this indicator, the Index examines the extent to which registration requirements impose a burden on or act as a barrier to the licensing parties. The most intrusive requirements are when full licensing terms and agreements must be disclosed, and governments retain the right to review, approve, and/or amend contractual terms. In other cases, there is a registration requirement and either the entire executed contract or critical aspects of it, including potentially commercially confidential information such as royalty rates, must be disclosed. In other cases, the registration requirement is fairly straightforward and requires minimum documentation or disclosure of contractual terms.

Looking at the 50 economies sampled in the Index, the vast majority have in place some form of registration requirement—only 9 out of the 50 economies mapped did not have a registration requirement in place. But most economies do not have overly burdensome registration requirements. However, there are some important exceptions. For instance, comparing the average score of the BRIC economies with the total economy sample shows just how significant and intrusive existing requirements are. Figure 16 shows the average percentage score on this indicator for BRIC economies versus the average score for all other economies.

Figure 16: Registration and disclosure requirements of licensing deals, average score all other economies and average score BRIC economies (indicator 27)



Impeding licensing: Does it really matter?

Impeding licensing activity is not cost-free. Just like with other impediments to the protection of IP, the restriction of licensing hurts all parties, from licensors to licensees to the domestic economy in which the licensing is being restricted. The purpose of this subsection is to look at some of the international data on licensing flows. What does empirical evidence indicate about the impact of technology diffusion regimes that seek to manipulate the licensing process and prioritize local entities, and ones that make licensing overly difficult or insecure? Have these controls on licensing led to increased rates of diffusion of technologies?

International in-licensing rates

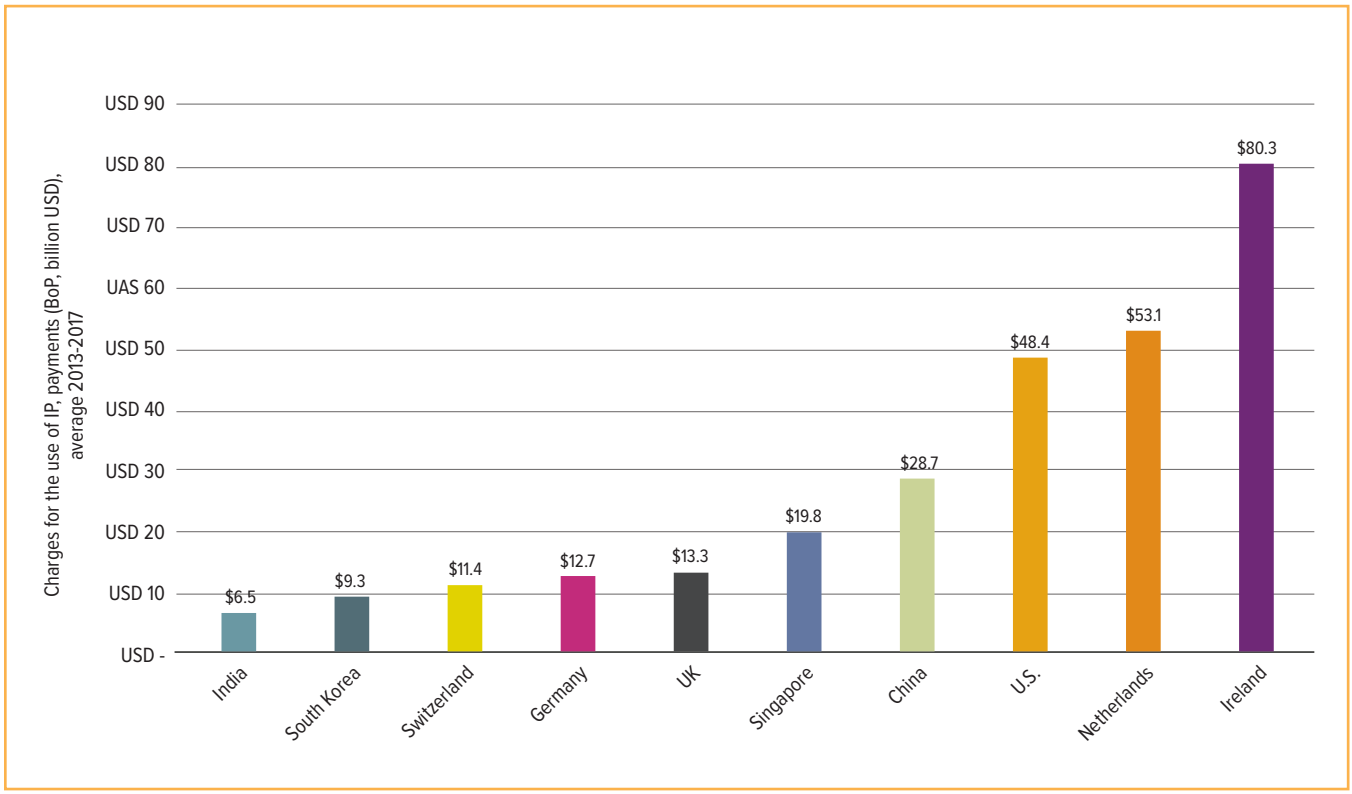
One proxy for technology flows, particularly of the most high-value assets, is to look at rates of international trade in charges for the use of IP (including royalties and license fees). Various measures exist, but one measure that captures inflows of technology and different types of IP assets is the World Bank's indicator on payments by residents to nonresidents for the use of IP rights.[54] The World Bank defines these charges for the use of IP as

> "payments and receipts between residents and non-residents for the authorized use of proprietary rights (such as patents, trademarks, copyrights, industrial processes and designs including trade secrets, and franchises) and for the use, through licensing agreements, of produced originals or prototypes (such as copyrights on books and manuscripts, computer software, cinematographic works, and sound recordings) and related rights (such as for live performances and television, cable, or satellite broadcast)."

The statistics are based on the International Monetary Fund's *Balance of Payments Statistics Yearbook* and data files. These charges thus include all manner of IP rights that could and are licensed internationally. While other global and economy-specific measures exist (some of which complement this analysis and are used below), the World Bank's data provide consistent and global coverage, making them a relatively good proxy for levels of technology transfer and licensing activities.

Like with all data, there are a few important caveats to bear in mind. First, the World Bank's data do not provide a breakdown on the type of IP or licensing agreement. They do not show the specific types of IP rights being licensed and transferred. Second, the total value of licensing, which does not necessarily reflect volume, is measured. In some cases—and economies—very high-value one-off licensing transactions can thus potentially skew numbers. Last, in terms of economy coverage, data are available for only 26 of the 50 Index economies. Still, despite all these caveats, these data do provide a good proxy and approximation of global in-licensing flows.

Figure 17: Charges for the use of IP, payments (Balance of Payments billion USD), average 2013–2017, select Index economies, World Bank



Source: World Bank (2018)

To begin with, it is worth looking at the overall levels of licensing flows globally and the top destinations. Overall total payments for the use of intellectual property in the 26 Index economies measured has increased substantially over the past half-decade, from just under USD250 billion in 2013 to just under USD320 billion in 2017, an increase of 29%.[55] Figure 17 shows the total value in aggregated overall payments (in billion USD) for the use of intellectual property on a rolling average between 2013 and 2017 for the top 10 economies out of the 26 Index economies sampled.

As Figure 17 shows, of the 26 Index economies sampled, Ireland, the Netherlands, and the U.S. are the largest recipients on an aggregated basis for licensed technology. Together these 3 economies make up almost 60% of the total value of all 26 Index economies. The strong performance of smaller economies (in addition to Ireland and the Netherlands) such as Singapore and Switzerland also stands out. Despite their relatively small size—in terms of both population and economic output—these economies are highly integrated into the global economy and benefit from high rates of in-licensing. But these are total aggregated figures that have not been standardized for population to show the actual intensity of licensing taking place. For example, as the world's 2nd largest economy, China is in 4th place with just under USD30 billion on an aggregated basis. Yet, as Table 5 shows, adjusted on a per capita basis China's performance is much weaker.

Table 5: Charges for the use of IP, payments (BoP, million USD), avg. 2013-2017 per million population (avg. 2013-2017), select Index economies, World Bank

Ireland	$14,580.85	Thailand	$61.05
Singapore	$3,760.52	Argentina	$50.70
Netherlands	$2,757.76	Malaysia	$47.50
Switzerland	$1,504.92	Russia	$45.82
Sweden	$360.47	South Africa	$34.32
South Korea	$192.71	Brazil	$25.34
UK	$183.23	China	$17.25
Hungary	$176.57	Colombia	$10.18
Australia	$151.24	Indonesia	$6.85
Israel	$138.08	Ecuador	$4.77
US	$132.99	India	$3.93
Germany	$131.25	Egypt	$2.61
Chile	$86.17	Mexico	$2.07

As Table 5 illustrates, when adjusting for population and measuring the actual intensity of in-licensing activity, the most licensed-to economies are the smaller ones: Ireland, Singapore, the Netherlands, Switzerland, and Sweden.

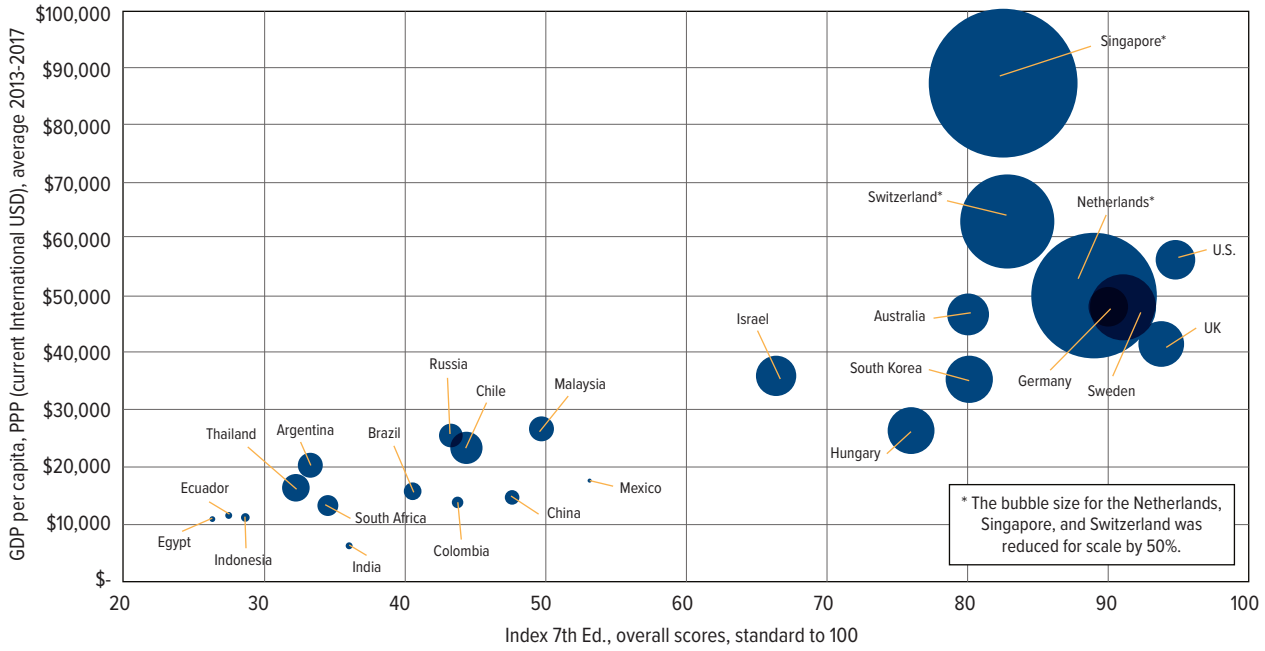
What explains this?

As with all types of economic activity there is never one explanation. There are a multitude of different drivers and factors affects decisions on licensing a given technology into any jurisdiction. These factors range from the micro and firm level—does the given licensor have a commercial interest or pre-existing affiliation in a given jurisdiction?—to the macro, where market size, consumer purchasing power, and ease and attractiveness of doing business are among the chief considerations. For example, the Irish economy has transformed itself over the past two decades into a high-tech hub and home to some of the world's leading technology and innovation-based companies. Among other factors, including high levels of human capital and EU membership, Ireland also has a highly attractive corporate tax regime.

Yet, looking at this from the Index's perspective, what stands out is that many of the most attractive economies have strong national IP environments and achieve high scores on the Index. Figure 18 seeks to better examine this relationship. It looks in more depth at licensing rates in comparison to economies' overall IP environment as measured by the Index and income level as measured by GDP per capita at purchasing power parity (PPP).[56]

Looking at Figure 18, a few things stand out. First, economies with the highest rates of in-licensing activity (as represented by the size of bubbles) are also those that achieve high overall scores on the IP Index. As mentioned, economies like Ireland, Singapore, the Netherlands, the U.S., Germany, Sweden, and Switzerland all have high levels of per capita in-licensing and also have strong national IP environments. Conversely, despite their market size and strong economic growth, economies such as China, Brazil, Mexico, Indonesia, India, Russia, and Argentina have much lower levels of per capita in-licensing and also substantially weaker IP environments. Of note is that per capita income does not seem to be the driving factor in determining rates of in-licensing activity. For example, economies such as Hungary and Israel have rates of per capita incomes comparable to lower-performing economies such as Malaysia, Chile, and Russia, which all have per capita incomes at PPP between USD20,000 and USD25,000. Yet their national IP environments, as measured on the Index, are far weaker.

Figure 18: In-licensing rates, in relation to national IP environment, and income: Index 7th edition overall scores versus GDP per capita average 2013–2017, USD PPP; bubble size displays charges for use of IP, payments per million population (average 2013–2017)



Sources: World Economic Forum (2018); GIPC (2018)
Data NA for Brunei, Taiwan, and Venezuela

Digging deeper: Examining international licensing through the lens of American multinationals

As mentioned above, a major drawback of the World Bank's in-licensing data is that they are not broken down by type of IP right, nor do they provide details of the affiliation of the licensing parties.

Why is this important?

To begin with, understanding what types of IP rights are being licensed into a given economy provides insight into the level of technology and know-how the licensor is willing to share. Licensing the use of an established brand and trademark is different from licensing the use of an industrial process or manufacturing method through a patent or trade secret. The more valuable and difficult to protect the IP, the more circumspect licensors are likely to be regarding where and to what entities they are willing to license the use of their IP. All other things being equal, it is fair to assume that if a country has a weaker national IP environment and high regulatory and administrative barriers to entry, then there is an accompanying higher risk of licensed IP being infringed, misappropriated or, in the case of trade secrets, revealed. Because of this, licensors will be less likely to engage in licensing

activity with that given entity or in that given jurisdiction. Conversely, where protection is stronger and there is less risk that the licensed IP will be infringed, misappropriated, or misused, there is a stronger base for licensors to engage.

What does the evidence available suggest?

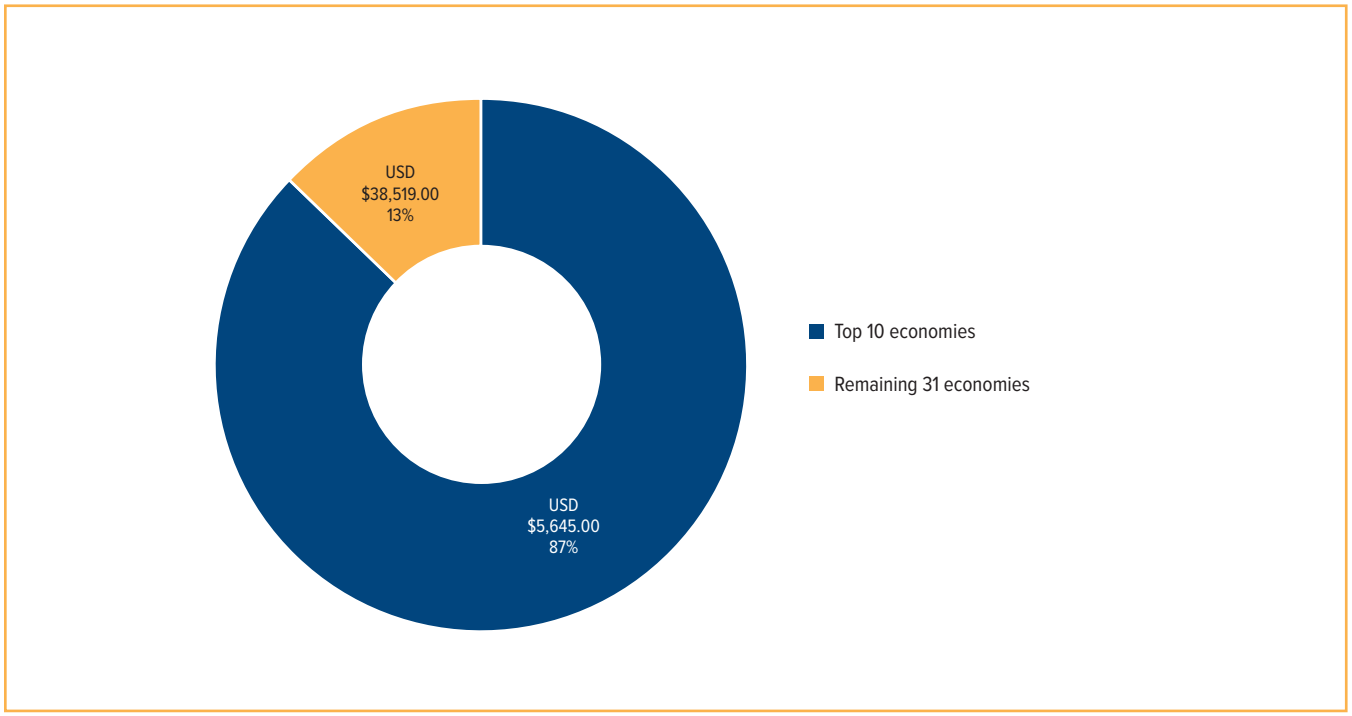
The U.S. Bureau of Economic Analysis (BEA) collects and houses data on the international trade in goods and services. These data include detailed accounts of international services, including charges for the use of intellectual property. Unlike the data collected by the World Bank, the BEA's statistics provide much more granularity and detail on the transactions. Specifically, they provide a breakdown of licensing activity by type of intellectual property into six distinct categories of IP:

1. Industrial processes
2. Computer software
3. Trademarks
4. Franchise fees
5. Audiovisual and related products (this category contains three subcategories: movies and television programming, books and sound recordings, and broadcasting and recording of live events)
6. Other intellectual property

Using these data it is possible to distinguish between the different types of IP that are being licensed by American licensors. Zooming in on the first category of IP rights, industrial processes, it is possible to get a sense of the extent to which U.S. firms are licensing out the secrets to their industrial prowess, namely those related to the production of industrial goods. The BEA defines rights related to industrial processes and products as "license fees, royalties, and other fees received or paid for the sale or purchase, right to use, or right to reproduce or distribute intellectual property, including patents, trade secrets, and other proprietary rights, that are used in connection with, or related to, the production of goods." It is useful to examine the volume of licensing of industrial processes within the Index economies.

Looking at 2017, data are available for 42 of the 50 Index economies. What stands out most starkly is how the vast majority of licensing of industrial processes measured in terms of value are concentrated in a select number of markets. In 2017, this totaled close to USD45 billion, but, as Figure 19 shows, the vast majority—close to 90%—of this licensing went to 10 of the 42 Index economies for which data are available.

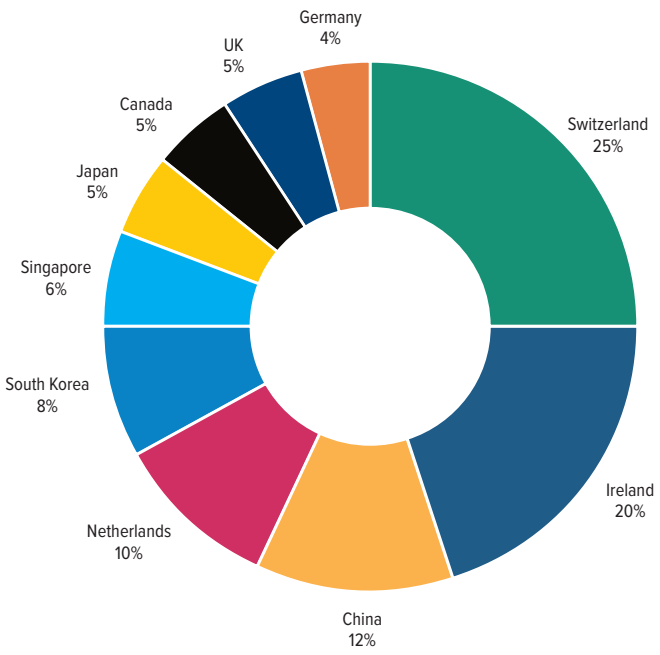
Figure 19: Exports of industrial processes, U.S. to foreign-based entities, 41 Index economies, 2017, USD millions



Of the top 10 economies only 1, China, was a middle-income economy. All other economies were high-income, developed, and, bar Singapore, OECD economies. Figure 20 shows the percentage breakdown among the top 10 economies.

Interestingly, as with the results for the World Bank in-licensing data, the overwhelming majority of these 10 economies have very strong national IP environments. Except for Canada and China, all 10 achieved an overall score of over 80% on the 7th edition of the Index. It is worth asking why in-licensing and knowledge transfer from the U.S. to these 2 economies is so low. China and Canada are the United States' 2 largest trading partners, together accounting for close to 30% of American total trade in 2018 per the latest data from the Census Bureau.[57] China is the largest market in the world and for most goods and services and is projected to account for a growing share of future global growth. It is thus of strategic interest to most, if not all, of American multinationals to have a considerable footprint in China. Similarly, one would assume Canada's long-standing history with, geographic proximity to, and close relationship with the U.S. would result in a higher rate of in-licensing. Yet, looking at rates of industrial processes licensing, China and Canada together accounted for less than that of Ireland. Both economies also have considerably weaker IP environments: Canada has the weakest among all high-income OECD economies in the Index, and China's score, while improving, is still below 50% of the available maximum.

Figure 20: Exports of industrial processes, U.S. to foreign-based entities, top 10 Index economies, 2017, percentage of total



Summing up: Why IP rights matter

Theoretical arguments over the role and importance of IP rights to socio-economic ouputs are being displaced by empirical and statistical evidence and real-world experiences of creators and innovators around the world. Intellectual property has little to no economic utility unless it can be protected, commercialized, and turned into an asset. As the preceding section and the accompanying *Statistical Annex* demonstrate, for all economies—emerging and developed alike—the creation of new forms of intangible assets and IP drives innovation, technological advances, and ultimately economic development and growth.

Having discussed the relationship between the provision and protection of IP rights and economic activity, the next section shifts back to focusing on the results of the 2019 International IP Index.