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BACKGROUND PAPER ON DEVELOPMENTS AND MAIN ISSUES IN ELECTRONIC COMMERCE AND INFORMATION AND COMMUNICATION TECHNOLOGIES

Executive summary

This paper provides an overview of recent developments in Internet use, e-commerce trade and strategies adopted to promote the development of e-commerce in developing countries. It also outlines selected critical areas for consideration by the Commission on Enterprise, Business Facilitation and Development, including measures that need to be implemented in order to increase the participation of developing countries in those areas. Finally, it discusses issues for future expert meetings.

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INTRODUCTION

1. As mandated by the Commission on Enterprise, Business Facilitation and Development (from its third to sixth sessions) and the Plan of Action adopted at UNCTAD X in Bangkok, the secretariat has embarked on a range of activities in the area of e-commerce. The primary goal has been to promote the development of e-commerce and information and communication technologies (ICT) in developing countries and countries with economies in transition. The specific objectives of the secretariat's work have been:

(a) To enhance e-commerce and ICT awareness among policy makers, businesses and civil society in various areas, including infrastructure, standards, legal and regulatory issues, and human resources development. To that end, UNCTAD has held a series of regional workshops and seminars on e-commerce.[1] It has also launched a series of publications on e-commerce and development.[2]

(b) To carry out studies on various aspects of e-commerce, including its developmental impact from the economic, social and legal perspectives, to inform developing countries about the experiences of enterprises and policies of other countries and to advise and assist Governments of developing countries in the formulation of strategies for e-commerce. These activities have been undertaken in the framework of Expert Meetings convened by the Commission and also through the secretariat's publications referred to above.

(c) To participate in international e-commerce and ICT initiatives, conferences and programmes and cooperate with other international organizations in promoting e-commerce and ICT in developing countries. This has been achieved though, among other things, through the secretariat's participation in the work of the United Nations ICT Task Force, the G-8's DOT Force and the preparatory work for the World Summit on the Information Society.

(d) To provide technical assistance to developing countries, including training and direct assistance to e-businesses by identifying potential opportunities for investment and encouraging partnerships between developing country and developed country e-businesses, and to support efforts by developing countries to participate actively in the formulation of international e-commerce and ICT policies and regulations and in multilateral negotiations on e-commerce.

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[1] These include Cairo, Egypt (September 1998), Lima, Peru (August 1999), Nairobi, Kenya (October 1999), Colombo, Sri Lanka (October 1999), Kathmandu, Nepal (for LDCs, May 2000), Curaçao, Netherlands Antilles (June 2001) and Bangkok, Thailand (November 2002), and one each for the African and Latin American regions, scheduled for 2003.

[2] The first publication, "Building confidence: Electronic commerce and development", was published in February 2000. Subsequently, an annual publication, *E-commerce and Development Report*, was launched, the first issue being for 2001. The 2002 issue was published in November 2002.

2. Against that background this paper provides an overview of recent developments in e-commerce and outlines key issues for consideration by the seventh session of the Commission on Enterprise, Business Facilitation and Development that need to be addressed in UNCTAD's future work on e-commerce.

I. TRENDS IN ELECTRONIC COMMERCE

3. In spite of the collapse of many highly visible "dotcom" businesses and the serious difficulties that most of the major global players in the ICT-related sectors have experienced for the last two years, the number of people using the Internet around the world and the value of the goods and services traded online have continued to grow rapidly. Thus, the effects of the Internet and e-commerce on the organization of the global economy continue to spread and reshape the context in which enterprises, including those from developing countries, must compete in domestic and in international markets. Such changes relate to, *inter alia*, the streamlining of existing business processes, more effective responses to customer requirements in terms of speed and cost, and improved access to new markets.

4. According to most estimates, the number of Internet users around the world will be about 655 million at the end of 2002. This means that the "Internet population" of the world is growing by about 150 million people a year, about a third of whom live in developing countries. The share of developing countries in the global Internet population will keep growing, and although the differences in terms of "Internet penetration" will remain very large, the absolute numbers of Internet users in developing countries will soon be high enough to represent a significant factor in global Internet usage.

5. The fact that more and more people are using the Internet, which is a prerequisite for the expansion of e-commerce, does not necessarily indicate that e-commerce is expanding or that the pace of expansion is quickening. Furthermore, while the number of Internet users may be a determinant of business-to-consumer (B2C) e-commerce volumes, it is business-to-business (B2B) e-commerce that represents by far the largest share of global e-commerce and has the most important implications for productivity and improved economic performance. In this regard, the gap between developed and developing countries in terms of e-commerce activity seems to be much larger than the one that exists in terms of access to the Internet.

6. Many widely differing estimates of the value of the goods and services traded online around the world are regularly issued by private research firms. For 2002, they range from less than $1,000 billion to close to $2,300 billion.[3] While differing in their estimates of the value of e-commerce, practically all forecasts point to a trend towards rapid growth in e-commerce. On current growth trends, e-commerce could come to represent between 15 and 20 per cent of global sales (domestic and cross-border) by 2006.

7. Very little statistical information is available about e-commerce transactions in developing countries. However, e-commerce operations in those countries worth about $100 billion would seem to be a reasonable estimate. Most of these transactions are concentrated in

[3] See UNCTAD's *E-commerce and Development Report 2002*.

the Asia-Pacific region. E-commerce in this region is generally expected to grow at a pace similar to that in the developed countries. In the remaining developing regions, and in spite of higher rates of e-commerce expansion, the respective shares in global online trade are expected to remain below 1 per cent. The amount of online trade in developing countries will thus remain modest in comparison with global figures; however, on current growth trends and measured in absolute terms, in the medium term e-commerce in developing countries is expected to represent a magnitude of the same order as today's global e-commerce.

8. Demographic weight alone could explain the leading position of the Asia-Pacific region in the spread of e-commerce in developing countries: at current rates, the region is adding close to 50 million new Internet users a year. This is more in absolute terms, and relatively faster than any other region of the world. But other factors come into play besides demographics. Enterprises, particularly in the manufacturing sector, are more integrated into intraregional and global trade flows than those of other developing regions. This means that they are more exposed to pressures from their customers in developed countries to adopt e-business methods and are making the necessary investments to facilitate the application of those methods. New broadband technologies are being deployed faster in some middle- and high-income countries in the region than anywhere else in the world. For example, the world's top four markets as regards the number of digital subscriber lines (DSL) per 100 people are the Republic of Korea, Hong Kong (China), and Taiwan Province of China. In all, 46 per cent of all DSL in the world at the end of 2001 were in the Asia-Pacific region. Finally, Governments across the region have taken a proactive role in the promotion of e-commerce.

9. The growth of e-commerce in developing countries and the ability of enterprises to benefit from the efficiency gains in their production and distribution processes will be largely dependent on their adoption of B2B e-business practices. It is through these that e-commerce can contribute most to development, because they translate into improved competitiveness for enterprises and higher levels of productivity, and hence incomes for the economy as a whole. The adoption of B2B e-commerce by developing countries' enterprises will be linked to their capacity to integrate themselves into regional and global supply chains. Other important determinants of the growth of B2B e-commerce in developing countries will be foreign direct investment (FDI) flows and the linkages between local producers and transnational corporations.

10. Online procurement and, on a larger scale, supply chain management are often quoted as the most common sources of savings generated by e-commerce. Indeed, if accompanied by the necessary organizational changes, they can dramatically improve a company's competitiveness. For example, successful e-procurement implementation is reported to result in savings in lead times of up to 30 per cent and reductions in transaction processing costs of up to 25 per cent.

11. Another B2B trend that is gaining momentum in the more advanced markets is the deployment of demand-chain information technology (IT) solutions. The objective is to enhance the efficiency of the interaction between a company and existing customers and/or the various players along its distribution channel and to enable it to reach a larger number of

potential customers. Web-enabled demand-side applications help companies achieve this objective through a wide range of possibilities, such as new, more valuable services for customers based on online availability of information, economically viable product customization, better understanding and predictability of customer needs and behaviour, or making it possible to work online with smaller customers at a reasonable cost.

12. Many of the changes brought about by the Internet in the global economy that have been mentioned above will have implications for the competitiveness of the enterprises of developing countries. While some of the factors affecting the evolution of global e-commerce (such as technological change) do not respond directly to the national policies of developing countries, Governments, business players and other stakeholders have a role to play in the formulation and implementation of national e-strategies to ensure that the new opportunities for creating, transforming, applying and exchanging information and value are used to improve the productivity of developing economies and their enterprises.

13. Recognizing that e-commerce and ICT are powerful enablers of development, the Governments of many developing countries are taking up the challenge of formulating national strategies to fully support the setting up and operations of local e-businesses. Some examples of success in this regard have already been reported in a number of developing countries where efforts have been undertaken by the Government, often in partnership with the private sector, to promote the development of e-business. Typical aspects of such strategies include issues such as awareness and training, investment in infrastructure and legal reform. At the level of the enterprise, e-business strategies have to take into account country-specific factors such as technology, infrastructure and the level of economic development.

14. The role of ICT in national development strategies has received growing attention in international forums. This issue featured, for example, on the agenda of the G-8's DOT Force, whose action plan includes as its point 1 "to help establish and support developing country and emerging economy national e-strategies". Also, and as part of the action undertaken by the United Nations for the achievement of the goals of the Millennium Declaration, the United Nations ICT Task Force has identified the provision of assistance to developing countries in designing national and regional ICT strategies as one of its medium-term goals and has set up a working group for that purpose. Following the conclusion of the work of the DOT Force at the Kananaskis Summit in Canada in 2002, the implementation of its activities will continue through a DOT implementation network. Part of this network is the International e-Development Resource Network (IeDRN), which will be active in the field of e-strategies. In this context, the role of the United Nations ICT Task Force will be one of strategic direction and policy coordination.

15. Bilateral donors are also increasingly including ICT considerations in the design of their international cooperation programmes.[4] In this regard, providing support to interested developing countries in defining and implementing their e-strategies for development, and in

[4] A far from exhaustive list of examples of donors with ICT-focused assistance programmes would include Australia, France, Germany, Italy, Sweden, the United Kingdom and the United States.

particular those related to e-commerce, should receive priority attention. Where such e-commerce strategies already exist, they should provide the main reference for donors with regard to international technical cooperation in e-commerce. This close relationship between national e-strategies and international cooperation would be greatly facilitated by the emergence of as wide a consensus as possible on the fundamentals of e-strategies, especially if ICT is to be mainstreamed into official development assistance programmes.

II. CRITICAL AREAS TO BE ADDRESSED BY THE COMMISSION

1. E-Commerce statistics for policy-making

16. With the growth of the digital economy, as outlined in section I, there is an increasing demand for reliable and internationally comparable data for informed decisions by policy makers designing national e-strategies as well as enterprises moving online. Currently, data on the use of ICT and e-commerce are largely provided by private sector companies. Unfortunately, figures differ considerably among the data providers, given their use of different methodologies, definitions and indicators.

17. During the past five years, a number of national statistical offices – mainly in the developed countries – have started to collect data on e-commerce and, more generally, the use of ICT and the Internet. These offices have the advantage of guaranteeing the confidentiality of the collected data, having a more neutral position when it comes to collecting and interpreting the data and being able to use their existing methodologies and infrastructure for data collection, processing and analysis.

18. Some countries[5] are already benefiting from the results: they are now in a position to benchmark their economies with competitors internationally, and are able to identify the number of qualified people needed to advance their country's digital economy or to calculate the amount of investments needed to provide businesses with access to the Internet. The United States is planning to include the measurement of e-commerce transactions in the whole of its statistical programme, which will enable it to measure the impact of e-commerce on the overall performance of the economy.[6] In short, both policy makers and business people are able to take well-informed decisions about the best public policy measures and private investments in e-commerce-related sectors.

19. Recognizing the value of e-commerce data, policy makers designing their national e-strategies increasingly include the need to measure the digital economy in their e-strategy programmes. For example, the European Union's eEurope 2002 Action Plan includes a set of benchmark indicators to monitor the progress made towards its targets.[7] In Japan, the Basic

[5] For example, Australia, Canada, Denmark, the United Kingdom and the United States, to name but a few.

[6] For progress made on collecting e-statistics in the United States, see T. Mesenbourg "Measuring electronic business", 2001, available on www.census.gov/eos/www/ebusiness614.htm.

[7] R. Deiss "The EU surveys on ICT usage of households", paper presented at the 17th meeting of the Voorburg Group on Service Statistics, Nantes, 23–27 September 2002.

Law on Formation of an Advanced Information and Telecommunications Network Society ("Basic Law on IT"), which came into force on 6 January 2001, requires the Government to devise a basic strategy ,to promote the formation of an advanced IT network society (the "E-Japan Strategy"), and also requires it to prepare official statistics related to ICT.[8] Hence, measuring the digital economy has been recognized as an important element in the development and planning of national e-commerce strategies.

20. Digital economy indicators and statistics are important for the design of e-commerce strategies in two ways. First, they help policy makers to better plan their strategies by identifying gaps and areas that need improvement. Second, basic information on the use of ICT and e-commerce by businesses and consumers is needed in order to assess the current and potential impact of the digital economy and thus to evaluate the impact of their e-strategies. This in turn leads to revised policies on how to best exploit the economic potential of the new technologies. Furthermore, at the international level, digital economy statistics have been used by countries to benchmark their economies against those of other countries.

21. Given the borderless nature of the digital economy and the need to carry out international comparisons, the importance of internationally harmonized definitions and indicators has frequently been pointed out by countries involved in measuring e-commerce. At the international level, there are four groups that are currently active in this connection: the European Union, the Organisation for Economic Co-operation and Development (OECD), the Voorburg Group[9] and the Nordic countries.[10] Their work has largely concentrated on agreeing on a working definition of e-commerce and identifying indicators for measuring the use of ICT in businesses and households. A model questionnaire on ICT use in enterprises was prepared and tested by the Nordic countries in close cooperation with the OECD and the Voorburg Group. It is based on internationally agreed guidelines and represents the first data collection tool that allows national statistical offices to compare their national results with those of other countries. Very few developing countries are represented in these groups, and thus these countries have not participated in the development of definitions, indicators and tools for measuring the digital economy.[11]

22. At the same time, many developing countries are now directing their attention to developing national e-commerce strategies. During the past year, UNCTAD has been helping developing countries to participate more actively in the debate on national e-commerce strategies. During these discussions, it was suggested that the development of reliable

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[8] H. Kitada "Japanese ICT statistics and new JSIC with the Information and Communications Division", paper presented at the 17th meeting of the Voorburg Group on Service Statistics, Nantes, 23–27 September 2002.

[9] The United Nations Voorburg Group is a group of statisticians, mainly from national statistical agencies, which was formed to facilitate the availability of services sector statistics. Its members include national statistical offices from 18 (mainly developed) countries, Eurostat, the International Monetary Fund, OECD and the United Nations Statistics Division.

[10] Denmark, Finland, Iceland, Norway and Sweden.

[11] Apart from the work of the Voorburg Group, little work on e-statistics has been done so far within the framework of the United Nations. The United Nations Statistical Commission considered e-commerce statistics as agenda item 7 (d) at its 33rd session, held in New York from 5 to 8 March 2002, at which contributions from Australia, Canada and Hungary were considered.

indicators and data on the e-economy be included as a basic element of national e-strategies. Given its role in promoting e-commerce in developing countries, coupled with its experience in carrying out research and quantitative analyses concerning the digital economy, UNCTAD is well placed to assist developing countries in bringing the topic of measuring e-commerce into the policy debate on e-strategies.

23. Even though the volume of e-commerce or the use of ICT by businesses may still be marginal in many developing countries, it is essential to start preparing e-commerce indicators now, for two reasons. First, the development and growth of the digital economy is irreversible. Businesses all over the world are increasingly using ICT in their business processes and are gradually moving towards e-business. Second, the experience of countries that have started to develop their e-statistics shows that it takes several years to design and implement the best national strategy for measuring the digital economy. Consequently, the sooner countries begin to work on their e-commerce measurement strategy, the more likely it is that they will achieve better results at a time when e-commerce is spreading to most parts of the developing world.

2. Enhancement of confidence and security

24. Uncertainty about the legal framework governing e-commerce may inhibit both consumers from purchasing products or services over the Internet, and companies from entering into the electronic market place. The international community has been busy trying to alleviate these concerns by proposing a number of measures and initiatives in order to boost confidence and security in the new business environment. In addition to the basic legal infrastructure recognizing the validity of electronic messages and providing equal treatment to users of paper-based documentation and to users of computer-based information, many Governments have become sensitive to the need for laws that have an impact on trust and many are enacting laws, such as those dealing with electronic signatures,[12] that are leading to more robust trust systems.

25. There is an increasing body of legislation and international models for legislation[13] to guide countries that are trying to decide how to deal with electronic records in the context of their own culture, traditions and legal rules. In addition to authentication and security of electronic records, one of the main challenges facing e-commerce is how to resolve cross-border disputes in the electronic business environment. The distance between the parties, language and cultural differences, difficulties in determining the applicable law and competent jurisdiction and enforcement of judgements are among the main obstacles that could significantly increase the cost of doing business online. Given that traditional dispute settlement mechanisms may not provide effective redress in e-commerce transactions, there is a need to consider alternative dispute resolution (ADR) mechanisms[14] that would provide speedy, low-cost redress for claims arising from online interactions. When ADR takes place

[12] For a survey of digital signature law, see http://rechten.kub.nl/simone/ds-lawsu.htm.

[13] See http://www.uncitral.org/en-index.htm.

[14] ADR refers to out-of-court methods for resolving disputes, including arbitration, mediation, negotiation and conciliation.

using computer-mediated communications in the online environment, it is often referred to as online dispute resolution (ODR). Both e-disputes and brick-and-mortar disputes can be resolved using ODR. At the moment there are four major types of ODR systems:[15]

(a) Online automated settlement of financial claims: this uses an expert system to automatically settle financial claims;

(b) Online arbitration;

(c) Online mediation;

(d) Online resolution of consumer complaints: this provides online handling of consumer complaints.[16]

(e) In view of the special rules applicable to consumers in many jurisdictions, most of the existing ODR systems do not preclude the consumer from having recourse to the court system if it disagrees with the decision rendered or the solution proposed by the ODR service provider.

26. ODR exists in a variety of contexts, including within a particular online market place (e.g. mediation in online auction sites,[17] arbitration in the domain name context and automated negotiation process for insurance disputes) as part of a trustmark or seal programme,[18] for the handling of disputes between citizens and Governments or on an independent basis. These ADR/ODR mechanisms range from those that are fully automated (where a computer program without human intervention generates outcomes) to most other ADR/ODR providers that offer dispute settlement with human intervention. ODR institutions often provide a large variety of additional services such as legal assistance, dispute prevention, complaint assistance, dispute resolution clauses, publication of complaints, trustmarks or seals, consumer information and training in ADR and ODR.

27. Although ODR is still in its infancy, it has the potential to grow and to provide fair and inexpensive adjudication of disputes arising out of online transactions. Developing countries are encouraged to promote and facilitate ODR as an alternative to national litigation

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[15] E. Van den Heuvel "Online dispute resolution as a solution to cross-border e-disputes", available at http://www.ocde.org/dsti/sti/it/secur/act/online_trust/documents.htm#related documents. See, for a detailed ODR study, T. Schultz, G. Kaufmann-Kohler, D. Langer and V. Bonnet, *Online Dispute Resolution: The State of the Art and the Issues*, E-Com Research Project of the University of Geneva, Geneva, 2001, http://www.online-adr.org.

[16] See the ODR international survey by Consumers International on cross-border disputes in cyberspace, available at http://www.consumersinternational.org/campaigns/electronic/sumadr-final.html.

[17] See as an example Ebay ODR system in http://www.squaretrade.com/eb/ebay_020801.html?marketplace_name=ebay&campaign=EBY_OD_2#odr. Over 220,000 disputes have been handled by SquareTrade.com – an online dispute resolution firm that handles disputes for Ebay – during the last two years.

[18] The trustmark is the cyberequivalent of the realworld certification mark. An independent third party drafts a code of conduct for conducting e-business and certifies that subscribing e-businesses meet the standards laid down in the code. A subscribing e-business is then able to display the trustmark.

in order to create confidence and trust in the new market place and are urged to ensure that their legislation facilitates the use of out-of-court schemes. Furthermore, the development of trustmarks and reliability programme and/or the voluntary adherence of e-businesses to the latter in developing countries as an indicator of e-businesses' reliability should be promoted and encouraged.

28. Another important area that deserves special attention is the protection of intellectual property rights (IPR) in an electronic environment. Authors, publishers, producers and content providers are increasingly demanding legal and technological answers to their concerns about copying and dissemination of digital material. Thus, in addition to appropriate copyright legislation[19] and enforcement mechanisms, cooperation between Internet service providers (ISPs) and right owners is of great importance. Technological protection measures such as digital rights management (DRM) systems are effective mechanisms that have been developed to protect digital content and prevent unauthorized use of IPR-content. Their aim is to secure rights clearance and revenue collection. It is important, therefore, that in addition to appropriate copyright legislation, IPR owners in developing countries have easy access to DRM systems in order to protect IPR content.

29. Finally, infrastructure security laws and regulations,[20] for example, that provide for appropriate security of data and networks and for a safe operating environment are a critical component because they form the underlying foundation of government support for IT. The confidentiality, integrity and availability of data and networks are central to creating a favourable business environment and attracting FDI and IT operations to developing countries. Privacy and data protection laws[21] are equally important for developing countries wishing to secure transborder transfers of data from countries that prohibit the transfer of personal data to countries where the data are not given an adequate level of protection.

30. In order to assist developing countries in attaining much needed confidence and security in the e-commerce environment, the UNCTAD secretariat will continue to keep under review and monitor developments pertaining to the above issues and keep developing countries informed about them. In addition, it will review the potential impact on developing countries of some of the most relevant issues described and will maintain its training activities in this field.

3. E-finance for development

31. Internet-based electronic finance is increasingly reaching developing and transition economies. In many of those countries local financial service providers, and especially banks, are providing e-banking and e-payments services while the global players are trying to serve

[19] See the WIPO Internet treaties at http://ecommerce.wipo.int/agenda/index.html.

[20] Security involves security of data (the information itself), networks (the mechanisms set up for interchange of information), critical infrastructure (the technological backbone of the information system), physical structures (and physical access to the computers and terminals) and executive protection.

[21] See UNCTAD background paper "Electronic commerce strategies for development: The basic elements of an enabling environment for e-commerce", para. 40, TD/B/COM.3/EM.15/2, 3 May 2002.

customers in countries where these services are still greatly underdeveloped. The traditional commercial and investment banks are changing from "brick and mortar" to "brick and click" institutions. This process is also developing in the financial sectors of many developing countries, where many financial services providers are becoming increasingly aware of the need to greatly improve the capacity to use ICT and especially the Internet as well as to increasingly resolve the related issues of security, trust and knowledge necessary for conducting e-commerce and e-finance.

32. E-finance involves a number of innovations in the financial industry. For example the use of modern Internet-based data mining technologies makes it possible and cost-effective to build large credit information databases and apply modern credit analysis and related credit appraisal, scoring and rating techniques, thus making it possible to assess enterprises' and households' credit risks and permitting the rapid processing of their credit applications. Moreover, enterprises and households are acquiring techniques for managing their cash flows online, making various transfers and payments, and buying and selling financial instruments directly from their desktops and other wired and wireless communication devices hooked through the Internet. The important issue is how these innovations could contribute to efficiency and wealth creation in developing and transition economies.

33. Strategies to promote the above-mentioned online financial services in developing countries should include the adoption of open Internet technologies and platforms for online payments with or without the use of cards, and the adoption of Internet banking, e-trade finance, e-credit insurance and other facilities. These strategies should *inter alia* address the adaptation of these forms of e-finance to the needs of enterprises, and primarily small and medium-sized enterprises, as well as of households. To receive online trade finance and longer-term investment SMEs need to provide reliable and verifiable information on their performance and financials, or at least on the nature of their businesses and future cash flows, to various Internet-compatible local, regional and global credit information databases run by banks, credit bureaux and other financial services providers. This constitutes a crucial first step to accessing e-finance both locally and internationally. At the same time universal and standardized databases should be available on the Web so that SMEs can access them on the basis of available, accessible and user-friendly technologies. E-finance providers should also take into account the constraints facing SMEs in the provision of comprehensive information and learn to be flexible and selective and, at the same time, efficient in communicating with SMEs.[22]

34. The introduction of online credit reporting systems and credit bureaux in developing countries would certainly help to strengthen risk management by corporate and local financial service providers. More transparent and equitable banking, data protection legislation, debtor- and creditor-related laws permitting enforcement of bankruptcy and other regulatory requirements are prerequisites for the creation of effective credit information systems. The regulatory system should include effective registration laws, bankruptcy laws, court registers, standards for adequate and timely disclosure by private sector operators, adequate public data

[22] As an example, see www.smeloan.com.

dissemination and publishing requirements, the possibility of collecting, processing and disseminating public records, suits and judgements, and permission to access companies track records with banks and other creditors.

35. Since e-finance implies expansion of cross-border financial flows with more active use of Internet, serious regulatory and oversight problems arise for national macroeconomic – and especially monetary – policy makers. Hence there is a need to consider e-finance-related policies as a part of e-commerce development strategies. Promoting e-finance involves making financial regulations technology-neutral and creating a supportive institutional environment that facilitates e-finance. At the same time, given the global nature of e-finance, further thought should be given to harmonization of electronic banking regulations. Supervisors from developing countries should have the necessary knowledge to assess local banks' business plans for electronic banking as a part of their capacity to assess the operational risks in the banking sector related to the introduction of IT. Outsourcing of some banking functions to third-party vendors poses further challenges to the regulatory process.

36. The international community should support national efforts to develop e-finance infrastructure. The focus should be on how online payments may be impeding the growth of e-commerce in developing countries and on measures that may be adopted to address those impediments.

4. Open source software

37. Open source free software (OSFS) dominates the Internet, with the majority of Internet servers running OSFS versions of UNIX or GNU/Linux operating systems, and 60 per cent use the Apache web server to distribute web pages to browsers. Forty per cent of e-mail servers run Sendmail and 90 per cent of domain name system (DNS) servers run BIND.[23] OSFS programs are not necessarily "free of charge", even though the majority are non-commercially available.[24]

38. OSFS is software that has made its source code public. Software is written using a programming language and to non-experts the results look like a combination of unintelligible language and mathematical and logical and expressions. These programming instructions are the "source code". Before the software can be used on a computer, it needs to be compiled. Compiling is the process of translating the text of the source code into a series of ones and zeros, which are saved as a separate file. The resulting compiled file can only then run on a computer and is called the executable binary file.

39. Opening the source code to public scrutiny is much more than a technical facet of a software application. It allows extensive collaborative development in producing, debugging and improving software. It enables better porting with other programs, produced by

[23] More examples of OSFS software can be found at the Open-Source Software Institute, www.oss-institute.org/reference.html, and the European Commission Information Society DG, *Free/Libre and Open Source Software: Survey and Study*, 2002, www.berlecon.de/studien/floss/FLOSS_Grundlagen.pdf., P. 16–22.
[24] OSFS is not the same as public domain software or freeware/shareware software.

independent programmers, and contributes to a reduction of redundancy in the code. It allows customization of existing applications to meet the commercial, regulatory, cultural and linguistic requirements of users and localities. Proprietary software is the opposite of open source and is very common on personal computers. It is distributed only as executable binary files and its source code is kept secret. Producers of proprietary software regard the source code as essential intellectual property that allows them to sell their software for money.

40. The OSFS community is focused on two organizations – the Free Software Foundation (FSF) and the Open Source Initiative (OSI). Both organizations support the notion that distributing a program's source code is beneficial for programmers and users alike. Users should be allowed to improve and customize their software, as this produces superior software more quickly than is possible in closed corporate environments.

41. FSF[25] regards traditional copyright as a means of restricting information and creating unequal access, usually along the lines of wealth and poverty. To replace traditional copyright, it has developed a standard copyright agreement – the GNU General Public Licence (GPL) – whose purpose is to deter the closing of the source code of a program with the aim of subjecting it to proprietary commercial development.[26]

42. OSI[27] came into being in February 1998 after Netscape decided to publicize the source code of its browser. It promotes the development of open source, citing advantages for the business and corporate community, as well as public institutions and individuals. It requires entities producing open source software to satisfy the Open Source Definition (OSD) in its copyright statement. An OSD-consistent software application must be licenced with a number of elements in place (described in the annex to this document). The definition regulates the issues of free redistribution, source code publication, derived works, author's source code integrity, discrimination and scope of licence. The OSI does not provide a licence wording but "approves" existing licences as complying with the OSD; at a recent count, there were 21 of these, including the original GPL licence, as well as licences from IBM, Nokia and Intel.

43. The advantages for developing countries of promoting OSFS are manifold and any differences with the developed world are only a matter of degree, but not direction. Open source environments produce reliable, secure and upgradable software at comparatively low cost. Open source eliminates the economic loss at the national level resulting from duplication of work, particularly if work has been done in a public or academic institution. Sharing applications and their source across ministries, government offices and schools and universities can be a public policy designation.

44. OSFS can have an anti-monopolistic effect on the IT market and industry in a country. Network externalities, whereby the value of a program (e.g. a word processor) increases with the number of people using it, may result in monopolies with inferior products.

[25] www.fsf.org.
[26] GNU.org, www.gnu.org/licenses/gpl.html.
[27] www.opensource.org.

Because of its anti-restrictive licensing OSFS allows anyone to provide IT services and thus reduces barriers to entry. While some open source software may assume a dominant position, no particular institution or business can use it to build a monopoly market position and lock clients into financially disadvantageous and long-term relationships.

45. The promotion of OSFS as a public policy may have a positive effect, creating more and better technically qualified employees, as their skills can be put to wider use. Instead of just reporting bugs, they could fix them as well. The level of service they may provide can extend beyond what is possible with proprietary applications. Sharing of software knowledge would benefit all IT stakeholders, down to the end user. This can have synergistic effects throughout the IT services industry and the broader economy, leading to job creation and export opportunities. Open source software typically provides an improved approach to security issues. With closed source software, it is difficult to assess the quality of security that is built in. Open source applications are transparent, and if a security flaw is found it can be related to the code causing it and fixed by any experienced programmer.

46. Cost reduction is not a goal, but it is a useful side benefit, as OSFS tends to be more affordable. In developing countries licensing costs for proprietary software can be prohibitively high, contributing the bulk of the total costs of ownership of an IT system; an inverse situation is very common in developed countries. Certain aspects that may discourage the use of open source software in developed countries, for example time and money spent on set-up and configuration, need not concern developing countries to a similar extent. Hardware upgrades are also less important, since open source allows the user to break free from the vicious upgrade circle of new software requiring new hardware.

47. Many Governments have realized the importance of OSFS for economic development and e-governance. Policies advising its voluntary or obligatory implementation are under discussion or implementation in Peru,[28] China,[29] South Africa,[30] the European Union[31] and the United Kingdom,[32] among others.

III. CONCLUSIONS AND POSSIBLE ISSUES FOR DISCUSSION BY THE COMMISSION

48. This paper has outlined some of the recent developments in e-commerce and their significance for developing countries. The objective is to highlight areas that are important to developing countries but that have not yet been dealt with adequately and thus require further attention.

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[28] Proyectos 1609, http://200.37.159.7/paracas/proyectos2001.nsf/evillanueva.
[29] www.redflag-linux.com/eindex.html.
[30] www.oss.gov.za/docs/ossreportv2.pdf.
[31] www.berlecon.de/studien/floss/FLOSS_Grundlagen.pdf.
[32] www.iprcommission.org/graphic/documents/final_report.htm.

49. With recognition of the need to create an enabling environment for the development of e-commerce, the issue of e-commerce strategies is gaining importance among Governments and other stakeholders in all countries. As many developing countries have started to design and implement national e-commerce strategies, UNCTAD's focus during the past year has been on assisting Governments in this process by bringing together experts from different countries to exchange experiences and identify best practices.

50. In this context, the lack of reliable statistics and indicators for assessing e-commerce developments at the national and international levels has been a source of major concern and has received attention from policy makers in many countries. As explained in section II.1 of this paper, data on the use of ICT and e-commerce are fundamental for facilitating well-informed decisions on how to formulate and implement e-strategies and to benchmark a country's digital economy vis-à-vis those of other countries. Therefore, further work in this area is a high priority in the work on e-commerce.

51. Although initiatives have been taken at the national and international levels to advance work on measuring e-commerce, very few developing countries are represented in these initiatives. The Commission may wish to discuss the importance of the availability of indicators of Internet use and of trends in e-commerce. The discussion may provide examples of member States that have taken steps to advance the collection of e-commerce statistics in their countries. It may also include proposals to address the specific problems faced by developing countries in this area. In this connection, an UNCTAD Expert Meeting on the subject of indicators and statistics for assessing e-commerce would provide an essential input to the design and evaluation of e-commerce strategies. It would also provide an important framework for incorporating the developing countries' views into the existing initiatives by bringing together government agencies from both developed and developing countries and regional and international bodies in charge of measuring e-commerce. This would build on existing efforts to define and measure e-commerce, including the experiences of those countries that have started to implement programmes for the collection of digital economy statistics. Since most developing countries are at an early stage as regards collecting their e-commerce statistics, they could thus take advantage of the experiences of some of their counterparts in the developed countries.

52. The Commission may, in addition, focus its discussion on open source free software. In view of the characteristics and advantages of OSFS outlined above (such as enhancement of the workforce's IT skills, anti-monopolistic effects and cost-reduction), the Commission may wish to discuss policy options and current experiences regarding, for instance, the use of OSFS in public institutions and the promotion of OSFS. Other IT development implications of the use of OSFS should be the subject of informed and serious consideration by Governments.

Annex

THE OPEN SOURCE DEFINITION – VERSION 1.8

Introduction

53. Open source does not just mean access to the source code. The distribution terms of open source software must meet the following criteria:

1. Free redistribution

54. The licence shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The licence shall not require a royalty or other fee for such sale.

2. Source code

55. The program must include the source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with the source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost, preferably downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a pre-processor or translator are not allowed.

3. Derived works

56. The licence must allow modifications and derived works, and must allow them to be distributed on the same terms as the licence of the original software.

4. Integrity of the author's source code

57. The licence may restrict source-code from being distributed in modified form *only* if the licence allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The licence must explicitly permit distribution of software built from modified source code. The licence may require derived works to carry a different name or version number from the original software.

5. No discrimination against persons or groups

58. The licence must not discriminate against any person or group of persons.

6. No discrimination against fields of endeavour

59. The licence must not prevent anyone from making use of the program in a specific field of endeavour. For example, it may not prevent the program from being used in a business, or from being used for genetic research.

7. Distribution of licence

60. The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional licence by those parties.

8. Licence must not be specific to a product

61. The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's licence, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.

9. Licence must not contaminate other software

62. The licence must not place restrictions on other software that is distributed together with the licensed software. For example, the licence must not insist that all other programs distributed on the same medium be open source software.