Countries are now reviewing their national laws on intellectual property to try to bring them into line with their obligations under the TRIPS agreement. This national process is likely to accelerate the biopiracy phenomenon. With careful and intelligent legal and policy choices, developing countries can try to avoid some of the worse aspects of implementing their TRIPS obligations. But a fundamental rethink and amendment of the multilateral rules is essential if the injustice done to local communities and to indigenous knowledge by biopiracy is to be corrected.

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COMMENT

# The importance of ICTs for developing countries

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According to data from the OCLC Public Affairs Information Service based on a recent European Commission report,<sup>1</sup> a third of the world's population has never made a phone call. This fact emphasises what has become known as the digital divide – the tremendous gap between people with access to information technology (IT), and those without. Not long ago talk of IT to most people signified computers. However, with the rapid and ongoing change in the IT world, computers and communication systems such as telephones and modern fax machines are increasingly using the same technology.

The ICT revolution

Information and communications technologies (ICTs) is an umbrella term which is currently used to refer to a wide range of services (telephony, fax, internet), applications (such as distance education and management information systems), and technologies (anything from 'old technologies' such as television to 'new technologies' such as cellular phones), using various types of equipment and software, often running over telecoms networks. The ICT (or information, or communications, or microprocessor) revolution is radically affecting the way we share information about development issues; and governments, NGOs, businesses, institutions, and individuals have jumped on the bandwagon to make ICTs part of their day to day organisational processes. Moreover, the revolution brings leverage in the two essential commodities of time and distance, which in business terms translate into efficiency and cost. The issue of transparency is easier to manage with ICTs, which may result in monetary savings in addition to stakeholder confidence in development processes and systems. However it is also true that if care is not taken to ensure that ICT provision and use is tailored to the specific needs of the groups that really need them, there is a danger that existing alienation and marginalisation will be reinforced and increase.<sup>2</sup>

There is general agreement that ensuring access to the fundamental tools of the digital society is one of the most significant investments the world can make for the future. But the world's most valuable resource is its people. Thus, the significance of ICTs is not in the technologies as such, but in the possibilities they open up for access to knowledge, information, and communications, elements of ever increasing importance in present day economic and social interaction. While some of the issues surrounding ICTs have similarities with those in other areas of infrastructure, such as roads, postal services, and railways, others are of course different and highly specific, with the potential to produce differential development of local and global cultures.

In this context, in March 2001 the United Nations Economic and Social Council requested the UN Secretary-General to establish an Information and Communication Technologies Task Force. This initiative aims to provide a truly global dimension to the large number of local and regional efforts to bridge the digital divide, to encourage digital opportunity, and to place ICTs at the service of development for all. The Task Force is an innovative mechanism in that it is the first body created by an intergovernmental decision of the UN in which members representing governments, civil society, and organisations of the United Nations system have equal decisionmaking power. To achieve its goals, the Task Force has set up collaborative links with governments, the private sector, non-profit organisations, the academic community, multilateral institutions, and the civil society/NGO community, as well as with other similar initiatives and activities at all levels.<sup>3</sup> It held its inaugural meeting on 19–20 November 2001, at which six thematic working groups were established which were open for participation by non-members of the Task Force.

'ICT for development' is one of the key areas on STDev, UNCTAD's internet gateway on science and technology for development.<sup>4</sup> This gateway hosts the homepage of the UN Commission on Science and Technology for Development (UNCSTD), provides continuously updated information on best practice in the assessment, transfer, adaptation, and mastery of technology, and also offers opportunities for partnering and networking in science and technology. On the subject of ICTs, a significant statement was recently made by the Chair of UNCSTD, Professor Vijaya Kumar of Sri Lanka. He made clear that ICTs provide developing countries with an opportunity to increase efficiency in public administration and the business arena, enhance industrial productivity, and promote competitiveness in trade and commerce. However, he also stressed that most developing countries have neither the infrastructure nor the human resources necessary to fully exploit the potential of ICTs. Even where ICT facilities are available, these are often restricted to urban areas and elites, since the costs of ICTs are high when compared with the incomes earned by most inhabitants of developing countries. The digital divide thus not only deprives the poorer developing countries from becoming full and dynamic members of the global economy, it also deprives poorer citizens within these states of the benefits of ICTs.

Various recent international ICT related programmes have been initiated in the context of the UN system. At its fifth session, held in Geneva in 2001, UNCSTD selected as the theme for its intersessional period 2001–2003 'Technology development and capacity-building for competitiveness in a digital society'.<sup>5</sup> The programme for this intersessional period is being carried out by three panels addressing specific aspects of the main theme, with particular attention being given to assimilation and application of ICTs for the purpose of enhancing competitiveness of developing countries and countries with economies in transition. The first of the panels is studying indicators of technological development for 'stocktaking' purposes.

## ICTs in the UN context

The second is exploring the link between foreign direct investment (FDI), technology development for capacity building, and strategic competitiveness. Lastly, the third panel is concentrating on the transfer, diffusion, and use of ICTs.

The first panel met in Geneva in May 2002 to identify the most important factors affecting technological mastery and development for competitiveness, to attempt to measure them, and to provide a rational explanation of their determinants. In addressing the need for technology indicators, it was decided that countries should be grouped into those that were 'catching up', 'keeping up', and 'getting ahead'. It was agreed that the key objective of collecting a set of indicators was in order to identify policies and programmes. Indicators should not merely be based on economic parameters, but should also include factors concerned directly with scientific and technological development.<sup>6</sup>

More specifically, an excellent working document was presented by the secretariat of the UNCSTD, including a comparative analysis of scientific and technological development in around ninety countries in terms of financial resourcing of research (R&D expenditure as a proportion of national income), human capital (enrolments in tertiary education and number of personnel engaged in R&D), as well as export performance (high technology exports as a proportion of total merchandise exports). These various aspects are strongly correlated, with high correlations observed between R&D, human capital, and export performance for the period 1995-99. It was on the basis of the indicators that countries were categorised as 'catching up', 'keeping up', or 'getting ahead', the resulting rankings being reasonably stable over time, though with some regional effects apparent. In general terms, Latin American and transitional economies are classified as 'keeping up', and OECD and some South East Asian countries as 'getting ahead'. This generalisation does however mask substantial variations in countries' experiences, with transitional economies above all showing great differences in all indicators except education and human capital, where they are consistently strong. Data limitations meant that African and South Asian countries had to be largely omitted from this analysis.

The second panel, meeting in Sri Lanka in October 2002, paid attention to the strategic use of FDI to transfer technology and to build ICT capabilities. In addition, it examined instruments that could be utilised to achieve 'deep integration' between foreign partners and local firms and suppliers. Finally, the panel also addressed the importance of domestic investment, particularly in R&D and in the ICT infrastructure for improving industrial productivity and enhancing innovation and competitiveness. The main results demonstrate that success in science and technology depends critically on the ability of each system to manage technical change efficiently, and that simply opening up to free trade, investment flows, and external scientific and technological inputs is not an adequate strategy for countries at the low end of the technology ladder.

Evidence from liberalising countries such as Kenya, Tanzania, Zimbabwe, and Ghana shows that after an initial burst of growth, economies with static capabilities slow down as their inherited advantages are exhausted.<sup>7</sup> Without any strategic support from government, they find it difficult to bridge the gap between their skills, technologies, and scientific capabilities and those needed for international competitiveness. This is one important reason why liberalisation has had such poor results in sub-Saharan Africa. Liberalisation has also led to technological regression in many countries of Latin America, with relatively weak growth and competitiveness. The experience of the most successful developing countries in recent economic history (the newly industrialised economies of Asia) suggests that there is

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## Investing in infrastructure

a major role for governments in providing the 'collective goods' needed for sustained development. The issue is not *whether* governments should intervene, but *how*.

The third UNCSTD panel, meeting in Angola in January 2003, focused on transfer and diffusion of ICTs. This panel also examined the extent to which ICTs are being used and diffused in developing countries and how this can affect their ability to 'catch up', 'keep up', and 'get ahead'. The panel formed a picture of the experiences of those countries that have successfully been able to build an indigenous human resource capacity in ICTs, in turn enabling them to become internationally competitive. Nineteen country case studies were reviewed (Czech Republic, Singapore, Indonesia, Vietnam, Uganda, Egypt, Cambodia, Hungary, Bolivia, Nepal, Laos, the Philippines, Malaysia, Thailand, Ethiopia, Morocco, Brazil, Peru, Botswana), as well as ten case studies for e-commerce (Bangladesh, Cambodia, Ethiopia, Madagascar, Mozambique, Myanmar, Nepal, Togo, Uganda, Tanzania).

Besides the activities of the UNCSTD, it is also important to mention the launch in early 2002, by the UN Development Programme (UNDP) in partnership with the Markle Foundation and in consultation with public and private institutions and individual expert partners, of the Global Digital Opportunity Initiative (www.gdoi.org). This initiative is attempting to increase the impact of ICTs in achieving developing countries' development goals by building on the strategic framework developed by the Digital Opportunity Initiative at the 2001 G8 Summit in Genoa, and by working from the fact of nations' growing interdependence.

Another significant perspective was provided by the 'measurement' carried out by OECD of the relations between the information economy, ICT sector data, and metadata.<sup>8</sup> In 1998, OECD member countries agreed on a definition of the ICT sector as 'a combination of manufacturing and services industries that capture, transmit and display data and information electronically'. This definition was based on an international standard classification of activities, as a first step towards obtaining some insight into core indicators for the ICT sector. The 1998 activity based definition was reviewed in April 2002, when it was decided that although it gives only a first approximation of the ICT sector, for the moment it should not be changed; instead its implementation should be improved with the aid of more detailed national classifications. This resolution will be reexamined at a later date, in the framework of the major revision of the International Standard Industrial Classification (ISIC) due in 2007.<sup>9</sup>

It is estimated that by 2003 almost all decisions made in science and technology, economics, and business development will be based on information that has been generated electronically. Access to information is thus a key factor in the generation of wealth and there is a strong link between a nation's level of development and the level of technological uptake. Governments are the main actors here, and they need to proceed in partnership with the key stakeholders in ICT provision – including existing and possible future carriers, internet service providers, high technology companies, business users, educators, bankers, and community groups – in order to ensure that a comprehensive system is put in place.

Some particular goals for governments include: (i) acting as catalysts and giving strong leads in showing the importance of ICT use; (ii) creating a regulatory infrastructure to enable easy and effective use of ICTs; (iii) establishing genuine and productive partnerships; (iv) ensuring that ICTs feature in the mainstream educational curriculum; (v) minimising electronic barriers; (vi) taking the needs of poor communities as a starting point, rather than imposing external agenda, ideas, and expectations; (vii) facilitating access to scientific and technological information online.

Use of ICTs to reduce inequalities

#### Diffusion of ICTs

Thus, for example, ICTs can be used to erode inequalities in communications, providing faster and cheaper communication as well as rapid support and advice in times of disaster and emergency. They can also help to reduce oppression and promote human rights by bringing greater attention to bear on individual cases. In the same way, in education ICTs can provide the choice of how, when, where, and at what rate to study, enabling all levels of education to be brought to the more remote parts of the world, and encouraging non-traditional learners to acquire basic literacy skills.

In short, the evidence suggests that under the right conditions ICTs may deliver substantial benefits. However, significant barriers to the effective uptake and use of ICTs by both developed and developing countries also exist, recommending caution in their application. Perhaps, in the end, it may be easier to say what ICTs are not: ICTs are not a magic potion for development or a replacement for real world processes. It seems appropriate to cite the words of UN Secretary-General Kofi Annan during the formal launch of the Task Force on Information and Communications Technology:

The new technologies that are changing our world are not a panacea or a magic bullet. But they are, without doubt, enormously powerful tools for development. They create jobs. They are transforming education, healthcare, commerce, politics, and more. They can help in the delivery of humanitarian assistance and even contribute to peace and security

#### Notes and literature cited

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