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Trade and Technology transfer

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The development of technology and its potential contribution to economic growth and development is a central feature of **globalisation**. In conventional terms, it is well known that **trade** in goods can result in the **transfer of technology**. Ideas and knowledge are an increasingly important part of trade. The rules of the GATT applied to trade in goods and had important implications for the transfer of technology. However, with the greatly expanded coverage of the rules of the WTO to address trade in services, intellectual property rights and technical standards, the potential importance for trade rules to influence technology transfer has increased greatly. This presents **challenges and opportunities**. To benefit from the opportunities, governments should examine the relationship between trade, technology transfer and the treaties of the WTO to determine if new instruments are required to better ensure the free flow of technology around the world.

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INTRODUCTION

The development of technology and its potential contribution to economic growth and development is a central feature of globalisation. This is particularly true for the international transfer of technology, or the shifting of ideas and knowledge across borders, and its effective diffusion into recipient economies.

In conventional terms, it is well known that trade in goods can result in the transfer of technology. Ideas and knowledge are an increasingly important part of trade. Most of the value of new medicines and other high technology products lies in the amount of invention, innovation, research, design and testing involved.

Similarly, trade in goods destined for the telecommunications sector, industrial chemicals, fertilizers, and information technology can directly improve production processes. Many products that used to be traded as low-technology goods or commodities now contain a higher proportion of invention and design in their value—for example brand name clothing or new varieties of plants. Technology can also be transferred through trade in counterfeit goods with copied trademarks.

There are other means of transferring technology that have not normally been considered to be trade in the sense of goods crossing borders. Trade in services, such as computer programming services, financial services and consulting, can result in a transfer of technology without the physical movement of goods. There is also the transfer of technology associated with the movement of skilled workers. Some technologies cannot be transferred without the knowledge of engineers and technicians who install turn-key operations. Skilled personnel move internationally between

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divisions of transnational corporations and foreign direct investment frequently requires the accompaniment of skilled technicians.

Similarly, technology can be transferred via temporary employment of managerial and technical personnel, the movement of students, scientists, and staff to universities, laboratories, and for study, teaching and researching. Returning expatriate students and professionals can transfer technology to local scientific, managerial and business activities.

Technology is also transferred at arms length through franchising and licensing to produce and distribute goods and services. Patents, trade secrets, copyrights, and trademarks are all means to transfer technology.

Expanding the Definition of Trade

An extraordinary development of the past decade is the extent to which international transactions that would not normally be considered the object of trade policy are central to the formulation of trade policy. Indeed, all of the above means of transferring technology, are now on the trade agenda.

What has greatly changed the situation is the entry into force of the World Trade Organization (WTO) and the agreements it administers. The reach of the WTO has been extended significantly in terms of its predecessor the GATT, with important implications for the relationship between what is now considered to trade policy and the transfer of technology.

WTO activities now reach deep into domestic regulatory systems of an increasing number of countries and relate to the domestic regulation of financial services, scientific evidence of the effect of hormone treated beef on human health and the international sale of telecommunication services. The Trade Related Intellectual Property Rights Agreement obliges WTO Members to provide for the patenting of life forms and it is seen by some to present a major obstacle to the access of the poor to technologically advanced medicines at affordable prices. Recent WTO disputes have also addressed trade in genetically modified organisms, raised questions about the role of science in the management of risks associated with public health, and dealt with the conservation of endangered species. It is argued that WTO rules frustrate the objectives of other multilateral agreements dealing with matters as diverse as the trans-boundary movements of genetically modified organisms and the rewarding of indigenous people for pharmaceutical products derived from local genetic resources.

The end result of the greatly expanded role of the WTO in world affairs is that the link between trade and the transfer of technology is now explicitly, or implicitly, inextricably linked to a number of WTO Agreements.

This is true of the Technical Barriers to Trade (TBT) Agreement which applies to national standards that specify the mandatory technological requirements of traded goods. These standards determine whether the goods may be imported or not. The TBT Agreement has as its objective the avoidance of standards being applied as a disguised protectionist measures. This could result in the refusal to import sophisticated radiological equipment or advanced internal combustion engines that did not meet domestic standards. Similarly, the Sanitary and Phytosanitary (SPS) Agreement disciplines the use of standards for human, animal and plant safety as disguised barriers to trade. Questions in this respect relate to whether the cross border movement of living genetically modified organisms (GMOs) are harmful to the environment, and whether food products derived from GMOs are harmful to human health.

Perhaps the most relevant WTO agreements for present purposes are, however, the Trade Related Intellectual Property Rights (TRIPs) Agreement, and the General Agreement on Trade in Services (GATS). These will be discussed below along with their impact on technology transfer.

Trade in services and technology transfer

The **General Agreement on Trade in Services** of the WTO emerged from the 1986-94 Uruguay Round. It establishes the rights and obligations that WTO Member countries must respect when trading services as well as the rules that WTO member countries pursue in the liberalization of trade in services. The international movement of services has a vast potential for the transfer of technology and the GATS is particularly relevant in this respect. An important question in determining the importance of GATS for technology transfer is what are the types of services activities the agreement applies to.

The GATT does not define "trade" in goods. Perhaps it is obvious as international trade takes place when merchandise crosses the border. In the case of services, the counterpart of a cross border definition would be, for example, postal services, voice-telephony and telefax services, the provision of which entails a cross-border movement in one form or another. Such a definition would exclude

many services where international transactions take place, where technology could be efficiently transferred, but where no services cross the border.

It was thought by trade negotiators in the Uruguay Round that if the definition of trade was based on the manner in which services were supplied internationally, rather than whether the service itself moved internationally, more areas of potential interest to both developed and developing countries would be covered by its rules.

Indeed, Article IV of the GATS refers to technology transfer and its importance for developing countries: "The increasing participation of developing country Members in world trade shall be facilitated through ... the strengthening of their domestic services capacity and its efficiency and competitiveness, *inter alia* through access to technology on a commercial basis ...". Interestingly, the access to technology is to be on a commercial basis.

After much negotiation, trade in services was defined as the supply of a service through any one of the following four *modes of supply*: cross-border movement of the service; consumption abroad of the service; commercial presence in the consuming country of the service supplier; and, presence of natural persons in the importing country to supply the service.

The adoption *modes of supply* as setting the boundaries to the coverage of services transactions has shaped the principles and rules embodied in the GATS, as well as the specific commitments that WTO Members have undertaken. Accordingly, it has had very considerable implications for the manner in which this trade agreement facilitates – or not – the transfer of technology. All modes of supply are direct relevance to the link between trade (as defined in the GATS) and the transfer of technology.

First, the service itself may cross the border from the territory of one Member to that of another (a telephone call from a person located in the territory to a person located in that of another Member). This mode of supply corresponds with the normal form of trade in goods. It is in many ways the most straightforward form of trade in services, because it resembles the familiar subject-matter of the GATT, not least in maintaining a clear geographical separation between seller and buyer.

Second, the service consumer of one Member may move across a border to consume a service supplied by another Member in its own territory (a medical patient temporarily moving to receive technologically advanced medical treatment in another country).

This involves the consumer travelling to the supplying country, perhaps to attend an educational establishment. Another example of consumption abroad would be the repair of a ship or aircraft outside its home country because of more technically advanced facilities than domestically available. Like cross-border supply, this is a straightforward form of trade which raises relatively few problems, since it does not require the service supplier to be admitted to the consuming country or the cross border movement of capital.

Third, a large proportion of service transactions require that the provider and the consumer be in the same place. In such instances there is a need for the presence of a service supplier of one Member through a form of commercial establishment in the territory of the consumer of another Member (a commercial presence to sell retail portfolio management services in the importing country). Examples would be the establishment of branch offices or agencies to deliver services such as banking, legal advice or communications. It could be the commercial establishment of an advanced engineering firm to sell its services in the importing country.

This mode of supply raises the most difficult issues for host governments. The fact that services are, by their nature, perishable and are supplied and consumed at the time of fabrication (e.g. many forms of financial and professional services) requires not the cross-border movement of the service, but the physical presence in the importing country of the service supplier or the physical presence in the exporting country of the service consumer.

Thus, this mode normally requires the admission of foreign nationals and the inflow of foreign capital and offers considerable opportunities for the transfer of technology, particularly if licensing, trademark protection, and other tools to promote the transfer of technology are in place.

The fourth mode of delivery is the movement of natural persons providing services as independent individuals. For example, a surgeon may take his or her technical skills to work in a hospital where a commercial presence has been established, or may be temporarily visiting another country to perform a specialised operation. An Annex to the GATS makes it clear, however, that the agreement has nothing to do with individuals looking for employment in another country, or with citizenship, residence or employment requirements.

While this form of trade may raise difficulties in terms of the need to apply measures to regulate the entry of natural persons (e.g.

visas), the situation may change in a number of services activities – particularly in labour intensive services - as a result of technological developments (e.g. services sold on the Internet, computer aided design services). Technological developments may make working abroad less necessary or attractive.

Intellectual Property Rights, trade and technology transfer

Intellectual property rights are the rights given to persons over the creations of their minds. They usually give the creator an exclusive right over the use of his/her creation for a certain period of time.

The Trade-related Intellectual Property (TRIPs) Agreement of the WTO also emerged from the Uruguay Round and establishes the minimum standards for intellectual property protection enforceable in the WTO. It attempts to strike a balance between the long term social objective of providing incentives for future inventions and creation, and the short term objective of allowing people to use existing inventions and creations.

The extent of protection and enforcement of these rights varied widely around the world; as intellectual property became more important in trade, these differences became a source of tension in international economic relations. Internationally-agreed trade rules for intellectual property rights were seen as a way to introduce more order and predictability, and for disputes to be settled more systematically.

One of the fundamental characteristics of the TRIPS Agreement is that it makes protection of intellectual property rights an integral part of the multilateral trading system, as embodied in the WTO. It is often described as one of the three "pillars" of the WTO, the other two being trade in goods (the traditional domain of the GATT) and trade in services.

In respect of each of the main areas of intellectual property covered by the TRIPS Agreement, the Agreement sets out the minimum standards of protection to be provided by each Member. For the purposes of the TRIPS Agreement, the term "intellectual property" refers to all categories of intellectual property. This includes copyright and related rights, trademarks, geographical indications, industrial designs, patents, layout-designs of integrated circuits and protection of undisclosed information and is therefore of particular relevance for technology transfer. It is unlikely that technology will freely flow to a country that does not have the necessary regulations in place to register and enforce intellectual property rights.

Each of the main elements of protection is defined, namely the subject-matter to be protected, the rights to be conferred and permissible exceptions to those rights, and the minimum duration of protection. The Agreement sets these standards by requiring, first, that the substantive obligations of the main conventions of the World Intellectual Property Organization (WIPO), the Paris Convention and the Berne Convention on moral rights, all the main substantive provisions of these conventions are incorporated by reference and thus become obligations under the TRIPS Agreement between WTO Member countries.

The conventional argument in favour of IPR protection is couched in terms of the need to encourage and reward creative work. Thus, intellectual property rights are designed to provide protection for the results of investment in the development of new technology, thus giving the incentive and means to finance research and development activities. Also, the protection of distinctive signs and other IPRs aims to stimulate and ensure fair competition among producers. As far as consumers are concerned, the protection of distinctive signs also offers protection, enabling consumers to make informed choices between various goods and services. An effective intellectual property regime should also facilitate the transfer of technology in the form of foreign direct investment, joint ventures and licensing.

The argument against the protection of intellectual property rights is based on the thesis that they are monopoly rights, at odds with the whole concept of free trade, and can be used in such a way as to exploit consumers and work against the public interest in general. The counter to this argument is that intellectual property protection provides exclusive, not monopoly, rights for a limited amount of time. Exclusive rights are necessary to fuel the engine of innovation -- which is risky and expensive. Innovation in turn lowers costs, increases quality, and provides new choices to consumers -- in short, it fosters trade.

Developing countries, in particular, see technology transfer as part of the bargain in which they have agreed to protect intellectual property rights. Major developed countries insisted on its inclusion in the total package of the WTO agreements on the grounds that it would increase technology transfer to developing countries. Many developing countries consider the agreement to be unbalanced in this regard and that it is fundamentally unbalanced against their interests. While it is difficult to measure, there is little hard evidence that the TRIPs Agreement has led to a major increase in the transfer of technology to developing countries.

Irrespective of the above arguments for and against the protection of intellectual property rights, most WTO members agree that developing countries have an important interest in providing intellectual property protection, as a way of encouraging more investment, research and innovation from which they should benefit. As they themselves increasingly innovate, they also have an interest in strong intellectual property protection. The experiences of Hong Kong, India, and Korea, for example, demonstrate this.

Some examples: -- Patents encourage discovery and invention of new products or processes by providing exclusive rights, for a limited period, to those who disclose the results of their inventions and thereby help to disseminate and advance the knowledge in both the original field of discovery and other fields. Copyrights encourage the creation of literary works, computer programs, and artistic works, as well as to performers, producers of sound recordings, and for broadcasters as well. These are obviously not interests unique to developed countries. Trademark protection helps to ensure consumers that products or services designated as having originated from a particular source actually come from that source. In that way, consumers can be certain they are getting the products and services they want.

Thus, in formal terms, Article 7 of TRIPs states that technology transfer is a basic objective of TRIPs: "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."

However, Article 40 of the TRIPs Agreement recognizes that some licensing practices or conditions pertaining to intellectual property rights which restrain competition may have adverse effects on trade and may impede the transfer and dissemination of technology (paragraph 2). Member countries may adopt, consistently with other provisions of the Agreement, appropriate measures to prevent or control practices in the licensing of intellectual property rights which are abusive and anti-competitive (paragraph 2).

The TRIPs Agreement does, however, have the requirement that developed countries' governments provide incentives for their companies to transfer technology to least-developed countries (Article 66.2). But it requires only developed countries to provide such incentives, and only on behalf of the least developed countries.

No obligations or rights are created for the developing and transition countries.

There is little doubt from discussions in the WTO context that intellectual property rights can stimulate innovation, and that the TRIPs Agreement can have an impact on technology transfer. Licensing technology subject to IPRs allows the transfer of certain know-how, skills and application technologies. Developing countries have noted in the WTO the need to encourage co-operation for establishing appropriate norms and practices that lower transaction costs of intellectual property and dissemination of technology. They have also identified the lack of will by many countries to engage in effective transfer programmes among the major problems that limit technology transfer.

State of play and conclusion

The Doha Ministerial Declaration has, for the first time in the history of the multilateral trading system, introduced a binding mandate for WTO Members to examine the relationship between trade and technology transfer. To this end, ministers established a Working Group on Trade and Transfer of Technology, open to all Members, to operate within the permanent structure of the WTO.

What is being sought by the developing countries is the full implementation of technology transfer clauses in all WTO Agreements. They are seeking to investigate all provisions of the WTO Agreements related to the transfer of technology and how they are being implemented; have the WTO carry out specific analytical work to better understand the relationship between trade and the transfer of technology; receive more assistance in terms of technical co-operation to better accommodate incoming technology; look for areas of agreement to build a consensus among WTO members as to how to promote the transfer of technology; and inquire into the role of other international and nongovernmental organisations. This broad ranging mandate has been resisted by a number of developed countries.

After negotiation, the Working Group Chair proposed an agenda covering a broad range of issues including: an analysis of the relationship between trade and transfer of technology; work by other intergovernmental organisations and academia; sharing of country experiences; identification of provisions related to transfer of technology in WTO agreements; and any possible recommendations on steps that might be taken within the WTO's mandate to increase flows of technology to developing countries.

In terms of policy directions, it would seem reasonable that given the unfulfilled expectations of developing countries with respect to the TRIPs agreement, serious consideration should be given to adopting a legally binding obligation for developed countries to put in place a mechanism for ensuring the monitoring and full implementation of the obligations of the TRIPs. This should include a binding commitment to promote the transfer of technology. It would also seem appropriate that there is a comprehensive review of the manner in which the entirety of the WTO agreements impact on the transfer of technology, what the implications are from a policy perspective, and if adjustments to current rights and obligations would facilitate a greater transfer of technology between countries.

As far as trade in services are concerned, the Doha Development Agenda is important in terms of prospects for additional technology transfer to developing countries. In these negotiations, governments reaffirmed "that the negotiations shall aim to achieve progressively higher levels of liberalization with no *a priori* exclusion of any service sector or mode of supply and shall give special attention to sectors and modes of supply of export interest to developing countries. We note the interest of developing countries, as well as other Members, in Mode 4."

The negotiations are being conducted on a request-offer basis, whereby a WTO member requests better access to a particular services sector in another WTO member's economy. This is followed by an offer to grant all, some or none of the additional access requested. What is of critical importance for developing countries is to secure commitments on the temporary movement of skilled workers, discussed as Mode 4 in the section above. Offers to liberalise the *temporary* entry of skilled workers from developing countries is a means to earn export revenues, encourage the development of skilled based industries, and provide additional learning for developing country services professionals in overseas markets.