

UNCTAD/SDTE/ECB/2005/1

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
Geneva

INFORMATION ECONOMY REPORT 2005

OVERVIEW



UNITED NATIONS
New York and Geneva, 2005

Overview

1. The Information Economy

This Report illustrates the vigorous efforts being undertaken by many developing countries to catch up with their more developed partners in the dissemination and use of ICT. However, it also shows that the gaps are still far too wide and the catching-up far too uneven for the promise of a truly global information society, with its attendant benefits for sustainable social and economic development, to materialize without the sustained engagement of national Governments, the business sector and civil society, and the tangible solidarity of the international community.

Data show that the rate of growth in the number of Internet users worldwide slowed down to 15.1 per cent in 2003, from more than the 26 per cent in the previous two years. While some regions showed robust growth in the number of Internet users in 2003, such as Africa (56 per cent) and South-East Europe and the CIS (74 per cent), overall the gap between developed and developing countries remains wide: only 1.1 per cent of Africans had access to the Internet in 2003, compared with 55.7 per cent of North Americans. In order to benefit fully from the Internet, users need not just connections, but fast, good-quality ones. In particular, for some e-business applications broadband has become indispensable. If SMEs in developing countries do not have access to broadband, it will be difficult for them to implement ICT-enabled strategies to improve their productivity in areas such as customer acquisition and retention, logistics and inventory control. However, while some countries have shown a spectacular growth – for example, China, which went from close to zero to 23 million broadband subscribers in just three years – there are wide variations worldwide in broadband access. In many developing countries, however, data about broadband access are not even available.

It is essential to take action to address these developments. In order to take relevant decisions about priority areas for action and the allocation of resources,

policymakers in developing countries require timely, accurate data and information about the situation of ICT in their countries. At a time when there is widespread realization of the importance of mainstreaming ICT in development strategies, the scarcity of data on ICT is a serious impediment to effective policy-making. Data about ICT diffusion and use also help SMEs to take informed business and investment decisions. At the national level, it is important to support, extend and replicate nascent initiatives to collect ICT data. At the regional and international levels, it is necessary to coordinate data collection in order to enhance global consistency and comparability. For these reasons, UNCTAD has been actively involved in the discussions that led to the establishment of a core list of internationally comparable ICT indicators, which is presented in chapter 1 of this Report and represents the beginning of a long-term international cooperative effort in the measurement of ICT for relevant policymaking.

Beyond the analysis of the disparities between countries in their access to ICTs, a more fundamental discussion concerns the economic and social impact of ICTs in the development process of individual countries and of developing countries as a group. The international debate has to focus on the impact of ICTs on the economic performance and trade competitiveness of developing countries. There is an urgent need to explore policies and best practices in order to enable enterprises, and particularly SMEs, to increase their productivity and their competitiveness through the use of ICTs. For example, Governments can help SMEs become integrated into national and international supply chains by using modern communication technologies, and examine the impact of such structural changes in enterprises on local, national and international labour markets. Therefore, it is important to support the debate between Governments, the representatives of workers and of employers and civil society that examines

policies and practices that permit enterprises to employ ICTs as effective productivity-enhancing tools.

This debate will also help Governments and international organizations to identify strategies to ease the transition of developing countries to an information economy, a concept that for the purposes of UNCTAD's work refers to an economy in which the role of ICTs extends beyond e-commerce to embrace a broad range of social and economic consequences of the diffusion and use of ICTs, including the Internet and e-business. In such an economy, ICT policy frameworks shape economic growth, productivity, employment and business performance. The new name of this Report – Information Economy Report – previously called the *E-Commerce and Development Report*, is an acknowledgement of this evolution.

UNCTAD, in cooperation with the International Labour Organization, the International Trade Centre, and the Organisation for Economic Co-operation and Development, has been actively involved in supporting international dialogue on the economic and social implications of ICT through the WSIS Thematic Meeting on this subject.¹ This meeting acknowledged that the adoption of ICTs by enterprises plays a fundamental role in economic growth for developing countries. The growth - and productivity - enhancing effects of well-implemented investments in ICT can lead to increased trade and to more and better employment. But at the same time, a healthy business environment is fundamental for firms to thrive and benefit from ICTs; this includes an open and transparent competitive business framework, access to energy and communication facilities, and the availability of transaction facilities and trust mechanisms.² Such an environment will encourage the development of entrepreneurship, which is an indispensable component of any ICT implementation policy. For SMEs, particular efforts must be deployed to facilitate the promotion of business development services that may assist in the design of ICT-enabled business models, in the redefinition of production processes and in finding the most cost-effective means of implementing ICT solutions. At the same time, adopting trade policies that support local value-added and exports will encourage better integration of developing countries' SMEs into supply chains, and their improved access to customers through the greater reliability, low cost and security of connection services. In addition to that, an essential part of all national ICT policies is access to skills and capacity-

building in ICT competencies. ICT training and retraining of the labour force might require a review of education and training systems so that the workforce will be able to adapt to increasingly frequent changes in work practices.

The potential of ICTs to facilitate and increase trade should be considered in national and multilateral trade policies and negotiations. International organizations and Governments have a major role to play in making the international debate more coherent, including through better coordination of policy development dialogues. Research organizations have a role to play in identifying the factors that may obstruct ICT adoption. Universities and research centres should be encouraged to research managerial practices, links between ICT investments and productivity growth, and the leveraging factors of firms' competitiveness in developing countries.

With the five-year review of progress towards the achievement of the development goals of the Millennium Declaration that took place at the UN General Assembly/Millennium Summit + 5 (MS+5) in New York in September 2005, and the second phase of the World Summit on the Information Society (WSIS) in Tunis in November 2005, there is a unique opportunity to maximize synergies between the work being done on ICT and the international endeavours in pursuit of the Millennium Development Goals (MDGs). In the follow-up process, international organizations and Governments are called on to support an intensification of the research and analytical work, increased cooperation between the different stakeholders, from civil society to business representatives, and a broad involvement of all stakeholders. Implementation efforts need to be integrated into national and international development plans and into poverty reduction strategy programmes. International organizations and Governments should also give priority to the integration of ICT into those sectors with the greatest potential impact for developing countries in priority policy areas such as trade, SME development and education.

There are indeed close links between the goals contained in the Millennium Declaration and the development potential of ICTs, which is explicitly related to Target 18 of Goal 8.³ But ICT can also support the achievement of many, if not all, other MDGs. The eradication of extreme poverty (Goal 1), for example, will to a large extent depend on the achievement of sustained economic growth, which can be facilitated

by the contribution of ICTs to economic growth and of ICT investments to development and job creation. ICTs can support the development of primary education (Goal 2) by broadening the availability of quality educational material and enhancing the effectiveness of educational administration and policy. ICTs can be used to improve health (Goals 4, 5 and 6) by providing efficient channels for the provision of health-care treatments and health-care services such as consultation, diagnosis and treatment.

The international community therefore needs to increase its commitment to mainstream ICT in all development efforts. As a contribution to this process, the various chapters of this Report highlight a number of current aspects of the information economy in which policy dialogue and concerted action can be of interest to developing countries. The subsequent sections of this Overview summarize their main elements and identify avenues for possible action.

2. ICT indicators for development: Trends and measurement issues

Analysing trends in the spread of the information economy in developing countries is a challenging task. Data are scarce, not always comparable and not yet at the level of detail necessary for measuring the impact of ICT on economic development and growth. The first chapter of the Report sets out to present an overview of basic developments in ICT access and use, in particular by enterprises in developing countries.

It finds that the number of Internet users continues to grow in all regions, in particular in Africa, whereas the market is almost mature in the United States. Despite high growth in many developing countries, Internet penetration rates are still very low; for example, China, the second largest Internet market in the world (after the United States), has a penetration rate of only 6.3 per 100 inhabitants. While the number of computers is increasing substantially in developing countries, particularly in some of the emerging markets, computer penetration remains very low, for example in China with 2.7 per cent, Brazil with 7.5 per cent and India with 0.7 per cent. Broadband, which plays a key role for enterprises to take full advantage of ICTs, is spreading quickly in developed countries and in a few Asian developing countries, whereas most other developing countries continue to have very low access rates.

Mobile phones, on the other hand, experienced a stunning growth in 2003 and developing countries have taken over from developed countries in respect of absolute numbers of cellular subscribers, mainly owing to Asian developing countries (e.g. China and India). This makes mobile phones the only ICT indicator with regard to which developing countries have

greater shares than developed countries, although penetration rates are still very low (whereas they have reached 100 per cent in some developed countries). This is an important development given that mobile telephony has been found to be a technology that has a significant impact on development, particularly in developing and least developed countries.

The Report reveals that enterprises' Internet use is high (up to 90 per cent) in developed countries and among medium-sized and large enterprises in developing countries; small and micro enterprises in developing countries are less connected, in particular those in rural areas. E-commerce continues to grow in all sectors. In the United States (the largest e-commerce market), it is most prominent in manufacturing and wholesale trade, although growth rates are highest in retail trade (B2C) and services. The Report also shows that the proportion of enterprises selling online decreases with size, but that online purchasing is more common than online selling. Most enterprises in developing countries use the Internet for e-mailing or basic information search, in particular those with slow modes of access; on the other hand, broadband access is spreading quickly among firms in developed countries and in Asian countries such as the Republic of Korea and Singapore, which use the Internet for more advanced e-business activities, banking and financial services, or filling out government forms.

As far as the ICT supply side is concerned, the chapter examines recent trends in international trade in ICT goods. It reveals that trade in ICT goods recovered strongly during 2003, after a sharp fall following the NASDAQ crash in 2000. In 2003, exports of ICT

goods exceeded \$1.1 trillion, accounting for 15 per cent of world merchandise exports and surpassing the combined value of international trade in agriculture, textiles and clothing. The growth of ICT trade was driven by developing economies (mainly from Asia), which accounted for almost 50 per cent of world exports of ICT goods; among these, China and Hong Kong (China) had the highest growth rates and gains in world market share.

As far as different ICT product groups are concerned, exports of electronic equipment fell sharply in 2001, and recovered strongly in 2003 to almost their level at the start of the millennium. Exports of telecommunications equipment, which also dropped in 2001, have not yet reached their 2000 levels. Exports of audio and video equipment fell less in 2001, and grew more than the other product groups during the same time period (by 25 per cent). While the Republic of Korea and China doubled their exports of telecommunication equipment between 2000 and 2003, those of the United States (the main exporter of telecommunication equipment in 2000) were halved. Developing countries have higher shares in the export of computer and related equipment, electronic components, and audio and video equipment. Trade in ICT goods among developing countries is increasing substantially, and trade in electronic components now represents over 50 per cent of all South–South ICT goods exports. On the other hand, audio and video equipment, as well as computer and related equipment, is largely exported from developing to developed countries.

As in any report that tries to quantitatively assess the information society in developing countries, the chap-

ter is limited by the availability of comparable data and statistics. The second part of the chapter therefore examines the process of measuring the information economy in developing countries. It argues that improving the production of ICT statistics in those countries is critical not only to analysing trends and monitoring impact, but also to designing effective national ICT policies and strategies. It finds that a number of statistical offices in developing countries have started to compile ICT-related statistics, including on the use of ICTs by enterprises and e-business. A closer look at four developing countries shows that ICT statistics can play a critical role in national ICT policymaking through identifying areas where specific action is needed, monitoring ICT policies and international benchmarking.

However, most of the available data are not comparable across countries or even between surveys carried out in the same country. Hence, there is a great need for harmonization and standardization of ICT statistics. This is why several international and regional organizations have formed the global Partnership on Measuring ICT for Development, so as to coordinate their work on ICT statistics and to help developing countries in their development of comparable data. Under the umbrella of the Partnership, a core list of ICT indicators that could be collected by all countries was developed, as a first step towards a coherent and integrated approach to the development of internationally comparable ICT statistics. But much remains to be done in terms of assisting developing countries in this process, which will remain a major challenge in the years ahead.

3. International Internet backbone connectivity: Issues for developing countries

The commercial arrangements that currently determine the terms for interconnection between Internet service providers (ISPs) of developing countries and the major international Internet backbone providers have been criticized for reasons ranging from their alleged lack of equity to the negative effects that such arrangements might have on the cost of Internet access. There have been calls for regulatory intervention to remedy this situation.

The Report argues that the divergence between the model for financial settlements that was traditionally used among telephony networks and the arrangements in place for the Internet does not necessarily imply the existence of anti-competitive practices. It further argues that the cost of Internet access in developing countries is more heavily influenced by lack of competition in domestic Internet and telecommunications markets, and by small market sizes

and lack of economies of scale, than by the terms for connectivity to global backbone providers or network service providers (NSPs).

In telephony networks the general principle applied to international interconnection was that operators shared the costs of calls terminated in each other's network. In the case of the Internet, most frequently the operator in the developing country has to pay the full cost of the connection between its network and that of the global NSP.

Internet traffic can be exchanged between networks on a peering (barter) or transit (purchase) basis. An analysis of the rationale for the decision to choose one or the other modality indicates that the choice of one or the other does not normally provide an indication of the intensity of competition among networks, but merely of the similarity or disparity between the cost structures of the various players. Networks of different sizes face different incentives to interconnect: they are much more significant for smaller networks, and a refusal to peer by the larger ones would not necessarily constitute anti-competitive behaviour.

In general, the international component of backbone connectivity represents only a small part of the total costs of ISPs, while costs determined at the domestic level are much more significant. The experience of several developing countries indicates that if restrictions on the provision of Internet backbone services are lifted, connectivity costs can be cut and infrastructure deployment accelerated. Restrictions on the provision of international connectivity (such as forcing ISPs to use the international gateway of the incumbent operator) have also been found to represent a heavy burden for ISPs.

Other restrictions in domestic Internet markets often make it difficult for developing countries' ISPs to lower their costs. For example, if ISPs in developing countries were allowed to create national or regional IXPs, they would be able to aggregate traffic, and this would make interconnection a more attractive proposition for global backbone networks. Transit arrangements could be negotiated on better terms and there would be more possibilities for peering. However, monopolies often oppose the creation of IXPs. In other cases, they impose high prices on leased lines, and these prices may represent up to 70 per cent of the total cost of ISPs.

Developing countries could facilitate Internet deployment by empowering their ISPs to make their own

choices about the commercial modalities that are best suited to their connectivity needs. Some may prefer to buy transit services from regional or global networks. Others may decide to aggregate traffic with other operators and thus gain leverage in their dealings with global providers. Yet others may choose to build or buy their own end-to-end capacity.

Concerns remain, however, about those developing countries, particularly among the least developed countries, that have very limited access to international backbone networks. For reasons both of the small size of their markets and of geographical difficulties, it is unrealistic to expect that domestic liberalization will be enough to bring down the cost of Internet interconnection to levels that enable a significant improvement in Internet affordability. International cooperation has therefore an important role to play in accompanying and supporting the commercial development of Internet connectivity in these countries.

The creation of IXPs should be supported. Where they already exist, their operation at the national level should be facilitated and cooperation agreements at the regional level should be promoted.

It is important that Governments establish a competitive environment for ISPs. Particular attention should be paid to ISP domestic interconnection. New entrants should have guaranteed interconnection with other operators, particularly with the incumbent, quickly and at a reasonable cost. ISPs would benefit from more competitive conditions for the purchase of international leased circuit capacity. Another area of concern is ISP licensing, which in many developing countries is subject to very high fees that hamper the development of Internet markets. Finally, ISPs may benefit from capacity-building efforts to help them better understand the full range of international connectivity options open to them.

Very Small Aperture Terminal (VSAT) satellites may increase the availability of bandwidth and reduce its cost. However, in many developing countries regulatory restrictions are inhibiting their deployment. The development of policy consensus among developing countries at the regional level might facilitate their diffusion by creating economies of scale.

Finally, Internet policymaking and regulation is an area that requires levels of expertise and resources that are often scarce in developing countries. Interna-

tional support for capacity-building in this area might therefore be useful.

In conclusion, if abuses of dominant positions are prevented through enhanced transparency, commercial arrangements for global backbone access should offer Internet operators the right set of incentives to

invest in infrastructure and increase connectivity in developing countries. Policies to promote Internet take-up by households, businesses and public entities by generating a critical mass of Internet users appear to be a more promising means of reducing Internet backbone interconnection costs than *ex-ante* regulatory intervention.

4. E-credit information, trade finance and e-finance: Overcoming information asymmetries

The Report notes that in most developing countries, financial service providers are not yet in a position to use modern credit risk management techniques to provide capital, and in particular trade finance, to local enterprises on competitive terms. One of the main reasons for this situation is the fragility and insufficient level of skills in the financial sector and in particular the lack of elaborate credit reporting systems. The inability of creditors to assess borrowers' risk owing to a lack of credit information, namely information on the financial state and payment record of the borrowers, is one of the main impediments to introducing a modern credit-based economy in those countries. Moreover, while enterprises in the formal sector face difficulties in accessing credit owing to their own weaknesses or to structural deficiencies of the economy, those in the informal economy lack a documented track record, and are therefore excluded from formal financial intermediation.

To improve on such major information asymmetries in creditor–borrower relations, those countries need to develop effective registration and bankruptcy laws, as well as public and court registers, acceptable standards for reporting and disclosure by private sector operators, international accounting standards and standards for auditors, and adequate public data dissemination and publishing requirements. Only in this way would institutions such as public credit registries, created mainly by banking regulators, and credit bureaux, put in place primarily by the private sector, be able to operate and to provide adequate and up-to-date electronic credit information. That in its turn would permit banks and other lenders to better assess enterprise risks on the basis of modern electronic credit risk assessment techniques and e-credit scoring or rating.

In point of fact, the emerging new international banking capital adequacy regulation, known as Basel II, makes the credit risks rating of potential borrowers a condition for their access to bank loans. Moreover, Basel II recommends a new, more differentiated and stricter regulatory capital criterion for various types of such ratings. Since the majority of more than 100 Central Banks that apply capital standards and other regulations based on the existing Basel I have announced their commitment to adopt Basel II, the development of e-credit information and related e-credit rating and scoring techniques should become a high priority for the financial sector in the developing and transition economies.

Lack of transparency and the existence of the informal sector are the major obstacles to introducing increasingly popular and innovative electronic credit information and risk management techniques. The persistence of these obstacles increases the risk of forgoing the opportunities that those techniques provide for considerable improvements in access to trade-related finance and e-finance. The recent and rapid introduction of the Internet and related innovative ICTs that make it possible to communicate, network and transact at much lower costs further underscore the importance of improving the quality of information flows in economies and hence making it possible to render more meaningful the use of modern ICTs. Moreover, actively using the Internet and ICTs, while building up from scratch modern credit information services, carries with it the promise of leapfrogging towards the latest and more efficient techniques and systems.

The recent migration of the credit information industry to the Internet has been followed by the migration

of its main users and, the namely credit insurers, bankers, factors and other financial service providers. Moreover, as the experience of e-trade finance platforms of developing countries shows, many of them have the capacity to compete with major providers of similar services in terms of the use of sophisticated web-based technologies, which make it possible to develop e-credit information techniques, undertake e-trade finance operations and even reconcile the whole spectrum of online trade operations, which includes e-trade finance. The ability of many developing countries' operators to apply state-of-the-art technologies might be constrained by their lack of access to the financial resources necessary for developing those systems. In some cases, operators might need to be supported by well-targeted technical assistance in the initial stages.

The Report argues that an important avenue for improving developing countries' access to trade-related finance and e-finance, and leading them towards the information economy, is the extensive use of opportunities provided by the Internet to overcome information asymmetry between creditors and borrowers. To substantiate that argument, the Report stresses the importance of strengthening credit infrastructure, meeting the regulatory challenge of Basel II and moving away from the informal economy by creating transparent conditions for collecting credit information on developing countries' enterprises, and by moving rapidly towards e-credit information infrastructures and e-credit scoring and e-rating techniques. In that respect, the Report also gives

examples of best practices, both in developed and in developing countries, of credit information and its migration towards Internet-based solutions. It analyses the recent trends in credit insurance, a financial service industry based on intensive use of credit and e-credit information. It also reviews the progress in e-banking and integrated e-trade finance platforms, other e-trade-finance-related techniques, and their applicability in the developing and transition countries. The Report stresses that while progressing towards paperless trade and e-trade finance, the industries, in addition to challenges related to e-credit information and e-trade finance business models, should treat adequately issues of a more general order such as IT security and interoperability.

Addressing the need to improve on the quality of credit information and simultaneously make it available at low cost by actively using opportunities provided by modern ICTs and the Internet is a task of great magnitude. Transacting economic agents are trying to overcome as much as possible information asymmetries. In that respect, modern ICTs are creating qualitatively a new environment permitting considerable advances in the right direction. That underscores the importance for developing countries of creating the necessary regulatory and institutional environment and making the establishment of credit information services a policy priority. Major international efforts, including public-private partnerships, technical assistance and other capacity-building, should not be spared to achieve that end.

5. Taking off: E-tourism opportunities for developing countries

One of the most important factors underlying the continuous evolution of the tourism industry is the Internet, which drives substantial changes in the market structure and consumer behaviour. Greater ICT access and availability, as well as comparison between the various tourism offers and price transparency, have seduced consumers, thus creating new expectations and accelerating the competition between online tourism providers. Consumers are increasingly mastering the online research and purchase processes. They expect to find high-quality and reliable information in order to be able to organize and

purchase the best product offering for each occasion and receive comprehensive feedback and confirmation. They are demanding flexible and customizable travel arrangements, including new travel experience based on cultural, natural, environmental and social resources. Understanding the opportunities offered by ICTs is a priority for public and private organizations, as well as tourism providers at national, regional and community levels in developing countries, including least developed countries (LDCs), where the tourism sector is of strategic importance and can meet consumers' demand.

Today's online tourism market is a very dynamic one, with highly competitive newcomers and powerful concentration mechanisms. Over the years, the number of online tourism providers, both generalists and niche players, has increased, and the market has experienced a gradual consolidation in the hands of the larger and better-funded companies. As was the case for the tourism industry before the Internet, information on tourism opportunities in developing countries is mainly generated and maintained by overseas service providers, who also conduct most of the sales transactions and take a large percentage of the profits. For a number of years, online giant travel agencies such as Expedia, Orbitz and Travelocity have dominated the online tourism business, but websites run by direct providers such as airlines, hotels and car rental services are attracting travellers seeking better prices by avoiding third-party distributors. In developed countries, large resources are being invested by tourism providers to design user-friendly destination management systems (DMSs) based on innovative ICT-based tools offering various functionalities (online reservation and booking systems) to meet their customers' expectations.

At the same time, ICTs are being deployed in developing countries at a slower pace. More and more destination management organizations (DMOs) in developing countries are using the Internet to market their tourism offerings. However, their websites are mainly an information window. Only a small number of DMOs have been able to gradually insert ICTs into the entire tourism value chain, developing effective DMSs capable of offering facilities for consumers to find what they are looking for, and for tourism producers to increase their competitiveness by networking globally with business partners. The chapter sets out to review the status of e-tourism initiatives undertaken by national DMOs in LDCs, on the basis of an informal survey of national tourism websites. It also presents some case studies on the e-tourism strategies developed both in developed and in developing destinations at a national or regional level. This will serve to shed light on similar challenges and the strategic options adopted to overcome them.

The Internet can help local tourism providers to benefit from global reach in international markets while promoting their tourism offer online. ICTs represent the most effective tools for destinations and tourism providers to help them remedy the existing imbalance and take charge of their destination promotion. The Internet is a complementary channel for distribution

of their tourism products, including niche tourism, through which they can offer a more complete set of tourism activities than the ones proposed by large online travel agencies and other distributors. The latter propose only tour vacations and a selection of international hotel chains. Small tourism producers have an opportunity to access international tourism markets on an equal footing, provided that they offer a well-conceived and effective e-tourism website that builds on technological and product innovations and enjoys consumers' confidence. For that purpose, effective e-tourism strategies should be adopted by policymakers and tourism enterprises in order to develop and maintain competitive advantages in the tourism global market.

ICT diffusion and use among tourism providers, and in particular within small and medium-sized tourism enterprises, are crucial for the effective development of e-tourism in developing countries. Governments and DMOs should create awareness of ICT benefits and emphasize local knowledge about tourism offerings as a competitive advantage to complement the actual promotion of their destinations by overseas tourism distributors. They should ensure that all local tourism providers at the national, regional and local levels are aware of the benefits of DMSs for promoting online their tourism products and services, and should encourage them to participate actively in them. The main priorities for destinations and tourism enterprises in developing countries are to foster the development of e-business in the local economy and to embrace new business models. In order to satisfy ever-demanding consumers, as well as ensuring sustainable development, they should develop and market innovative products and services such as eco-tourism for achieving a strong position in the global tourism market.

Building a dynamic, reliable and secure DMS with comprehensive packaging will be essential for DMOs in developing countries in order to meet consumers' information, purchasing, care and security needs. Public and private partnerships should be encouraged to gradually and successfully implement the DMS. Security issues, in particular those related to the transmission of credit card information, have to be addressed at the national level. In the end, the lack of confidence and security, and of user-friendly and high-quality frameworks, is influential in customers' decisions. This is an issue of particular relevance for the majority of developing countries, and particularly LDCs, which do not have transaction capabilities or

legal instruments to protect both businesses and consumers, or do not have the capacity to develop an effective DMS and cannot rely only on uncertain online revenue. For this reason, it is essential to propose different and complementary traditional distri-

bution channels (travel agents, national tourism offices, tourism producers, call centres, etc.). In addition, DMSs should work with certification authorities to build consumers' confidence and allow e-tourism to take off successfully.

6. Information technology and security

Risk management and policy implications

The mission of information security is to establish trust in technologies that support or enable various social and commercial activities. Information security and the resulting trusted technological environment are an essential component of digital development. Trade, financial transactions, government administration and education are examples of activities that are increasingly dependent on technology infrastructures and therefore on information security.

In practice, information security is compromised on a daily basis. Estimates of economic damage vary but certainly reach into the tens, if not hundreds, of billions of dollars per year. The threat of such losses may, in turn, deter the application of information technologies where they may bring about valuable innovation, productivity gains and improved efficiency. In practice, electronic communication, network bandwidth and computing resources have become critical infrastructures, and a default level of security is expected. However, it has been argued that a systematic underinvestment in security technologies may represent the current state of affairs, and this, in consequence, validates and explains the general and broad involvement of Governments in developed and developing countries and at the highest level of international policy. Government involvement in information security issues is rarely disputed perhaps also because of strong historical links with military and intelligence institutions.

A risk management approach can make significant contributions to defining and implementing corporate strategy as well as government policy addressing information security issues. Using risk management means moving away from technology-centred treatment of information security towards a more holistic approach. Instead of reacting to security attacks with technical solutions, risk management requires consideration of the problem and its context; and this

includes analysing the balance of incentives and, in particular from a government policy perspective, the structure of the information security and technology market. For any entity, the immediate and difficult task is the evaluation of the information assets at risk. This is followed by an assessment of the various threats that affect these assets, their frequency and the severity of the damage they may inflict. Risk mitigation activities and reducing the hazardous conditions under which a threat can materialize are the next step. This includes the application of security technologies, security policies, regulations, standards and information security education and training. Having put in place all feasible risk mitigation options, risk management moves towards finding ways to reduce the severity of potential loss and damage and often implies establishing safety and emergency response teams, technologies and procedures. Inevitably, any entity must accept that some damage will occur at some point and must choose to transfer some risk using insurance, thus securing a source of financial compensation for part of the loss.

Governments are finding that the state of information security technologies is unsatisfactory from a critical infrastructure perspective. Their actions typically fall into the risk mitigation or loss severity reduction phases of the risk management process. In practice, Governments often propose regulations mandating general minimum standards or specific requirements for certain industries or government suppliers. They can also encourage self-regulation in response to consumer demands for quality certification. Government can, and often does, support the establishment and work of nations' computer emergency response teams. Finally, Governments have engaged in international policy processes for information security, initially from the perspective of instituting a common understanding and platform on cybercrime issues, moving thereafter to establish best practice guidelines often

imbued with the notion of the necessity of using risk management processes and techniques.

Given that Governments implement active policy, this can lead to several considerations for information security technology firms or firms that are heavy users of technology in the provision of their services, such as software and business process services exporters in developing countries. Increasingly stringent regulation aims to, among other issues, identify liabilities and fault in the event of security compromises. When judging its prospects, it may be insufficient to focus solely on the gauging of market demand: exporters will need to monitor international and national regulatory developments and adjust business expectations accordingly.

The position of developing countries is not conceptually different from that of developed countries. As electronic communication and interaction become part of everyday experience for many people, there may be an overall decrease in risk tolerance: early adopters of online technologies may have been less risk-averse or more technically capable of dealing with the security consequences. Thus, information security takes on strategic importance with growing digital penetration. Developing countries may, however, need to address several issues more specifically. The first is that the scope for human resource development may be greater, and government policy may reflect this by extending activities and support to all educational and training institutions. The second is

that disincentives for applying information security may be greater since there is less to protect, the most valuable information assets being owned or managed by entities in developed countries. This suggests that international technical and policy cooperation with developing countries should be encouraged and supported, in particular by the most technologically advanced countries, as there is only mutual benefit to be had. Since export and outsourcing opportunities increasingly depend on satisfying security regulations in the export destinations, undemanding domestic regulation does not facilitate technology or the outsourcing of export development.

The international community continues to address the issue of information security policy and practice and has recognized the threat posed by cybercrime for information economy development. International and national regulatory and standards bodies have also taken up this issue and are formulating and advising on minimum information security standards for international commercial partners. The substantive engagement of the international community in providing guidelines and addressing particular issues that may need policy consideration and action should offset the difficulties presented by increased regulatory requirements, provided that the latter are followed up with practical capacity-building and technical cooperation activities. The technologies that bring with them the inconvenience of increased security risks present stakeholders in the digital development process with many opportunities for the global sharing of security information and experience.

7. Protecting the information society: Addressing the phenomenon of cybercrime

As developing countries embrace, exploit and integrate computer and communications systems at an economic and social level, so concerns arise about the vulnerability of such systems to deliberate attack. An attack may target the data being processed by systems, or the integrity, confidentiality and availability of the systems themselves. Where such attacks are targeted at, or inadvertently impact on, a country's critical national infrastructure, such as power systems or transportation networks, their consequences may be disastrous.

Addressing the phenomenon of cybercrime is critically important in order to engender trust among Internet users. While the full economic cost of cybercrime is difficult to measure accurately, it is clear that the cost to individuals, businesses and Governments is substantial and increasing significantly. Since they have different levels of technological development, developing countries may experience patterns of threats and vulnerabilities different from those experienced by developed countries.

Protecting systems from attacks primarily relies on the implementation of appropriate technical, physical and operational security measures. Prevention being better than cure, it must therefore be the concern of policymakers that users, whether from the public or private sector, implement security measures to protect their data and systems. Greater awareness about the need for adequate data security must be promoted amongst users.

However, a reciprocal requirement for appropriate security is the establishment of a legal framework that deters such attacks by criminalizing the different forms of activities being carried out against systems and enabling law enforcement agencies to adequately investigate and prosecute such activities.

In general, law reform in respect of computer-related and content-related crime will involve adaptation designed to ensure that the criminal code is capable of being applied to acts involving the use of computers, rather than wholesale revision of the existing criminal code. In terms of substantive law, existing laws may need to be amended to reflect the involvement of computer and communication technologies. In addition, the penalties associated with certain crimes may need to be increased in order to address their greater prevalence in an Internet environment. Most countries also create new offences to cover criminal activities that specifically target computer and communication systems and the data they hold.

Reforming the criminal code is only one step towards the effective legal treatment of cybercrime. Public law enforcement agencies also require the necessary powers, training, expertise and resources to be able to tackle instances of cybercrime, often working in conjunction with the private sector. Countries will need to consider procedural law reforms, such as laws governing search and seizure and the interception of communications, to adequately equip their law enforcement agencies to investigate cybercrime. But Governments must also balance the need to tackle cybercrime with the protection of individual rights and liberties, such as freedom of expression and privacy.

Computer crime has an obvious international dimension and policymakers recognize the need to ensure that legal protection is harmonized among nations in

order to prevent the emergence of cybercrime havens. Cybercrime is often international in nature, occurring across boundaries and impacting on users in different countries. Law enforcement, however, stops at the borders of nation States and must go through proper legal channels to receive assistance in cybercrime investigations.

While it is important for developing countries to have cybercrime laws in place, it is equally important that countries have the legal authority to assist foreign countries in an investigation, even if the country in question has not suffered any damage itself and is merely the location of the intruder or a pass-through site. Thus, inadequate regimes for international legal assistance and extradition might in effect shield criminals from law enforcement. Developing countries might be both the victim and source of cybercrime activities.

Attempts have been made in various international organizations and forums, such as the G8 member States and the United Nations, to achieve a harmonized approach to legislating against computer crime and thereby try to prevent the emergence of “computer crime havens”. The most significant intergovernmental institution in the field has been the Council of Europe, which adopted on 23 November 2001 the Convention on Cybercrime, which is open for ratification by non-European countries. The Convention requires Parties to criminalize certain conduct that is committed through, against or in relation to computer systems, and provides for broad international cooperation in the form of extradition and mutual legal assistance. The Convention also requires Parties to have the ability to investigate computer-related crime effectively and to obtain electronic evidence in all types of investigations. The Convention entered into force on 18 March 2004.

The comprehensive nature of the Convention, as well as the geographical spread of its signatories, means that it is likely to remain the most significant international legal instrument in the field for the foreseeable future. However, concerns have been expressed about the Convention by both human rights groups and providers of communication services, and there have been calls for a treaty to be drafted under the auspices of the United Nations.

Notes

1. WSIS Thematic Meeting on the “Economic and Social Implications of ICT”, 17–19 January 2005, Antigua, Guatemala. The meeting report can be downloaded at <http://www.itu.int/wsis/docs2/thematic/ilo/final-report.pdf>.
2. See chapter 5.
3. Goal 8 aims at developing a global partnership for development: “In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.”