

International Federation  
of Pharmaceutical  
Manufacturers & Associations

# TECHNOLOGY TRANSFER:

A COLLABORATIVE  
APPROACH TO  
IMPROVE GLOBAL HEALTH

The Research-Based Pharmaceutical Industry Experience



**IFPMA**

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# Foreword

Dear Reader,

Increased use of modern technology by countries is vital to their economic and social development. It raises the quality of production, generates new knowledge, improves living standards, and boosts the productivity or efficiency of export companies. The process of technology transfer stimulates investment, for example, in the production of food, medicines, steel, cars, and electronics, as firms gain access to the technology of others, learn and absorb it, and implement it in production.

Technology transfer of medicines and vaccines shares many of the challenges of other advanced industries. Moreover, the research-based pharmaceutical industry strives to ensure that the transfer of technology also reflects its commitment to global health. It aims to devise sustainable ways not only of bridging research-and-development gaps but also of increasing the availability of vaccines and medicines in the developing world. In recent years, the research-based pharmaceutical industry has pushed forward with this unique type of technology transfer, at the cutting edge of business practices today.

In an increasingly globalized world, creating the right conditions for the transfer of technology is an important consideration for all countries at all income levels. Many multilateral organizations, including the United Nations, the World Bank, the World Trade Organization, and the World Intellectual Property Organization, have a role to play, while technology transfer as it applies to medicines and vaccines is of vital interest to the World Health Organization and the broader public health policy-making community.

Based on their experience, IFPMA member companies have identified the main factors determining a country's attractiveness for transferring technology and have compiled a list of policy recommendations for consideration by the relevant institutions at national and international levels.



**Eduardo Pisani**  
Director General

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## The Role of IFPMA and its Member Companies

IFPMA members want to contribute to the sustainable development of the world economy and to the improvement of the health and living standards of people in all regions.

# Executive Summary

## Creating a win-win process



Transfer of technology is a key component of economic development. It is one means by which low- and middle-income countries can accelerate the acquisition of knowledge, experience and equipment related to advanced, innovative industrial products and processes.

Technology transfer can increase the reliability of supply and decrease reliance on imports, raise the competence of the local workforce, and reverse the “brain drain” from low- and middle-income countries by increasing local “high-tech” employment opportunities.

Beside the beneficial impact on economic and social development normally credited to technology transfer, transferring pharmaceutical technology can also help improve the health of recipient countries’ populations by increasing access to innovative medicines and vaccines.

Many research-based pharmaceutical companies have used technology

transfer to improve a country’s ability to use innovative medicines, by strengthening the expertise of the local scientific and medical communities and, where possible, working to improve the health infrastructure. The rewards to companies transferring pharmaceutical technology can be reputational or commercial, or both. However, while some decisions to transfer technology may be taken on a philanthropic basis, to prove sustainable these collaborations have also to be driven by commercial rationales and market conditions, which are in turn heavily influenced by policy and regulatory decisions by national governments.

**“The rewards to companies transferring pharmaceutical technology can be reputational or commercial, or both.”**

The decision by research-based pharmaceutical companies to transfer technology depends on a wide variety of factors, most of which are influenced by the local policy environment. While an overall prerequisite for transferring technology is the existence of a suitable local partner, eight factors emerge as critical enablers for pharmaceutical technology transfers:

1. A viable and accessible local market;
2. Political stability and transparent economic governance;
3. Appropriate capital markets;
4. Innovation-friendly environment with sound intellectual property rights;
5. Proper access to information;
6. Adherence to high regulatory standards;
7. Skilled workforce;
8. Clear economic development priorities.

Many newly industrialized countries and other middle-income countries are developing a suitable policy environment and are witnessing the benefits of access to advanced foreign technologies and expansion of their domestic capabilities.<sup>1</sup>

However, low-income countries may not always be able to offer the preconditions required for successful uptake of technology transfer. The experience of IFPMA member companies suggests that governments of low-income countries

can encourage technology transfer by focusing on attracting technology for which there is already a demand from local companies, and by adopting mutual recognition of regulatory decisions, within regions and between high- and low- and middle-income countries (LMICs), which can help increase the local market and/or reduce regulatory barriers.

In addition, high-income countries can help LMIC experts to increase their technical expertise and familiarity with international standards. Public sector institutions can also increase technical and financial assistance to LMICs to strengthen local technical competence.

The importance of transferring technologies for medicines is recognized in the 2008 Global Strategy and Plan of Action on Public Health, Innovation and Intellectual Property Rights of the World Health Organization (WHO). An agreed action under the strategy is “to promote transfer of technology and production of health products in developing countries through identification of best practices, and investment and capacity building provided by developed and developing countries where appropriate”.<sup>2</sup>

#### **IFPMA member companies support technology transfers by:**

- Creating new technology through research and development of innovative pharmaceuticals and vaccines.
- Delivering programs that offer a range of products and the transfer

of specialized knowledge and skills, thereby contributing to economic development and public health of the recipient country.

- Transferring not only manufacturing technology but also other forms of acquired expertise.

#### **IFPMA calls on:**

- Governments in low- and middle-income countries to provide policy support for the development of national private sectors and implement a welcoming policy environment for global partner firms.
- Governments in high-income countries to increase aid funding for health and healthcare in the developing world as a platform for economic development. This can be innovative at the same time as affordably addressing basic needs.

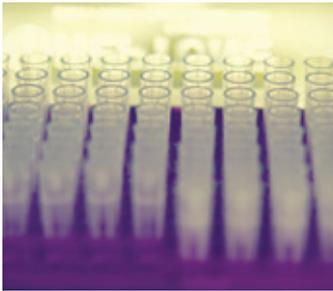
1 Charles River Associates, Policies that encourage innovation in middle-income countries, Tim Wilsdon, Jim Attridge, Eva Fiz, Satomi Ginoza, October 2012.

2 World Health Assembly Resolution 61.21 which includes the WHO Global Strategy and Plan of Action on Public Health, Innovation, and Intellectual Property, Element 4, Sub-Element 4.1 c.

# I. The Anatomy of Technology Transfer in the Pharmaceutical Sector

It's much more than simply handing over technology.

The transfer of pharmaceuticals R&D is more than a question of “bricks and mortar” or providing a “tool box”. It involves many channels, all of which improve the economic capabilities of the recipient firm or institution. What is transferred may be a physical object or it may be pure knowledge. Following one definition,<sup>3</sup> we can identify the following elements:



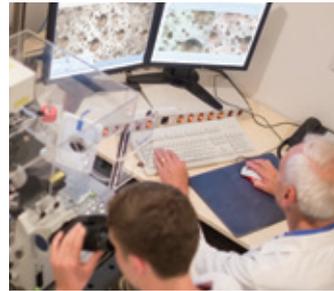
## “Techno-ware”:

for the pharmaceutical industry this would include the transfer of physical objects such as equipment for use in research laboratories or production equipment for the manufacture of pharmaceuticals ingredients, or the formulation or packaging of final products.



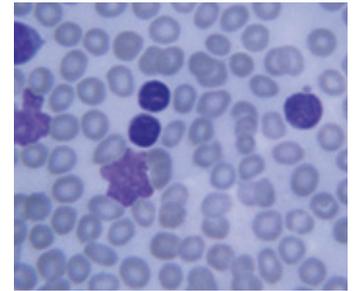
## “Human-ware”:

skills and human aspects of technology management and learning, such as training for researchers or general practitioners. Technology transfer can also create positive spillover effects into associated industries and into the supporting public sector research infrastructure.



## “Info-ware”:

all techniques related to knowledge, information, and technology, in the form of a technology license.<sup>4</sup>



## “Orga-ware”:

organizational and procedural knowledge needed to operate a given technology relating to a chemical or biological compound.

<sup>3</sup> Sharif (1995, 1997) and Ramanathan (1994).

<sup>4</sup> As noted in the World Health Organization Commission on Macroeconomics and Health Report of 2001, voluntary licenses can be a valuable tool for transferring technology. Voluntary license agreements may or may not entail transfer of manufacturing know-how. To learn more about technology transfer and voluntary license programs, please visit the IFPMA website ([www.ifpma.org](http://www.ifpma.org)).



### **Strong market mechanisms provide the starting point**

Foreign direct investment (FDI) is by far the main channel for technology transfer, but other market mechanisms such as licensing agreements, royalties and joint ventures are also vital channels for transferring R&D pharmaceutical technologies. Through regulation and investment, governments can help to create the right conditions for technology markets to function. For the research-based pharmaceutical sector, reliance on “non-market” mechanisms is unlikely to provide a sustainable technology transfer platform for economic growth or business development.

### **Complex map of technology transfer**

Newly industrialized countries and other middle- income countries are increasingly relying on technology transfer to access advanced foreign technologies and expand their domestic capabilities. In addition, technology transfer programs have contributed to better health, for example, in Brazil, where development of vaccines through technology transfers has been essential to the country’s universal immunization program. The experience of research-based pharmaceutical companies shows that, in the public health arena, the historical demarcation lines such as “North-South” are being replaced by more complex networks of technology transfer. Low-income countries, however, may have weak absorptive capacity for foreign technologies. This creates a particular challenge for R&D pharmaceutical technology transfer, since those parts of the world least able to benefit from it today are among those who need its products the most.

## II. A Checklist for Transferring Technologies

Commercial opportunities are paramount for the private sector when considering technology transfer. However, if the basic conditions are right, non-commercial reasons may also play a part in decision-making.

This is particularly true in advanced technology sectors, especially when confronted with an opportunity to open a market to a specific technology. Many countries are already well positioned to attract R&D pharmaceutical technology transfers (case studies are available on IFPMA Health Partnerships Directory: <http://partnerships.ifpma.org/partnerships>).

Pharmaceutical and vaccine manufacturers consider a variety of factors in evaluating potential technology transfer ventures. Many of these factors are influenced by government policy decisions. For all investors, political stability and the rule of law are prerequisites. Research-based pharmaceutical companies are also looking for:



A VIABLE AND ACCESSIBLE LOCAL MARKET



POLITICAL STABILITY AND TRANSPARENT ECONOMIC GOVERNANCE



APPROPRIATE CAPITAL MARKETS



INNOVATION-FRIENDLY ENVIRONMENT WITH SOUND INTELLECTUAL PROPERTY RIGHTS



PROPER ACCESS TO INFORMATION



ADHERENCE TO HIGH REGULATORY STANDARDS



SKILLED WORKFORCE



CLEAR ECONOMIC DEVELOPMENT PRIORITIES



The most effective role for governments is to create optimal enabling conditions, linked to the country's overall economic policy objectives. A government's willingness to create optimal conditions to attract technology is a strong determinant of whether transfers will be directed towards their domestic industrial sector. While many governments in newly industrializing and middle-income countries are taking an active role in encouraging the transfer of technology, in low-income countries, it can be difficult for their domestic industry to meet the above conditions. In these cases, governments and international development institutions need to play a greater role and government policy will be critical in determining the potential for technology transfer in the future.

# A CHECKLIST FOR TRANSFERRING TECHNOLOGIES FOR MEDICINES AND VACCINES

- Political and economic stability, including predictability in industrial policy-making
- Political will to address health challenges and strengthen healthcare system capacity

## POLITICAL STABILITY AND GOOD, TRANSPARENT GOVERNANCE



- Educated workforce with engineering and management skills
- Free movement of scientists and other experts strengthen healthcare system capacity



## SKILLED WORKFORCE



- Sufficient resources to meet high quality and safety standards
- High-quality facilities and equipment for scientists and healthcare professionals
- Promotion of inward investment through incentives designed to encourage tech transfer from foreign companies



## APPROPRIATE CAPITAL MARKETS



## ADHERENCE TO HIGH REGULATORY STANDARDS



- Internationally recognized regulatory standards in place
- Efficiency in processing product registrations and other applications

- Effective systems for disseminating market-relevant information for technology holders and technology demanders to identify potential partners

**PROPER ACCESS TO INFORMATION**



**CLEAR ECONOMIC DEVELOPMENT PRIORITIES**



- Promotion of technology transfer matching overall economic policy goals
- Investment in domestic healthcare systems and infrastructure as a priority in the development agenda

**INNOVATION-FRIENDLY ENVIRONMENT WITH SOUND IP RIGHTS**



- Strong legal framework and enforcement ensuring secure intellectual property rights, data confidentiality, transparency and certainty for investors, licensees, and customers

**VIABLE AND ACCESSIBLE LOCAL MARKET**



- Market size and/or prevalence of certain diseases
- Market equally accessible to domestic and foreign enterprises

### 1. A viable and accessible local market

There is no agreed formula to determine the ideal market size that ensures the economic viability of domestic production. However, the larger the country or geographic bloc, the greater the market potential and investment appeal. For pharmaceutical technology transfer, the prevalence of certain diseases will also play a role in determining the size and viability of the market, as is the case for malaria-endemic countries, for example. Research-based pharmaceutical companies are more likely to consider small countries when there is effective regional economic integration. All countries, large or small, benefit from ensuring that foreign enterprises have easy access to their markets and that the pharmaceutical sector is not burdened by differential treatment of domestic and foreign investors. Recent technology transfer activities related to the production of pandemic influenza vaccines have also taken into account other factors, such as health security issues at national and regional levels.

### 2. Political stability and transparent governance

Relative political and economic stability of a country will influence the rate of inward technology transfer and can be seen as a precondition for any technology transfer. Long periods of stability also lead to stronger and more successful partnerships, as demonstrated by Brazil, where some partnerships started 25 years ago, and by Singapore, which in the recent past has secured a strong industrial base, partly as a result of stability and transparent governance.

Whether a transfer generates value over the medium and long terms is, in part, dependent on a certain degree of predictability in policy-making, in particular in relation to industrial policy, inflation and interest rates, and international economic and political linkages. Even when research-based pharmaceutical company technology transfers are philanthropic in nature, they need to be sustainable in order to achieve their goals.

In the host countries, concerns about the impact of technology transfer on the existing industrial base may restrict the opportunities for integration and promotion of these collaborations. On occasion, it can be effective for governments to take a leadership role in communicating the need to prepare for open markets, facilitating the upgrading of local capacities, and preparing the public for the changes to the local economy that come with global integration.

Research-based pharmaceutical companies have found that training and education programs can help in changing attitudes. For example, programs to train and equip local researchers to carry out clinical trials or quality control to internationally recognized standards can sow the seeds for opening up a market.

There is a risk of confusing political leadership for healthcare with political leadership for local supply of healthcare goods and services. Political leadership is critical to address global and local health challenges and, more importantly, to strengthen the capacity of healthcare systems. Political leadership in promoting local production

“Political leadership is critical to address global and local health challenges and, more importantly, to strengthen the capacity of healthcare systems.”



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can be a different story unless it is tempered by the views of technology providers.

### 3. Appropriate capital markets

For many governments seeking to expand technological capacity, attracting direct investment is very important, but there is also the need to maximize the spillover benefits of that investment, which requires adequate capital markets. For example, a local pharmaceutical manufacturer receiving a product license must have sufficient resources to meet high standards of quality and safety controls, good manufacturing practices, sophisticated human capital, and so on. Likewise, benefits from the transfer of clinical skills increase when scientists or medical personnel have access to high-quality facilities and equipment. All of these require financing.

When local private capital markets are insufficient, the public sector or global institutions may provide alternative solutions. However, in the case of healthcare and the pharmaceutical industry, the long time horizons and high investment risks raise unique challenges for sustainable public sector involvement. Where such public sector investments are made, whether in production capacity or in underpinning research activities, participation of foreign organizations should be encouraged.

A number of emerging economies have made strategic decisions to attract research-based pharmaceutical investment. This can be a natural evolution from existing chemicals or generics production capabilities. In some cases, encouragement for foreign direct investment has been coupled with government help to nurture indigenous scientific expertise. R&D-based pharmaceutical companies have on occasion been able to contribute to this process by providing training in the scientific and business disciplines relevant to strengthening research capacity and transforming scientific ideas into commercial opportunities.

Governments can also promote inward investment through tax breaks and other forms of incentives designed to encourage technology

transfer, in compliance with international trade rules. Global institutions, such as the International Finance Corporation and the World Bank, provide certain options geared towards medium-term investments in the private health sector.

### 4. Innovation-friendly environment with sound intellectual property rights

To successfully attract imported technology and to build the necessary preconditions for adapting imported technology, countries need a supportive environment that includes strong intellectual property (IP) protection. Effective implementation of any intellectual property laws and regulations already in force provides transparency and certainty for investors, licensees, and customers. The level of intellectual property protection tends to be directly and positively linked to the rate of technology transfer.

To a large extent, this was the rationale behind the negotiation of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement). Article 7 of the Agreement addresses the relationship between intellectual property and technology transfer, economic welfare, and the need for a balance of rights and obligations. It reads:

“The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations”.

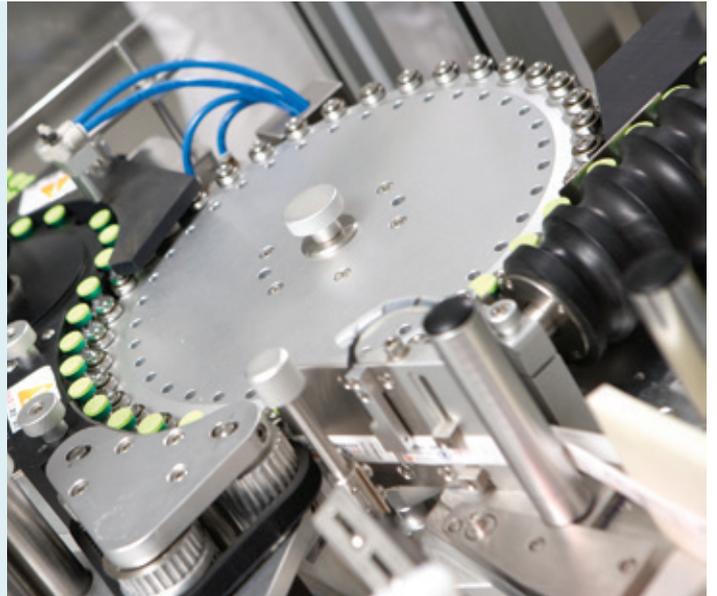
Governments are responsible for putting in place the proper legal environment and economic conditions to facilitate private commercial transactions, while high-income countries should introduce measures such as technical support to facilitate technology transfer (TRIPS articles 66 and 67). The sum total of private deals and government facilitation should lead to technology transfer and capacity-building.<sup>5</sup> While technical capacity is more widely distributed around the world than was the case before TRIPS, it has

5 This strategy was successfully employed by the Asian Tigers and some of the Eastern European countries, which adopted the necessary legal infrastructure, followed sound economic policies, and incorporated technology transfer initiatives in their national development programs.

become clear that, although a robust intellectual property regime is a necessary component of a knowledge-based economy, it must also form part of a wider trade-oriented framework.

Technical support may often be needed to help build innovation-friendly frameworks. For example, a limiting factor for low- and middle-income countries can be lack of knowledge on how to manage intellectual property at the interface between academic and private sector research. Support for this critical juncture is important to assist translation from basic research to practical innovation. Technical assistance to establish an intellectual property system supports the business development of local innovators, licensees, and patentees. A country with aspirations to develop a technology base must be able to transfer technology from the public to the private sector within its own borders. It is thus important that the public domain continues to function in an open and efficient manner.

While building innovation-friendly and intellectual property frameworks entails costs, the domestic costs of failure to advance intellectual property rights are also significant. If intellectual property protection is inadequate, firms may choose not to transact at all, offer and rely on older-generation technologies, or keep information within the firm by dealing only via subsidiaries. Disclosure of proprietary information requires a high level of confidence in both partners and the legal regimes under which they operate. Business development will also be more difficult in the absence of secure intellectual property rights and data confidentiality. Strong intellectual property protection and enforcement in LMICs benefit domestic economic development by providing an incentive for domestic entrepreneurial initiatives. Major middle-income countries have many positive attributes sought by inward investors, but their experience also demonstrates how the pattern and rate of adoption of IP has influenced industrial development.



“The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations”.



### 5. Proper access to information

Where adequate legal frameworks are in place, attention should be given to supporting access to information. This has a number of dimensions, from better documentation of available resources to the longer-term issue of addressing the complexity of the global knowledge market. In the absence of effective systems for disseminating market-relevant information, technology holders may find it difficult to identify precisely who is interested in purchasing their technology, while technology demanders face a similar challenge in finding entities willing to transfer their technology. These asymmetries can result in very high search costs, which can be reduced by improving information, networking, and other communication measures. The emergence of product development partnerships such as Medicines for Malaria Ventures, Drugs for Neglected Diseases initiatives, the Global Alliance for TB Drug Development, or initiatives like WIPO Re:Search demonstrate the point. These autonomous bodies have become knowledge hubs in which all stakeholders, including pharmaceutical companies, can provide both assets and knowledge to advance the specific goals of the partnership.

### 6. Adherence to high regulatory standards

The pharmaceutical industry is one of the most heavily regulated, to ensure quality, safety, and efficacy of its medicines and the well-being of patients. The ability to meet international regulatory standards, or at least those of the major markets, is a precondition for many technology transfer activities. Regulations and standards apply also in low- and middle-income countries. For example, governments require product registration and data submissions to demonstrate quality, safety, and efficacy. Governments also vary greatly in their relative efficiency in processing registrations and other applications, which can influence a technology holder's decision to make a transfer to a particular country.

When the technology transfer operation involves local production, technology holders often choose the recipients based in part on their capacity to comply with international quality standards. The ability to meet these standards has contributed to the growth of the domestic pharmaceutical industry in emerging countries. For example, Indian companies account for a significant share of the new drug applications received by the US Food and Drug Administration (FDA)



and are also major suppliers to the substantial donor-funded market for antiretrovirals (ARVs) and anti-malarial medicines.

Although building strong regulatory and administrative capacity for pharmaceuticals requires a substantial investment by governments, the failure to do so can inhibit the ability of the local industrial sector to attract technology and can isolate the country from a globalizing world. The pharmaceutical industry has undertaken initiatives to enable LMIC researchers, manufacturers, and regulators to align their practices to international norms.

### 7. Skilled workforce

Human capital is an essential element of the technology transfer process. The successful absorption of technology or know-how in the recipient country and its translation into greater economic development hinge on the availability in the host country of an educated workforce with, for example, engineering and management skills. Certain low- and middle-income countries are disadvantaged because a large proportion of their highly trained workers have

emigrated to more technologically sophisticated environments in higher-income countries. The healthcare sector has been particularly hard hit by this “brain-drain”.

Migration is a mixed blessing for many countries. By improving the prevailing conditions, individuals may be more inclined to return home. Flexible work structures and international fellowships can also help. High-income countries can play a major role both by providing access to the best centers of higher education, as they do now, and by supporting sustainable solutions to human resource issues. Through scholarships and other initiatives, IFPMA members have sought to strengthen the human resources available to low- and middle-income countries. One good example is the EDCTP-TDR Clinical Research and Development Fellowship (hyperlink: <http://partnerships.ifpma.org/partnership/edctb-tdr-clinical-research-development-fellowships>). This program, developed with the help of IFPMA, offers targeted training to enhance competencies in clinical trials for medicines, vaccines and diagnostics on a broad range of infectious diseases of poverty.

Inward investment also helps create a skilled workforce, as pharmaceutical companies train LMIC nationals and transfer needed expertise from elsewhere. Supportive government policy is crucial to ensuring the free movement of scientists and other experts.

### 8. Clear economic development priorities

The finite or limited resources available to governments mean that measures taken to promote technology transfer must be realistic and fit with overall policy goals. A technology transfer policy dedicated to the creation of completely new types of economic activity, and one which is as complex and as highly regulated as the pharmaceutical sector, can present a much bigger challenge than building on a sector that already exists.

Where local capacity already exists, governments must be ready to invest in support of their technology development goals. Having the right legal framework is important but countries that are successfully strengthening their technology base in a particular sector have often also committed to develop the supporting science base through public sector funding.

The impact of health and healthcare on economic outcomes makes healthcare investment a strategic priority. Improving the health of the population and healthcare delivery will presumably rank high on the development agenda of any country pursuing technology transfer and should be reflected in an appropriate level of investment in the domestic healthcare system and infrastructure.

“Supportive government policy is crucial to ensuring the free movement of scientists and other experts.”



## The case of low-income countries

Low-income countries may struggle to provide the enabling conditions for technology transfer that could be expected in middle-income countries. In most cases, the concern is not so much about intellectual property enforcement as the capacity of the industrial sector to absorb advanced technology. Developing technical capacity in low-income countries requires more than just a national endeavor.

While the international community has tried to address the situation through direct financial aid, many low-income countries still do not have the appropriate conditions for successful uptake of technology transfer. International development and financial assistance through institutions like the World Bank are intended to build local capacity, but many low-income countries, especially in sub-Saharan Africa, have yet to make significant advances. This has led some commentators to suggest that the international aid model itself is flawed.

To encourage technology transfer on both the provider and the receiver side, there need to be additional incentives for projects in which technology transfer and the associated capacity-building are the main operation (e.g., licensing, joint ventures) and a recognition of the more extensive support needs of low-income countries, both in capacity-building and in external financing.

## III. Policy Recommendations

Across all advanced technology sectors, including pharmaceuticals, there is a large base of evidence and consensus that technology transfer is strongly influenced by the conditions in the host country described above. Adherence to international norms will positively influence the level and magnitude of technology transfer directed to a given market.

The immediate objective in policy planning should be to strengthen capacity and understanding of the appropriate framework to facilitate technology transfer. The newly industrialized countries that are now at the point where they have a significant domestic stake in promoting innovation as part of their economic development will have a key role to play over the medium term.

To optimize their national technology bases, enhance sustainability, and realize maximum benefits from globalization, the IFPMA calls on:

- Governments in low- and middle-income countries to provide policy support for the healthy development of national private sectors and implement a welcoming policy environment for global partner firms;

### 1 Policy recommendations for host countries

- Focus on technology for which there is a demand from local companies and markets as this will motivate local companies to develop innovation projects to suit local needs and markets, and will generate spillover benefits that can be captured by the local economy;
- Institute progressive development of a national intellectual property system, which is integral to efforts to promote learning from technology transfer and follow-on innovation;
- Allow foreign companies to participate in relevant projects where public funding is being deployed to strengthen industrial capacity;
- Consider using mutual recognition of administrative or regulatory decisions, both within regions and between high- and middle- and low-income countries.

### 2 Policy recommendations for source countries

- Commit to greater access to standards-setting bodies for experts from low- and middle- income countries;
- Increase technical and financial assistance for improving the ability of low- and middle-income countries to absorb technology and trade;
- Ensure that tax deductions are available for technology contributions to non-profit entities engaged in technology transfer in low- and middle-income countries;
- Offer fiscal incentives to encourage enterprises to employ, at least temporarily, recent scientific, engineering, and management graduates from low- and middle-income countries;
- Develop grant programs that support meaningful involvement of research teams from low- and middle-income countries.

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- High-income country governments to increase the funding available for health and healthcare in low- and middle-income countries as a basic platform for economic development. This can be innovative at the same time as affordably addressing basic needs.

The WHO Global Strategy and Plan of Action on Public Health, Innovation, and Intellectual Property Rights contained ambitious proposals to map research capacity and the research being undertaken. This could be valuable if supported by sustainable funding.

Based on IFPMA member companies' experience, the solution for effective pharmaceutical technology transfers depends on actions at host and sponsor country level, with the support of multilateral organizations and positive engagement from industry.

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### **3** Multilateral policy recommendations

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- Reduce information gaps by establishing knowledge hubs furnished with examples of successful technology acquisition programs that have been undertaken;
- Establish special trust funds to support training of scientific and technical personnel in their countries of origin;
- Share knowledge about management of the public/private research interface.



## IV. The Role of IFPMA and its Member Companies

IFPMA members want to contribute to the sustainable development of the world economy and to the improvement of the health and living standards of people in all regions.

They are committed to work with public and private institutions in low- and middle-income countries to enhance healthcare provision for the benefit of all patients.

IFPMA member companies believe the contribution of pharmaceutical industry technology transfers lies in:



Developing innovative pharmaceutical and vaccine technologies;



Continuing to deliver corporate social responsibility programs that offer a range of products and the transfer of specialized knowledge and skills, which contribute to public health and economic development of the recipient country;



Enabling access to appropriate therapies and technical know-how, by implementing programs to improve the health of patients and build capacity around the world;

Transferring not only manufacturing technology but also other forms of acquired expertise, ranging from good clinical and laboratory practices to innovative solutions for therapy adherence and health literacy. Examples include:

- Sharing of know-how through clinical trials training and management;
  - Screening/sharing of compound libraries;
  - Scientific knowledge transfers via research collaborations;
- Building public health capacity through training and education;
  - Imparting management skills and expertise;
  - Diffusing knowledge through direct investments;
- Raising local production quality through joint ventures and licensed manufacturing;
  - Training in regulatory and quality standards;
  - Education in supply chain/logistical management;
    - Training of local health workforces;
    - Communication and advocacy training;
- Sharing of intellectual property and other knowledge.

# Case Studies

## Technology Transfer Track Record

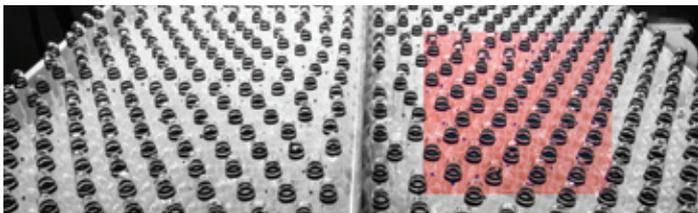
IFPMA member companies have engaged in technology transfer activities for a number of years in many emerging and developing countries, and have built up a creditable track record. Many examples are captured in IFPMA Health Partnerships Directory (<http://partnerships.ifpma.org>) and seek to inform policy discussions by providing an overview of recent technology transfer programs in the pharmaceutical and vaccine sectors. The programs have been grouped into two categories:



Transfer of manufacturing and entrepreneurial know-how



Scientific collaboration and knowledge-sharing



### Manufacturing and Entrepreneurial Know-How Transfer

This may include transfer of physical material, equipment or an entire factory, provision of information, know-how and performance skills to allow recipient countries to produce medicines and vaccines locally.

Voluntary licenses can also be a valuable tool for transferring technology. Voluntary license agreements may or may not entail transfer of manufacturing know-how.

To learn more about IFPMA position on voluntary licenses and non-assert declarations please visit [IFPMA website](#).



### Scientific Collaboration and Knowledge Sharing

Technology transfer is also performed through collaboration in the scientific field, including sharing of knowledge. Much of the research being conducted by IFPMA member companies into diseases disproportionately affecting people in low- and middle- income countries is being conducted on a collaborative basis, with public and private sector partners.

IFPMA [2014 Status report on pharmaceutical R&D to address diseases that disproportionately affect people in low- and middle-income countries](#) lists 186 R&D projects supported by IFPMA members to develop new or improved medicines and vaccines for 11 neglected conditions that each year kill or disable millions of people in low- and middle-income countries. Eighty-eight percent of these R&D projects are collaborative efforts, involving partnerships between IFPMA member companies and more than 80 partners from universities, public and private sector institutes and non-governmental organizations. More information on collaborative research can also be found in the [IFPMA website](#).



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### Partnerships make a difference to health and well-being where help is most needed

The IFPMA World Health Partnerships Directory is a database of partnerships between the research-based pharmaceutical industry and actors across all fields of global health; working together to meet current health needs and strengthen health systems in LMICs. With over 250 active case-studies currently profiled, the IFPMA Directory is the largest resource of its kind, with programs that impact every country in the world.

### FIND A PARTNERSHIP



- 1 Partnerships by disease
- 2 Partnerships by type

### HEALTH PARTNERSHIPS 502



**IFPMA Health Partnerships Directory** is the most comprehensive international database for health development programs involving the research-based pharmaceutical industry. The directory is a continuously expanding online resource that allows users to view in depth partnerships from across the world. Each partnership profile offers valuable insights into why a specific program was developed, and the ways in which it is helping to make a difference to communities and countries in which it operates. These health partnerships bring together governments, intergovernmental and nongovernmental organizations, private sector companies, universities, and foundations to improve the lives of people suffering from HIV/AIDS, malaria, tuberculosis, neglected tropical diseases (NTDs), and non-communicable diseases (NCDs) as well as tackling cross-cutting challenges such as women's and children's health. Content can be filtered by disease area, program type, country and partner organizations. In just a few clicks, users can identify relevant programs, determine where and how they operate and find out which diseases they are tackling.

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## **ABOUT IFPMA**

IFPMA represents the research-based pharmaceutical companies and associations across the globe. The research-based pharmaceutical industry's 2 million employees research, develop and provide medicines and vaccines that improve the life of patients worldwide. Based in Geneva, IFPMA has official relations with the United Nations and contributes industry expertise to help the global health community find solutions that improve global health.

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ISBN 978-2-940498-39-0



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