A survey of allied think tanks summarizes what 23 nations and the EU are doing best when it comes to innovation policy, and where there are the greatest opportunities to improve. In many cases, the successes can serve as model policies for other countries to adopt.

The Global Trade and Innovation Policy Alliance (GTIPA) is a global network of 33 independent, like-minded think tanks from 25 economies throughout the world that believe trade, globalization, and innovation—conducted on market-led, rules-based terms—maximize welfare for the world's citizens. The Alliance exists to collectively amplify each member's voice and enhance their impact on trade, globalization, and innovation policy issues while bringing new scholarship into the world on these subjects. This volume provides GTIPA members' perspectives on what their nations are doing best when it comes to national innovation policy, and where there is the greatest opportunity for improvement. The goal of this report is to provide a profile of member countries' national innovation policies, and a comparative analysis of where the greatest strengths and opportunities for improvement lie. It also provides examples of specific innovation policies that have proven successful and other nations may therefore wish to adopt.

The classic definition of innovation is the improvement of existing, or the creation of entirely new, products, processes, services, and business or organizational models. Put simply, innovation is about the creation of new value for the world. Or, as the innovation evangelist John Kao frames it more aspirationally, innovation refers to the transformation of existing conditions into preferred ones.
Innovation matters because it’s the foundational source of long-term global economic growth and improvements in quality of life and standards of living. For instance, the U.S. Department of Commerce reported in 2010 that technological innovation can be linked to three-quarters of the U.S. growth rate since the end of World War II. A different study attributes approximately 50 percent of U.S. annual gross domestic product (GDP) growth increases to innovation. Similarly, two-thirds of United Kingdom private-sector productivity growth between 2000 and 2007 resulted from innovation. And differing innovation rates explain differing levels of per-capita income across nations. When Klenow and Rodriguez-Clare decomposed the cross-country differences in income per worker into shares that could be attributed to physical capital, human capital, and total factor productivity, they found that more than 90 percent of the variation in the growth of income per worker depends on how effectively capital is used (that is, innovation), with differences in the actual amounts of human and financial capital accounting for just 9 percent. And while the private rates of return from innovation (technically, from research and development (R&D) investments) have been estimated at 25 to 30 percent, the social returns from innovation are typically two to three times larger than the private returns. In other words, the benefits from innovation spill over to society at large.

Thus, innovation matters greatly to the world economy. But maximizing the output of innovation globally requires two key conditions: First, countries must implement effective policies to maximize their own outputs of innovation. And second, the global economic and trade system must allow innovation-based industries to flourish by granting access to large international markets, confronting excessive non-market-based competition, and providing robust intellectual property (IP) protections. While both factors matter, this report focuses on the former.

Countries’ innovation strategies must coordinate disparate policies toward scientific research, technology commercialization, information technology (IT) investments, education and skills development, tax, trade, IP, government procurement, and regulatory policies in an integrated fashion that drives economic growth. As Finland’s National Innovation Strategy argues, it’s vital that nations’ innovation strategies comprehensively address a broad set of policy issues because “piecemeal policy measures will not suffice in ensuring a nation’s pioneering position in innovation activity, and thus growth in national productivity and competitive ability.” As ITIF wrote in its report “The Global Flourishing of National Innovation Foundations,” at least 50 nations have now articulated national innovation strategies; and most have even created special agencies or foundations to maximize the innovation output of their countries’ enterprises and organizations. Ultimately, countries’ innovation policies aim to explicitly link science, technology, and innovation with economic and employment growth, effectively creating a game plan for how they can compete and win in innovation-based economic activity.

This report summarizes what 23 economies and the European Union are doing best in innovation policy, and where they have the greatest room for improvement. The first thing that stands out is many economies—including Chile, Ghana, Honduras, and the United Kingdom—have established government agencies, councils, and organizations specifically responsible for innovation. For instance, Chile created a new National Office of Productivity and Entrepreneurship; Ghana created a Presidential Advisory Council on Science, Technology, and Innovation; and the United Kingdom
established UK Research and Innovation to direct the nation’s investments in research and innovation funding. Conversely, the lack of such an entity was identified as a weakness in American, Malaysian, and Italian innovation policy.

Several economies—including Argentina, Canada, Chile, China, Italy, Korea, and Poland—have implemented strong and innovative tax measures, such as more generous R&D tax credits, investment incentives, collaborative tax credits—which offer more generous incentives for industry-funded research occurring at universities—and patent boxes that tax profits from products deriving form new IP at a lower rate. Chile offers a flat 46-percent R&D tax credit. In Canada, Ontario has introduced a collaborative tax credit and Quebec has introduced a patent box. China offers a patent box that lowers the tax rate on qualifying R&D to between 0 and 12.5 percent. Italy offers super-depreciation for investments in new capital goods, tangible assets, and intangible assets such as software and IT systems; a tax credit on incremental R&D costs; and a patent box. Lack of tax incentives was identified as a German weakness, and a U.S. weakness is its collaborative R&D tax credit applies only to energy-sector collaborations. Beyond taxes, Poland has introduced innovation vouchers and loan programs in an effort to specifically stimulate innovation by small and medium-sized enterprises.

A number of economies have made efforts to improve their regulatory environment in support of innovation. Argentina and Chile introduced one-day registration for new businesses. Korea introduced a regulatory sandbox covering all industries—including information and communications technology (ICT), energy, and fintech—whereby no process of deliberation or approval is to exceed three months. The Philippines’ Central Bank is experimenting with a regulatory sandbox for fintech. Chile produced the report, “Regulatory Policy in Chile,” seeking to simplify and harmonize relevant regulations and improve its efficacy, predictability, compliance, and supervision. However, conversely, weak regulatory environments were cited as barriers to innovation in Canada, India, Korea (hence its introduction of the regulatory sandbox approach), Honduras, and South Africa. These countries noted their stringent regulatory environments as the most constraining innovation in their fintech and life sciences industries.

Colombia, the European Union, Mexico, Pakistan, and Taiwan all have initiatives to leverage open data as a platform for innovation. Colombia’s portal has more than 10,200 datasets from 1,184 public institutions. Mexico’s National Digital Strategy has more than 40,417 datasets from 278 public entities available on its open data portal. The European Union’s Ministerial Declaration on e-Government pledges to link-up members’ public e-services and adopt a “once-only” principle (i.e., ask citizens for data only once). Taiwan is implementing an “Action Plan of Open Data” in which government organizations, at every level, are required to have an open data committee and establish open-dataset goals. The country has almost 40,000 open datasets, and regularly holds events such as Hackathons, Data Jams, and Datapaloozas to stimulate open innovation.

Several countries have introduced strategies to drive leadership in emerging information technology application areas. Canada has invested, established agencies, and developed strategies to spur growth in artificial intelligence (AI) and quantum computing. The European Union has
developed an AI strategy and directed each of its individual member states to do the same. Among the countries represented in this compendium, that covers France, and Korea is also developing an AI strategy.

Several countries have defined strategies to ensure leadership in manufacturing digitalization, or “Industry 4.0,” including Bangladesh, Italy, Malaysia, Mexico, Sweden, and the Philippines. For instance, in 2017, the Filipino government launched the Inclusive, Innovation-led Industrial Strategy, which represents a new approach to industrial policy for a nation anchored in competition, innovation, and productivity.

Several countries report favorable trends in their national R&D intensity (their countries’ R&D investments as a share of GDP). For instance, Korea’s national R&D intensity grew to 4.55 percent in 2017, second in the world; China’s grew to 2.19 percent, from just 0.90 percent in 2000; and Sweden’s remained a robust 3.3 percent, although this was down from the country’s 3.9 percent in 2000; while Germany eclipsed 3 percent in 2017, a steady rise from its 2.4 percent from 2000. Yet, for most other nations in this report, faltering R&D investments is a lament, something that is true for both developed nations such as Canada, the United States, and the United Kingdom, and developing countries, including Argentina, Chile, Colombia, Mexico, and South Africa. Canada’s national R&D intensity actually fell by over 20 percent from 2.0 percent in 2001 to 1.6 percent in 2014. The United Kingdom invests a meager 1.67 of its GDP in R&D, ranking 11th among European nations; France’s investments have been flat for years. U.S. public investment in R&D is down dramatically. And Latin America remains a laggard in global R&D investment. As a whole, Latin American nations invest just 0.83 percent of their GDP in R&D, less than half the average of (non-high-income) East Asian and Pacific nations (1.96 percent), and even below such other country blocks as Central Asia. Bolstering their nations’ investments in R&D would be perhaps the single most important step Latin American countries could take toward turbocharging their innovation economies.

It’s difficult to achieve innovation without protecting ideas. Robust IP rights—an effective protection and enforcement mechanism—provide innovators security in the knowledge they can capture a share of the returns from their risky, expensive, and uncertain investments in innovation, and then be able to turn the profits from one generation of innovation into financing to create the next. While some members have reported improvements to their countries’ IP environment in recent years, notably Mexico, many reports point to weak IP environments inhibiting innovation. Reports from Bangladesh, Canada, China, India, Malaysia, and South Africa in particular note difficult IP environments. For example, in India, Malaysia, and South Africa, governments have introduced (or are considering introducing) compulsory licenses that would force enterprises to disclose the novel IP behind their innovative drugs. Thus, it is perhaps not a surprise that after Brazil and Canada weakened drug patents, R&D investment by pharmaceutical companies declined by 75 and 34 percent respectively. And the number of clinical trials declined by 60 percent in the five years after Colombia threatened compulsory licensing in the life sciences (a position the new Duque government has since retracted). Another concern for many nations is the need to strengthen workforce-training systems, especially science, technology, engineering, and mathematic (STEM) talent. The profiles of innovation policies in Chile, Germany, Italy, Korea,
Malaysia, Mexico, the Philippines, Sweden, and Taiwan all cite educating high-level talent, fielding highly skilled workforces, and ensuring a sufficient level of graduates and workforces as a significant concern. For some economies, such as Germany, Sweden, and Taiwan, the concern is more about a lack of STEM professionals specifically. For others, there are broader concerns related to human capital, ensuring sufficient levels of educational attainment, enhancing both individual and broader workforce-level preparedness for Industry 4.0, or the coming changes that will be wrought by digital transformation. Clearly, many countries are facing a lack of talent, and in several cases, difficulty bringing it into their countries as well.

Achieving effective technology transfer and commercialization of new discoveries from universities, research institutions, and national laboratories to the private sector has been cited as a challenge for a number of countries, developed and developing alike. The Italian submission has noted that despite its high-quality academic research, Italy performs relatively poorly in terms of patent submissions and time to market. Similarly, a recent study of Sweden’s life-sciences industry lamented, “There is currently no effective platform to industrialize ideas from higher education institutions in the life sciences sector.” Country profiles of Canada, India, and the Philippines also reference the challenge of creating stronger linkages between industry and academia, or between knowledge producers and consumers. Only the U.S. country profile reports this as a systemic strength, noting that America’s Bayh-Dole Act (which gives universities rights to innovations stemming from federally funded R&D) and the Small Business Innovation Research Program (SBIR), a program designed to help small businesses commercialize technologies stemming from federal R&D funding, have proven effective in tackling this challenge. Notably, America’s Bayh-Dole legislation has been copied by more than two-dozen countries and its SBIR program by at least 18 worldwide.

Several other weaknesses, or challenges, that have been cited by multiple economies are worth noting. Reports from Colombia, Korea, Poland, the Philippines, and Taiwan have all cited the need to reform public procurement systems to either favor more innovative vendors, give small businesses better opportunities to compete, or introduce more competition into the tender process. For some countries, including Bangladesh, Ghana, Honduras, India, and the Philippines, the challenge isn’t just about government procurement, but broader regulatory weaknesses, including slow government processes for registering new businesses, approving uses of new technologies, and simply removing restrictions and burdensome regulations and procedures from sectors such as telecommunications, transport, and professional services. Finally, some members, including in Colombia and Poland, believe a weak ICT infrastructure is significantly inhibiting their countries’ innovation potential, while others, such as members in Pakistan and the Philippines, report significant improvements in this regard have tremendously advanced their national innovation environments.

In conclusion, these 24 reports of economies’ three best innovation policies and three greatest opportunities for improvement represent a comprehensive, deep, and insightful catalog of best innovation policies and practices, revealing how countries—developed and developing alike—are
trying to deal with similar opportunities and challenges. There's something to be learned from each country profile, and hopefully this volume will represent a practical tool for innovation policymakers to reference some of the most cutting-edge practices being applied on the world stage today.