

The deployment of Free and Open Source Software in developing countries:

side-stepping the problems of TRIPs compliance

abstract:

Across the developing world the promise of 'informational development' is proclaimed. However, as the global governance of intellectual property rights (IPRs) is currently structured through the Trade Related Aspects of Intellectual Property Rights (TRIPs) agreement, overseen by the World Trade Organisation (WTO), software is expensive to deploy in developing countries. However, there is an alternative: the open source software and/or free software movement is already growing fast in Africa and elsewhere, and may allow WTO members to deploy powerful computing while at the same time avoiding propriety software *and* remaining TRIPs compliant. The utilisation of open source and/or free software will ameliorate one of the major problems that many developing countries have anticipated as they have changed their laws to protect IPRs; they will be able to deploy extensive computerisation throughout their societies without making large payment to suppliers from the developed countries. By side-stepping TRIPs, many developing countries will stand a better chance of enjoying the potential benefits 'informational development' is claimed to bring.

Centre Études Internationales et Mondialisation,
Université du Québec à Montreal, Tuesday 16th March 2004

Dr Christopher May, Reader in International Political Economy
School of Politics, Faculty of Humanities, Languages and Social Science
University of the West of England, Coldharbour Lane,
Bristol BS16 1QY, UK, ph. 0117 344 2375; fax. 0117 344 2295,
email: christopher.may@uwe.ac.uk

work in progress: cite with caution

Across the developing world the promise of ‘informational development’ is proclaimed. Multilateral aid agencies fund programmes which are meant to ensure that developing countries become ‘connected’ and are able to take advantage of the (globalising) information society. However, software is expensive to deploy in developing countries because much of it is proprietary, and therefore subject to intellectual property rights. However, there is an alternative: the open source software and/or free software movement is already growing fast in Africa, Asia and in the countries of the former Soviet Union. This may allow developing country and ‘transitional’ members of the World Trade Organisation (WTO) to deploy powerful computing while at the same time avoiding propriety software *and* remaining compliant with their international legal obligations as regards the protection of intellectual property rights (IPRs). This paper examines a policy strategy for (so-called) ‘informational development’ that side-steps the Trade Related Aspects of Intellectual Property Rights (TRIPs) agreement, and thus avoids many of the problems that up until now have concerned both policy makers in developing countries and activists who have proclaimed the importance of getting developing countries ‘on-line’.

Since 1995 IPRs have been subject to the TRIPs agreement overseen by the WTO. Although this agreement does not determine national legislation, for members of the WTO to be TRIPs-compliant their domestic intellectual property law must support the protections and rights that are laid out in the TRIPs agreement’s 73 articles. The agreement covers not only general provisions and basic principles as regards the laws of IPRs, but also represents an undertaking to uphold certain minimum standards of protection for IPRs and to provide legal mechanisms for their enforcement. Perhaps most importantly, the dispute settlement mechanism which is a central aspect of the WTO now encompasses international disputes about IPRs. Prior to 1995, while there were long standing multilateral treaties in place regarding the international recognition and protection of IPRs, overseen by the World Intellectual Property Organisation (WIPO), most rich and developed countries’ governments, and the multinational corporations (MNCs) based in these countries, regarded the agreements as essentially toothless in the face of ‘piracy’ and the frequent disregard for the protection of non-nationals’ intellectual property in poorer countries.

In addition to the advantages to be gained by having a tougher multilateral enforcement mechanism, the US government (alongside allies in the European Union) wanted to move the international regulation of IPRs into the new WTO (at the expense of regulatory competence located with the WIPO) because their negotiators felt that they were more likely to gain agreements to their advantage by linking these issues to the international trade regime (Braithwaite and Drahos 2000: 61-64). Therefore it is perhaps unsurprising that the TRIPs agreement represents a particular view of the role of IPRs in economic relations. Indeed, a number of large MNCs with a particular interest in protecting their IPRs played a major role in the negotiations which led to the TRIPs agreement, drafting the majority of the document which became the broadly successful position advocated by the office of the US Trade Representative (USTR) during the Uruguay Round (see May 2000: 82-84; Sell 2003: chapter five). These companies therefore had a significant impact on the (potentially) globalised norms lying at the heart of the TRIPs agreement.

The inclusion of the TRIPs, the General Agreement on Trade in Services and a number of other agreements (ranging from investment to antidumping) into the Uruguay Round final settlement was the culmination of a general strategy on behalf of the United States and the European Union to force developing countries to adopt multilateral agreements in sectors which they had hitherto resisted (Steinberg 2002). By withdrawing from their previous commitments under GATT 1947 and therefore terminating any obligations under that agreement, the US and EU forced developing countries to accede to a much wider ranging agreement under the WTO if they wished to regain the trade arrangements with which they had started the Uruguay Round.

Although there are still some members of the WTO who are in a transitional period, the TRIPs agreement establishes for the first time a potentially global settlement on the recognition and protection of IPRs. For the developed countries TRIPs compliance has involved some legislative reorientation and occasionally new laws (or judicial reinterpretations of existing laws); for the developing countries, often with little or no tradition of IPRs, compliance is considerably more difficult and expensive to achieve. In recognition of these difficulties most developing country members of the WTO are currently covered by the transitional arrangement (recently extended to 2016 in regard of pharmaceutical patents); they have been allowed a interim period in which they are expected to develop the legal and governance structures that full accession to the TRIPs agreement requires. During this transitional period developing countries have also been in receipt of extensive technical support (under article 67 of the agreement) to enable them to build the legal capacity to establish TRIPs compliance when they emerge from these transitional arrangements (May 2004). This support aims to reproduce global 'best practice' in the legal framework that underpins IPRs and is intended to ensure that the models of IPR-law favoured by the US and the EU are established in countries that have had different systems (or no systems) for the protection of intellectual property in the past.

However, as regards 'informational development' it may be possible to side-step the problems of TRIPs compliance through the use of free software and/or open source software, and it is this possibility that is explored below. Perhaps the most obvious reason for developing countries to consider this option is cost: countries in sub-Saharan Africa each year currently pay around 24 billion USD to developed country software companies to secure the use of proprietary products (FOSSFA 2004: 7), and this is unlikely to be exceptional across the developing countries as a whole. This transfer from poor countries to rich can hardly be depicted as unproblematic, whatever the utility of the products procured. However, if dependence on software products from the developed world continues, and IPRs are increasingly protected and enforced in developing countries (under WTO/TRIPs-related pressure), then these transfers will rise rather than fall. Below, I start by setting out the context of the global governance of IPRs, before briefly examining the model of 'informational development' (with a little historical context). I then examine the development and accelerating deployment of free and open source software in Africa, alongside the advantages of this deployment. The use of free and open source software, I conclude is an important political response to the problems encountered by developing

countries as regards the protection of IPRs in software, and may have a relevance beyond the realm of information and communication technologies.¹

A (very) short history of the global governance of IPRs

While the history of intellectual property itself stretches back to the fifteenth century Venice, for the first 350 years of its legislative existence it was almost entirely a national issue (Sell and May 2001). However, as part of the nascent multilateralism of the mid- to late-nineteenth century diplomacy between the major trading nations established two intellectual property agreements which broadened the governance of IPRs beyond national borders. These diplomatic efforts resulted in the Paris Convention (covering patents), completed in Madrid in 1891, and the Berne Convention for the Protection of Literary and Artistic Works (1886) (covering copyrights). Additionally, in 1891, the Madrid Agreement Concerning the International Registration of Marks (which dealt with trademarks) was also negotiated as part of this international diplomatic dynamic. The first conference to consider the case that there should be some extra-national co-ordination of patents met in Vienna in 1873. This was partly a response to concerns that there would be insufficient protection for the innovations displayed by exhibitors at the International Exposition to be held in Austria later that year. Although the Austrian government passed a special law for the period of the exposition, the discussion and negotiations behind this law prompted the US representatives to suggest another conference on international patent protection (Penrose 1951: 42ff). Conferences in Paris (1878 and 1880) developed the idea further and a final conference in 1883 approved and signed the Paris Convention, which was completed by an Interpretative Protocol in Madrid in 1891, and was revised six times before being finally amended in 1979.

Unlike patents, in the realm of copyright the first international agreement was preceded by some bilateral agreements to recognise contracting state's nationals as legitimate rights holders in non-domestic jurisdictions. However as Sam Ricketson notes: 'Although the network of bilateral copyright arrangements... was extensive, the protection this offered to authors in countries other than their own was far from comprehensive or systematic' (Ricketson 1987: 39). Like patents, the multilateral convention that was finally negotiated originated with a conference (this time in Paris) which accompanied an international event (the Paris 'Universal Exhibition' of 1878'). The conference launched the International Literary Association (later the International Literary and Artistic Association) under the founding presidency of Victor Hugo, which held a number of meetings (London 1879; Lisbon 1880; Vienna 1881; Rome 1882) culminating in the 1883 Congress in Berne. This and subsequent conventions explicitly set out to follow the example of the Paris Convention, and produce a multilateral copyright agreement (Ricketson 1987: 49ff). This process

¹ This paper was prompted in the first instance by my attendance at *Idlelo 2005: First African Conference on the Digital Commons*, University of the Western Cape, Cape Town, South Africa, in January 2004, which was very kindly funded by the Open Society Institute, and who I thank for their support (especially Vera Franz). Many of the people I met in Cape Town helped me think through issues about open source software in Africa and although their contributions are too varied to list individually, I would like to especially thank Derek Keats who was the organiser and facilitated a very productive four days, and Carole Spary (University of Bristol) who provided some research assistance on her own time for this paper.

finally produced the Berne Convention for the Protection of Literary and Artistic Works (1886).

While both these conventions grew and developed over the subsequent century, alongside agreements on trademarks and other forms of intellectual property, as early as 1893 the number of common issues had led to the establishment of a combined secretariat, functioning under various names until the establishment of WIPO at the end of 1960s. An agency of the United Nations since 1974, WIPO also administers other international treaties covering intellectual property (including trademarks, geographic indicators and industrial designs) and is responsible for promoting technology transfer by supporting the recognition of IPRs in developing countries. Thus, WIPO by the 1970s oversaw a complex of different agreements on various forms of intellectual property, all with differing signatory lists, with divergent mechanisms for negotiating settlements in international disputes and little harmonisation in their underlying principles. The Paris and Berne conventions, remained the most important agreements and both aimed to ensure that the rights of owners could be easily exercised in foreign jurisdictions (national treatment), utilising common processes and levels of protection. However, not only did the conventions themselves (and thus WIPO's secretariat) have no explicit rules on enforcement, there was no settled effective mechanism for the settlement of disputes between members regarding the protection offered non-nationals (Matthews 2002: 11). Members enjoyed enormous discretion over how they legislated to protect IPRs and many potential signatories of the various conventions who were IPR-importers did not perceive accession to all of WIPO's portfolio of treaties as in their immediate national interest.

The differences between the various members' perceptions of their national interests undermined attempts in the 1970s and 1980s to establish a more workable dispute settlement procedure. While the conventions allowed some voluntary harmonisation of protection across the various forms of IPRs, growing concerns among important industrial sectors in the richer, developed countries (especially the content industries) regarding piracy, were largely frustrated at a time when IPRs were moving steadily to the centre of the commercial concerns of a number of important globalising industrial sectors. Indeed, the main political pressure from the developed countries to include intellectual property in the Uruguay Round originated in the response by the content industries to a series of technological innovations, centred on information and communications technologies (ICTs) which enhanced both the possibilities of an international (commodity) trade in information- and knowledge-related goods, but also enlarged the possibilities of 'theft' and 'piracy' (May 2000: 81-85). Trade negotiators from the developed countries were heavily (and successfully) lobbied on this issue while they themselves also argued that the complex of 24 multilateral treaties administered by WIPO produced too much rule diversity. The solution was to bring the governance of IPRs into the realm of the new WTO and by doing so harmonise protection across the members of this new organisation. However, this line of argument did little to stimulate developing countries' interest in including IPRs in multilateral trade negotiations.

To 'encourage' a change of heart regarding the negotiation of the TRIPs agreement, the US trade representative threatened bilateral trade sanctions (under the Special 301

section of the Omnibus Trade and Tariff Act, 1988), and actually utilised such measures against the Indian pharmaceutical industry among others (Matthews 2002: 31). This stick was combined with the carrot of a promise to open up agricultural markets and an offer to abolish the Multi-Fibre Arrangement which constrained developing countries' textile exports (May 2000: 88). The developing countries generally lacked the expertise and resources to fully resist this firm bi-lateral pressure. Thus, although even in 1989 for many it was clear what the detrimental effects of an international trade-linked agreement on IPRs would likely be (Gakunu 1989), this was not the same as being able to withstand the considerable political resources brought to bear by the developed countries' negotiators to secure the TRIPs agreement in the final settlement of the Uruguay Round. The combination of political pressure, and weakened resistance due to the complexity of the negotiations relative to the limited resources developing countries could dedicate to them, ensured that when the developing countries joined the new WTO they had to accede (with some transitional arrangements to be sure) to the TRIPs agreement as well.²

The Trade Related Aspects of Intellectual Property Agreement

Since the conclusion of the Uruguay Round of multilateral trade negotiations, and the formation of the WTO, the legal regime for intellectual property has been effectively globalised. Although the TRIPs agreement does not dictate national laws it does require members of the WTO to ensure their laws in this area produce certain mandated patterns of governance. The preamble to the TRIPs agreement which itself was subject to some considerable negotiation was finally agreed on the basis that the signatories desired

to reduce distortions and impediments to international trade, and taking into account the need to promote effective and adequate protection of intellectual property rights, and to ensure that measures and procedures to enforce intellectual property rights do not themselves become barriers to legitimate trade (GATT 1994, A1C: 2).

In the agreement the formal recognition that 'intellectual property rights are private rights' is partly balanced by an explicit allowance of the need for the 'public policy objectives of national systems for the protection of intellectual property, including developmental and technological objectives'. The previous problems of international enforcement of IPRs is reflected in the desire to promote 'adequate' protection through the application of a global set of standards.

The keystone of the TRIPs agreement is the adoption in the realm of intellectual property of the principles that are central to the WTO (like the GATT before it): national treatment; most-favoured nation treatment (MFN); and reciprocity. While reciprocity as a principle does little in itself to change the intellectual property regime, the introduction of MFN does change the international governance of IPRs somewhat. Under the auspices of WIPO there were many smaller scale treaties and conventions on various aspects of intellectual property; under TRIPs all such specialised agreements immediately apply to all the members of the WTO. Where there has been resistance to incorporate particular sectoral conventions in the past, by inclusion into the WTO their scope becomes as wide as the main IPR conventions.

² Extended discussions of the negotiations that led to TRIPs can be found in Matthews (2002: chapter two) and Stewart (1993: 2245-2333).

Furthermore national treatment ensures favouritism accorded domestic inventors or prospective owners of IPRs relative to non-nationals is rendered illegal. This is an important shift as many national IPR systems have favoured domestic 'owners' either through legislative or procedural means. Indeed, in the past, many industries in then developing countries (such as the US publishers in the Nineteenth century) have 'pirated' non-national intellectual property by awarding protection to nationals who were known not to be the original innovators.

At the dawn of the new millennium however, the central intention of the TRIPs agreement is to provide a legal framework for a single intellectual property regime throughout the international system. The TRIPs agreement presents WTO members with a single framework for dealing with the diverse aspects of intellectual property, replacing WIPO's more fragmented set of treaties and sectoral agreements. That said, it is not a model piece of legislation that can be incorporated directly into national law. Rather, it sets the minimum standards that should be reflected in the national legislation of all WTO members. It does not preclude members setting more rigid or stronger protection for IPRs except where such extensions above and beyond the minimum standards represent an infringement of the agreement's articles in some way. National legislatures are required therefore to ensure IPRs are protected but the method for this protection is only important as regards its consequences, not its form; the agreement is explicitly concerned with ends not means. But, national legislative enactment of the TRIPs agreement's principles are subject to the WTO's dispute-settlement mechanism under the agreement. Therefore, unlike the WIPO's stewardship of previous conventions, the WTO offers a considerably more robust mechanism for states to appeal to where the national laws of a particular country are seen to impede the rights of other nationals.

While the character of intellectual property, what is actually to be protected, is modified to some extent by the agreement (especially for computer programmes), the main area of discontinuity with prior practice is in the national protection of IPRs. By bringing intellectual property under the purview of the WTO, the TRIPs agreement stipulates that 'procedures shall be applied in such a manner as to avoid the creation of barriers to legitimate trade' central to intellectual property law (GATT 1994, A1C: 19). The protection of intellectual property rights (or more often their non-protection) should not be used to disrupt trade flows. For instance, if only nationals are protected this would act as a barrier to non-nationals who would receive no protection for the IPR element of goods or services they wished to export to that jurisdiction. Non-discrimination must be explicitly part of a clear and fair registration procedure for IPRs, where they require registration, to be recognised (the exceptions being copyright and trade secrets - 'undisclosed information'). The agreement provides a set of conditions which national legislation for registration must fulfil, broadly based on the requirements of openness and prompt enacting of procedures.

The members of the WTO are required to enact suitable procedures to ensure the 'effective action against any act of infringement of intellectual property... including expeditious remedies to prevent infringements and remedies which constitute a deterrent to further infringement' (GATT 1994, A1C: 19). These procedures must be fair and equitable and available under civil law. In the section of the agreement covering Civil and Administrative Procedures and Remedies there are a number of

requirements which national legislation should include ranging from the need for courts to have powers to obtain evidence of infringements to the need to produce fair settlements in regard to damages. The agreement also mandates clear limits to the parallel importation of licensed goods from other jurisdictions. However, this is expanded in TRIPs to cover not only trademarked goods but also ‘pirated copyright goods... [and] goods which involve other infringements of intellectual property rights’ (GATT 1994, A1C: 23). This has clear implications for the trade in computer software, where such software is protected by copyright.

Overall this extension of the protection of intellectual property in the international realm as well as the harmonisation of law across WTO members represented a major triumph for the ‘US pharmaceutical, entertainments and informatics industries that were largely responsible for getting TRIPs on the agenda’ of the Uruguay Round (Hoeckman and Kostecki 1996: 156). The TRIPs agreement is significant in the extension it represents for the rights of the owners of intellectual property. This one-size-fits-all strategy may not self evidently serve many developing countries immediate best interests, even though this is the model which well-funded capacity building and ‘awareness raising’ programmes aim to reproduce (May 2004).³ The World Bank, WTO, WIPO and a number of other multilateral, national, and private, agencies are expending significant effort in this area to ‘help’ developing countries establish TRIPs compliance. Furthermore, and paradoxically, as Peter Drahos has pointed out, in an attempt to ensure their clients are not caught up in costly IPR-related trade disputes with developed country members of the WTO, the staff of WIPO have often encouraged developing countries to adopt legislation that goes beyond the formal requirements of the TRIPs agreement (Drahos 2002: 777). It is now difficult to imagine that any developing country member of the WTO can withstand the pressure (and influence) brought to bear on the legislative process, and thus slowly all IPR systems in the world are converging on the TRIPs-standard.

Indeed, in the wake of bi-lateral trade agreements with the USA, a number of developing countries have found themselves needing ‘TRIPs-plus’ legislation which again reinforces this dynamic within the assistance programme at WIPO. Thus, in trying to help developing countries avoid trade disputes, the assistance programme has undermined the (albeit limited) possibilities of diplomatic (and democratic) critical engagement with the agreement itself. These difficulties are compounded in the arena of ICTs as the software that might enable countries to take advantage of the (claimed) promise of the ‘information age’ are mostly owned by large computer sector multinationals that have been strident in their claims for protection from ‘piracy’. Indeed as noted in the introduction, the deployment of these software programmes has involved significant transfers from the developing countries to companies in the richer, developed countries. This issue of cost and the deployment of software in developing countries is largely an issue of the ownership and enforcement of IPRs.

³ However in an interview published at the end of 2003 in *the ACP/EU Courier* Kamil Idris, the Director General of WIPO, proclaimed that: ‘There is no one-size-fits-all solution and each country must tailor its IP strategy, taking into account its particular circumstances’ (Lefèbvre 2003: 25). Here he and I must differ, as there is widespread evidence of considerable political pressure brought to bear both inside and outside WIPO to shift WTO members into a particular reading of the TRIPs agreement’s requirements.

Informational development and the ‘problem’ of intellectual property

It is part of the common-sense of internationalism that enhanced global communications serve the wider (developmental) good of a liberal global society. In 1980 the (in)famous MacBride report *Many Voices One World* noted that communication functions are linked to all people’s needs, both material and non-material. Man does not live by bread alone; the need for communication is evidence of an inner urge toward a life enriched by co-operation with others. People want to add aspirations towards human growth to the satisfaction of material needs. Self-reliance, cultural identity, freedom, independence, respect for human dignity, mutual aid, participation in the reshaping of the environment - these are some of the non-material aspirations which all seek through communication. But higher productivity, better crops, enhanced efficiency and competition, improved health, appropriate marketing conditions, proper use of irrigation facilities are also objectives - among many others - which cannot be achieved without adequate communication and the provisions of needed data (MacBride *et al* 1980: 15).

This summation of the benefits for development of communication has hardly been bettered since. While the MacBride report was hardly uninterested in new technologies in the subsequent two decades the role of new information and communication technologies (ICTs) has moved centre stage.

Many multilateral institutions now stress that improved communications (utilising new ICTs, and specifically the Internet) are a key aspect of development. The World Bank’s 1998/99 Development Report *Knowledge for Development* laid great emphasis on the role of the Internet and linked digital technologies (World Bank 1999: chapter 4), as did the UNCTAD report *Knowledge Societies* (Mansell and Wehn, 1998), and the G8’s Digital Opportunities Task Force report (DOT Force 2001). In one sense, all development is informationalised development: development is the application of (new) knowledge (and information) to existing or historical social, political and economic problems. However, one of the central arguments of the 1998/9 World Development Report was that new ICTs ‘hold great potential for broadly disseminating knowledge at low cost, and for reducing knowledge gaps both within countries and between industrial and developing countries’ (World Bank 1999: 57). These themes are being taken forward through the World Summit on the Information Society process, which is establishing action plans for developing countries with the clear aim of encouraging their entry into the ‘information society’.

This emphasis on new ICTs is most often expressed through the all encompassing term ‘the Internet’ (now shorthand for a group of linked technologies, hardware *and* software). Responding to the developmental focus on ICTs, the G8 governments set up the Digital Opportunities Task Force (DOT Force) at their Okinawa meeting in July 2000 to examine the potential of these technologies and explicitly to address the emergence of the ‘digital divide’.⁴ The DOT Force May 2001 report stressed that ‘the

⁴ The term ‘digital divide’ itself has an interesting history which space precludes from discussion here, but the American elements of its genealogy are usefully set out in the documents collected by Benjamin Compaine (2001).

basic right of access to knowledge and information is a prerequisite for modern human development' (DOT Force 2001: 5). The report went on to argue that: 'Creating digital opportunities is not something that happens *after* addressing the "core" developmental challenges; it is a key component of addressing those challenges in the 21st century' (DOT Force 2001: 7). To some extent these claims echo an earlier debate regarding the new world information and communication order (NWICO), which sought to extend Article 19 of the Universal Declarations of Human Rights to cover all forms of communication.

The appeal to Article 19 was intended to guarantee freedom of opinion and expression alongside the right to seek, receive and impart information through any media. In addition, the NWICO campaigners argued for a 'right to communicate' due to the major shifts in ICTs already apparent twenty years ago (Anash 1986: 78). Most importantly, if we are to take seriously Amartya Sen's notion of 'development as freedom' where freedom is concerned with the processes of decision making in social, economic and political realms (Sen 1999), the need to establish communications networks would seem to be a *sine qua non* of development. Indeed, Sen argues at length that the developmental focus on growth of output needs to be allied to a clear concern for the manner in which countries developmental decisions are made, and the scope of provision of information about such decision-making processes. This, of course, dovetails with the vast information society literature which stresses the empowering character and value of *more* information.⁵ By linking up with the global information society via ICTs and the Internet not only are horizons widened but local potential can be unleashed (Mansell and Wehn 1998). In this sense, all development is informationalised development, although it is as well to be clear that this does not necessarily entail the roll-out of the latest powerful computers (it may more importantly be interpreted as a call for literacy and education).

Nevertheless, focusing on the technological element of any 'informational development strategy, the 1998/9 World Development Report made one of its central arguments that new ICTs 'hold great potential for broadly disseminating knowledge at low cost, and for reducing knowledge gaps both within countries and between industrial and developing countries' (World Bank 1999: 57). This remains subject to strident wealth effects regarding computer ownership (although this may have been partially ameliorated by the speedy deflation of home computer prices in the last couple of years), and the costs of software programmes. Certainly, few developing countries even approach the defacto one-telephone-per-household standard of service achieved in the developed countries (Mansell and Wehn 1998: 258). For anyone arguing for the developmental potential of the global information society this is undoubtedly a major stumbling block. In this sense, the 'informational development' paradigm is just the latest in a long line of development strategies promoted by aid agencies, multilateral agencies and others (Wade 2002). Although, the deployment of ICTs may have specific advantages in certain areas, this is different from the general panacea that is sometimes presented. The so called 'digital divide' is not necessarily the most pressing developmental priority: health, welfare and education are much more serious problems. However, this is not to say that ICTs can play no role in reducing the gross inequalities within the global system.

⁵ I have surveyed the literature at length in *The Information Society: A sceptical view* (May 2002) and all generalisations regarding this literature are drawn from this source.

Henry Lucas and Richard Sylla argue that the widening technological gap between rich and poor, between developed and developing countries, needs to be ameliorated through extensive action by the developed countries, which could be rather costly. Their recommendations range from a 1% tax on e-commerce as well as a monthly one USD surcharge on Internet accounts in wealthy countries to a number of forms of direct aid and a programme of Peace Corps-like bands of trainers being dispatched to help developing countries' populations become familiar with ICTs (Lucas and Sylla 2003). However, like many writing from a telecommunications background the authors of these suggestions fail to also include the problem of intellectual property in their deliberations, and thus miss one further limitation on informational development which needs to be addressed in some way. Nevertheless, even for Lucas and Sylla's interventions, the problem is how to organise and politically support such public-regarding policies in a global information system that is increasingly marketised.

Paul Anash pointed out, twenty years ago, that the concern of the developing countries was to ensure that the vast potential offered by innovations in communication technology could be harnessed to promote cultural progress, social development and international understanding rather than to perpetuate the subjugation to which they had been relegated by historical circumstances. They also wanted to ensure that they could take advantage of the world's communication resources to articulate their problems and make their own contribution to world culture, rather than remaining passive recipients of other people's cultures which could undermine their cultural integrity and identities (Anash 1986: 67).

To fulfil these demands, the global communications sector needed to be regulated not merely be a market logic. However, any suggestion that the Internet or other electronic networks might be regarded as a public good is somewhat undercut by the continuing commoditisation (and 'liberalisation') of the tools which facilitate access to these networks. One of the key concerns motivating many of those involved in the NWICO debates was the problem of social provision of communications. Often in developing countries up-to-date communications technologies were available to urban elites, however wealth effects ensured that only a small minority was able to benefit from these advances and the access to information and communication they provide.

Like transportation and other public networks, the marginal costs of using communications networks are close to zero. Therefore as Jacques Habib Sy points out Pricing is never innocent for network goods.... Instead pricing is the result of a conscious distributive decision on how to share the burden of the initial investment. With privatisation, these distributive decisions are often taken out of the public domain and put into foreign hands (Sy 1999: 338).

However, when we move to more complex ICTs, the key issue regarding the delivery of information revolves around the costs of reproduction which are largely shifted from the producer to the consumer, and this trend starts with the tools required (the various software packages needed to establish meaningful connectivity). This can be retrogressive despite the rhetoric of the information society. The running costs of information retrieval (from technological purchase and support, to line rental and user

fees and of course including printer consumables such as paper and ink) can be prohibitively expensive for many sectors of the putative global society. Thus, while ICTs may enhance immediate communication, they do little to reduce the costs of information retrieval where such information is complex and needs to be accessed on-line but printed off for real use.

There has been considerable discussion of the Internet as a Public Good supporting the dissemination of valuable knowledge and information for development (see for instance, Adamson, 2002; Lessig, 2001; Spar, 1999). As Jerome Reichman stresses, the

increased use of electronic publication via the Internet already allows even the latest-comers to access the most advanced thinking and methods in certain fields [fn.del]. These information networks thus become critical tools for breaking through the neo-mercantilistic fences that increasingly surround innovative products and processes in the technology-exporting countries (Reichman, 1997: 85).

Although there may be technological problems (linked to infrastructural development), and dissemination costs (noted above), it is important to note that these knowledge flows are also compromised by the continuing commoditisation of knowledge and the widening scope of IPRs. Specifically the problems of IPRs related to software tools and programmes limit the ability to utilise the tools that are required to access the information that is central to the claims of Internet-mediated informational development.

When the TRIPs agreement was being negotiated, many of the issues central to the 'informational development' agenda were relatively under-recognised, especially by developing countries' trade negotiators. Despite calls for a 'new world information and communication order' in the 1980s, during the Uruguay Round the full potential of the Internet had not yet been fully appreciated. Thus, for many developing countries' negotiating teams this aspect of TRIPs was seen more as an item for cross-sectoral bargaining rather than anything that would have an immediate impact on their developmental potential. However, IPRs have a considerable (and growing) salience for developing countries' interactions with global electronic networks. Broadly speaking there are two linked issues where IPRs may have a serious impact: on access to valuable knowledge and information for non-ICT related development goals (new agricultural or health related information, for instance); and on the ability to utilise and further develop ICTs and related technologies themselves.

Developing countries may have handicapped themselves as regards these issues (but not only these issues) by acceding to the TRIPs agreement. This is especially the case regarding the costs of obtaining electronic tools (software), which need to be compatible with the software used elsewhere in the network. Certainly, there are arguments about the possibility of technical transfer being facilitated by protecting the owners rights, so they are willing to licence new and innovative technologies to developing countries' users. However, the manner in which the majority of patents are used in Africa does little to support the rhetoric of their supporters as regards the developmental advantage of IPRs. Rather than facilitating the importation of new technologies for production (or service fulfilment), intellectual property (and specifically patents) historically have been used to maintain import monopolies

(Kongolo 2000: 275). Patents have not been ‘worked’ and therefore do the precise opposite of what is intended: the patent holder is protected from any copying or competition regarding their technology, while also gaining new markets through imports, local production either by the patent holder or by imitators is foreclosed ensuring no real economic developmental benefits can be gained (apart from the direct consumption of the product). Exactly the same sort of effect is produced through copyright protection for software.

Furthermore, the character of the Internet allows owners of operating systems to enjoy monopoly rents when these technologies becomes the standard interfaces utilised for connectivity and knowledge dissemination. Although the Internet may encourage the proliferation of content, as the domination by Microsoft demonstrates, the considerable network effects of communications infrastructure have allowed a virtual monopoly based on the software underpinning the system to be established. Thus, much, if not all, software used to access the Internet is based on propriety technologies.

Free software and/or open source (non-propriety) software is increasingly available but as yet represents only a tiny minority of deployed software.⁶ It has yet to win the full confidence of many developing countries’ users and governments who need to carefully choose how to use their limited resources (and need to maximise the potential interactivity from such investment). However the lower cost base and, perhaps more importantly, the ability to amend programmes for specific needs (without infringing IPRs) suggests that developing countries’ users would be well served by a move to open source technologies, as discussed in the following section. Already in the developed countries LINUX has captured a significant and growing proportion of company servers for this reason. Additionally, in the wake of the increasing incidence of viruses aimed at machines running Microsoft programmes,⁷ open source alternatives may also become a more secure, as well as cheaper, option for users with limited resources to deploy on connectivity.

In the past the cost problem was often side-stepped by pirated software which is widely available in the urban centres of many developing countries. This might be regarded as a necessary, if illegal form of technology transfer when confronted with relatively high prices of legitimate software. Yet, this pragmatic response is dwarfed by the already noted and vast financial transfers from the poorer countries to the rich due to the current IPR system. Even the bastion of all things fundamental in economics recognises the problem. The *Economist* noted that the evidence suggests that inflows of foreign direct investment may rise when intellectual property rights are strengthened. In the meantime, however, governments of poor countries are being asked to co-operate in a redistribution of global income that will cost them hundreds of millions of dollars (Economist 2001).

⁶ see *Rebel Code* (Moody 2001) for a readable history of open source, and specifically LINUX.

⁷ One recent report claimed that the Microsoft ‘monoculture’ was dangerous and a real risk to security on the Internet (claims hotly disputed by Microsoft), see Geer *et al* (2003); a number of studies into the security aspects of open source are summarised by David Wheeler (2003: section six).

Although the gains and benefits which developing countries can expect from the global information society are in the future, the costs of protecting IPRs are all too immediate.

The trade in ICT-technologies in developing countries can be easily characterised as rent-taking by companies that have already fully recovered their costs of development and made significant profits in developed country markets. Under previous national legislation high social costs might have prompted the legitimate recourse to some form of compulsory licensing, but under TRIPs such strategies have been severely constrained. Furthermore where the source-code of software is protected (which while ‘encouraged’ bilaterally is not actually mandated by TRIPs) this inhibits reverse-engineering of specific programmes. This further restrains development as reverse engineering has been the traditional method of technology transfer, and in the past allowed local innovators to improve off-the-shelf technologies to reflect local conditions.

Therefore, not only are the very tools which are central to ‘informational development’ expensive, the previous (albeit illegal) methods for taking advantage of them are being withdrawn under immense political pressure from the US and EU. However, this is not the only way of looking at the question of software in informational development. In the next section I explore an alternative scenario: free and open source software (FOSS) as a developmental strategy.

Free and open source software in developing countries

In the last couple of years there has been significant interest in the free and open source software development strategy in sub-Saharan Africa and elsewhere. In Africa, the Free and Open Source Software For Africa (FOSSFA) project has been expanding its membership and reach with the help of various aid funders.⁸ In the Asian-Pacific region the UNDP has recently launched the International Open Source Network (IOSN) to support the exploration of FOSS for development initiatives in the region.⁹ In the ex-communist countries of Eastern European and central Asia, the Open Society Institute’s information programme has also been supporting the development of FOSS strategies for the public sector. These projects aim to expand the use of FOSS by developing and transitional countries, establish networks to facilitate this expansion, and also support the development of software solutions directly relevant to developing and transitional countries needs and resources.

Given that FOSS is not necessarily without cost it is as well to stress that the ‘free’ in free software, as Richard Stallman has famously proclaimed on many occasions is not ‘free’ as in ‘free beer’ but rather ‘free’ as in ‘free speech’.¹⁰ The key issue is the liberty to access the source code of the software (its underlying architecture) with the connected freedom to copy, modify and distribute/share the software with others without the imitations that constrain such activities for proprietary software. Neither should it be assumed that the FOSS model of software development is a relatively

⁸ The project’s website can be found at <<http://www.fossfa.org>>.

⁹ The project’s website can be found at <<http://www.iosn.net>>

¹⁰ Useful discussions of Richard Stallman’s role in the development of FOSS can be found in Moody (2001: *passim*) and Brate (2002: chapter ten).

recent occurrence; rather in the early years of the history of computer development (the 1960s and 1970s) this was the primary (if not exclusive) working method among programmers. In the early years source code was shared and work was collaborative and essentially unowned. However, after the US Department of Justice prosecuted IBM for anti-trust violations, the use of software and hardware was separated, and source code began not be distributed and a separate software industry began to develop which sought to 'own' code so as to profit from it. As a response to the widening scope of this model of 'ownership' Richard Stallman and others established a new (positive) FOSS movement, leading among other things to the establishment of the Free Software Foundation.

Stallman, with some legal advice, then produced what he himself regards as his 'greatest hack'; the General Public License (GPL) sometimes referred to as 'copyleft'. The GPL permits the user to run, copy or modify the software programme's source code, and if they so wish, to distribute versions of the programme. However, this does not allow them to add restrictions of their own. Often termed the 'viral clause' of the GPL, one of its central elements compels programmes utilising aspects of GPL licensed software to be fully compatible with the GPL themselves. The clause reads: 'You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the programme [covered by this licence] or any part thereof, to be licensed as a whole at no charge to all parties under the terms of the licence'.¹¹ It is crucial to understand, however, that the licence utilises copyright law to ensure it is both included in any derivative works as well as ensuring the GPL itself remains unchanged. While this guarantees that the FOSS-community developed programmes are never enclosed, it has also meant that there is little possibility to develop hybrid FOSS/proprietary software tools. Although the GPL is the central and founding element of the FOSS movement, and as such represents its keystone, currently there is little case law to support the GPL, and as such its legal strength remains as yet untested.¹²

Moving to the potential advantages of FOSS for informational development, there are three key reasons that the public sector and commercial operators in developing countries might benefit from the utilisation of FOSS: the total cost of ownership; the performance and flexibility for localisation; and the development of a knowledge base in programming and other skills.¹³ In each of these areas there are clear advantages to be had from the deployment of FOSS over and above the informational developmental advantages that might stem more generally from the deployment of ICTs.

a) costs: As Rishab Aiyer Ghosh (2003) notes, in developed countries those costs not covered by the licence fee for a specific software are a large proportion of the *total cost of ownership* (TCO). Where labour costs are high (as they are - relatively speaking - in developed countries), the labour intensive

¹¹ The text is available from the Free Software Foundation <<http://www.gnu.org/licenses/gpl.txt>> and is reproduced in Annex 1 of UNCTAD (2003).

¹² The MySQL vs. NuSphere lawsuit in the US was settled out of court on an issue unrelated to the GPL (Dravis 2003: 31).

¹³ In addition to the cited article (Ghosh 2003), I have drawn this analysis in part from private discussions with Rishab Aiyer Ghosh as well as from his presentation at *Idlelo 2005* available at <<http://flossproject.org/papers/200401/idlelo-GHOSH-outlinetext>> (accessed 13 February 2004).

components of the TCO, i.e. those that stem from actual use, including user support and maintenance (everything apart from the actual licence, communication and hardware costs), far outweigh the costs of the software licence. Here, the saving that might be made from shifting from proprietary software to FOSS would represent a small saving (or given the costs of changing software platforms, perhaps even a prohibitive positive cost). However where labour costs are lower, this calculation looks somewhat different. Indeed, with lower labour costs, the price of software licences becomes a major problem.

Mobilising GDP per capita figures from the World Bank, Ghosh calculates the effective cost in dollars. He lists these out in a chart for national and regional comparison, and here I shall only focus on two figures: in the USA Microsoft XP costs the user 560 USD for a licence (although there may be some discounts available); the regional dollar equivalent figure for Africa is 30,297 USD. This is to say, given respective levels of GDP per capita, Microsoft's XP is over fifty times more expensive than it is in America (Ghosh 2003).¹⁴ Thus while FOSS may incur exactly the same (or even more) labour costs than some proprietary software, the absence of licence fees makes a profound difference to the TCO in developing countries where labour costs are lower and income (and purchasing power) is considerably lower.

b) Flexibility/localisation: because FOSS can be adapted without recourse to negotiations with the owner, and source code is immediately available for adaptation it is much more flexible than proprietary products. For instance, when Microsoft declined to develop an Icelandic language version of Windows95 (because the market was too small), the Icelanders were forced to use English on their computers running Windows and its related programmes (Wheeler 2003: section eight). However, user language translation versions, as well as modifications to respond to specific local demands can be engineered into the software at the locale of use. The FOSS user can adapt the software to their needs quickly; this has been most obvious in the availability of FOSS packages in non-European languages and dialects. For instance, the Open Source Software Translation Project in South Africa has produced Xhosa language packages for LINUX, in contrast to the lack of such support for Windows (Kshetri 2004: 77).

The deployment and use of FOSS allows developing country programmers to be freed from the constraints of dependency on large (often US-based) multinational software corporations. Support can be localised and is not dependent on training (and authorisation) from foreign providers (or their agents). In this sense, local control responds to a wider recognition that local communities need to 'own' their developmental strategies if they are to benefit from these economic changes.

¹⁴ Like Ghosh I would stress that the example of MS XP is used not because either of us are out to get Microsoft, but because it is a very widely used piece of contemporary PC software. This problem is not limited to Africa, see similar levels of price related by Catalin Cosovanu (2003: 16/17) for countries in eastern Europe.

More generally, the use of FOSS can be seen as anti-monopolistic, and as such reduces or abolishes many barriers to competition in the software market (Stoltz 1999: 6). Unlike proprietary software there is no 'lock-in' effect, and thus even of specific versions of a programme gain predominance in a specific location, the network advantages can be enjoyed without ceding control of the software to a single monopolistic provider. This can allow FOSS to be utilised as a public good, and enhance the transparency of the technological process, leading to a greater interaction between software development and user communities (Dravis 2003: 20). Not least of all the interactive character of FOSS encourages local amendments and engagement with the technology, and shifts the emphasis from passive use of proprietary technologies to a emergent culture of ICT-related skills self-development. And rather than demanding the most powerful current chips and computer architecture, much FOSS can run on older and cheaper machines: its system requirements are lighter and less onerous than much current propriety software, designed with new generations of chips in mind.

c) skills development: linked to the previous advantage, FOSS also encourages the development of computer programming, maintenance and developmental skills within the local user community. While propriety software may require specific skills (which of course can be gained through accredited training), FOSS allows local engineers to develop skills related to their specific local needs. Indeed, given the flexibility of FOSS, its deployment allows a form of on-going community apprenticeship to emerge in programming communities, with more experienced programmers helping newer practitioners through email discussion lists and bulletin boards. Given the open character of FOSS software, there are relatively low barriers to entry to the community, and this may encourage participation in the collective process of improving and refining specific FOSS projects (UNCTAD 2003: 110).

In one sense, this can be seen as a form of on-going technological transfer from those organisations in developing and developed countries who have funded the initial acquisition of programming skills by individuals, who then spread those skills through the user community of any particular FOSS project. Furthermore, programmes like UNDP's IOSN are already establishing databases of developing country FOSS programmers, as well as attempting to facilitate other networking opportunities. Thus, the capacity-building element of informational development is much better served by the utilisation of FOSS than by the importation of proprietary software (Dravis 2003: 22).

Reducing the costs to private sector (and public sector) organisations of obtaining and utilising software frees up considerable resources for investment elsewhere in the organisations' activities. Thus, for example, a recent study for the Taiwanese government projected savings of around 300 million USD in royalty payments if the government adopted a strategy of open source development across the private and public sectors (Weerawarana and Weeratunga 2004: 34). To some extent these levels of cost savings are predicated on models of e-government that have promised more than they have currently delivered, as I have noted elsewhere (Chadwick and May 2003; see also Wade 2002: 446/7). Nevertheless, whatever the benefits of the

deployment of ICTs, clearly the avoidance of licence fees must reduce the investment required for any specified roll-out (where FOSS alternatives are available).

Furthermore, many claim that FOSS is actually more reliable (having been more extensively 'de-bugged') than proprietary alternatives. Certainly, much mainstream software contains multiple errors and problems, as the succession of 'patches' and upgrades for many products attests. One report suggests that there is a mistake (simple or more serious) in about every nine lines of computer code. Given that Windows contains around 100 million lines of code, the potential problems are quite serious (Caulkin 2004).¹⁵ However, FOSS not only subjects code to much more widespread pre-use scrutiny, the model of development means that local users (potentially, at least) are able to fix those problems they come across, not wait for some centrally devised solution to be provided.

Quite apart from these practical benefits, FOSS also allows the public sector to avoid the problems of being locked in to a single supplier. This advantage has been recognised in Europe (the Munich city government recently moved from Microsoft products to FOSS, more on the basis of lock-in issues, than due to any cost-savings) (Azhar 2004: 54), while the Chinese government has also proclaimed its desire to shift to FOSS for its own internal networks. In Brazil and other countries that are suspicious of the involvement of US companies, LINUX and other open source software products reflect the desire to establish a form of technological independence (Ashurst 2004). As Peruvian Congressman Edgar Villanueva stressed in an exchange of letters with Microsoft Peru 'to guarantee free access by citizens to public information, it is indispensable that the encoding and processing of data not be tied to any single provider... the usability and maintenance of software should not depend on the goodwill of suppliers or on conditions imposed by them in a monopoly market' (quoted in: UNCTAD 2003: 111). And of course, public sector independence from monopoly providers is not merely a concern for poorly resourced public sector agencies in developing countries.

One thing that is required for FOSS development communities to develop and prosper is the wide-spread availability of low-cost Internet connectivity and access (Weerawarana and Weeratunga 2004: 35). This may present a serious challenge to the deployment of FOSS/informational development strategies across the developing countries in sub-Saharan Africa and elsewhere. In response to such shortages, in January 2004, at the annual World Economic Forum, Microsoft announced a one billion dollar programme (cash and software) to fund a programme with the UN Development Programme to bring computers to local communities in developing countries (FT 2004). This prompted a largely negative reaction from FOSSFA leading one discussion list correspondent to suggest this was near to UNDP promoting 'technological slavery' by promoting the use of Microsoft products rather than supporting the development of local programming skills.¹⁶

At the time of writing, discussions between FOSSFA and UNDP regarding the implications of Microsoft's 'donation' were on-going, but Microsoft had also signed agreements with the New Partnership for African Development (NEPAD) and the

¹⁵ see also the reliability studies reported by David Wheeler (2003: section three).

¹⁶ Remarks by Edwin Okugbo, circulated on the Idlelo discussion list 12 February 2004.

United Nations High Commissioner for Refugees (UNHCR). The problem is that the costs of switching once expertise has been gained and files have been generated or archived, are very high and may deter even those who assume that LINUX might be a better option for other reasons (Bärwolff 2002). Hence, FOSSFA are determined to keep Microsoft out of African community computer centres, at the very same time that Microsoft recognise the need to establish usage patterns so that the network effects of their quasi-monopoly position in the software market can 'lock-in' new users.

Thus, this question of which software new users are initially introduced to is a crucial issue for the FOSS 'community' as much as it is for Microsoft. As Nir Kshetri points out this issue highlights some current problems with the FOSS strategy for developing countries' private and public sectors. Currently, there remains a significant vicious circle of low penetration, leading to few users with FOSS programmes and thus less network gains to be had, in relation to Microsoft products that are often already running on donated machines. As Microsoft is unlikely to produce programmes that will dovetail with FOSS software, while there are few FOSS users, incompatibility remains a barrier to further deployment; this is especially the case where business partners (in the field of trade and exports) are using proprietary platforms and expect their suppliers and contractors to do so as well (Kshetri 2004: 78). This emphasises the concerted effort that is required in both public and private sectors if the potential developmental advantages of FOSS are to be captured in developing countries.

But, as governments are the biggest single user of hardware and software in most developing countries, their deployment of FOSS can and will have a major impact on its use elsewhere in their economies. Indeed, one of the ways of avoiding the cost and security problems of the Microsoft monoculture is for governments (in both developed and developing countries) to move to other operating systems (Geer *et al* 2003: 19). Certainly, a number of countries (including Australia, Brazil, China, Denmark, India, Malaysia, Pakistan, Peru, Philippines, South Korea, South Africa, Spain, Sweden, Thailand and Vietnam) are at various stages of establishing a major role for FOSS in the public sector.¹⁷ Furthermore, for NGOs like Oxfam International, FOSS much more clearly fits with their overall institutional ethos and thus should be deployed in their developing country operations (Yee 1999). The key issue is establishing a critical mass of FOSS users which can act as an alternative gravitational pole for users about to enter the world of the Internet.

The continuing development of the *simputer* project in India, may prompt a similar set of changes as regards hardware. The *simputer* is a mobile computer based entirely on FOSS, and is intended to allow ICT use in rural communities where normal desktops may be impractical. It can provide Internet and email access, and is able to deal easily with India's two official languages, 19 major languages and the 418 official listed languages. Perhaps more importantly it has been designed with non-

¹⁷ Links to various national reports and strategies can be accessed at <http://r0.unctad.org/e-commerce/e-commerce_en/freeopen_en.htm#selec> (accessed 13 February 2004) and the 2003 E-commerce and Development Report (UNCTAD 2003: 118/9). Further research is included and Paul Dravis' report for the Information for Development Programme at the World Bank (Dravis : 7-11) and Martin Bruggink's report on Open Source Software in Africa (Bruggink 2003).

literate users in mind, who can use the device cued only by images.¹⁸ The open source dimension of the project carries through to production, with the hardware specification available on the Internet which the Simputer Trust hopes will encourage multiple manufacturers to produce these devices. While the name is trademark protected, the hardware specification is available on a specially developed (hardware related) Simputer GPL that provides for open source-like parameters for the development of the manufacturable machines (Chandru 2002). As yet, the Simputer is still projected to be relatively expensive (especially when compared to personal digital assistants [PDAs] from proprietary manufacturers), and does not yet have a significant potential library of applications available for users. However, as a developmental strategy for non-proprietary computing in India is an interesting co-joining of software and hardware provision for rural and poor communities.

A similar project, the Brazilian *Computador Popular* is currently nearing deployment in South America; here costs have been kept down by utilising FOSS and not having a hard disc, it is essentially a mobile thin client network PC, offering sufficient power for many local uses (Kshetri 2004: 77). Even where 'normal' PCs may be deployed, prices can be reduced through the use of pre-installed FOSS. South Korean LG is already offering to ship PCs pre-loaded with LINUX at significantly lower costs than their Windows machines (Kshetri 2004: 76). Indeed, given that more than half of all computers that come into use each year in sub-Saharan Africa are reconditioned machines donated by developed countries, the relatively lower hardware requirements of FOSS also mean that the utilisation of this software does not require large-scale investment in newer machines than those that are easily (and cheaply) available. Likewise the use of mobile telephony to establish Internet connections, or even advances in wireless connectivity may have a swift impact on developing countries where wired infrastructure has never been available outside urban centres. Where these technologies take advantage of FOSS prices are likely to be lower.

Side-stepping TRIPs

As developing countries become TRIPs-compliant, and therefore have to go some way to reducing the availability of counterfeit software, so the cost advantages of FOSS will become even more apparent. Whereas currently many developing countries look at proprietary software as almost free because of wide-spread counterfeiting (Weerawarana and Weeratunga 2004: 35), once IPRs are enforced as regards software then the cost of Microsoft and others' products will reach the relative cost levels noted by Ghosh. Indeed, as Catalin Cosovanu has noted the low cost of counterfeited software in the eastern European countries is one of the main factors forestalling the expansion of FOSS use and deployment (Cosovanu 2003: 34). As such FOSS will represent a significant saving even while labour costs' for each type of software deployment may be generally comparable, once the price of proprietary software starts to approach the levels the multinationals would like to achieve.

Of course this is not to say that given the low marginal costs of production (alongside the already recovered developmental costs) that these companies might hold down

¹⁸ A short assessment of the project by students of Thunderbird Business School can be found at <<http://www.digitalpartners.org/simputer>> (accessed 27 February 2004).

prices to compete with FOSS products. It would be an interesting case at the WTO if a developing country accused a developed country MNC of ‘dumping’ their software if this sort of low price policy was utilised to try and quash the spread of FOSS use. On one hand, given the minuscule marginal costs of software such a case might be difficult to prosecute on the basis of production costs, however on the other hand prices below those of the home market might be a diplomatic lever (at least) in such a dispute, especially as regards a claim of anti-competitive pricing (which has become over the decades an accepted mode of identifying dumping by importers).

Most importantly, and related to their multilateral commitments, the utilisation of FOSS will enable developing countries to establish a more effective set of IPR-enforcement mechanisms as regards counterfeited software, at the same time as being able to benefit from the deployment of powerful non-proprietary software programmes. Thus, in this area at least the problems of TRIPs-compliance may be able to side-stepped.¹⁹ However, it is important to stress that for FOSS to work as intended, the GPL needs copyright law to be enforced because otherwise the open character of FOSS cannot be easily policed and maintained. Indeed, this strategy is at the centre of the Free and Open Source Software Foundation for Africa (FOSSFA) action plan for 2004-2006. Although, other benefits are also recognised in the Action Plan in the main it is those aspects of FOSS that allow developing countries to side-step TRIPs that have driven FOSSFA’s swift development from its origins at the ICT Policy and Civil Society workshop in Addis Ababa, Ethiopia in November 2002 (FOSSFA 2004). Thus, FOSSFA is keen to see governments, donor agencies and the private sector in Africa adopt and deploy FOSS products. They also recognise that FOSS’s licence structure is supported by TRIPs-compliant IPRs legislation and thus they support the formalisation and clarification of intellectual property legislation across sub-Saharan Africa. While this may put them at odds with other political campaigns, the FOSS strategy offers a different way of dealing with the global governance of IPRs.

Neither is it only developing countries that might stand to gain from the deployment of FOSS. As Mitch Stolz has noted, agencies like the US Postal Service are already using modified versions of LINUX (Stolz 1999: 7). The advantages that flow from deploying FOSS in developing countries, are also available (and important) for governments in the richer developed countries. Indeed, as the US government has already tried to break Microsoft’s monopoly twice (and failed), it may also be the case that developed countries will start to consider side-stepping IPRs (and their TRIPs related undertakings) in software in a similar manner as described above. One further key advantage of FOSS is that without the proprietary licence agreements, accidental (but unauthorised internal) extra copies are no longer in danger of being ‘uncovered’ by vendor audit. Given that it may be difficult to ensure total compliance with a vendor’s extensive licensing conditions without significantly reducing the adaptability of an organisation, without the IPR-related demands of proprietary software, the internal exchange of programmes and tools need not be expensively controlled and limited. Thus the danger of a vendor audit costing organisations considerable fines is halted.

¹⁹ Documentation from UNDP/IOSN stresses this aspect of FOSS as one of its main advantages.

Of course, already many of us are using FOSS packages without realising it. The web server software Apache, has dominated the Internet page retrieval market for nearly ten years. In June 2003 nearly two-third of all websites utilised this FOSS package, with only just over a quarter using Microsoft's proprietary system (UNCTAD 2003: 104). Furthermore, many companies are already using FOSS programmes (predominately LINUX) as their operating systems for their own networks and mainframes, with Amazon, Reuters and Merrill Lynch all having recently shifted to FOSS systems for their back-room networks. In Hollywood Industrial Light and Magic and Pixar already utilises FOSS, while Royal Dutch Shell have developed a LINUX based system for the seismic and geophysical data work (Dravis 2003: 29; Wheeler 2003: section eleven). Although Windows is still used on around fifty percent of all servers worldwide, by mid 2001 GNU/LINUX (the key FOSS operating system) was approaching thirty percent market share and with a couple of other FOSS programme also with small shares, the overall FOSS market share was around a third of all servers. In Japan, over half of all corporations are using forms of FOSS, especially as regards small scale projects. Looking to the future, a large number of surveys of expected ICT/software deployment have discovered a broad expectation that the software market will have a significant and growing element of FOSS software used across many private and public organisations.²⁰

If some developing countries are able to enhance their software development communities, and specifically the scope of FOSS-related skills in the labour force, then they will also have started to develop an export opportunities for customised software to these and other (potential) users (UNCTAD 2003: 120). Given the current suspicion of proprietary software and the continuing problems Microsoft is encountering from viruses and security breaches, the demand for FOSS programmes seems likely only to expand. This may produce new markets for software both in developed and developing countries for companies in developing countries (mimicking the development of the Indian software industry). If informational development means anything, then it is in the area of FOSS that some of the claimed advantages and possibilities of ICTs for developing countries might actually come to fruition. Utilising FOSS may enable developing countries to establish new forms of valuable expertise and market opportunities, while at the same time freeing themselves (at least partly) from the dependence on the developed countries for ICT-related manufacturing and services.

Finally, although many have decried the widened use of the term 'open source' to include all manner of collaborative projects, the FOSS model of side-stepping the problems of TRIPs model of string IPR protection and enforcement does have some more general applicability. For instance the utilisation of 'creative commons' licences in the realm of content-related copyright is another way of side-stepping TRIPs, where the circulation of socially important content is circumscribed by the limitations of copyright. The 'creative commons' licences, similar to the GPL, allow distributed usage of content, but also do not allow its subsequent 'propertisation' when used in other contexts.²¹ Currently this model for content distribution is being promoted by a

²⁰ All these figures are drawn from David Wheeler's long research digest on FOSS 'numbers' (Wheeler 2003: section two).

²¹ see <<http://www.creativecommons.org>> for the licence.

number of groups interested in the public domain and is also a key element of the Open Society Institute's information programme in Eastern Europe.

Conclusion

We should not over-emphasise the role of any specific technology in development. In this sense, informational development is merely one aspect of a more general dynamic of development.²² Although many of the measures and strategies may have a beneficial effect on developing countries' economies, these effects must be recognised for what they are: one part of a wider set of issues. These new technologies do not represent neutral mechanisms, or novel developments lacking histories, but rather are a technological manifestation of the historically specific social system in which they have emerged. It is certainly difficult to clearly establish the possible veracity (or conversely the vacuity) of claims regarding informational development

Early forecasts had little idea of the likely impact of computing. Because early computers were so cumbersome, and used only for highly specialised mathematical work, there was little reason to expect their use to become more widespread. With faster and smaller machines, the expansion of hobby and home use, and the realisation of the capacity for information processing that computers brought, early predictions of limited utility were revealed as hopelessly mistaken about the future of computer use. Unable to see the way social use might develop as the technology improved, the expected trajectory of these early accounts missed the possibilities of home and office PCs (personal computers) completely, and supposed computers would always be large centralised service-specific machines. This might indicate we should be cautious in our forecasts for the (global) social and developmental effects of new technologies, and also lead us to acknowledge that users in developing countries will find their own ways to take advantage of ICTs.

Some years ago Steven Schnaars warned against commentators on ICTs being captured by 'technological wonder' (Schnaars 1989: 143/4). Technological wonder in the capabilities in the underlying technologies has in the past blinded commentators and analysts to the relative continuity in the practices to which they are applied. That said, wonder can fade: Bill Gates has admitted that providing computers to the poor in developing countries might not be the best way forward for improving living conditions. He asked:

Do people have a clear view of what it means to live on a \$1 a day?...

There's no electricity in that house. None... The mothers are going to walk right up to that computer and say 'My children are dying, what can you do?' They're not going to sit there and browse eBay (quoted in Martinson 2000).

This has led Gates himself to concentrate on health care in his philanthropic giving, prompting the conclusion that: 'computers are amazing in what they can do, but they *have to be put into the perspective of human values*' (Quoted in Helmore and McKie 2000, emphasis added). Although derided for these remarks by industry figures who maintain a transformative vision of the information society, Gates seems to have

²² some of this conclusion is drawn from May (2002: chapter six).

finally recognised that ICTs, which his company has done so much to promote, can only be regarded as *part* of human existence, not as defining its character.

Although, on the other hand, technological advances certainly have some economic effect, quite how extensive and immediate that effect is can often be over estimated. Thus as Charles Kenny concludes his study of the role of the Internet in supporting economic growth in developing countries:

Overall, the largest determinant of the impact of the Internet in developing countries is likely to remain the broader environment outside the information infrastructure sector. This environment will also play by far the predominant role in determining the quality of life of [their] populations (Kenny 2002: 14).

This is to say that while ICTs may have a positive impact this is a reflection of the overall levels and scope of development not a key causal factor. Nevertheless, as Doreen Massey notes:

New technology is created; and it is a social creation. Our responsibilities do not lie solely in mitigating its effects, in adapting society to its demands and implications. There is social choice also, and a social responsibility, for the very nature of new technology (Massey 1985: 312).

Technology has no independent existence outside the society in which it is developed, indeed it is a product of that society and reflects the character, mores and interests of that society. New technologies are deployed in ongoing social relations and although they may impact on those relations, such effects are not necessarily revolutionary or socially transforming. The impact of technology is not unmediated nor automatic, it is the subject of social negotiation, reflecting previous social settlements and practices.

Although we might be sceptical about the claims made for informational development, it is also the case that the FOSS strategy at least encourages an explicit social embeddedness in local communities, rather than an importation from societies where technologies have been developed with different problems in mind. While developing countries software developers (and engineers) are more interested in servicing the developed countries products than domestic needs the advantages of FOSS may be minimal. However, while Robert Wade suggests this needs action from the US to establish a requirement that software must be compatible with FOSS products (Wade 2002: 454), this seems both unlikely and difficult to establish formally. It is not clear that US legislation could be effective against the dominant players (Microsoft, Oracle and Novell), and without requiring their software code to be made public (with the attendant intellectual property ramifications) it is difficult to see how FOSS could be made to be compatible with proprietary software and vice versa. Conversely, if organisations like FOSSFA and the Asian FOSS projects are successful then the developing countries' software markets will become patterned by FOSS products and will be able to side-step the problems of 'lock-in' and control that proprietary software brings in its wake.

Hence, while FOSS is hardly *the* answer, it may be a better bet than merely encouraging the development of a community of proprietary software users in developing countries. Politically, the utilisation of FOSS also may allow developing countries to side-step the problems which they are already encountering with TRIPs compliance. Although there are clearly considerable advantages (linked to network

externalities) to deploying Window-related software products, neither should the advantages of FOSS be down-played. Indeed, in many ways, if developing countries' computer users are going to 'own' informationalised development then FOSS offers advantages which are not available from the less flexible Windows-based alternative. In addition, given the difficulty of avoiding the demands of TRIPs compliance, a strategy of side-stepping may be the best bet not only in the realm of ICTs. As noted above, in copyright, the encouragement of the use of 'creative commons' licences may be another useful strategy. In the realm of scientific research, open access journals (organised by scientists and in parallel to more 'normal' channels of publication) are also having an impact on the availability of scientific knowledge. Rather than merely accepting the transfers of funds that the TRIPs agreement underpins, developing countries are starting to seek an alternative path for the management and dissemination of knowledge and information. The deployment of FOSS may be exemplary of this strategy and may in the future be an example that can be drawn on by other sectors, but most immediately it clearly allows new members to be both TRIPs compliant and in the realm of ICTs avoid some of the costs of such compliance.

Bibliography

- Adamson, G. (2002) 'Internet Futures: A Public Good or Profit Centre?' *Science as Culture* 11, 2: 257-275.
- Anash, P.A.V. (1986) 'The struggle for rights and values in communications' in: M. Trabner (ed.) *The Myth of the Information Revolution. Social and Ethical Implications of Communication Technology* London: Sage.
- Ashurst, M. (2004) 'Brazil falls in love with Linux' *BBC News world edition* 1 February, available at <<http://bbc.co.uk/2/hi/business/3445805>> (accessed 4 February 2004).
- Azhar, A. (2004) 'The Microsoft Killers' *Prospect* 95 (February): 54-58.
- Bärwolff, M. (2002) *Linux and Windows: A Case of Market Failure?* (Bournemouth Papers on Intellectual Property: 2) Bournemouth: Centre for Intellectual Property Policy and Management.
- Braithwaite, J. and Drahos, P. (2000) *Global Business Regulation* Cambridge: Cambridge University Press.
- Brate, A. (2002) *Technomanifestos: Visions from the information revolutionaries* New York: Texere.
- Bruggink, M. (2003) *Open Source Software: Take it or Leave it? The Status of Open Source Software in Africa* (No place of publication [Amsterdam?]): International Institute for Communication and Development
- Caulkin, S. (2004) 'Software must stop bugging us' *The Observer* (Business Section) 7 March: 10.
- Chadwick, A. and May, C. (2003) 'Interaction between states and citizens in the age of the Internet: 'e-government' in the United States, Britain and the European Union' *Governance: An International Journal of Policy, Administration and Institutions* 16, 2 (April): 271-300.
- Chandru, V. (2002) 'Simputers and the Diffusion of Information' paper presented at the Annual Meeting of the Asian Development Bank, Shanghai, May 2002.
- Compaine, B.M. (2001) *The Digital Divide: Facing a crisis or creating a myth?* Cambridge, Mass.: MIT Press.
- Cosovanu, C. (2003) 'Piracy, Price Discrimination and Development: The Software Sector in Eastern Europe and Other Emerging Markets' *The Columbia Science and Technology Law Review* 5: 1-38.
- Digital Opportunities Task Force [DOT Force] (2001) *Digital Opportunities for All: Meeting the Challenge*, available from: <http://www.dotforce.org/reports/DOT_Force_reportV5.oh.doc> (accessed 27 June 2001).
- Drahos, P. (2002) 'Developing Countries and International Intellectual Property Standard Setting' *Journal of World Intellectual Property* 5, 5: 765-789.
- Dravis, P. (2003) *Open Source Software: Perspectives for Development* Washington DC: Information for Development Programme/World Bank.
- The Economist* (2001) 'Markets for ideas', 14 April: 96.
- Financial Times* (2004) 'Microsoft in \$1bn training project', 24 January: 7.
- Free Software and Open Source Foundation for Africa [FOSSFA] (2004) *FOSSFA Action Plan: 2004-2006* Nairobi: FOSSFA, available at <<http://www.fossfa.org>> (accessed 6 March 2004).

- Gakunu, P. (1989) 'Intellectual Property: Perspective of the Developing World' *Georgia Journal of International and Competition Law* 19, 2 (Special Trade Conference issue): 358-365.
- Geer, D., Bace, R., Gutman, P., Metzger, P., Pfleeger, C.P., Quarterman, J.S. and Schneier, B. (2003) *CyberInsecurity: The Cost of Monopoly*, Computer and Communications Industry Association, available at <<http://www.skillbytes.co.uk/memex/2003/11/16.html>> (accessed 27 November 2003).
- General Agreement on Tariffs and Trade [GATT] (1994) *Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations* Geneva: GATT Publication Services.
- Ghosh, R.A. (2003) 'Licence Fees and GDP per Capita: The case for open source in developing countries' *First Monday* 8, 12 (December), available at <http://firstmonday.org/issues/issues8_12/ghosh/index.html> (accessed 23 January 2004).
- Helmore, E. and McKie, R. (2000) 'Gates loses faith in computers' *The Observer* 5 November: 5.
- Hoeckman, B.M. and Kostecki, M.M. (1995) *The Political Economy of the World Trading System. From GATT to WTO* Oxford: Oxford University Press.
- Kenny, C. (2002) *The Internet and Economic Growth in Least Developed Countries* (WIDER Discussion Paper no. 2002/75) Helsinki: United Nations University/World Institute for Development Economics Research.
- Kongolo, T. (2000) 'The African Intellectual Property Organisations' *Journal of World Intellectual Property* 3, 2 (March): 265-288.
- Kshetri, N. (2004) 'Economics of Linux Adoption in Developing Countries' *IEEE Software* (January/February): 74-81.
- Lefèbvre, F. (2003) 'The World Intellectual Property Organisation and the Developing World' *The ACP/EU Courier* 201 (November-December): 24-25.
- Lessig, L. (2001) *The Future of Ideas. The fate of the commons in a connected world* New York: Random House.
- Lucas, H.C. and Sylla, R. (2003) 'The Global Impact of the Internet: Widening the Economic Gap Between Wealthy and Poor Nations?' *Prometheus* 21, 1: 1-22.
- MacBride, S *et al* (1982) *Many Voices One World. Communication and Society, Today and Tomorrow* London: Kogan Page/UNESCO.
- Mansell, R. and Wehn, U. (1998) *Knowledge Societies. Information Technology for Sustainable Development* Oxford: Oxford University Press/UNCTAD.
- Martinson, J. (2000) 'Gates derides digital donors' *The Guardian* 4 November: 25.
- Massey, D. (1985) 'Which "New Technology"?' in M. Castells (ed.) *High Technology, Space and Society* (Urban Affairs Annual Review: 28) Beverly Hills: Sage Publications.
- Matthews, D. (2002) *Globalising Intellectual Property Rights: The TRIPs Agreement* London: Routledge.
- May, C. (2000) *A Global Political Economy of Intellectual Property Rights: The new enclosures?* London: Routledge.
- May, C. (2002) *The Information Society: A sceptical view* Cambridge: Polity Press.
- May, C. (2004) 'Capacity building and the (re)production of intellectual property rights' *Third World Quarterly* 25(5), 4 (July) [forthcoming].
- Moody, G. (2001) *rebel code: How Linus Torvalds, Linux and the Open Source Movement are Outsmarting Microsoft* London: Allen Lane/Penguin Press.

- Penrose, E.T. (1951) *The Economics of the International Patent System* Baltimore: John Hopkins Press.
- Reichman, J.H. (1997) 'From Free Riders to Fair Followers: Global Competition under the TRIPs Agreement' *New York University Journal of International Law and Politics* 29, 1: 11-93.
- Ricketson, S. (1987) *The Berne Convention for the Protection of Literary and Artistic Works: 1886-1996* London: Kluwer/Centre for Commercial Law Studies.
- Schnaars, S.P. (1989) *Megamistakes: Forecasting and the Myth of Rapid Technological Change* New York: Free Press.
- Sell, S. (2003) *Private Power, Public Law. The Globalisation of Intellectual Property Rights* Cambridge: Cambridge University Press.
- Sell, S. and May, C. (2001) 'Moments in Law: Contestation and Settlement in the History of Intellectual Property' *Review of International Political Economy* 8, 3 (Autumn): 467-500.
- Sen, A. (1999) *Development as Freedom* Oxford: Oxford University Press.
- Spar, D.L. (1999) 'The Public Face of Cyberspace' in: *Global Public Goods. International Co-operation in the 21st Century* (edited by I. Kaul, I. Grunberg and M.A. Stern) New York: United Nations Development Programme/Oxford University Press.
- Steinberg, R.H. (2002) 'In the Shadow of Law or Power? Consensus-Based Bargaining in the GATT/WTO' *International Organisation* 56, 2 (Spring): 339-374.
- Stewart, T.P. (1993) *The GATT Uruguay Round. A Negotiating History (1986-1992)* Deventer: Kluwer Law and Taxation Publishers.
- Stolz, M. (1999) *The Case for Government Promotion of Open Source Software* (A NetAction White Paper) San Francisco: NetAction, available at <<http://netaction.org>> (accessed 13 February 2004).
- United Nations Conference on Trade and Development [UNCTAD] (2003) *E-Commerce and Development Report 2003* New York/Geneva: UNCTAD.
- Wade, R.H. (2002) 'Bridging the Digital Divide: New Route to Development or New Form of Dependency' *Global Governance* 8: 443-466.
- Weerawarana, S. and Weeratunga, J. (2004) *Open Source in Developing Countries* [Stokholm?]: Swedish International Development Cooperation Agency.
- Wheeler, D.A. (2003) *Why Open Source Software/Free Software (OSS/FS)? Look at the Numbers!* available at <http://www.dwheeler.com/oss_fs_why.html> (accessed 5 March 2003).
- World Bank (1999) *World Development Report 1998/99 - Knowledge for Development* New York: Oxford University Press.
- Yee, D. (1999) 'Development, Ethical Trading and Free Software' available at <<http://danny.oz.au/freedom/ip/aidfs.html>> (accessed 5 March 2004).

Christopher May is Reader in International Political Economy at the University of the West of England (UK). His publications include *A Global Political Economy of Intellectual Property Rights. The new enclosures?* (Routledge 2000), *The Information Society. A sceptical view* (Polity 2002) and *Authority and Markets. Susan Strange's writings on IPE* (co-edited with Roger Tooze, Palgrave 2002). His articles have appeared in *New Political Economy*, *Review of International Political Economy*, *Global Society*, *Governance*, *Government and Opposition*, *Third World Quarterly*, *Actuel Marx*, *First Monday*, *Prometheus* and *Information Communication and Society*. He is series co-editor (with Nicola Phillips) of the International Political Economy Yearbook (Lynne Rienner Publishers), and is currently organising volume 15, *Global Corporate Power* (for publication in 2005). He is currently working with Susan Sell on an international history of IPRs (also to be published by LRP in 2005).