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POLICIES AND INSTITUTIONS FOR E-COMMERCE READINESS: WHAT CAN DEVELOPING COUNTRIES LEARN FROM OECD EXPERIENCE?

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DEVELOPMENT CENTRE
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PREFACE

The OECD has played a pioneering role in work on e-commerce policy. This has borne fruit in the formulation of numerous codes of good practice and sets of guidelines for various aspects of e-commerce, from online consumer protection and dispute resolution, to privacy, to encryption and information security, to taxation. The OECD's online privacy statement generator is one example of a tool that is available to enterprises located anywhere in the world.

Each country will follow a somewhat different approach to e-commerce readiness, but there are enough common elements that having access to a concise summary of OECD "good practice" can save developing country policy makers valuable time and energy. Focusing in particular on the Brazilian experience, the paper seeks to highlight both similarities and differences in initial conditions compared to a typical OECD country. One area of potentially large differences is in the extent of deregulation of, and competition in, the telecommunications sector. It is well understood that costs of Internet access are to a significant degree a function of the competitiveness of telecommunications and Internet service provider (ISP) markets. It is also appreciated that, when privatising state telecoms monopolies, governments faced with strong fiscal pressures may be inclined to grant generous exclusivity rights to newly privatised telecoms providers in order to realise a higher sale price. The cost, however, is postponed competition and slower Internet diffusion.

The focus on Brazil is a strength because Brazil is prominent among the group of middle-income developing countries that can perhaps benefit most from the OECD experience, given their technological sophistication and developed enterprise sector. But it is also a limitation in that Brazil has hardly anything in common with poor developing countries. While e-commerce policy makers in the latter face a much greater challenge, small differences in policy and approach seem to make a big difference in outcome at the early stages. Estonia is a classic example among the transition economies, while a country like Sri Lanka that has been pro-active in promoting ICT has the chance to get quite away ahead of a country like Pakistan that has been less so.

There is an acronym, DIALECT, which captures well the main elements of e-commerce readiness that developing countries need to address:

Digital Infrastructure: the backbone communications network needs to be extended and upgraded, using latest digital, broadband technology wherever possible.

Access: affordable access to telephone and Internet services, fostered by deregulation and stronger competition policy.

Literacy: basic literacy is crucial to exploiting the technology's potential, but computer literacy is also needed for at least a cadre of skilled technicians.

Entrepreneurship: an enterprise-friendly environment in which successful start-ups stand to reap rich rewards.

Content: the benefits to an individual user are a function of the number of other users, which in turn depends on how much useful content can be found; in developing countries, more useful local (language) content needs to be generated.

Trust: developing country e-ntrepreneurs without an international reputation may face a particularly high trust barrier to doing business electronically. Governments and business associations can help in building trust.

The T could also stand for Transparency and Taxes, especially if one were to include e-government in the discussion. The Internet can be a potent tool for governments to enhance transparency through the online provision of information about their operations, the use of e-procurement with online posting of procedures and outcomes, and the use of the Internet to solicit public views about government policies and programmes. The Internet is also certain to affect public finances, though not always in clearly predictable ways. On the one hand, e-commerce transactions may substitute for conventional sales, posing a threat to tax revenues for as long as e-commerce remains tax-exempt; on the other, the Internet can facilitate both tax collection and the processing of tax returns, reducing the revenue leakage and transaction costs associated with the tax system.

As e-commerce spreads through both the developed and the developing worlds, research will be needed into the effects of this DIALECT on both private and public enterprise. This technical paper represents another product in taking up the challenge of serving as a bridge for the two-way flow of ideas between the OECD and the developing world.

Jorge Braga de Macedo
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April 2002

RÉSUMÉ

Les priorités des mesures visant à favoriser le commerce électronique évoluent en parallèle avec le passage des pays par des phases successives d'« aptitude au commerce électronique ». Pour la plupart des pays en développement, la première exigence consiste à acquérir les infrastructures de base en matière de télécommunications, à créer un environnement concurrentiel et un cadre réglementaire permettant un accès étendu et bon marché à l'Internet. La privatisation du secteur des télécommunications doit aller de pair avec un renforcement de la concurrence, et non avec l'octroi d'accords d'exclusivité excessivement généreux. Dans les pays à revenu intermédiaire, les pouvoirs publics doivent en outre faire en sorte que l'environnement des affaires soit propice au commerce électronique. Certains problèmes, comme la protection du consommateur, sont classiques, même si la résolution des différends se trouve compliquée du fait que les transactions virtuelles sont anonymes, à distance et dépassent les juridictions nationales. Mais d'autres problèmes n'ont pas d'équivalent ou prennent une acuité particulière dans un environnement virtuel : c'est le cas de la protection de la vie privée, de la sécurité des transactions ou encore de l'authentification des signatures électroniques. L'OCDE a élaboré un certain nombre de lignes directrices en ce qui concerne la protection des consommateurs en ligne, la cryptographie et la sécurité, ainsi que la protection de la vie privée, qui sont globalement accessibles aux pays non membres. Par exemple, son système de protection de la vie privée est un outil en ligne d'utilisation aisée qui peut être utilisé par n'importe quelle organisation, qu'elle soit publique ou privée. Il existe un large consensus parmi les pays de l'OCDE sur les règles de bonne conduite dans ce domaine (la vie privée exceptée) et les gouvernements sont très près d'un accord sur les principes généraux de la taxation du commerce électronique. Néanmoins, des désaccords profonds persistent sur des points spécifiques, en particulier sur les taxes à la consommation. Les pays en développement ont probablement tout à gagner à court terme à adhérer à un mémorandum sur la fiscalité des transactions électroniques, compte tenu qu'elle n'aurait au départ que des conséquences très réduites sur les recettes fiscales mais un effet d'incitation positif sur la diffusion du commerce électronique à plus long terme. En ce qui concerne les autres mesures de promotion, les pouvoirs publics pourraient transférer en ligne leurs procédures d'appel d'offre et d'autres fonctions : cela aurait pour effet de dynamiser le marché électronique local tout en permettant d'abaisser les coûts de transaction et d'améliorer la transparence.

SUMMARY

E-commerce policy priorities evolve with a country's transition through phases of "e-commerce readiness". For most developing countries, getting the basic telecommunications infrastructure, competitive environment, and regulatory framework in place to support widespread and affordable Internet access remains the highest priority. Telecoms privatisation needs to be accompanied by expanded competition, not excessively generous exclusivity agreements. In important middle-income developing countries, governments must address a further challenge: ensuring an e-commerce-conducive business environment. Some issues, like consumer protection, are familiar even if cross-jurisdictional, remote and anonymous transactions in a virtual environment complicate dispute resolution. Other issues are unique to or especially acute in a virtual environment, like protection of privacy, security of transactions, and authentication of electronic signatures. The OECD has devised a number of guidelines (including for online consumer protection, cryptography and security, and privacy protection) that are generally available to non-OECD members; its privacy statement generator is a user-friendly online tool that can be employed by any organisation, public or private. While there is fairly wide consensus among OECD members about good practice in many policy areas (privacy being an exception) and governments are also close to agreement on broad e-commerce taxation principles, considerable disagreement persists about specifics — notably of consumption tax treatment. Developing countries probably stand to gain in the near-term by adhering to a tax moratorium on e-commerce transactions, given the initially small revenue implications and the positive incentive effect on e-commerce diffusion. In terms of other diffusion measures, moving government procurement and other functions online could pump-prime the local e-market while having the added benefits of lowering transaction costs and enhancing transparency.

I. INTRODUCTION

This paper's principal objective is to describe the key elements of the policy and institutional framework for e-commerce existing in OECD countries, to summarise the most important contributions of the OECD as an organisation to defining a common e-commerce framework for its Members, and to reflect on their applicability and adaptability to a developing country context.

Differences in the diffusion of information and communications technologies (ICT) are creating a digital divide both between countries and across regions and social groups within countries. While differential rates of technology diffusion are a persistent fact of economic history, the advent of the Internet and its perceived economic significance have served to focus attention on narrowing the digital divide. While electronic commerce offers opportunities to increase productivity and to improve access to information and to markets, developing countries and small and medium size businesses are usually at a disadvantage to reap these benefits due to poor telecommunication infrastructure, lack of appropriate IT equipment and software, and inadequate skills to use and support e-commerce applications.

As developing country governments seek to improve their regulatory and policy environment to facilitate e-commerce, how might an examination of the OECD country experience be of use? E-commerce has become a central element in the OECD's analysis of economic growth and the expansion of world trade. There are four major thematic lines for future work endorsed by Ministers in the "OECD Action Plan for Electronic Commerce" (SG/EC(98)9FINAL) around which the paper is organised.

First is enhancing the information infrastructure. This involves improving access to telecommunications and Internet services at the price, reliability, and speed levels needed for e-commerce. There is a wide recognition that introducing competition and freer entry into the telecommunication services market is a sound policy to reduce prices, introduce innovations, and boost investments. The transition, however, from a public monopoly to a competitive market is still an ongoing process in many OECD countries. The main problem is not the privatisation *per se* but rather how to enhance competition in the telecommunication services market. There are political, economic and technical barriers to be overcome. Telecommunications infrastructure is often associated with national interests and industrial policies. From the economic point of view, telecommunications is usually described as a natural monopoly, since there are huge economies of scale and network economies that represent important barriers to new entry, especially in basic infrastructure provision. New technologies like wireless and fibre optics are reducing barriers but their impact is uneven through different segments of the services market. OECD countries' experience in liberalising telecommunications

services is very relevant to developing countries. The challenges are greater in the latter, however, since in most developing countries the size of the market does not encourage private investments to compete with entrenched monopolies. This is especially true, of course, for small, poor countries.

Second is the challenge of building trust for users and consumers of electronic commerce. The OECD has produced guidelines and recommendations to governments, business and consumers addressing principles associated with fair business, advertising and marketing practices, online business and information disclosure, handling consumer complaints, provision of effective dispute resolution, education and awareness, and global co-operation. If there is an important difference between developed and developing countries in these areas, it is perhaps in the broader legal and institutional endowment pertaining to contract enforcement and dispute resolution. Here we describe OECD guidelines and frameworks that could perhaps be adopted by developing countries and reflect on what specific issues the latter may face.

The third thematic line pursued by OECD is establishing ground rules for the digital market place. The major issue arising under this theme is e-commerce taxation. In 1998, OECD countries agreed Taxation Framework Conditions for Electronic Commerce, which establish general principles. There remains, however, strong disagreement between the USA and other OECD members concerning taxes on e-commerce. While the former proposes a tax-free environment, the European Union and Japan argue that the same principles that governments apply to taxation of conventional commerce should apply equally to e-commerce. One obvious concern is the potential loss in tax revenues, a concern shared in no small measure by state and municipal government officials in the United States. The loss of tariff revenue on internationally traded digital products may be of particular concern to developing countries, which tend to rely more heavily than OECD countries on trade taxes as a source of government revenue. On the other hand, it is not clear how large a share of imports into those countries stands to be diverted through electronic channels. While some services trade could be strongly affected, the impact on manufactures and primary commodity trade taxes is probably small. In any case, most countries are moving to reduce their dependence on trade taxes in the context of the WTO and/or regional trade liberalisation agreements.

Fourth is the question of how to maximise the benefits of electronic commerce. Its full potential will only be realised through its widespread use by businesses, consumers, and institutions. The considerable differences in computer and Internet use by country, by region, by industry, and by size of firm have raised concerns even in OECD countries. Most have introduced policies and programmes to reduce the digital divide within their territory. These include general policies to lower network infrastructure access costs and increase competition, and focused policies to improve access to technologies in rural areas, schools and other public institutions, to support training for SMEs, and to provide government services and procurement online. This paper provides an overview of these policies and briefly discusses their relevance for developing countries.

Developing countries have to set priorities, since the available infrastructure does not immediately support wide Internet diffusion. The benefits of Internet for increasing productivity and competitiveness are associated with business-to-business applications (B2B) rather than business to consumer (B2C). The opportunities of e-commerce for cost

reductions are mainly in procurement and online data exchange within value chains. But Internet also opens windows of opportunity for improving education, government services and social development.

II. ACCESS TO TELECOMMUNICATIONS AND INTERNET SERVICES

The access to e-commerce depends on several basic resources which developing countries usually lack in different degrees. Based on the guide produced by Harvard's project on Electronic Commerce Readiness[1], we can classify access to telecommunications into four stages of development. It should be noted, however, that large developing countries usually combine different stages of telecommunications development within the country according to the region. In countries where the telecommunication services market has already been liberalised, private domestic and international operators are supplying advanced infrastructure and value-added services wherever demand exists. On the other hand, vast parts of these countries have no reliable access to telecommunication. These include rural areas, small or poor urban centres and sparsely populated areas.

Telecommunications Infrastructure

The development of this infrastructure is usually measured by "teledensity" — the number of fixed telephone lines per 100 inhabitants. Of the four stages alluded to above, developing countries usually fall in the first three as far as teledensity is concerned.

In stage 1, access to telecommunications infrastructure is very poor and teledensity is less than 2 per cent. There are very few shared facilities for telecommunication and cable services are usually not available. Quality of connection and network speed are not conducive to electronic commerce since no service beyond limited e-mail capability is available. Large businesses that want access must link their networks directly to infrastructure backbone outside their communities. Examples of countries in this stage (based on ITU's most recent teledensity statistics) are Bangladesh, Afghanistan, Cambodia and most sub-Saharan African countries.

At stage 2, a small minority in the community has access to the telecommunications network. Teledensity is between 2 and 8 mainlines per 100 people, and there is an incipient mobile wireless and cable penetration. The quality of the services is inadequate for e-commerce since dropped connections are frequent and packet loss is significant and regularly disruptive of online activities. Many developing countries are included in this stage according to the teledensity criterion. Larger low-income countries of Asia like India, Philippines and Indonesia can be included in this stage. They do, however, have pockets of high quality infrastructure in urban business centres and upper class residential areas which are typical of stages 3 and 4. Also, Indian households' cable access is significantly higher than others in this group.

Stage 3 concerns countries where a sizeable portion of the community has good access to telephone services. Teledensity is between 8 and 40, mobile wireless penetration is between 3 per cent and 14 per cent of the population, and between 5 per cent and 14 per cent of households subscribe to cable services. The quality of services is still poor, since connections are dropped with noticeable frequency. In large urban centres users have wide access to dial-up modem lines with transfer speed of up to 28.8 Kbps and alternative links through radio and cable are supplied by competitors of main telephone incumbents at much higher speed. Leased high-speed lines are available for business and Internet service providers (ISPs). This is the case of China, Malaysia, Iran and most Latin American countries.

Developing countries with widespread access to telecommunications and network services (teledensity of 40 mainlines per 100 people or more), classified as stage 4, are rare although several smaller countries (notably in the Caribbean) and more developed regions within larger countries have reached this stage or will do so soon.

In the vast majority of developing countries, market mechanisms alone are not sufficient to ensure widespread individual access to the network, since a large part of the population lack the required income level to subscribe to telephone services. For low income and rural populations, universalisation programmes are required to make adequate telecommunications available in areas where telecom operators cannot otherwise be expected to provide full network access. In Brazil, for example, where teledensity was 18 in 2000, telecommunication operators are required to contribute 1 per cent of their total revenues to a universalisation fund aimed at providing services to those excluded from the market. Universalisation programmes exist also in many OECD countries. In Italy, the Competition Authority adopts the “access deficit contribution principle”, which requires competitors to refund Telecom Italia for assuring universal service[2].

Access to the Internet

Access to the Internet is not a function of telecommunication infrastructure alone. Cultural, demographic, and regulatory factors seem to be influential too. China and Thailand, for example, have roughly the same teledensity (9-11 mainlines per 100 people in 2000) but the latter has more than twice as many Internet users (3.8 per 100) as China (1.7 per 100). Malaysia is a striking example of a developing country teledensity (20 per cent) and a percentage of Internet users typical of many developed countries (16 per cent)[3]. Iran, in contrast, had 15 mainlines per 100 people but less than one Internet user per 100 in 2000, presumably largely for cultural and political reasons.

Income level and distribution also matter. The monthly Internet access charge may represent as much as 70 per cent of GDP *per capita* in countries like Mozambique and Ethiopia. In countries like Mexico and Brazil it represents only about 5 per cent, but because of inequalities in income distribution the Internet is still unaffordable to a large proportion of the population: as of 2000, only about 2.8 per cent of the population were users.

A key regulatory determinant of Internet costs is the nature of access rules to the services of “potential bottleneck facilities” that are features of network industries like

telecommunications, electricity and railways. If private service providers must pay punitive rates of access, competition can be effectively curtailed even where industry entry is purportedly free. Thus, the high leased line costs charged by state telecoms monopolies to private Internet service providers (ISPs) still poses a major constraint on affordability of access in many countries.

Also, legal and statutory factors such as regulation of transactions, privacy protection, security, intellectual property protection, taxes on e-commerce transactions, and government policies such as promotion of IT production and use can enable or inhibit e-commerce. These factors will be analysed in other sections.

Usually, countries classified in Stage 1 have virtually no ISPs offering local dial-up access. Business is unable to lease dedicated lines from the local telephone operator. Most users are charged long distance or international rates for dial-up access and ISP rates are so high that few firms and individuals can afford them. Very few software developers, programmers or computer technicians are present in the community. Less than 0.5 per cent of the population makes use of Internet services. The majority of least developed countries are still in this stage.

In stage 2, a limited number of Internet providers offers dial-up access. Users often have difficulty establishing a dial-up connection to a local ISP. Rates for a local telephone call are usually high enough to discourage extensive Internet use via local ISPs. There is seldom competition in commercial leased line provision and business may only lease lines from a single telephone operator. Service and support are poor and it may take several months for installation of mainlines. Countries or regions within a country in this stage have an Internet diffusion rate varying from 0.5 per cent to 1 per cent and there are more than 1 million inhabitants per local ISP.

Stage 3 is characterised by many more opportunities for public Internet access. Usually subscribers have choice among various Internet packages and it is normally possible for users to establish a good dial-up connection to a local ISP, except during peak hours. Competition in leased line provision for business has been introduced in most large urban areas and prices are falling but are still high. A variety of hardware and software solutions are usually available locally.

In stage 4, higher bandwidth solutions such as DSL (digital subscriber line) and cable modem access are available. Customers can tailor services to meet different demands for speed, service, security, quality and cost. A competitive and sophisticated web design market exists, incorporating the latest development technology.

Perspectives for the Development of E-Commerce

The implications of different degrees of access to infrastructure for e-commerce development are quite clear-cut. Countries or regions within a country characterised by stages 1 and 2 have very limited possibilities to develop e-commerce in the short run. They need to develop basic telecommunication infrastructure in an environment where incomes remain low and market demand consequently weak. Public investment is likely to continue to play a role in extending the basic telecommunications infrastructure, though wherever possible efforts need to be made to attract private investment.

For the last decade-and-a-half, the International Telecommunications Union (ITU) has been exploring ways to mobilise private capital for telecoms investment in low-income countries. A 1994 McKinsey report, "Closing the Global Communications Gap", recommended that the ITU create a privately owned commercial company whose mission was to mobilise equity investment into telecom companies in developing countries. In June 1995, the ITU resolved to support this initiative and WorldTel was formally created as a privately held company in the summer of 1996. As yet, though, its investment portfolio is rather slim; perhaps this is because the investment boom of the late 1990s saw the major established telecoms companies expanding far afield, even into low-income countries.

The ITU is also deploying e-commerce infrastructure in more than 100 countries. Its Electronic Commerce for Developing Countries (EC-DC) project aims at providing first-class security, trust and services for e-business transactions under affordable conditions by pooling and sharing available resources. Using the World Trade Centers network's global infrastructure and certification services, countries lacking secure infrastructure, digital certification and electronic payment facilities can in principle leapfrog these obstacles. Development assistance programmes to narrow the international digital divide are still in an early phase of development, but there have already been many innovative uses of ICT in more traditional social and economic development projects (see, for example, http://wriws1.digitaldividend.org).

At stages 3 and 4, there are already some of the necessary conditions to participate in e-commerce networks. In addition to availability and affordability of the basic communications infrastructure, however, a number of other factors play a crucial role in the diffusion of e-commerce. These include the efficiency of complementary infrastructure and services — e.g. transport (roads, airports, railways and ports) to facilitate the shipment of physical goods, logistics, trade financing, and customs clearance; reliability of electric power supply; and general skills to operate, develop and maintain IT systems.

While countries classified in stages 3 and 4 are more prepared to benefit from the opportunities opened by e-commerce than countries that are still in stages 1 and 2, they also face greater risk of losing shares in international trade should they fail to adapt quickly enough to e-commerce requirements.

Market Competition and Pricing Policies

One of the key factors in explaining the different performance in the development and usage of the Internet among OECD countries is access cost and the structure of pricing[4]. This applies both to the price of basic telephone services and to the costs of Internet connection. While the consensus view is that competition and market access are important influences on price and availability of telecommunications infrastructure[5], there is surprisingly little cross-country evidence of their impacts on investment, performance and industry structure[6].

Along with regulatory reform, technological change plays a key role in shaping new market structure in telecommunications services. Technology convergence in different media and forms of transmission opens new opportunities both for competition and market concentration. On the one hand, it boosts competition by providing alternatives for data, voice and image transmission at higher speed and better performance. By choosing among cable, radio, and satellite connections provided by different service firms, users can bargain for better prices and services. Technology and regulatory reform have eliminated most natural monopolies, lowering entry barriers and enabling a multiplicity of operators to supply these services. Wireless communications, including mobile cellular and WLL (wireless local loop), are enabling new firms to introduce facilities to supply voice service to customers. While cellular mobile phone usually constitutes a separate market, WLL competes directly with existing domestic fixed telephone service suppliers[7].

The possibility of accessing the Internet via a cable TV link also enhances competition. Strategic convergence in TV, Internet and telephone markets still depends, however, on regulatory changes.

In some OECD countries, liberalisation of public switched telecommunication markets has not only enabled new players to enter the market but also encouraged the development of new ways of buying and selling capacity. Not only do users now have a choice of suppliers in a growing number of markets; they also have the option of purchasing capacity in the form of Indefeasible Rights of Use[8] (IRUs) rather than just leasing capacity. The new suppliers are also casting aside many of the traditional ways of segmenting network pricing. New carriers are bypassing the established method of connecting calls between telecommunication carriers in different countries. There are now new exchanges for trading capacity, including sites on the Internet where capacity has begun to be traded. The impact on price competition has been dramatic with the proliferation of options for leasing a circuit. These include discount prices from the entrenched telecommunications carriers that faces competition from new market entrants, lower market prices for leased capacity, and wholesale prices from infrastructure providers with excess capacity.

Competition in high-speed infrastructure is beginning to emerge in most OECD countries. For electronic commerce, an essential service is leased lines, defined as an amount of dedicated capacity that has been allocated by a telecommunication infrastructure provider between two points[9]. Corporate Intranets employing TCI/IP protocol to link up private networks usually use leased lines. This represents a fast-growing market for the construction of wholesale capacity that can be provided either by existing public telecommunication operators (PTO) or newcomers in deregulated markets.

On the other hand, the recent trend towards industry concentration through mergers and acquisitions poses a potential threat to full competition in different segments of the market — one that has drawn close scrutiny from anti-trust regulators in major OECD countries.

The evidence presented in a 1999 OECD report[10] shows that leased lines are still often priced dearly by infrastructure providers with legal monopolies or dominant market power. On a route where competition is not yet permitted at both ends, a leased line can be cost up to 14 times the best available price in the USA. The report argues that business will not be competitive if it cannot get connections with a high quality of service, in the quantities it needs, and at prices comparable to competitors elsewhere. Leased lines are considered to be the building blocks of electronic commerce networks. Technological developments in fibre optics are enabling cables to be installed with huge increases in capacity linking firms to Internet service providers (ISPs) or directly to major business partners.

In dial-up services, OECD countries have different pricing arrangements, some with metered and others with unmetered local charges to connect to ISPs. In countries with metered local charges, users pay according to the duration they stay online while in those adopting unmetered charges user costs are either included in the rental of a telecommunication line or paid as a connection fee per call. Even so, figures on Internet use strongly suggest that the two approaches are far from equivalent in terms of costs and intensity of Internet use. An OECD report on local access pricing and e-commerce shows that the difference in the penetration of Internet hosts between countries with unmetered and those with metered local telecommunication charges for Internet access is a multiple of 6:1 (see Table II.1). The average price for countries with unmetered Internet access, including all charges, for 150 hours of use at peak rates is $38.06, while the average price in countries with metered Internet access is $235.67. In the latter countries, users usually shift to unmetered access options like cable modem, DSL or even leased lines. The study concludes that there is a trend in OECD countries to adopt unmetered access, which will be important in facilitating electronic commerce.

Table II.1. **Internet Diffusion, Prices and Price Structure in OECD countries, 2000**

Country	PSTN Charging Structure[a]	Internet Host per 1000 inhabitants[b]	Internet Access Price for 40 hours[c]
Australia	Unmetered (Flat Rate)	77.3	33.85
Canada	Metered	111.1	29.74
France	Metered	29.8	62.22
Germany	Metered	34.0	58.41
Greece	Metered	9.6	41.83
Italy	Metered	18.9	37.13
Japan	Metered	25.8	85.65
New Zealand	Metered	88.1	34.80
Portugal	Metered	12.8	89.99
USA	Metered/Flat rate/Unmetered	141.5	35.40
Mexico	Unmetered[d]	5.0	35.40
OECD average	Unmetered (150h)	104.9	38.06
OECD average	Metered (150h)	30.8	235.67

Notes:
a) Local Telephony and Internet access
b) January 2000.
c) At peak times using discounted PSTN rates, including VAT, 2000
d) First 100 calls free, then flat rate.

Source: Elaborated from various tables extracted from DSTI/ICCP/TISP(2000)1

Competition in Developing Countries

In developing countries the opportunities for full competition and sharp price reductions are more limited, especially where economies of scale and sunk costs create natural monopolies. The evidence provided by Latin American countries that have already privatised and re-regulated their telecommunications sectors is that former state owned PTOs still retain a great deal of market power. In some cases, like Argentina and Mexico, this is partly due to temporary monopoly rights obtained in the form of exclusive license for local services for a certain period after privatisation[11]. Governments face a clear-cut trade-off between the privatisation price and post-privatisation competition enhancement. Granting a certain exclusivity period for operators boosts the attractiveness to private investors but slows the rate of network expansion relative to cases where no exclusivity period is granted (Wallsten, 2000).

However, even where the concession granted was non-exclusive as in the case of Chile and Brazil, competition in local services is still very limited due to the competitive edge acquired by those firms that took over existing PTOs and their network capacity. Sunk costs play an important role in telecommunications competition, despite technology change and capital goods cost reductions. Where markets are relatively small, new entrants are more cautious about investing in building physical infrastructure. They usually focus in specific markets (like large urban centres or catering to a few large multinational clients) rather than on nation-wide networks and backbones. Newcomers start offering value-added services and rent existing carriers' infrastructure and wait for market growth and new partners to share the risks before investing heavily in their own networks. Meanwhile, though, they must pay a monopoly price to interconnect to the local backbone.

The situation is considerably better for international links, since there are options to use alternative infrastructure developed by independent international carriers like Global One, Global Crossing and Genuity. These firms are developing their own cable and satellite infrastructure and can provide, in some cases, international telecommunication services bypassing local PTOs. Also, in segments of the market where, for technical reasons, competition is more easily enhanced like mobile cellular phone, ISP and other values-added services, the prices have already come down as the case of Brazil shows.

Box 1. **Interconnection Prices in Brazil**

Brazil presents characteristics of both developed and developing countries concerning telecommunications. By the end of 2000, there were 61.5 million telephone lines (or roughly 37 per 100 persons, of which 38.3 were fixed and the rest cellular. There were considerable investment opportunities after privatisation of Telebras in 1998. In higher income markets like the Southeast and the South, new entry occurred and investment boomed.

Technological and regulatory changes introduced competition in several segments of the market. Prices have already fallen substantially and the price gap in relation to the USA has been almost eliminated in cellular mobile, as Table II.2 shows. Also, in international connections, alternative suppliers of telecommunications infrastructure have been beneficial to users. However, in Internet connections, where there is still a quasi monopoly, prices are exorbitant.

Embratel is responsible for 70 to 80 per cent of all Brazilian Internet traffic, because its IP network is the only one to cover the country as a whole. Before privatisation it had the monopoly of long distance telecommunications, both domestic and international. In January 2001 Embratel, which is now owned by MCI, charged up to 9 times the US price for leasing high-speed circuits to ISPs and other telecommunications service providers. Intelig, a subsidiary of Sprint, obtained a concession to compete in long distance services but since it has not yet develop its own nation-wide infrastructure it relies on the Embratel network to link its routers and servers inside Brazil. Facing exorbitant interconnection fees, Sprint has complained to the Brazilian telecommunication regulatory agency, Anatel, which recognised its right to link up to the existing network at fair prices. However Embratel refuses to comply under the argument that linking IP routers is not a legally recognised form of interconnection and that Intelig must pay full price. Under these conditions, the competitiveness of local e-commerce is seriously affected since the cost of basic access to IP backbone can represent as much as 80 per cent of total ADSL services.

Table II.2. **Internet Price Comparison between USA and Brazil**

Services	USA	Brazil	Price Difference
Fixed line subscription fee*	16.00	10.20	- 36.3%
Mobile phone (one minute)**	0.35	0.23	- 34.0%
Pentium 3/800 Mhz/64Mb	924	1,080	+ 17.00%
1 Mbps Connection to IP network (minimum price)***	700	7,200	+ 900%
Maximum price	1,200	7,200	+ 500%

Notes

* USA subscription is in fact cheaper because it includes all local calls, while in Brazil an extra pulse is charged for each additional minute exceeding 3 minutes.

** No-limited tariff in the USA and average Telesp Cellular price in Brazil

*** UUNet prices in the US and Embratel prices in Brazil.

Source: Empresas Valor 12-14 January 2001

III. BUILDING TRUST

Most business relationships involve an element of trust. Only in a world where all economic transactions were instantaneous, where no resources had to be committed in advance, would trust become irrelevant. When businesses are operating within a well-functioning legal and institutional environment, they may have an incentive to be more trusting, since they know that, if their trust proves misplaced, they can always seek legal redress. That realisation, moreover, should offer their business partners an incentive to be trustworthy. Recent research by economists on the nature of trust suggests that both incentives and experience matter; group membership — and its associated norms — can also be important in securing trust.

For developing country entrepreneurs seeking to break into world markets, whether via the Internet or more traditional means, each of these conditions can be difficult to meet. First, the home country may have a reputation, whether warranted or not, for weak laws and law enforcement. Second, the unknown entrepreneur has no international track record that could form the basis of trust. Third, cultural differences may stand in the way of trust, which is one reason why networks of overseas nationals can be exceedingly valuable to establishing a toehold in foreign markets. None of these barriers to trust is unique to e-commerce. What is distinctive about the latter is that, paradoxically, e-commerce suffers from more serious information asymmetries and adverse selection problems than more traditional means of commerce, at least during this initial learning period. Where the only address may be a virtual one, the untrusting client cannot even hire an agent to pay the prospective supplier a site visit. Thus, while barriers to entry may have fallen with the advent of the Internet, they have by no means been Jericho walls.

With this as background, what can developing countries learn from OECD experience with building trust in an e-commerce environment? There are several aspects of the commercial relationship where trust can become an issue. These include compliance with contractual terms regarding delivery and payment; honouring confidentiality of client information; protecting transactions from unauthorised “snooping” (including theft of sensitive financial information) by third parties. Several questions can help frame the discussion:

— What roles should governments and other stakeholders play in encouraging alternative dispute resolution mechanisms?

— What measures can best provide assurances of consumer protection?

— What form of international co-ordination may be necessary for promoting network security?

— How far can technology itself be expected to address security concerns?

— What mechanisms are needed for co-operation to control international e-commerce fraud?

— How can consistency be assured between national global approaches to authentication and certification?

Factors affecting the level of trust required in an e-commerce transaction include[12]:

— where and how payment takes place (whether real or virtual — for virtual settlement either electronic money or payment instructions must be transmitted over the Internet);

— when settlement takes place (prior to, at the time of, or after the transaction);

— who settles (established incumbents or new entrants); and

— whether settlement can be traced.

Consumer Protection

If e-commerce is to be a close substitute for normal "bricks-and-mortar" shopping, Web shoppers should be able to expect an equivalent level of protection to other consumers. To a degree, this can be assured through enforcement of existing consumer protection law and practices, and through modification of these laws and practices as necessary to accommodate the unique characteristics of the online market. This solution is adequate, however, only when all parties to a transaction are located within countries with strong legal protections for consumers. Where this is not the case, jurisdictional rules and the probability of their enforcement will determine how consumers perceive the riskiness of the transaction.

The OECD has developed *Guidelines for Consumer Protection in the Context of Electronic Commerce*, which reflect a Member country consensus on the core characteristics of effective consumer protection for online business-to-consumer transactions. The *Guidelines*, which were issued in 2000, aim to encourage fair business, advertising and marketing practices; clear information about an online business's identity; a transparent process for the confirmation of transactions; secure payment mechanisms; privacy protection; provision of effective dispute resolution and redress; and consumer and business education.

The OECD Committee on Consumer Policy (CCP), which oversaw the preparation of the *Guidelines*, is working to refine specific elements and to monitor progress towards their implementation. One initiative seeks to ensure that effective redress mechanisms are available in cross-border business-to-consumer disputes; another examines the refund mechanisms offered by payment card issuers. Since parties to an e-commerce transaction can be individuals located on opposite sides of the globe, traditional "bricks-and-mortar" dispute resolution — e.g. taking one's case to small claims court — is often impractical. This has given rise to private sector initiatives to put in place effective online alternative dispute resolution mechanisms. For instance, companies like Online Mediators, eResolution, and SquareTrade feature online complaint forms and third-party

mediators who employ e-mail and organised case-development processes to mediate disputes between parties. Companies like CyberSettle, ClicknSettle, CyberSolve and Settlement Now have developed an entirely automated system for disputes involving cash settlements. OnLine Disputes.org resolves disputes according to automated rules, while iCourthouse, an online jury trial system, allows parties to select a jury to decide their case in an entirely virtual courtroom[13]. The appropriate means of dispute settlement is likely to vary depending on the transaction. For example, arbitration appears to work well in the domain name context, an automated negotiation process in the case of insurance disputes, and in the online auction context, mediation could be preferable. While the litmus test of market survival might suffice in time to validate a given ADR programme in the eyes of the consumer, some have proposed government certification of ADR programmes that meet certain accreditation criteria meant to ensure fairness and effectiveness.

As the *Guidelines* point out, the electronic marketplace requires a global approach to consumer protection. Disparate national policies may impede the growth of electronic commerce and, for this reason, e-commerce consumer protection issues need to be addressed through international consultation and co-ordination.

The *Guidelines* encourage efforts on the part of Member countries to:

1) facilitate communication, co-operation, and, where appropriate, the development and enforcement of joint initiatives as the international level among businesses, consumer representatives and governments;

2) co-operate at international level to combat cross-border fraudulent, misleading and unfair commercial conduct;

3) make use of existing international networks and enter into bilateral and/or multilateral agreements or other arrangements as necessary and appropriate to accomplish such co-operation;

4) work toward building consensus, both at the national and international levels, on core consumer protections to further the goals of enhancing consumer confidence and ensuring predictability for businesses; and

5) co-operate and work towards developing agreements or other arrangements for the mutual recognition and enforcement of judgements resulting from disputes between consumers and businesses, and judgements resulting from law enforcement actions taken to combat fraudulent, misleading or unfair commercial conduct.

Besides assisting governments in the formulation of appropriate policies, the *Guidelines* are also designed to be of use to:

— business associations, consumer groups and self-regulatory bodies, by providing guidance as to the core characteristics of effective consumer protection that should be considered in reviewing, formulating and implementing self-regulatory schemes in the context of electronic commerce;

— individual businesses and consumers engaged in electronic commerce, by providing clear guidance as to the core characteristics of information disclosure

and fair business practices that businesses should provide and consumers should expect in the context of electronic commerce.

What is the relevance of these *Guidelines* for developing countries? In many developing countries, consumer protections are not well defined in law or, if they are, they are not always well enforced. Does this matter? In the absence of legal protections, consumers have evolved their own strategies to protect themselves from negligence, fraud or simply poor service. The use of informal networks to share information about experience with specific products and their suppliers is a common strategy, one that is certainly compatible with e-commerce. Customer brand loyalty is another, but one that may disadvantage the same new entrants that the Internet is supposed to benefit.

The OECD may itself be a valuable brand name in this area, one with which governments, industry associations or even individual enterprises may wish to be associated, e.g. by announcing adherence to the OECD *Guidelines* on online consumer protection. One complication is that, if the OECD is not to see its brand devalued, it must ensure that those using it do so credibly. This, however, requires some mechanism for monitoring and enforcement. Peer monitoring is the means by which this is done among Members; it is not clear how it could be done with non-Members choosing to adhere to OECD *Guidelines*, especially if the entities involved were not governments but private businesses or business associations.

For the latter, there may be preferred privately initiated options like corporate codes of conduct, subscription to online customer and peer rating schemes, or "purchasing trust" via association with a recognised private brand name — e.g. through setting up a virtual storefront on a reputable Internet portal. This last approach may offer the best prospects for new entrants, before they have had a chance to amass a customer service record that could establish an online rating. Through such portals, small-scale enterprises should also be able to gain access at reasonable cost to shared software and services (for example, for authentication and encryption).

The OECD *Guidelines* may be too general for the needs of a specific business, in which case it may choose to consult other models. Business associations in individual OECD countries very often have their own models for "online ethics" and, depending on where a particular enterprise expects to do most business, it may want to consult a relevant model in that country. For instance, the Better Business Bureau (BBB) of the United States has its own "Code of Online Business Practices", which can be consulted at http://www.bbbonline.org/code/CodeEnglish.pdf.

Protection of Privacy and Personal Data

Technological developments are offering some tools that enable citizens and consumers to protect their privacy, but governments and the private sector are also taking an active role to ensure that individual privacy is protected in the Internet environment. The 1980 OECD *Guidelines on the Protection of Privacy and Transborder Flows of Personal Data* (*Privacy Guidelines* for short) provide a benchmark for the level and extent of privacy protection that must be extended to e-commerce users and there is a continuing need for international co-operation in this area. OECD work is focusing on implementing and enforcing privacy principles in the context of global network

technologies. As the *Guidelines* note, “there is a danger that disparities in national legislations could hamper the free flow of personal data across frontiers”.

Among the basic principles set forth in the *Privacy Guidelines* are:

— **Collection Limitation Principle** There should be limits to the collection of personal data and any such data should be obtained by lawful and fair means and, where appropriate, with the knowledge or consent of the data subject.

— **Purpose Specification Principle** The purposes for which personal data are collected should be specified not later than at the time of data collection and the subsequent use limited to the fulfilment of those purposes or such others as are not incompatible with those purposes and as are specified on each occasion of change of purpose.

— **Security Safeguards Principle** Personal data should be protected by reasonable security safeguards against such risks as loss or unauthorised access, destruction, use, modification or disclosure of data.

— **Accountability Principle** A data controller should be accountable for complying with measures which give effect to the principles stated above.

Current OECD work in this area also builds on the Ministerial Declaration on the Privacy of Global Networks adopted by Ministers at the 1998 Ottawa conference, “A Borderless World: Realising the Potential for Global Electronic Commerce”. The Ministers affirmed their determination to take the necessary steps to ensure that the OECD *Privacy Guidelines* are effectively implemented in relation to global networks, recognised the need to co-operate with industry and business, and agreed that the OECD provide practical guidance in furtherance of these objectives, based on national experiences and examples

The OECD has undertaken work in co-operation with industry, privacy experts and consumer groups to:

— identify the legal and self-regulatory instruments used to implement and enforce the OECD *Privacy Guidelines* on global networks at international, regional and national levels, as well as various practices, techniques and technologies either in use or being developed to implement and enforce privacy principles in networked environments;

— encourage the adoption of privacy policies, whether implemented by legal, self-regulatory, administrative or technological means, and encourage the online notification of privacy policies to users.

In order to assist webmasters and administrators in the creation of a privacy policy, the Privacy Policy Statement Generator was issued in August 1999. The use of the Generator highlights important considerations, such as applicable national privacy requirements, and the substance and scope of policy statements. Based on responses to an online questionnaire about an organisation’s handling of private data, it automatically produces a draft privacy statement reflecting current practices, indicating whether the resulting statement is or is not consistent with the OECD’s *Privacy Guidelines* (but without labelling a web site as “compliant” or not). Users are thereby alerted to the

possible need to revise current practices if they would like to ensure conformity with the *Guidelines* before posting their privacy policy on their web sites.

What is the relevance of privacy policy in a developing country context? Clearly, e-commerçants in developing countries need to be sensitive to the privacy concerns of customers as much as those based in OECD countries do. Since notions of privacy are culture sensitive, it is not always advisable to base minimum standards of privacy on local preferences if one's intended customer base is wider. The Privacy Policy Statement Generator can serve as a useful tool in designing a policy that would satisfy minimum expectations in most OECD countries at least, though it would also be advisable to consult specific national legislation and regulations in the major countries where one expects to do business.

Security of Information Systems and Authentication Services

The 1992 *OECD Guidelines for the Security of Information Systems* define this concept as "the protection of the interests of those relying on information systems from harm resulting from failures of availability, confidentiality, and integrity".

From the perspective of e-commerce, the greatest security concerns are with protection against the unauthorised third-party acquisition and use of confidential financial information and the perpetration of online business sabotage. In the case of the Internet, protocols and procedures for security need to be operable internationally, which calls for international co-operation. The 1992 *Security Guidelines* are an important step in the direction of establishing a consistent international framework for addressing security questions. Among the noteworthy principles enshrined there are:

— **Proportionality Principle** Security levels, costs, measures, practices and procedures should be appropriate and proportionate to the value of and degree of reliance on the information systems and to the severity, probability and extent of potential harm, as the requirements for security vary depending upon the particular information systems. (For example, a "micro-payments" system needs to hold down transaction costs and thus may not need the same level of security as an electronic payment system used to transfer millions of dollars.)

— **Reassessment Principle** The security of information systems should be reassessed periodically, as information systems and the requirements for their security vary over time.

— **Democracy Principle** The security of information systems should be compatible with the legitimate use and flow of data and information in a democratic society.

E-commerce transaction security is enhanced through the use of cryptography. While facilitating e-commerce, encryption technology also raises certain national security and law enforcement concerns. On national security grounds, the United States government historically restricted export of strong encryption technology. Recognising that this could adversely affect the growth of global e-commerce, since the mid-1990s the US Government has relaxed restrictions in order to permit companies to export encryption products using a 56-bit Data Encryption Standard or equivalent algorithms, given certain security precautions. Law enforcement concerns — e.g. the use of

encryption to hide illegal funds transfers — have led to efforts to ensure that authorities have the legal means to demand access to the keys for decryption of data in the event of criminal investigation.

In 1997, the OECD issued Cryptography Policy Guidelines addressing, among others, “the need for compatible cryptography policies and laws, as well as the need for interoperable, portable and mobile cryptographic methods in national and global information and communications networks”. The OECD Guidelines advise that national key management systems should not unduly interfere with international flow of encrypted data and that bilateral and multilateral co-operation and agreement should be pursued to permit lawful key access across national borders.

Recent advances in encryption techniques have made it possible to ensure the safe transmission of credit card numbers and other sensitive information needed to facilitate payment electronically. The most widely adopted technology thus far is known as “digital signature” technology, which is based on a method known as “public key” or “asymmetric” cryptography. Unlike traditional cryptography systems, public key systems allow parties to exchange encrypted data without communicating a shared secret key in advance. Instead, one of two keys is public and the other private, and a message that is encrypted with a private key can only be decrypted with the corresponding public key, and vice versa. If the recipient of an encrypted message can open it with a certain public key, he/she can be sure that the sender must be in possession of the corresponding private key. The recipient can then verify the identity of the particular person or organisation to whom the public key “belongs”. Once a document is encrypted with the private key, the digital signature provides proof that the document was “signed” by the purported author, which makes it operate like an electronic signature. Box 2 describes the legal framework for use of digital signatures in two major Latin American countries.

Digital signature technology is one instance of a broader set of measures used for electronic authentication, by which is meant a means of establishing the validity of a claimed identity of a user, device or another entity in an information or communications system. Authentication services are needed, in effect, to provide a reasonable level of assurance that the parties transacting over the Web are who they say they are. This is important, for example, to verify that a credit card number being encrypted for transmission belongs legally to the party authorising payment, or that the computer transmitting payment instructions is authorised to do so and not just mimicking one that is.

Box 2. **Building Trust in Mercosur**

Cross-country legislation is a necessary condition to e-commerce, especially in free-trade areas like Mercosur. In Argentina, Decree no. 427/98 is already in force, regulating digital signatures and cryptographic systems based on an asymmetric key, but its application is restricted to the public administration.

In Brazil there is not yet specific e-commerce legislation. The rules governing online sales are the same as those applied to the "Code of Consumer Protection". There is, however, a proposal in the legislature — Proposal for Law no. 589/99 — to regulate electronic commerce and authentication of digital signatures. The proposal has been approved in the Commission for Science and Technology and is awaiting a plenary decision. The proposed law includes:

— Certification of electronic signatures by a public notary and their annexation to electronic documents.
— The use of a cryptographic system based on a public or asymmetric key. The codified message is received using a private key de-coded by the corresponding public key.
— Foreign certified documents would only be accepted if Brazilian contracts receive the same treatment overseas.

Within Brazilian federal government agencies, official document exchange is already done electronically using a Public Key Infrastructure. Presidential decrees nos. 3585 and 3587 establish that, from January 2001, official documents for normative acts must be transmitted electronically.

Source: CFF, Veirano & Advogados Associados; *Gazeta Mercantil Latino Americana*, 25th Sept to 1st October 2000, page 18.

More than simply a means of identifying a party in cyberspace, an electronic *signature* has a legal connotation. In some countries, there may be need for adjustments to the legal framework to allow for recognition of electronic signatures. In devising or revising legislation to recognise electronic authentication, it is necessary to accommodate the inherent tension between the goal of technological neutrality and that of prescribing specific legal consequences for the use of electronic authentication systems. To the extent that legislation seeks to enable the use of diverse electronic authentication techniques, including some that are not yet even conceived, it becomes progressively more difficult to accord specific and meaningful legal consequences to their use; see discussion by Internet Law and Policy Forum (ILPF) at http://www.ilpf.org/digsig/survey.htm.

A recent example of legislation on electronic authentication is the United States Electronic Signatures in National and Global Commerce Act, signed into law on 30 June 2000. This law contains provisions that ensure the legal validity of electronic signatures and contracts, permit the electronic delivery of legally-required notices and disclosures, and allow for the satisfaction of record retention requirements through electronic means. The law is technology-neutral, allowing parties to choose the technology for authenticating their transactions. Consumers retain the choice to do business or receive records on paper or online[14].

An International Working Group on Electronic Authentication convened by IPLF at Brussels in April 1999, and reflecting the perspective of the industry supplying authentication products and services, urged wide recognition of the traditional legal principle of freedom of contract, that is, respect for the rights of parties, both businesses

and consumers, to agree to their own requirements for electronic authentication[15]. This principle had been earlier endorsed by OECD Ministers in their Ministerial Declaration on Authentication for Electronic Commerce adopted at Ottawa in 1998, which acknowledges that “transacting parties may select appropriate mechanisms which meet their needs for authentication in conducting electronic commerce…”. That declaration in turn makes favourable reference to passages on authentication (notably, Articles 6, 7, 8, 13 and 14) in the Model Law on Electronic Commerce developed by the United Nations Commission on International Trade Law (UNCITRAL), endorsed by the UN General Assembly in December 1996.

The OECD Ministerial Declaration on Authentication outlines a number of programme elements for OECD work in this area. The Working Party on Information Security and Privacy (WPISP) has commissioned preparation of a report on progress in the implementation of the Ministerial Declaration, including initiatives developed and results achieved in Member countries. This report is to look at how national policy and laws are currently implemented with the aims of facilitating legal recognition, party autonomy, technology neutrality, global authentication mechanisms and user confidence.

For developing countries, the question of the legal status of digital signatures and electronic documents is the same as for OECD countries. The technologies for secure online payments are as readily available to *e-commerçants* in those countries as in OECD countries, with the exception of strong encryption technology — beyond the requirements of most prospective commercial users in any case.

The biggest challenge facing developing country policy makers may be to ensure that their countries do not become havens for cyber *saboteurs* or other e-criminals. Governments of countries whose economies are internationally linked clearly have a strong incentive to take preventive measures, and co-operation with the appropriate technical and law-enforcement bodies from other countries can minimise the risk. Still, the Philippines and the “I love you” virus stand as vivid testimony to the damage to a country’s reputation that a lone hacker can cause. As Nakatomi observes in the *OECD Observer*[16], “Technological development may have greatly enhanced the security of the information system as a whole. But it has also given potential attackers the chance of far faster penetration into data systems (whether personal, corporate or government) and with wider and deeper effects”.

IV. E-COMMERCE AND TAXATION

Most developing countries have not yet faced major concerns about how the growth of e-commerce might affect tax revenue collection, but eventually they will need to confront this issue. While the biggest question surrounds the treatment of goods and services that can be delivered digitally via the Internet, there may also be tax implications of online payment for traditional goods and services[17].

There are three broad sets of taxation issues raised by e-commerce[18]:

1) **Consumption tax issues:** defining the place of consumption (for cross-border transactions) and the collection mechanisms best suited to ensuring effective collection.

2) **International direct tax issues:** monitoring application of the current rules for taxing business profits; characterising payments from different e-commerce transactions for taxation purposes; clarifying the concept of permanent establishment.

3) **Tax administration issues:** examination of the opportunities internet technology provides for improving taxpayer services as well as assisting and promoting compliance.

E-commerce can have implications both for domestic sales or value-added tax collection and for trade tax collection, where transactions occur across borders. In the United States, most consumers who make purchases over the Internet pay no sales tax. Analysis by Goolsbee (1999) finds that people living in high sales tax jurisdictions are significantly more likely to buy online than others, controlling for other observable characteristics. This suggests that, were online transactions to be subjected to the same sales taxes as on other purchases, the demand for B2C e-commerce would be significantly reduced. In other research, Goolsbee and Zittrain (1999) find that the costs to government of not strictly enforcing sales taxes on e-commerce are initially small, given the small size of e-commerce transactions, but will rise with e-commerce volume. Goolsbee (2000) estimates, based on recent projections of e-commerce growth in the United States, that it could take a decade for state revenue losses from e-commerce to amount to 10 per cent of projected state sales tax revenues. Also, the enforcement costs of e-taxes are thought to be low (largely due to new off-the-shelf tax software)[19], and since the marginal social benefits of promoting e-commerce are likely to diminish as it becomes more widespread, stronger e-tax enforcement makes sense after a moratorium period during which marginal benefits of e-commerce expansion are presumed to exceed the marginal costs of foregone tax revenues.

In countries with a single, nation-wide value added tax rather than individual state sales taxes as in the United States, the enforcement costs are likely to be even lower. This would argue, *ceteris paribus*, for an earlier introduction of taxes on e-commerce — i.e. a shorter moratorium period. Another consideration for developing countries without a large domestic e-commerce sector is that most e-commerce transactions are likely to involve imports of goods or services. In this case, depending on how large such imports are, they may pose a threat to tariff revenues on which many developing country governments still depend rather heavily by comparison with OECD countries. In 1995, for example, low and middle income countries (World Bank's definition) obtained 12.5 per cent of current government revenues from trade taxes, whereas for high-income OECD countries the figure was 0.06 per cent (World Development Indicators CD-ROM database, 2000).

With internationally traded physical goods, customs posts provide a point of control and of revenue collection, so avoiding taxes on physical merchandise imports is no more likely with payments made online than with other means of payment. The only potential threat, then, to governments' revenue base would be in areas where digitised products delivered electronically substitute for physical products (e.g. software, music, books, etc. downloaded from the Internet as opposed to being shipped as CD-ROMs, CDs, or hard copies). Presently, the threat to the customs revenue base seems small. Mattoo and Schuknecht (2001) estimate the tariff revenue collected by developing countries in 1996 on selected digitisable media products at 0.8 per cent of total import duties and 0.1 per cent of total revenues.

Perhaps the greater potential impact on developing countries' revenue base comes from the range of services that can be and increasingly are supplied over the Internet or other electronic networks. These include brokerage and other financial services, banking, insurance, accounting, publishing, customer support, computer programming, data entry, and other information-intensive services. Depending on the type of service involved and the factor endowments, including the skill base, of a particular developing country, it could gain or lose business as a result of remote sourcing. India, for instance, is benefiting from the remote sourcing of programming tasks by US and UK companies. The growth of the software export sector there has contributed to the government's income tax revenue take, even if exports are duty-free. Probably more important than the advent of the Internet to the offshore sourcing of financial and banking services is the presence or absence of capital controls.

The OECD Ministerial at Ottawa in October 1998 reviewed favourably "E-Commerce: Taxation Framework Conditions", intended to reflect consensus thinking at the time on the tax treatment of e-commerce. The document charts a middle course between, on the one hand, a completely tax-free e-commerce environment and, on the other, the levying of new taxes (such as a "bit tax") on e-commerce transactions. The basic principles of taxation endorsed by the Ministers include the following:

— **Neutrality** - Taxation should seek to be neutral and equitable between forms of conventional and electronic commerce, so avoiding double taxation or unintentional non-taxation;

— **Efficiency** — Compliance costs to business and administration costs for governments should be minimised as far as possible;

— **Certainty and simplicity** — Tax rules should be clear and simple to understand, so that taxpayer knows where they stand;

— **Effectiveness and fairness** — Taxation should produce the right amount of tax at the right time, and the potential for evasion and avoidance should be minimised;

— **Flexibility** — Taxation systems should be flexible and dynamic to ensure they keep pace with technological and commercial developments.

The Framework calls for the application of consumption taxes on cross-border trade in the jurisdiction where consumption takes place, adding that an international consensus needs to be sought on how to define jurisdiction of consumption. It also states that, "(f)or the purpose of consumption taxes, the supply of digitised products should not be treated as a supply of goods". The World Trade Organisation (WTO) members have also affirmed that the majority of Internet transactions are services and should be subordinated to the General Agreement on Trade in Services (GATS). In 1998, they agreed to a two-year customs duty moratorium on electronic transmissions; the moratorium continues in effect, as a decision whether to extend it was to have been taken at the Seattle WTO meeting but has been postponed.

There remains the question of the tax treatment of income from the sale of a digital product. If it is treated as a goods sale, then the tax implications are likely to be different than if it is considered a transfer of copyright. In the latter case, a royalty income tax would be appropriate and, in general, royalty income is treated differently from business income under the US federal and state tax codes. A further complication arises when different international jurisdictions assign different tax treatment to the same revenue flow from the purchase of a digital product, giving rise to the possibility of double taxation.

Another tax jurisdiction issue is the definition of "place of permanent establishment" for e-commerce enterprises, which in turn has income tax implications. Normally, the business will have a website hosted by an Internet service provider on one of its servers. Does the location of that server then constitute the place of business, or permanent establishment, of the website owner, even if that owner maintains no physical presence in the jurisdiction? Within the OECD, a near consensus (with dissenting opinions expressed by Portugal and Spain) has been reached to the effect that a web hosting arrangement typically does not result in a permanent establishment for the enterprise that carries on business through that website and that an ISP will not, except in very unusual circumstances, constitute a dependent agent of another enterprise so as to constitute a permanent establishment of that enterprise (OECD, 2000*a*) This matters to whether local tax authorities in the jurisdiction where the server resides can levy taxes on income generated by the websites hosted on that server. A "substantial presence" criterion also applies to the determination of taxing jurisdiction in the case of US sales taxes. In 1992, the US Supreme Court ruled that mail-order firms are not required to collect sales tax from customers located in states where they do not maintain a physical presence. This ruling has been interpreted as applying to e-commerce as well (Whinston *et al.,* 1997).

On other aspects of e-commerce taxation, consensus is not yet forthcoming. The European Union and US Federal Government views remain divergent. The Framework

Conditions include a provision “that there should be no discriminatory tax treatment of e-commerce”. This would appear to be consistent with the current US practice following the 1998 decision by the US Congress to impose a federal moratorium (subsequently extended) on discriminatory e-commerce taxes and on Internet access taxes. In practice, however, since most sales tax is collected by states and localities, the *de jure* federal exemption together with *de facto* state sales tax exemption of e-commerce transactions means that they enjoy a tax advantage over other transactions (as pointed out above). This represents a kind of “infant industry” protection, strongest in the states with the highest sales tax rates. Admittedly, the US moratorium does leave open all future tax options, and pressures on state and local officials for stronger enforcement of e-commerce sales taxes are likely to mount in the face of an eroding revenue base.

The other aspect of the US Internet tax moratorium — and an issue for other countries as well — is the tax exemption of Internet access charges. While taxing these charges could provide a significant revenue source, with relatively low collection costs and a rather progressive tax incidence, there may be significant dead-weight losses if, as in the United States, any tax would be assessed on a flat monthly fee and could thereby deter some would-be users (perhaps many, given estimates of Internet price elasticity of demand) from ever getting connected (Goolsbee, 2000 and Varian, 1999). A slower rate of Internet diffusion would be the result.

The argument in favour of taxing access charges derives from the increasing convergence of Internet and traditional telephony. The latter is taxed, but increasingly the Internet is being used to carry telephone calls, threatening the revenue base of telecommunications service providers. These companies argue that this weakens incentives to invest in upgrading the network, thereby worsening congestion problems that owe much to widespread “always-on” Internet connection encouraged by flat fee pricing. The question, then, is whether the solution is to introduce taxes on Internet access or to lower taxes on telephone user charges.

From an economic perspective, favourable tax treatment of e-commerce only makes sense if there is good reason to suppose that the social benefits of its expansion exceed private benefits so that, without an implicit subsidy, there would be underuse of this medium relative to some social optimum. One possible source of divergence between private and social benefits is the existence of network externalities, so that the value to any one user is an increasing function of the number of users. Stiroh (2001) finds no evidence of spillover effects of ICT use within US manufacturing at least. Another possibility is the existence of information imperfections that can be remedied by local learning from e-commerce users (Goolsbee and Zittrain, 1999). For example, the risks of providing credit card details online are often exaggerated; experience of friends, family and colleagues who have provided such details may enable individuals to gauge risks more accurately. In weighing benefits of e-commerce, one needs to compare this means of doing business with the alternatives. Only if significant cost savings or productivity improvements associated with e-commerce are being foregone by virtue of sub-optimal use does a subsidy make economic sense. Even if a plausible case could be made for such infant-industry subsidies, it would clearly only apply during the early stages of diffusion of the Internet and e-commerce. Still, given the significant lag in

Internet diffusion in many developing countries, it could be some time before the infant-industry phase is completed.

The Taxation Framework Conditions also call for intensified co-operation and consultation with non-OECD countries, in recognition of the difficulties of their implementation in the event that important jurisdictions do not abide by the OECD consensus. On this last point, the document lists as one element of the post-Ottawa agenda work on “how harmful tax competition for electronic commerce is to be avoided”. Already, the Framework Conditions have been endorsed by the APEC Finance Ministers at a meeting in May 1999. To advance the work, post-Ottawa, on various aspects of e-commerce and taxation, five Technical Advisory Groups (TAGs) were established by the OECD, with an initial two-year mandate. Along with the private sector, various non-Member governments have been invited to join the TAGs.

V. POLICIES FOR ICT AND INTERNET DIFFUSION

The diffusion of ICT and the Internet through the economy and society usually increases productivity, reduces transaction costs, and enhances price competition. It can yield a variety of other social and economic benefits as well. There is a risk, however, of economic marginalisation of countries or segments of society within a country that cannot access these technologies effectively. All OECD countries are now implementing policies to reduce the digital divide. Policies range from general approaches aimed at strengthening aspects of the information economy, including telecommunications, to policies to diffuse access to information more widely and to improve the information skills of individuals and workers.

Policies to Encourage Internet Diffusion: the OECD Experience

OECD countries have introduced a number of policies to increase and widen access to Internet. Government policies are in some cases complemented by actions undertaken by industry associations, NGOs and other local institutions engaged in the diffusion of e-commerce. Vickery (2000) introduces a typology of diffusion policies that we adopt here.

Diffusion to Business

Policies for encouraging the participation of micro, small and medium sized enterprises in e-commerce are adopted by many OECD countries. As adoption by SMEs is already occurring more or less spontaneously, the only issue now is one of effective use. Small firms usually have a limited understanding of e-commerce potential. Most OECD countries have established centres to provide comprehensive information, advice and training on business usage of the Internet as well as support services for the establishment of e-business activities[20]. SMEs may also lack the skills and financial resources fully to exploit opportunities and overcome barriers to entry. One particularly relevant barrier is that of trust, where the technologies for encryption, authentication, data security, etc. represent fixed costs that weigh more heavily on SMEs than on large enterprises able to spread those costs more widely[21]. (As discussed above, SMEs may be able to share those costs by opening their virtual storefronts in online shopping malls that provide the “trust overheads”.) Table V.1 summarises policies, goals and the number of OECD countries adopting these policies, according to recent OECD reports[22].

Table V.1. **Policies for E-Commerce Diffusion in Business**

Policy	Goals	Number of OECD countries adopting
Support and training for SMEs	Increase network externalities, improve management and IT skills	11
Assistance to regions and rural areas	Facilitate ICT access	8
Diffusion of information	Reduce information asymmetries	8
Encourage high-tech start-ups	Technology development, boost new market entry	2

Source: Adapted from OECD (2000*a*).

The degree of ICT diffusion and Internet use among enterprises differences widely across OECD countries and also across sector and firm size within any given country. A number of factors can drive the adoption of e-commerce by business including: scope for reductions in transaction costs and improvements in product quality and customer service; reaching new customers and suppliers in existing markets and expanding into new markets; a defensive reaction to competitors engaging in e-commerce; requirements by large business that their suppliers link into their e-commerce system as a condition of doing business[23]. The OECD is presently engaged in a multi-country, multi-sector study of e-commerce readiness[24] to determine what explains the extent and nature of e-commerce applications and what impact these applications have on the corporate bottom line.

Diffusion to the Not-For-Profit Sector

These policies are designed to improve Internet access in public institutions such as libraries, local and regional government facilities, schools and post offices (see Table V.2 for some OECD examples). Subsidies to schools have received a high priority since they are seen to contribute to building the future skill base of the work force. Also, for equity reasons, targeted Internet diffusion policies are common in OECD countries to facilitate access for under-privileged groups, the disabled and the elderly, and for rural remote and low- income areas.

Table V.2. **Policies for Internet Diffusion to the Not-for-Profit Sectors**

Policies and Programmes	Main Goals	Number of OECD Countries Adopting
Access in schools	Improve computer/Internet literacy, introduce new teaching methods	11
Access in other public institutions	Equity, enhance overall economic efficiency via network effects	12
IT for the elderly/disabled	Equity	8
Programmes to lower the costs of IT	Reduce economic barriers to wide IT diffusion	8
Demonstration and awareness	New applications development information	3
Programs to increase demand for IT	Speed up diffusion rates	3

Source: Adapted from OECD (2000*a*).

Targeted programmes to reach the disadvantaged can be more problematic in developing countries where the poor represent not a small minority but a sizeable minority if not majority of the population. What seems likely in poor countries is that non-governmental organisations will play a prominent role in providing communications, including Internet, access in many poor communities, in the context of their day-to-day development projects and programmes. In so doing, they can have an important demonstration effect that may generate local demand for the services available through communications media and perhaps encourage commercial provision by private entrepreneurs.

Government Online, Government as Model User

E-government has become a key application for e-commerce. Table V.3 lists a number of applications of e-government in OECD countries. The online provision of government services can contribute to economic efficiency of the business sector through information, co-ordination and simplification of bureaucratic procedures. Also it may represent a model for private use. The UK government aims to provide all government services online by 2005; already 42 per cent are available online via a "one-stop-shop" citizens' portal. Demonstration projects produce learning effects, create markets and contribute to technology development. Procurement policies through the Internet can be instruments to reduce corruption and any cost savings from a shift to online procurement can relieve pressures on government budgets. Also, to the extent that online government procurement gives equal access to SMEs, it can level a playing field that is often tilted in favour of larger enterprises. In Chile, for example, the government has taken the initiative to move all competitive bidding on contracts online and to make available to the public information on bidders and their bids, on the outcome of the bidding process, and on the history of government contracts won by each successful bidder. Free access to government information helps transparency and democratisation, though it seems doubtful that the technology alone will create a climate of transparency where none previously existed.

Table V.3. **Government Projects**

Policies	Goals	Number of OECD Countries Adopting
Government services online	Delivery of services and information; increase government efficiency by reducing costs, time and bureaucracy; increase competitiveness of service users.	11
Government as model user of ICT	Demonstration effects, technology development	9
Foster ICT applications	Learning effects, reduce digital divide	2

Source: Adapted from OECD (2000*a*).

Education and Training

Education and training play an important role in OECD Internet policies. Measures aiming at improving computer skills at school are identified as of particularly high-level policy importance to reduce the digital divide. This includes vocational training, teacher training, lifelong learning and distance learning using Internet and other multimedia tools.

The widespread diffusion of e-commerce requires technical skills to develop applications, support and maintain ICT equipment and systems. On the user level, basic computer literacy is necessary to encourage the use of e-commerce by the business sector. Policies to promote skills and to encourage effective learning are also critical in employment programmes aiming at retraining and re-qualifying redundant workers.

A recent IDC report[25] projects that the number of students enrolling in e-learning courses in the United States will jump by 33 per cent per annum over the next four years. In 2000, over 1 500 universities were offering online courses. Naturally, most of these are courses are not free and the costs of enrolment are beyond the means of many in the developing world. Still, the possibility of enrolling in an online university from anywhere in the world having reasonably reliable and cheap Internet access could — perhaps with support from foundations or international donors — open up horizons to many people from poor countries previously excluded from higher education. The benefits of this need to be weighed, naturally, against the potential cost in retarded development of the indigenous higher education system.

Internet Diffusion: Driving Forces in Developing Countries

The global digital divide is still strongly evident. According to a 2001 report on employment in the information economy around the world by the International Labour Organisation[26], many developing countries remain “technologically disconnected”. Under the right conditions, even a poor country like Bangladesh can witness a rapid diffusion of new communications technology, in this case mobile telephony. With the Internet, admittedly, given that it remains largely a text-based medium, literacy takes on greater importance. Thus, countries that do not provide adequate education are likely to lag in diffusion; likewise those that have not developed an affordable telecommunications infrastructure and established a policy environment conducive to entrepreneurship, of which dot.com start-ups are merely the latest manifestation. For instance, India’s recent overhaul of its venture capital regulations may be one of the most important stimuli to the growth of e-commerce, as wealthy Silicon Valley Indians and other investors stand ready to pour funds into the country. Mody (1999) also mentions content as an obstacle to Internet diffusion, and this implies locally relevant and accessible content, which may or may not mean local-language content. Content is something that should ultimately be provided through private entrepreneurial initiative, but there is something of a co-ordination, or time-inconsistency, problem, in that the Internet becomes much more useful the more local content is available but developing local content becomes attractive commercially (apart from specialised, high-value niches) only when enough local people are connected.

A map of Internet users reveals a stark global North-South divide. The Internet has planted deep roots in the world's wealthiest regions. North America, Europe, and parts of East Asia have by far the highest Internet penetration rates. Southern Hemisphere regions have trailed much further behind. There are different surveys on Internet diffusion, using a variety of measurement parameters. Table V.4 provides an "educated guess" of Internet users worldwide compiled by a major Internet consultancy.

Table V.4. **Internet Users: August 2001**

Continent	Millions of Internet Users	Millions of Population, 1998
Africa	4.15	672
Asia/Pacific	143.99	3 122
Europe	154.63	475
Middle East	4.65	286
Canada and USA	180.68	300
Latin America	25.33	502
World Total	513.41	5 897

Source: NUA Internet Consultancy; WDI CD-ROM, World Bank.

Developing countries are in different stages of Internet diffusion and face various challenges to reap the benefits of new information technologies. Even in regions with a competitive economy, relative wealth, and well-developed telecommunications infrastructure, a digital divide still exists among social groups and across regions, as in the OECD area. The uneven distributions of education, income and technology infrastructure are major contributing factors. Box 3 describes how Brazil is trying to make Internet access more widely affordable.

Box 3. **Programme for Information Society in Brazil**

The Information Society Working Group was established in June 1997 with the aim of developing a new generation of Internet networks and diffusing advanced information and communication technologies throughout the country. Its efforts focus on the diffusion of Internet and e-commerce among societal segments that are not likely to become major IT users relying on market mechanisms alone. These include micro and small enterprises, low-income consumers, public schools and health centres. Programmes are developed through partnerships of government agencies, NGOs and private firms relying in part on financial resources from the Telecommunications Universalisation Fund (FUST). In 2001, FUST´s average monthly receipts were $13 million.

A first Working Group target was to make available affordable computers, since equipment and software costs are major barriers to the diffusion of Internet in most segments of Brazilian society. Universities and computer manufacturing firms designed several versions of a “popular computer” with a target price of US$300. The design specifications were based on the network computer concept, using upgradable minimum hardware, operating in connection to local or remote servers. For software, options being considered include versions using either free operating systems (LINUX 6.0) or open codes based on GNU oriented towards the Internet environment (using the Netscape Navigator 4.76 browser). The advantage of using free software is twofold. First it costs less than $5 per installation against $50 for Windows. Second, users are not under constant pressure to purchase newer versions of the software, for which hardware upgrades are also frequently required. On the other hand, free software has the disadvantage of poor technical support and low availability of applications. The software to be used in these popular computers has yet to be decided. Microsoft is reacting by offering discounts in licensing fees.

A network computer must be linked to a server, either through local area networks (in the case of schools and other multi-user institutions) or through a remote ISP. Since there are many towns in Brazil without an Internet provider, the government is launching the 0i00 service. It enables Internet users to pay local call fees when dialling long distance to any ISP within the country.

Another step is to develop a financial package to support the sale of millions of these systems to small business and domestic users. The target monthly payment is $15, including hardware, software and an Internet service provider. The programme also aims at creating economies of scale in hardware manufacturing in order to make the system competitive in the export market.

However, the universalisation of Internet access in Brazil can not rely on individual PCs only. While a potential demand for e-commerce exists even in poorer segments of urban society, poverty is a barrier for diffusion in many domestic households. The Information Society Program intends to fill the pent-up demand from those unable to afford their own PCs by introducing Internet in small businesses such as news-stands, post offices, lottery and convenience stores. These shops would play the role of intermediary between consumers and the net. According to SEBRAE, more than 100 000 micro and small retailing shops are already connected.

Sources: O Globo, 21 May 2001; www.anatel.gov.br.

As in OECD countries, government has been an important catalyst to widespread Internet use in some developing countries. The case of Brazil is described in Box 4. The Chilean government is also moving to online procurement. A private company is contracted to manage the online bidding process and information is made available to the public on the identity of bidders and the size of their bids, on the outcome of the bidding process, and on the history of government contracts won by each successful bidder. The Indian state of Andhra Pradesh has set up Internet-based Integrated Citizen Service Centres to register land transactions, make an application for a driver's license, and even file complaints against government officials[27].

Box 4. **The Electronic Government Project in Brazil**

The federal government has played a role as a pioneer Internet user in Brazil. In addition to information, services and procurement, there are demonstration projects aimed at encouraging the use of Internet in business and society. A recent initiative is the programme Br@gov which aims at boosting Internet use in three main areas:

- **Information and Services:** The electronic government project aims at providing universal access to public services, more transparency in government actions, greater efficiency in the use of information technology, and integration of communications networks used for public administration. By December 2002, all public services that could dispense with the citizen's physical presence will be available on the Internet. A showcase project is the national elections, which are almost fully informatised. In the 2000 county polls, which involved more than 80 million voters, the results where known nationwide within a few hours after polling stations closed.
- **Procurement:** Federal and state government procurement through the Internet is saving millions in public funds and supporting transparency in public goods and services supply management. The federal government estimates that $900 million in "common goods and services" — i.e. those which can be objectively defined — will be bought in 2001 through reverse auctions. It expects a cost reduction of 20 per cent ($180 million) due both to greater bargaining power and a reduction in number of "intermediaries". The cost reduction estimate is based on tests conducted in December 2000. The federal government has more than 4 000 purchase points, which complicates effective procurement management, and it hopes to rationalise the process through centralised e-procurement via the site www.compras.net.gov.br. There are still legal problems to be resolved concerning government purchases through the Internet. In 2000, the government issued a provisional measure (# 2018) which makes the process legal until a definitive law is voted in Congress.
- **Taxes:** The technologies underlying e-commerce offer significant opportunities for improved taxpayer services. The Brazilian tax system is progressively moving online. In 2001, 90 per cent of the income tax declarations received by Federal Tax Authority were handled through the Internet. Taxpayers either send statements directly from a domestic computer or take a floppy disk to a nearby bank or post office and transmit from terminals specially installed for this purpose. Several other taxes and contributions are migrating to the Internet, but some state taxes have yet to be regulated to legalise online payment.

Evolution of Income Tax Declarations Handled Through the Internet

Year	Number of Declarations ('000)	Percentage of Total Declarations
1997	706	6
1998	4 422	30
1999	11 296	62
2000	13 500	90

Source: Ministry of Finance/Receita Federal

The educational level can be a barrier for Internet diffusion both because of poor supply of qualified workforce to support the development of local applications and because of potential user lack of literacy skills. Table V.5 bellow provides cross-country indicators of human resource development. It provides a clue for the potential of Internet diffusion in newly industrialised countries in Latin America and Asia. Highly populated Latin American countries have a potential for ICT diffusion in absolute terms although they are weaker in relative terms compared to Korea and Singapore.

Table V.5 **Human Resource Indicators in Selected Newly Industrialised Countries in Latin America and Asia (most recent year)**

Indicator / Country	*Mexico*	*Brazil*	*Korea*	*Singapore*	*Malaysia*
Population (million)	91.1	159	44.9	3.3	20.1
Literacy rate (%)	90	83	98	91	84
Average schooling years	4.7	3.9	8.8	3.9	n.a.
High school enrolment as a percentage of age group	58	45	100	n.a.	57
Scientists and R&D professionals /1000 people	0.3	0.2	2.9	2.6	0.2
Number of software professionals (1000s)	321	550	340	11	53

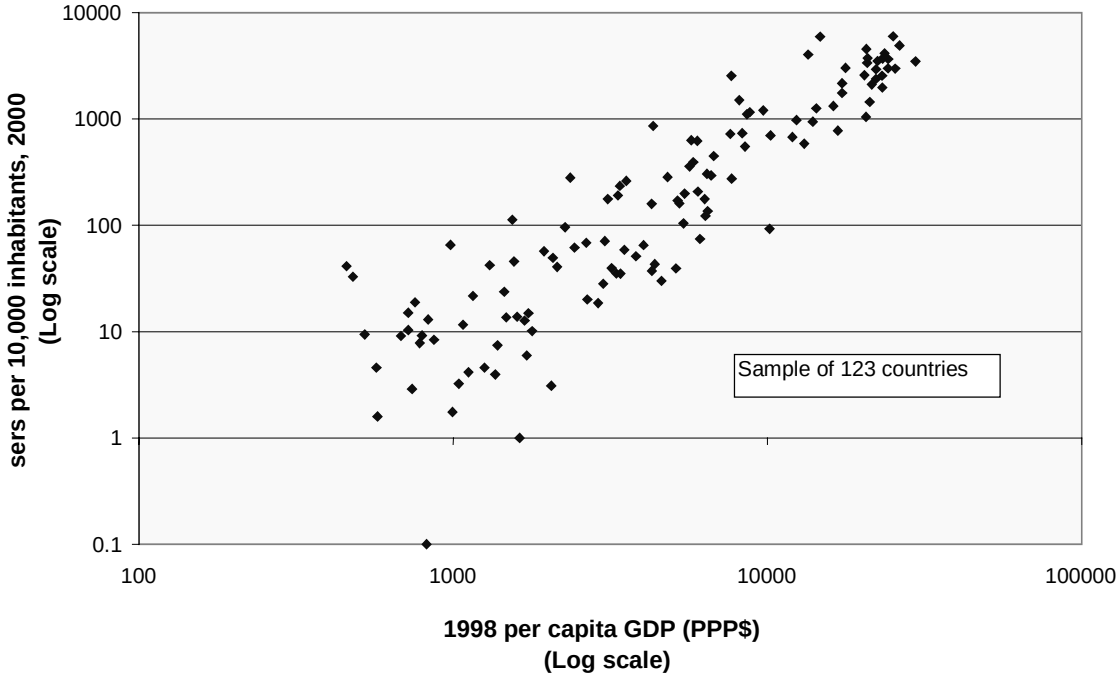
Sources: UNDP (1998).

Years of school attendance play a key role in Internet diffusion. A high school degree is often seen as a necessary condition to make professional use of computers. Ideally, users should have basic familiarity with English, since this is the language used in 85 per cent of all Internet sites, though multi-language sites are becoming increasingly common. Also, while icon-based navigation, combined with audio and video technology hold the potential to make the medium accessible even to the illiterate, these additional features come at added cost and the illiterate are usually the poorest of the poor. On the other hand, in developing countries, where most poor people are likely to have access to the Internet only through shared facilities (kiosks, post offices, schools, etc.), there will undoubtedly be better educated individuals — often young people — who will seize the opportunity to serve as Internet service provider to the illiterate (offering, for example, Web-based information search, retrieval and if necessary translation on a fee-for-service basis).

Income level and distribution also clearly matter to Internet diffusion. As for the former, Figure V.1 shows the relationship between per capita PPP GNP and the density of Internet users for some 123 countries. The relationship is strong, though even at low levels of per capita income density can vary markedly, ranging from one per ten thousand to perhaps 80 per ten thousand for incomes below PPP$1000. The digital divide is indicated by the fact that, for a 10-fold increase in per capita income, Internet density increases roughly 100-fold. Bearing in mind that we are looking at a log scale, there remains a rather high dispersion in Internet densities even at the high end of the cross-country income distribution, indicating that there must be other important influences than per capita income on Internet use.

Within countries, income also matters importantly to Internet use. In Brazil, the top 10 per cent of the income distribution accounts for 60 per cent of all home computers. In Chile 26 per cent of households account for almost 70 per cent of home Internet connections in the country. The average Indian earns about $450 per year, an income incompatible with Internet and computer costs. According to the National Association of Software and Services Companies, India's population of one billion owns just 4.3 million computers and 26 million fixed phone lines. The number of Internet subscribers was less than a million in 2000.

Figure V.1. **Internet User Density vs. Per Capita GDP**



Source: based on ITU figures (Internet users) and WDI (per capita income).

Despite problems with telecommunications infrastructure, education and poverty, developing countries are experiencing Internet growth at a much faster rate than expected. As the cost of computers and Internet access continues to drop, penetration rates and e-commerce ventures will rise significantly.

Among developing countries India has taken a number of steps toward wiring rural villages and increasing high-tech literacy among its people. Fibre-optic cables now connect the state government with district offices in the southern state of Andhra Pradesh. Despite facing structural and regulatory barriers, China has the potential to become a dominant Internet nation. In 1998, the Chinese government launched the new Ministry of Information Industries (MII) as a hub for IT policy and industrial development. Today, China is leapfrogging a generation of communications technologies with wireless and optical fibre shaping the nation's newly developing communications backbone.

Brazil counted some 5 million Internet users in 2000 and has implemented policies to promote further diffusion. An independent committee which includes academics and business representatives runs a programme — RNP (*Rede Nacional de Pesquisas*) — that is intended to guide the provision of high-speed backbones to universities and business centres and to foster Internet diffusion. Since private institutions are now well established in commercial Internet services, RNP is emphasising social and scientific applications of the Internet.

The Internet is making progress into Africa, but diffusion still lags far behind other regions, with 0.31 Internet hosts per 1 000 inhabitants in October 2000, compared with 1.96 in Asia and 2.53 in Latin America (OECD *Communications Outlook, 2001*).

VI. CONCLUDING REMARKS

The Internet is becoming a key facilitating technology for international commerce. It is becoming an important marketplace for several sectors either through business-to-business sites or inter-firm networks linking value chains spread across the globe. It is also affecting the way business is transacted in many service industries, from banking to tourism.

Developing countries are at a disadvantage for Internet diffusion since they are less technologically advanced and start in many cases with a weak telecommunications infrastructure. Despite these problems, e-commerce is evolving in most developing countries due to both private and public initiatives. The authorities and decision-makers in these countries can learn some useful lessons from the OECD experience with e-commerce policies and institutions summarised here. One noteworthy feature of the evolution of the Internet and of e-commerce has been its spontaneity. *Ad hoc* governance structures have been devised to address various issues as they arose, with little government interference apart from safeguarding public interest (e.g. combatting cybercrime). Until fairly recently, the Internet and e-commerce have been predominantly North American phenomena (even if the world-wide web can trace its roots to Europe); as a result, cross-jurisdictional disputes were largely contained, though there have been differences of viewpoint across levels of government in the United States, e.g. on the issue of e-commerce taxation. As the Internet and e-commerce become ever more global in nature, mechanisms for addressing transboundary disputes will take on greater importance. Until now, the OECD has been an important forum for discussing and narrowing difference, working towards common guidelines and principles. As more and more developing countries have a major interest in the Internet's evolution, this forum will have to engage a broader group of countries, while at the same time other organisations like the WTO will become prominent fora for discussion of specific e-commerce issues like tax treatment, at least insofar as there is a trade dimension.

The various OECD e-commerce guidelines are in the public domain and available to be adopted in current or modified form by any country so interested. Private enterprises establishing a web presence in developing countries can avail of the privacy statement generator, as can any other entity in a developing country establishing its own website. Probably the biggest challenge facing developing countries in the early stages of building e-commerce readiness is to foster more competitive telecoms and ISP markets in the interests of reducing access costs and broadening Internet use. There is a rich experience in both OECD countries and a growing number of developing countries on the pros and cons of various approaches to telecoms deregulation. One important

lesson is the need to ensure that the network does not simply pass from the hands of a public monopoly to those of a private monopoly.

In summary, a number of issues have been flagged in the preceding discussion that policy makers do well to bear in mind when devising diffusion policies and e-commerce regulations:

— Internet diffusion requires the involvement of several actors, including private firms and business associations, governments, universities, and international and multilateral development agencies. Dismantling of the state telecoms monopoly is an important element of a strategy for improving access at competitive prices, but this needs to be done in such a way as to: (a) avoid turning a public monopoly into a private one, and (b) secure a continued commitment to “universal service”.

— Private sector initiatives can go some distance towards building online trust, but a strong government regulatory framework addressing consumer protection, privacy, security of transactions, cybercrime, and other concerns can greatly reinforce those efforts.

— E-commerce taxation is not an immediate concern for most developing countries but it may become so in the longer term. At present, the social benefits of tax leniency on Internet transactions most probably outweigh costs in lost government revenue. Given the strong import-bias of e-commerce in most developing countries and their governments’ continued heavy reliance on import duties to raise revenue, the treatment of international trade in Internet-based services is certainly a matter of policy concern. Developing countries ought to play an active role in WTO negotiations on e-commerce treatment.

— Developing countries also need to become more active in other international fora defining rules and technical standards for the Internet. This requires a degree of familiarity with the issues and the technology that is lacking in many developing countries. Co-operation among countries and pooling of their technical resources can help overcome this handicap.

NOTES

1. *Readiness for the Networked World. A Guide for Developing Countries.* Information Technologies Group, Center for International Development, Harvard University, Cambridge, Massachusetts.
2. See Goldstein, A. (2000) p. 212.
3. ITU Telecommunications Indicators Update.
4. OECD/DSTI/TISP(2000)1, p. 4.
5. At the Ottawa Ministerial Conference on Electronic Commerce, Ministers concluded that "Effective competition in telecommunications markets can ensure a sustained, long-term trend towards lower costs, increased quality and, thus, expanded access to information infrastructures and services".
6. Boylaud, Olivier and Nicoletti, Giuseppe, "Regulation, Market Structure and Performance in Telecommunications", OECD ECO/WKP(2000)10, Economics Department, OECD, Paris.
7. In Brazil WLL was temporarily reserved (up to 2002) to new entrants in the local service market — known as "mirror firms" — in a policy designed to encourage new competition. WLL technology requires lower investment and provides an opportunity to reduce barriers to entry in the face of existing local fixed telephony monopolies.
8. Indefeasible rights of use are arrangements under which owners of international telecommunications fibre or bandwidth capacity grant rights over that capacity to other carriers, usually for a period of 10 to 20 years.
9. The ITU Telecommunication Indicators Handbook defines leased lines in the following way: "Lease circuits refer to a two-way link for the exclusive use of a subscriber regardless of the way it is used by the subscriber (e.g. switched subscriber or non-switched, or voice or data). Leased circuits also referred to as leased lines, can be either national or international in scope."
10. OECD DSTI/TISP(99)4/FINAL.
11. See Tigre (2000), table 3.2
12. Goldstein and O'Connor (2000), p. 23.
13. See http://www.ftc.gov/bcp/altdisresolution/summary.htm#N_60_ for further discussion of ADR mechanisms.
14. See http://www.ecommerce.gov/ecomnews/ecommerce2000annual.pdf for more details.
15. The Internet Law and Policy Forum has prepared a set of International Consensus Principles for Electronic Authentication that can be consulted at the following site: http://www.ilpf.org/digsig/intlprin.htm.
16. Taizo Nakatomi, "Threats to the Information Society", *OECD Observer,* January 2001.
17. As Whinston *et al.* (1997) point out, "the fluidity of online taxable entities makes it difficult to establish at any one time what is being taxed, who should be taxed, and who can impose taxes" (p. 489). Varian (2000) notes that "detection of 'taxable bitstreams' could be very difficult and may be more trouble than it is worth", especially where price competition is intense.

18. See “Taxation in a Wired World”, *OECD Observer*, May 2000, p. 2.

19. Sales tax collection in multiple jurisdictions with multiple rates already poses a challenge in the case of the large US mail-order business. Until now there has been *de facto* tax exemption due to high enforcement costs. This could change, also, with new tax software.

20. See DSTI/OECD background report on “Realising the Potential of Electronic Commerce for SMEs in the Global Economy”, prepared by MariaRosa Lunati for the Bologna Conference on “Enhancing the Competitiveness of SMEs in the Global Economy”, 14-15 June 2000, OECD/DSTI/IND/PME(2000)1/FINAL.

21. Ibid, p. 3.

22. OECD/DSTI/ICCP/IE(2000)9.

23. OECD/DSTI/IND/PME(2000)1/FINAL, p. 5.

24. See DSTI/OECD (2000), “Methodology for Assessing the Dynamics and Impacts of Electronic Commerce”, Document No. 1, WPIE Ad Hoc Technical Expert Group, Electronic Commerce Business Impacts Project, 19 June.

25. International Data Corporation (IDC), ‘Distance Learning in Higher Education: Market Forecast and Analysis’.

26. *World Employment Report 2001: Life at Work in the Information Economy.*

27. www.NUA.com, 19 January 2001.

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