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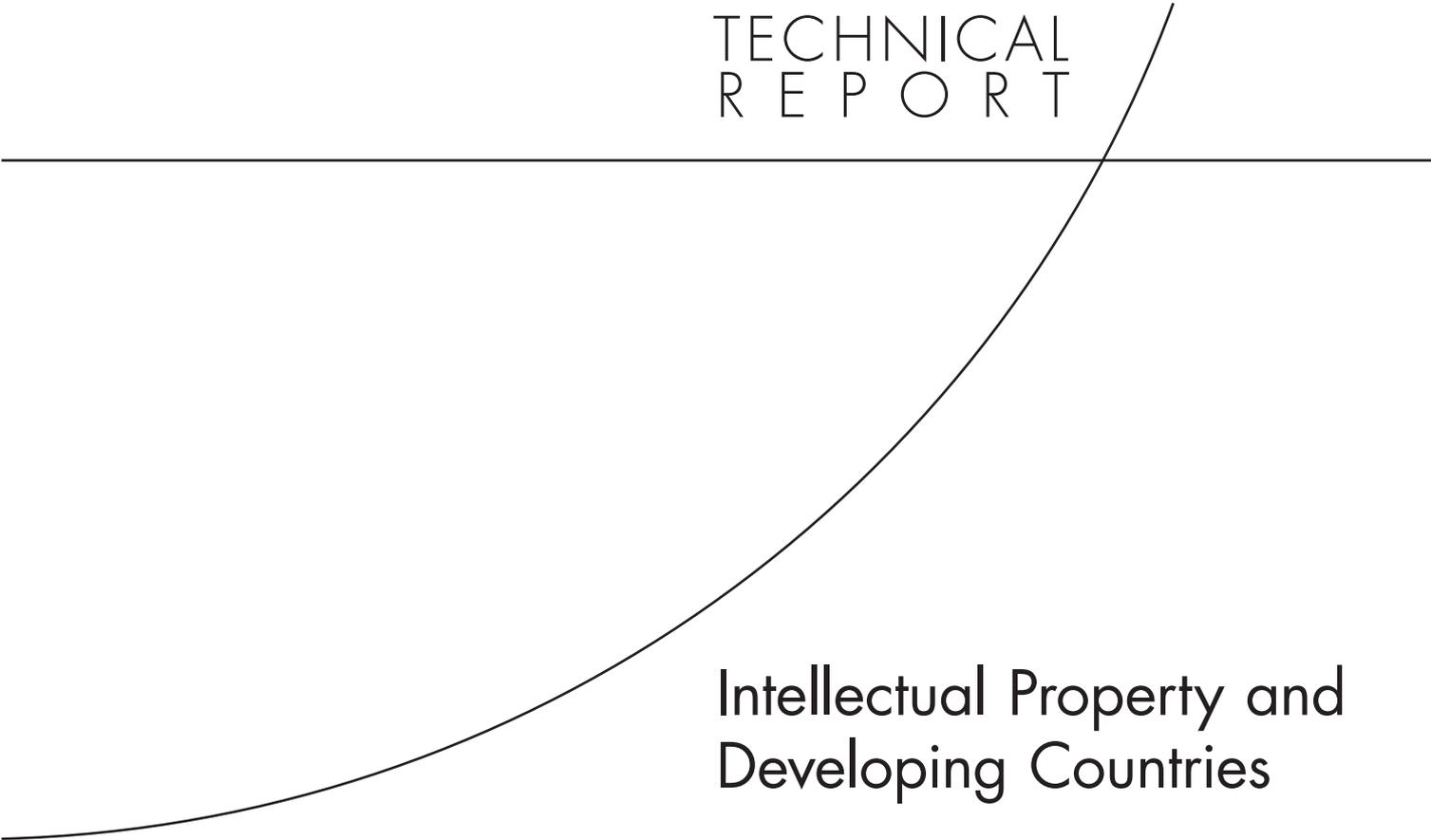
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# Intellectual Property and Developing Countries

A review of the literature

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Prepared for the UK Intellectual Property Office and the  
UK Department for International Development

The research described in this report was prepared for the UK Intellectual Property Office and the UK Department for International Development.

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# Executive summary

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## Introduction

The debate concerning the economic implications of intellectual property rights (IPRs) has gained considerable attention over the past two decades in the context of the World Trade Organization's (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), and the subsequent increase of regional and bilateral free trade agreements in the TRIPS-plus era. TRIPS aims to narrow the gaps in the way that IPRs are protected around the world, and to bring them under common international rules. It establishes minimum levels of protection that each WTO Member State must provide. The following rapid proliferation of regional and bilateral free trade agreements include elements of IPRs building on and raising minimum standards defined by TRIPS. These agreements indeed integrate TRIPS-plus norms, including undertakings by developing countries not to use specific TRIPS flexibilities. Developing countries are under increasing pressure to strengthen their national intellectual property (IP) regimes, in order to harmonise them with those of developed countries.

The movement towards strengthening IPRs in the laws of developing countries was initiated by developed countries under the belief that this would generate additional profits leading to more research and development (R&D), and it would be necessary to fuel economic growth in those countries. However, such belief attracted many critics, particularly researchers, who stressed that this movement was initiated against developing countries, underscoring the absence of empirical evidence to justify the socio-economic benefits for developing countries from strengthening IPRs.

Encouraged by this controversy, researchers have undertaken growing work to better understand the socio-economic effects of strengthening IPRs in developing countries, both from theoretical and empirical perspectives. In particular, researchers have tried to assess the effects of stronger IPRs on various economic variables, such as foreign direct investment (FDI), trade and innovation, as well as key areas such as public health and traditional knowledge.

This report presents the results of studies examining the effects of strengthening IPRs in developing countries. It reviews the results of the recent grey and scholarly literature on the positive and negative effects of stronger IPRs in developing countries, with a focus on five areas: FDI, trade, innovation, public health, genetic resources and traditional knowledge. The report also suggests future research directions.

## **Main findings from past research**

The main findings from the literature review are presented below. The empirical literature on the effects of strengthening IPRs in developing countries has grown substantially over the past decades. However, it remains surprisingly scarce, despite the passionate debate generated by the implementation of TRIPS and the subsequent development of bilateral and regional free agreements creating higher standards for IPRs in developing countries. Consequently, the main findings presented in this report should be interpreted with caution.

### **Intellectual property rights, foreign direct investment and international trade**

Commonly, FDI and trade are seen as key determinants for economic development and poverty reduction in developing countries. Inward FDI can generate important spillovers for developing economies, resulting in the upgrading of domestic innovative capacity, increased R&D employment, better training and support to education. For most developing countries, international trade allows them to acquire high value-added goods through importation that are necessary for economic development, but which are not produced domestically. In turn, exports allow developing countries to transform under-utilised natural resources and surplus labour into foreign exchange, in order to pay for imports to support economic growth.

Consequently, a central aim of the literature has been to examine how stronger IPRs in developing countries can give incentives to firms in developed countries to undertake cross-border investment in, and to export their goods to, these countries. Recalling the ambiguous relationship between IPRs and the individual strategies of single firms from a theoretical point of view, researchers have investigated empirically the effects of stronger IPRs on inward FDI in developing countries and exports from developed to developing countries.

The empirical evidence suggests that stronger IPRs may positively affect the volume of FDI and exports, particularly in countries with strong technical absorptive capabilities where the risk of imitation is high. When such risk is weak, particularly in the poorest countries, firms in developed countries do not seem to be sensitive to the level of protection in developing countries.

Using disaggregated data on FDI and trade, the empirical literature also shows that stronger IPRs impact on the composition of FDI and trade. First, stronger IPRs seem to encourage FDI in production and R&D rather than in sales and distribution. Second – and more surprisingly – stronger IPRs do not have any effect on the exports of high-technology products. There are at least two explanations for this somewhat surprising result. Many high-tech products are difficult to imitate, thereby international trade for these products is less sensitive to the level of protection than for other products. Furthermore, firms in developed countries may choose to distribute their high-tech products through FDI or licensing, instead of exporting them directly.

### **Intellectual property rights, international technology transfer and domestic innovation**

Increasingly, harnessing technological progress is viewed by policymakers as a key priority to boost economic growth and improve living standards. In an open economy, technological progress can be driven either by technology diffusion or technology creation.

In less advanced economies, technology absorption can drive economic growth because countries at the forefront of technology act as a driver for growth by expanding the stock of scientific and technological knowledge, pulling other countries through a ‘catch-up’ effect. However, the strength of this ‘catch-up’ effect at the technology frontier decreases with the level of technological development, to the benefit of technology creation. Indeed, technology creation by domestic firms becomes progressively more important as a country moves closer to the technology frontier, because catching up with the frontier translates into increasingly smaller technological improvement.

The empirical literature has examined the effects of IPRs on technological progress through these two main channels: technology absorption (i.e. international technology transfer) and technology creation (i.e. domestic innovation).

The empirical evidence suggests that stronger IPRs in developing countries may encourage international technology transfer through market-based channels,<sup>1</sup> particularly licensing, at least in countries with strong technical absorptive capacities. In the context of strong IPRs, firms in developed countries are more inclined to transfer their technologies to developing countries through licensing rather than through exports and FDI, since such rights allow them to retain control over their technologies. In the presence of weak IPRs, multinationals in developed countries seem to prefer to retain control over their technologies through intra-firm trade with their foreign affiliates in developing countries or FDI. Nevertheless, the historical evidence shows that many developing countries have benefited from international technology transfer through non-market-based channels, especially reverse engineering and imitation, thanks to weak IPR regimes.

The empirical literature also shows that stronger IPRs can encourage domestic innovation, at least in emerging industrialised economies. Nevertheless, the empirical literature suggests the existence of a non-linear function (i.e. a U-shaped curve) between IPRs and economic development, which initially falls as income rises, then increases after that.

### **Intellectual property rights and public health**

One-third of the world’s population does not have access to essential medicines. The proportion reaches 50 per cent in the poorest parts of Africa and Asia. In addition, pharmaceutical R&D on health problems specific to poor countries is often perceived as inadequate. Moreover, fewer than 10 per cent of global health research is directed towards diseases that afflict 90 per cent of the world’s population.

IPRs in pharmaceuticals have two principal areas of impact which affect public health. First, there is the issue of access, where discussion focuses on the links between IPRs, the exclusion of competitors, and the availability and pricing of new medicines. Second, there is the issue of incentivising innovation, where discussion focuses on the role of IPRs in motivating the discovery and development of new drugs, and the effect of these rights on R&D expenditure and its allocation across diseases, countries and organisations.

These two areas are at the heart of the empirical literature on the effects of IPRs on public health in developing countries. Overall, the literature suggests that strong IPRs can hamper

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<sup>1</sup> Other market channels include trade and FDI.

access to medicines in developing countries and does not necessarily encourage pharmaceutical innovation that responds to developing country needs.

Generic medicines are central to providing healthcare at prices affordable to developing countries. However, strong IPRs in only a select few countries that export generic medicines have far-reaching consequences for the developing world. This is because countries that rely heavily on imports of generic medicines may find themselves with a sudden shortage of suppliers.

Some have suggested that developing countries may benefit from differentiated prices, provided that strong IPRs are allowed to set high prices in the developed world and measures are taken to minimise parallel importing from developing countries where prices will be lower. However, the evidence suggests that even under such favourable IP and importing conditions, price differentiation is unlikely to be large – certainly not large enough to be of benefit to the very poor.

The argument that strong IPRs will benefit developing countries through future innovation is not borne out by the evidence. Strong IPRs are important for pharmaceutical innovation, but only where there is a strong market, as is often the case for health problems prevalent in the developed world. However, pharmaceutical industries in countries such as India, which have seen their IPR regimes strengthened, are not responding to developing country needs. Instead they too are focusing on developed country markets.

So, for health issues of particular relevance to developing countries, IPRs are of value to commercial product and technology developers only if a viable market can be created (for example, through an advanced market commitment).

### **Intellectual property rights, genetic resources and traditional knowledge**

Genetic resources from plants, animals and micro-organisms are widespread in developing countries, amounting to 90 per cent of the world's genetic resources. Communities and individuals in developing countries have exploited these genetic resources through the generations. Their use is embodied in what often is referred to as traditional knowledge.

However, the use of such knowledge and resources is not limited to local contexts, and many innovations relate to and draw on them. The broader use of traditional knowledge and genetic resources raises the prospect that they may play an important role in driving growth in developing countries. Therefore, the main issue is how this prospect might be best realised, particularly when the exploitation of traditional knowledge and genetic resources is coming increasingly under the governance of various, and sometimes conflicting, IPR frameworks.

The empirical evidence shows that IPRs can facilitate diversity in access to knowledge and benefit-sharing from innovation in developed countries. However, the effectiveness of IPRs in this regard depends on local capabilities in developing countries, in particular capabilities to engage in market production and exchange, and negotiate and establish the right legal infrastructure and enforcement.

Tailored IP laws are a necessary condition for knowledge protection systems to engage a wider range of people in accessing and sharing the benefits of knowledge in developing countries.

Although evidence about implementation is scarce, this could be facilitated by using the provisions in TRIPS for *sui generis* protection and geographical indications. Empirical studies have found that *sui generis* IP systems can facilitate increased influence in innovation on the part of local communities in developing countries. Geographical indications can be used to protect diversity in access and benefit-sharing in developing countries by making provisions for a price premium for goods produced in a specific locality.

Finally, in isolation, plant variety protection might impede diversity in access and benefit-sharing; however, these measures could be combined with provisions for farmers' rights, so as to promote diversity in knowledge systems in agriculture. However, at present, the empirical evidence about the impact of plant variety protection and farmers' rights in developing countries is thin.

## **Future research directions**

Throughout the literature review, the report identifies several knowledge gaps that deserve attention for future research.

### **Intellectual property rights, foreign direct investment, trade and licensing**

The bulk of the empirical literature on the effects of IPRs on FDI, trade and licensing has relied on data covering the period preceding the establishment of TRIPS and subsequent development of increases in the strength of IPRs through regional and bilateral free trade agreements in the TRIPS-plus era. Research is needed to assess the effects of these agreements on economic development in developing countries.

The majority of empirical studies have used indicators of IP protection constructed by researchers to proxy the level of protection in both developed and developing countries. However, many studies do not consider explicitly the effects of stronger IPRs in developing countries. Instead, they focus on examination of the differentials of protection across countries, whether developed or developing countries. Future research should concentrate explicitly on the effects of stronger IPRs in developing countries, and even distinguish between different groups of developing countries (e.g. fast-growing countries, least-developed countries).

Most of the empirical evidence of the effects of stronger IPRs on FDI, trade and licensing has been based on econometric methods. Although these methods are useful to examine whether there is a statistically significant relationship between IPRs and development, they are not able to explain fully the fundamental reasons behind the statistical results. For example, the limits of these methods are striking when the focus of the analysis is at industry level. Case study methods can provide useful insights in order to explain the different impacts of IPRs on economic variables such as FDI and trade at industry level.

Many studies using firm-level data to assess the effects of stronger IPRs on FDI, trade and licensing have used data on American (US) multinationals. More research is needed on European and Asian multinationals.

The empirical literature on the impact of stronger IPRs has considered the strategies of single firms in a partial-equilibrium framework without considering the impact on the whole economy. It is important to consider broader efficiency aspects in a general-equilibrium setting, particularly from a North–South perspective. Future research should investigate how IPRs impact on the dynamic allocation of resources devoted to the generation of knowledge and how the former influences the international division of labour devoted to the manufacture of protected goods. Furthermore, it is not clear from a dynamic perspective whether strong IPRs in developing countries encourage innovation in developed countries or whether some benefits from innovation in developed countries accrue to developing countries. These issues are of considerable importance and deserve further empirical research.

### **Intellectual property rights, international technology transfer and domestic innovation**

The empirical literature on IPRs and international technology transfer has concentrated mainly on market-based channels of technology transfer, i.e. licensing. However, little is known on the effects of stronger IPRs on non-market channels of international technology transfer, i.e. reverse engineering and imitation. Future research should examine in particular how stronger and well-structured property rights regimes can foster the diffusion of free technical information, and thereby innovation.

The empirical literature on IPRs and domestic innovation has established the existence of a U-shaped relationship between IPRs and economic development at the country level, suggesting that weak protection may ease economic development. Further research should seek to better explain the reasons behind this U-shaped relationship.

### **Intellectual property rights and public health**

Due to the convergence of economies, it is possible that IPRs may have a more important role to play in the future in dealing with the health problems common to both developed and developing countries. There is evidence that many problems are converging. Future research should investigate how the convergence of economies – and thereby the growing similitude of health problems between northern and some southern countries – are likely to impact on IPR regimes.

The review of the literature also reveals a knowledge gap in understanding the role of IPRs in public–private partnerships. Since these types of arrangements have emerged as the dominant paradigm for addressing neglected diseases, further research on this issue is needed urgently.

Several IP-related policy measures (such as government patent buy-outs, bifurcated patent systems, orphan drug legislature that extends patents, and transferable IPRs) have been put forward, based on theoretical grounds or indirect empirical evidence. These require careful policy analysis in order to determine their feasibility and implications with more confidence.

**Intellectual property rights, genetic resources and traditional knowledge**

The review of the literature on genetic resources and traditional knowledge has shown that there is a need for further research in order to assess the relative impact of different tailored IP laws on diversity in access and benefit-sharing. Specifically, more empirical evidence is required to better understand the impact of existing national *sui generis* systems and specific measures in the agricultural sector.