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DOI: https://doi.org/10.36059/978-966-397-366-1-35

THE ROLE OF TECHNOLOGY TRANSFER POLICIES IN BRIDGING INNOVATION GAPS

Surging technologies including biotechnology, blockchain, artificial intelligence, and machine learning have advanced quickly in the twenty-first century. The role of technology is crucial in driving innovation, economic growth, and societal development. Technology has a significant impact on nations all over the world, albeit the impacts will differ according to the nations' degree of economic development, technological prowess, and economic structure.

The question thus arises: can we expect that all countries have the same level of technological development and benefit from the technology in the same way?

Countries can be classified into several categories regarding their technological, and subsequently innovative development: from pioneers at the forefront of cutting-edge research and implementation to adopters swiftly incorporating new technologies into the infrastructure that already exists, to innovators who ride the waves of innovation to differing degrees of preparedness, and lastly those that struggle to get started and grow in the technical area.

Pioneers are countries that have strong, longstanding R&D ecosystems, universities with a focus on research, and blossoming startup ecosystems. Thus, they can be considered as leaders in technological innovation. The US, Japan, South Korea, and some European countries are prime examples.

Adopter nations are quick to adopt new inventions and technology, using them to improve their competitiveness, productivity, and standard of living. While their original research and development may not be at the forefront, they are adept at quickly incorporating and utilizing current technologies. This includes several emerging economies, like China, India, Brazil, and Mexico, which are rapidly digitalizing and undergoing technological change in a variety of industries.

Countries that actively work to catch up to adopters despite being somewhat behind in terms of technology preparation are known as followers. They acknowledge the role that technology plays in economic development, but they also confront obstacles like a lack of funding, insufficient infrastructure, and a skills deficit. Examples are some ASEAN countries, Eastern European countries, and certain African regions.

Developing nations have formidable obstacles to admission and progress in the field of technology: they frequently lack the institutional support, human capital, and infrastructure needed to engage in the global innovation economy. These countries can be dealing with structural inequality, economic downturns, or political unrest that makes it difficult for them to use technology for growth. Conflict-ridden states, the least developed countries, and areas with poor connectivity and resource availability are a few examples. Classifying nations according to their inventive and technological advancements offers important insights into their advantages, disadvantages, and possibilities in the international arena.

The same can be seen in The Global Innovation Index, which is an annual report published by the World Intellectual Property Organization (WIPO) in collaboration with Cornell University and INSEAD, which ranks countries based on their innovation performance. In the 2023 Global Innovation Index report, nations are classified based on their inventive and technological advancements using various indicators.

Countries like Switzerland, Sweden, the United States, and Singapore are often considered innovation leaders due to their high rankings in indicators such as knowledge creation, knowledge impact, and innovation linkages. Nations such as China, India, and Brazil are classified as innovation followers as they are making significant progress in innovation and technology adoption, investing in research and development, and building innovation capacity. Countries like Vietnam, Malaysia, and Indonesia are considered emerging innovators due to their rapid growth in innovation, increasing number of startups, and efforts to build a knowledge-based economy. Nations such as South Korea and Japan are known for their efficient use of resources in innovation, generating significant innovation output relative to their inputs, despite not having the highest levels of R&D spending. Countries like Kenya, Nigeria, and Ukraine are classified as innovation aspirants, actively working to improve their innovation ecosystems, invest in education and infrastructure, and enhance policies to support innovation. Nations facing challenges in innovation performance, such as Yemen, Haiti, and Chad, may be classified as innovation laggards

due to limited R&D investments, weak intellectual property protection, and a lack of skilled workforce [1].

Additionally, the Global Innovation Index report, mentions technology transfer may be discussed in various sections related to knowledge diffusion, innovation linkages, and knowledge absorption. Especially, indicators such as intellectual property receipts, production and export complexity, and high-tech exports can indirectly reflect aspects of technology transfer. In terms of innovation linkages university-industry R&D collaboration and joint venture/strategic alliance deals are indicators that can involve technology transfer activities between academia, research institutions, and businesses. Furthermore, intellectual property payments, high-tech imports, and ICT services imports can indicate the extent to which countries are absorbing technologies and knowledge from external sources through trade and investments.

One of the most striking technology transfer policies is the European Union Framework Programme for Research and Innovation, so-called Horizon 2020. Horizon 2020 is the EU's largest research and innovation program, aimed at funding scientific excellence and promoting technology transfer across member states.

Regarding the function of technology transfer policies in closing innovation gaps, Horizon 2020 included several programs and mechanisms to support commercialization, technology transfer, and knowledge sharing.

For example, with a significant increase in research and innovation funding, Greece has seen improvements in its technological and innovation results since Greek companies and research institutions have been able to leverage the Horizon 2020 program to enhance their technological capabilities and participate in collaborative projects with other European partners. The rate at which allotted money is used or absorbed by beneficiaries is known as the absorption rate, and it applies to both Horizon 2020 and other research and innovation financing programs. It assesses the effectiveness and efficiency with which program-supported projects and activities are receiving funding. Greece has a good absorption rate, meaning that money is being used wisely and distributed to qualified projects on schedule, guaranteeing that the funding program's goals are fulfilled. According to the European innovation scoreboard Greece's innovation score increased from 24 in 2014 to 32 in 2022 [2]. This represents an improvement, though it's worth noting Greece remains below the EU average.

Horizon 2020's Technology Transfer Policy likely played a part in this progress. Additionally, the Horizon 2020 program is a model of success for

igniting innovation in a variety of European countries. Its effectiveness is also demonstrated in nations like Bulgaria.

Bulgaria's score on the Innovation Union Scoreboard, a crucial measuring tool, is one striking indication of this progress. Bulgaria's innovation score in 2014 was 127, which shows where the nation stands in the European innovation scene. By 2022, Bulgaria has made significant progress, as evidenced by its innovation score of 150 [2]. This impressive development highlights how Horizon 2020 has revolutionized innovation and technological progress within Bulgaria.

Technology transfer policies—such as those modeled after Horizon 2020—are essential for promoting innovation, economic expansion, and societal advancement. These policies help nations close innovation gaps and realize their full potential in the global innovation environment by encouraging cooperation, promoting information exchange, and supporting technological commercialization.

In conclusion, the emergence of cutting-edge technology in the twenty-first century has drastically altered societal development, economic growth, and innovation around the world. Nonetheless, differences in economic growth, technological capability, and economic arrangements mean that the advantages of technological advancement are not evenly shared between countries. The significance of technology transfer policies in closing innovation gaps and promoting equitable growth is highlighted by this classification. Policies for technology transfer, such as Horizon 2020, are essential for advancing technical advancement and economic development because they spread inventions, knowledge, and intellectual property. As seen by success stories in nations like Bulgaria and Greece, Horizon 2020 has considerably improved innovation ecosystems through cooperative research projects, cutting-edge technology, and knowledge transfer efforts. Because of the program's focus on technology transfer, participating countries have been able to close innovation gaps, advance their technological capacities, and significantly impact the state of global innovation.

Thus, despite the difficulties brought on by the war, Ukraine has an opportunity to become more deeply involved in Horizon programs. Ukraine could take advantage of several advantages provided by European research and technology cooperation by taking part in Horizon programs, which can opportunities in the sphere of technology cooperation.

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