

I nternational Technology Transfer

By Andrea Andrenelli, Julien Gourdon & Evdokia Moise

Encouraging or Imposing the Transfer of Technology?

Research and development (R&D) collaboration between firms, including in the form of joint ventures and investments to acquire knowledge and capabilities, are central features of business interactions in today's knowledge economy. The transfer of technology, in particular by Multinational Enterprises (MNEs), is considered an important source of knowledge diffusion and economic growth worldwide. For that reason, it is increasingly a focus of policies aimed at attracting and retaining international business.

Governments may take steps to encourage technology transfer and diffusion. These interventions typically seek to promote technology-related foreign direct investment (FDI); to enhance the capacity of the local economy to absorb technologies transferred via such investment; and to establish an intellectual property rights (IPR) framework that is conducive to technology transfer. However, there are clear and growing concerns that other policies and measures may have the effect of "forcing" international technology transfer (ITT) by imposing on affected firms conditions that restrict their access to the market, or by undermining their control over their proprietary technology. Addressing these concerns can be complicated, not only in terms of identifying policies and measures of concern but also in terms of exploring appropriate disciplines and paths likely to offer relief.

Distinguishing between voluntary and mutually agreed-upon ITT, and ITT that is, or is perceived to be, compelled, is not always straightforward. Policies may or may not distort the normal process of technology transfer, depending on a number of factors, related both to the measures themselves and to the broader policy environment in which those measures are adopted and implemented. It can also be difficult to gather information on practices which are generally hidden and that companies may be reluctant to report publicly, including for fear of losing access to valuable markets.

While there are clearly questions of degree, forced technology transfer can involve situations in which the owner of a technology (e.g. an investor or licensor) is required to transfer technology either to be permitted to operate under the same conditions as local firms or to access the market at all. Therefore, although the owner of the technology might consent to transfer the technology in order to overcome those obstacles, the obstacles may still be viewed as *forcing* the owner's choice to give away proprietary technology. This is especially true for markets which are central to economic activity in given sectors and thus very difficult for a company to forgo.



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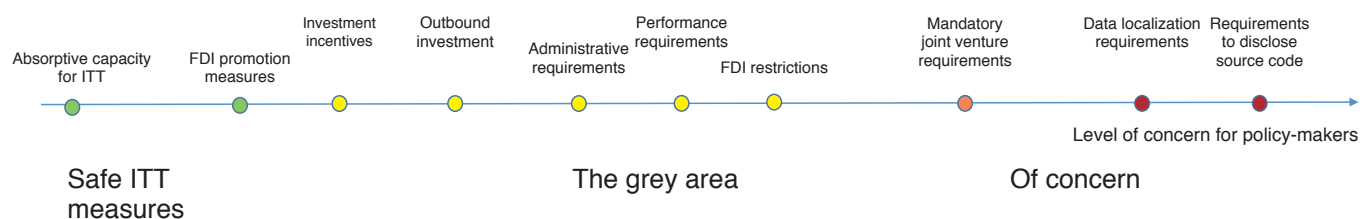
As a result, government efforts to distinguish policies that enable cross-border diffusion of technology, with the resulting benefits for widespread innovation and growth, from policies that may compel the transfer of technology in order to benefit competing firms are particularly challenging.

The OECD Continuum of ITT-related Policies

In order to help make this distinction, the OECD has elaborated a continuum of measures related to ITT, ranging from policies aimed at creating an appropriate supporting environment for ITT, to policies that may have the effect of imposing ITT to varying degrees, to policies which clearly result in a forced transfer of technology. This "ITT continuum" maps policies according to their potential to compel disclosure of commercially valuable and sensitive technology, based on the degree of compulsion the policies impose on foreign firms when they interact with local counterparts and the effect they have on foreign firms' control of their proprietary technology (*Chart 1*).

Along the continuum, three main categories of policies can affect ITT. The first, which normally does not raise concerns, includes *policies to enhance absorptive capacity*, aimed at enabling and maximizing the benefits of ITT, and *technology-related FDI promotion and facilitation measures*, which aim to attract and help to shape ITT effects. Investments in education and training, funding for networks between universities and foreign firms, or policies that facilitate investor access to human capital in technology-intensive areas may be an indispensable ingredient in successfully attracting and diffusing foreign technology. Policies aimed at fostering collaboration on R&D among foreign and local firms may also help upgrade local absorptive capacity. Investment promotion and facilitation measures such as streamlining administrative procedures, setting up information exchange networks and more generally improving the business environment also help, by creating the conditions for a supportive

CHART 1

ITT continuum map

Source: "International Technology Transfer Policies" by Andrea Andrenelli, Julien Gourdon and Evdokia Moise, OECD Trade Policy Papers, No. 222, OECD Publishing, Paris, 2019

business climate that will appeal to potential investors.

The second category encompasses a number of grey area policies, such as *technology-related investment incentives* which impose ITT obligations on foreign firms in exchange for financial benefits. They may take the form of preferential tax treatment on income from royalties, licensing and R&D capital gains, or grant schemes dependent on the technology transfer characteristics of the investment, as well as incentives for using local facilities, employing a skilled local workforce or building local suppliers' capacity. These incentives are less of a concern as such, but can drive companies to discount the risk of involuntary transfer of technology if they are essential for recipient firms to be able to operate competitively in a given market (for instance where all domestic companies in the sector already receive the benefit). Certain types of *ITT-related outbound investment*, motivated by the acquisition of foreign technologies, can also be of particular concern where they are directed by the state in support of state industrial plans (including in the case of mergers and acquisitions financed by state-owned banks or state-backed funds). State involvement can impact the competitive environment for other market participants when state-owned enterprises (SOEs) take advantage of their domestic protected status to expand internationally.

The third category covers policies often reported as problematic by firms, many of which impose technology transfer as a precondition for accessing the market, or otherwise jeopardise the firm's control over its proprietary technology. Concerns have been raised about the use of *registration, certification and approval procedures* by government bodies to request, formally or informally, sensitive proprietary information, including sensitive designs or other IP-related information which does not appear to be necessary for (or related to) the relevant administrative process. *FDI restrictions* such as screening processes can also be of concern where there is a requirement to provide sensitive information as a specific determinant of approval of the FDI by the relevant regulatory body. When such disclosure of information is not necessary to verify that products conform to legitimate public safety or security objectives, they can be considered as mandating technology transfer, especially if there is no transparency regarding the use by the regulator of the acquired information, if the protection of trade secrets is weak, or if the information may be transferred to competitors in the market. This category also includes *technology-related performance requirements* that impose local sourcing with the potential to compel involuntary technology transfer. These policies can limit the ability of foreign firms to enter into agreements with local partners on market-based, voluntary and mutually agreed contractual

terms.

A further area that can be of concern is *mandatory joint venture requirements* which oblige foreign investors to have local partners, and which can require transfer of, or have implications for, control of proprietary IP and know-how. Mandatory joint-venture requirements may or may not raise concerns depending upon their conditions, but they are of particular concern if they specifically require the transfer of technology. Lastly, some measures are highlighted as being of particular concern, such as *requirements to disclose source code* and *localisation of data storage* which can allow proprietary technology and trade secrets to be unintentionally transferred to or accessed by local firms, especially in combination with restrictions on cross-border data flows.

Factors Shaping the Impact of ITT-related Policies on Technology Transfer

The degree to which a given measure can be viewed as forcing foreign firms to transfer technology is influenced by factors related both to the measure itself and the broader policy environment. The most important of those factors are whether there is a **quid pro quo** established between access to the market and transfer of technology, potential **discrimination** and **lack of transparency** characterizing the measure or the broader policy environment, and the **role of the state** in the economy. Finally, the role of **intellectual property rights** and their enforcement are pivotal in preserving the technology owners' interests or, on the contrary, in resulting in unplanned transfers of technology when they are weak or discriminate against foreign firms.

When a measure imposes the transfer of proprietary technology as a **precondition to enter or operate in a foreign market**, firms may still have the choice not to enter the market at all, but face a high degree of compulsion to hand over their technology should they wish or need to enter the market.

Discrimination against foreign holders of technology, not just in terms of the measure itself (non-discriminatory measures can still compel ITT) but in the broader environment (e.g., lack of equal access by foreign firms to the courts or to contract enforcement) can complicate firms' efforts to resist involuntary ITT. In this sense, the conditions in which domestic firms operate, both in relation to specific ITT measures and in the broader environment, are a good yardstick against which to assess whether policy measures contain a lesser or greater degree of compulsion for technology transfer from foreign firms.

The same applies to **lack of transparency**, both in terms of how measures are formulated and applied (e.g., where the criteria for receiving a license or certification are unclear or discretionary) and in the broader policy-making environment. For example, where joint venture requirements lack clarity on the respective ITT-related obligations of the two partner firms, or where the criteria for receiving a license or certification are unclear or discretionary, or where the broader policy-making environment is non-transparent, there is a greater risk that policy measures may affect disproportionately the foreign firm's leeway in ITT decisions.

The **role of the state in the economy** may also be relevant in terms of the broader policy environment. Where the state is a player in the economy, with a significant stake in companies competing or collaborating with foreign firms, the conditions for the market-based transfer of technology under voluntary and mutually agreed terms can be compromised, including in the context of giving rise to concerns about the protection of information provided to government bodies for the purposes of approvals or licensing. Concerns may also arise when SOEs seek to obtain cutting-edge technologies and IP through mergers and acquisitions of foreign firms or where the state directs or facilitates outbound investment in support of state policy.

Finally, **protection of IPRs** plays a central role in attracting FDI and encouraging technology transfer and knowledge spillovers. The efficiency of the patent system in providing the necessary legal protection of inventive technology, while improving knowledge dissemination through the disclosure of relevant aspects of the inventions and in promoting further development of technologies through its licensing rules, is a critical factor for facilitating commercialization of innovative products. Adequate protection of trade secrets is also important, especially in the context of digitalization. Weak or discriminatory IPR protection and enforcement which enables competitors to imitate or reverse engineer protected technology products may be a strong disincentive for companies to risk exposure of their cutting-edge technology in that market. At the same time, host countries need sufficient technological endowment to be able to benefit from the positive effect of stronger IPR protection on technology transfer, a capacity that developing economies may lack in the absence of appropriate assistance.

These factors can mean that an otherwise neutral measure, particularly in the grey area of the ITT continuum, could be viewed as actually placing greater constraints on a foreign firm's choices in whether and how to transfer technology locally, or on its capacity to control proprietary technology in a non-transparent policy environment or where the involvement of the state in the economy and the ITT process is high. Not all these factors are equally pertinent for all measures, and a combination, such as a lack of transparency coupled with discrimination, can compound the effects of a measure in terms of compulsion and control. For example, if administrative requirements regarding the type of information required for product certification are not transparent, and where the role of the state in the economy gives rise to doubts over the

independence of the administrative or regulatory bodies and about the appropriate protection of information provided to them, a normal process of seeking administrative approval could become a potential channel for involuntary technology transfer. Where such aggravating conditions apply, the measure can "leap" from the safe or the grey area of the ITT continuum into the area of concern.

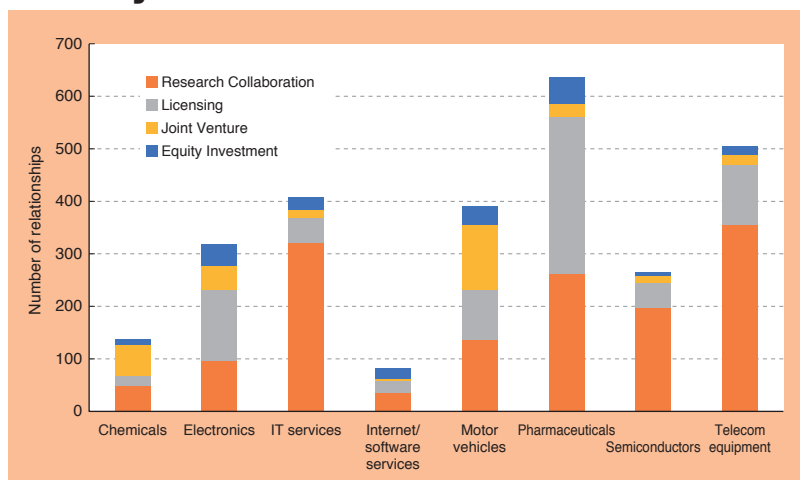
The Private Sector Perspective

The private sector perspective is key for promoting an informed debate on technology transfer. Firm-level data can be leveraged to provide evidence on business relationships among companies operating internationally, in order to draw a general mapping of the main technology transfer arrangements in place among multinationals and their business partners.

The forms of technology transfer arrangements identified among a sample of 160 MNEs in 14 different economic sectors, across both manufacturing and services, are international equity investments, joint ventures, technology licensing agreements, and research collaborations. At the aggregate level, companies appear to interact most frequently with foreign partners through research collaborations. This is followed by international licensing of technology and by international joint ventures. However, firm and sector characteristics appear to be important drivers of the form of technology transfer arrangement adopted between companies. In the available sample, chemicals, electronics, IT services, Internet/software services, motor vehicles, pharmaceuticals, semiconductors and telecommunications equipment particularly stood out for involvement in such arrangements (*Chart 2*), showing significant heterogeneity. For example, while research collaborations are most commonly observed in IT services, semiconductors and telecommunication equipment, firms in electronics and pharmaceuticals tend to use licensing as a form of direct ITT arrangement, whereas joint ventures are particularly important in the motor vehicles sector.

CHART 2

Technology transfer arrangements by industry



Source: OECD, based on FactSet Supply Chain Relationships

The use of firm-level data produces a heatmap of technology transfer arrangements that would be most sensitive to ITT policies in different economic sectors. It also provides interesting insights on the effect of sector-level restrictions on the form of technology transfer arrangement adopted by firms. For example, China appears as a main location for joint venture partners in the motor vehicles sector, which could be explained by restrictions on foreign investment in the automotive sector.

The data also confirms that interactions between MNEs and governments – at the federal, provincial or local level – are not unusual in global value chains, serving a wide variety of policy purposes, such as information exchange, capacity building and improvement in absorptive capacities. In order to distinguish voluntary technology transfer from its more constraining variants, the wider policy environment hence constitutes a key element, in particular as regards transparency in the terms of collaboration between companies and governments and on the nature of the collaborating MNEs (such as in the case of state-owned or state-backed enterprises) and regarding the objectives governments are seeking to attain through such collaborations.

International Disciplines Related to ITT

Relevant disciplines related to IPR protection, and ITT more broadly, can be found in the WTO and International Investment Agreements (IIAs), which include both Bilateral Investment Treaties (BITs) and relevant provisions in regional trade agreements (RTAs). International disciplines include WTO TRIPS provisions calling for *national treatment* with regard to the protection of intellectual property; *exclusive rights* conferred to patent holders; *non-discrimination* for patents in all fields of technology, irrespective of their place of invention or whether resulting products are imported or locally produced; and protection of *undisclosed information* from unintended disclosure and unfair commercial use, including in the context of marketing approval procedures. Recent RTAs also provide more extensive guidance as regards the protection of undisclosed information, with 25% of RTAs signed over 2010-2018 including provisions on trade secrets in their chapter on Intellectual Property Protection.

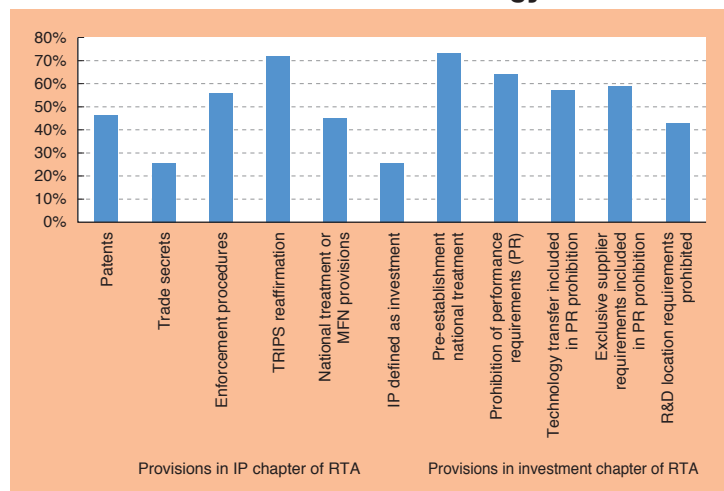
Beyond IP-related disciplines, provisions governing the wider investment policy environment can be found among WTO TRIMS provisions on national treatment, the WTO General Agreement on Trade in Services, notably in relation to scheduled commitments relating to market access and national treatment for mode 3, as well as in investment chapters in RTAs and BITs. Two-thirds of all RTAs concluded since 2010 and containing detailed investment provisions require the recipient country not to discriminate between foreign and domestic investors, not only with respect to their operations in the country once the investment has been established, but also as regards the conditions for establishing such investment (Chart 3).

Conclusion

Involuntary technology transfer is a complex issue, about which

CHART 3

2010-2018: Share of RTAs with specific provisions relevant for international technology transfer



Source: Authors, based on Andrenelli, Gourdon and Moise (2019)

there are clear and growing concerns. In order to think through the issues and identify the most appropriate policy responses, policy-makers need to apply a systematic and analytical approach to assessing which policies are of the greatest concern. ITT-related policies can range from measures aimed at creating an appropriate supporting environment, to those that may have the effect of imposing ITT to varying degrees, to policies which can clearly result in involuntary transfer of technology. The distinction between the various groups of policies depends on the degree of compulsion they impose on foreign firms and how they affect the bargaining power between foreign and local firms; and the effect they have on foreign firms' control of their technology.

Broader factors may also shape the impact of ITT-related policies, such as the conditions affecting the ability to access or compete in a given market; the transparency not only of the policy itself, but also in the broader governance environment; the extent to which the policy or the wider business environment discriminates against foreign firms; and finally, the role of the state in the economy, including in terms of the implications for the confidence of business in the independence of regulatory bodies.

Note: The opinions expressed and arguments employed are those of the authors and do not represent the official views of the OECD or of its member countries. This article draws heavily on work found in "International Technology Transfer Policies" by Andrea Andrenelli, Julien Gourdon and Evdokia Moise, *OECD Trade Policy Papers*, No. 222, OECD Publishing, Paris, 2019 (<http://dx.doi.org/10.1787/7103eabf-en>).

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