ICTs AND THE DEVELOPMENT OF E-COMMERCE INSTRUMENTS

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Abstract:
Recent advances in the area of ICTs (computer technology, telecommunications technology, software and information technology) are changing lives in unimagined ways a few decades ago. The article focuses on the manner how the development of ICTs opened the door for a revolutionary form of trade, the electronic commerce, which became a very important part of the larger sphere of ICT. Statistics show that despite positive trends in ICT diffusion, much more needs to be done to achieve an information society for all. Important gaps remain within economies and that affect the demand for and the ability to use ICT. The final part of the paper refers to the effects of the financial crisis upon the ICT development.

Key words: *ICT, e-commerce, Internet, Millennium Goals*

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1. Introduction

Recent advances in the area of ICTs (computer technology, telecommunications technology, software and information technology) are changing lives in unimagined ways a few decades ago. New means of exchanging information and transacting business are transforming all aspects of social and economic organization. A proof that reality has passed beyond imagination is that one of the targets of the World Summit on the Information Society, to ensure that "more than one half of the world's inhabitants have access to ICTs within their reach" by 2015, has been met.

The development of ICTs opened the door for a revolutionary form of trade, the electronic commerce, which became a very important part of the larger sphere of ICT.

OECD provides two definitions for e-commerce transactions and guidelines for their interpretation (OECD, 2002):

- A broad definition of e-commerce transactions: An electronic transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, Governments, and other public or private organizations, conducted over computer-mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the good or service may be conducted on or off line. As a guideline for the interpretation of the definition above, the OECD notes that the broad definition includes orders received or placed on any on-line application used in automated transactions, such as Internet applications, electronic data interchange (EDI) or interactive telephone systems.
- A narrow definition of e-commerce transactions: An Internet transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, Governments, and other public or private organizations, conducted over the Internet. The goods and services are ordered over the Internet, but the payment and the ultimate delivery of the good or service may be conducted on or off line. As a guideline for the interpretation of the definition above, the OECD notes that the narrow definition includes orders received or placed on any Internet application used

in automated transactions, such as web pages, extranets and other applications that run over the Internet such as EDI over the Internet or over any other web-enabled application regardless on how the Web is accessed (e.g. through a mobile phone or a TV set, etc.). The definition excludes orders received or placed by telephone, facsimile or conventional email.

Electronic commerce (e-commerce) may be simply defined as *the production, advertising, sale and distribution of products via telecommunication networks.*

There can be distinguished six main instruments of electronic commerce: the telephone, the fax, television, electronic payment and money transfer systems, Electronic Data Interchange and the Internet. Therefore, despite what most people are tempted to think, the Internet was not the first stone of electronic commerce.

2. Instruments of e-commerce

The oldest and, for a long time, the most important instrument of electronic commerce is the *telephone*. The telephone succeeded to achieve and maintain a leading role in commercial transactions thanks to its widespread availability, its versatility, the low cost of equipment, the user-friendliness of the instrument, the necessity of a very little bandwidth (capacity for data transmission) and its cheap use for local calls and declining costs of long distance and international calls. (Bacchetta et all., 1998) Until a few years ago, the telephone's communication potential was limited to voice (spoken) communication between just two people, but telephone conferences and recently, video conferences, have now become possible.

The main advantage of the *fax*, another of the e-commerce instruments, lies in replacing traditional mail services with speedier document transmission. Besides its advantages, this instrument lacks the potential for the transmission of voice communication and sophisticated images. Interactive communication is not possible, and any complication in a transaction requires an additional fax or phone call for clarification. Fax charges, network access, bandwidth requirements, and user friendliness are similar to the telephone, although fax machines are usually more expensive. These characteristics have made the fax important in communication and commerce mostly between businesses, and less important among individual consumers.

Television benefits from an even more widespread distribution than the telephone. One limitation of television as an instrument of electronic commerce is the need to conduct transactions in multiple steps (watching the advertisement, picking up the telephone, making the payment, waiting for the delivery of the desired product). However, the relatively low costs of a TV set and subscription charges for the viewer, as well as the user friendliness of TV, have contributed to its success as a means of commerce. (Bacchetta et all., 1998)

Electronic payment and money transfer systems like automatic teller machines (ATM), credit cards, debit cards or smartcards are also part of electronic commerce. Although these instruments typically only serve to make or receive payments, they have become very important complements to other means of electronic commerce and "conventional" commerce.

Another important instrument of electronic commerce is so-called *Electronic Data Interchange* (EDI). EDI typically entails the exchange of documents and information between the computers of two businesses without human intervention. In the beginning, EDI was used between big manufacturers and their suppliers in a so-called hub-and-spoke system, but the development of new communication technologies opened the possibility of expanding the access to EDIs.

The *Internet* is an extremely versatile means of commerce. For some products, all elements of the production and distribution chain can be completed online and across

borders. Strength of the Internet is its multimedia potential with simultaneous voice, image and text transmission. Through the Internet, many medical, legal, architectural, travel, accounting, education and numerous other services became tradable over long distances within and across countries. The Internet also made possible for people to do all or part of their work from a computer terminal at home. The Internet is not only more versatile than other instruments of electronic and "traditional" commerce, it is also more advantageous in terms of delivery time and user costs. But it also has disadvantages, such as bandwidth limitations, necessity of moderate computer skills, uncertainty about technical standards, the jurisdiction of transactions, the validity of contracts, possibilities of redress, the security and privacy of information, and the future role of government in regulating and taxing Internet activities. (Bacchetta et all., 1998)

3. The progress in ICT sector – condition for the development of e-commerce

The development of electronic commerce and the realization of its potential benefits have been discussed in the economic literature from two perspectives:

- the necessary conditions for the provision and development of electronic commerce and Internet services;
- the effects of electronic commerce and the Internet on sectors which apply these new means of exchange.

The next section of the article will focus on the first one of the perspectives and analyze the progress achieved in ICT sector.

General context shows that while fixed telephone subscriptions are in slight decline, mobile and (to a lesser extent) Internet usage continues to expand rapidly in most parts of the world. At the same time, there is a widening gap between high income and low income countries in the area of broadband connectivity. (UNCTAD, 2009)

The number of fixed lines in the world has essentially been frozen at around 1.2 billion since 2006 and even saw a slight decline in 2008. (UNCTAD, 2009) The slow or negative growth in fixed line subscriptions reflects, to a large extent, significant developments in both voice over Internet Protocol (VoIP) and mobile telephony. There is a growing move, primarily in developed economies, to replace traditional voice services delivered over the public switched telephone network with VoIP or, more appropriately, voice over broadband. VoIP services are driven by so-called "triple play" bundles (telephone, Internet and television), that are becoming increasingly popular in developed economies. The second reason for the slow growth in fixed telephony is the rise of mobile telephony. In many developing countries, mobile phones are essentially replacing fixed telephone lines as the primary medium for voice communications. Recent studies suggest that even in developed countries, younger adults see mobile phones as more important than access to fixed telephone lines. As mobile telephony is becoming widely available in most places throughout the world, the lack of fixed lines no longer represents a barrier to basic voice telephony in developing economies. The lack of fixed line infrastructure in an economy is likely to slow down the move to NGNs and convergence and prevent citizens from benefiting from the applications, services, and functionality and lower costs of triple play delivered over broadband networks.

At the end of 2008, the number of mobile subscriptions reached four billion. Although growth was down somewhat from the previous year, it still remained close to 20 % in 2008. (UNCTAD, 2009) On average, there are now 60 subscriptions per 100 people, and in a number of developed, developing and transition economies penetration exceeds 100. Developing countries account for two thirds of all subscriptions, corresponding to a mobile penetration rate just short of fifty (48%). In developing Asia, five economies had achieved mobile penetration of more than 100 in 2008 and another

four reported penetration levels between 90 and 100. At the end of 2008, three Latin American countries had a mobile penetration exceeding 100 and the regional average was 80. The share of the population covered by a mobile signal stood at 76% in developing countries in 2006, including 61 % in rural areas. Mobile coverage was close to or above 90 % in East Asia and the Pacific, Europe, the Commonwealth of Independent States (CIS), Latin America and the Caribbean, and around 80% in the Middle East and North Africa. In sub-Saharan Africa, over half the population was covered, including 42% in rural areas. (UNCTAD, 2009)

The rapid penetration of mobile phone technology reflects in part the process by which it has been financed. Unlike most fixed wire telephone systems, railroads, and electrical grids, mobile phone technology has been introduced into most developing countries by well-funded private operators working within a relatively competitive environment. As a result, the creation of the necessary infrastructure for these systems has not been held back by the government financing and bureaucratic constraints that slowed the diffusion of older technologies.

The main barriers to increased mobile phone penetration are related to the regulatory frameworks, market restrictions and taxes, particularly import duties on handsets or special mobile communications surcharges.

At the end of 2008, there were an estimated 1.4 billion Internet users around the world (one fifth of the world's population). The growth rate of 15% was slightly lower than in 2007. (UNCTAD, 2009) In developing countries, the number of users grew by a quarter, or almost five times faster than in developed countries. As a result, developing countries now account for more than half the world's Internet users. China hosted the largest number of users (298 million), followed by the United States (191 million) and Japan (88 million). Still, while more than half of the developed world population is now online, the corresponding share is only 15% in developing economies and 17% in transition economies. Despite positive Internet developments in many countries, its use is progressing only slowly in certain regions. Some developing countries are caught in a vicious circle, with insufficient demand due to high prices and inadequate infrastructure. The lack of demand in turn contributes to low levels of investment and high prices. One contributor to high prices is the cost of international connectivity. Other barriers to greater Internet take-up are low levels of education, limited supply of web content in local languages and adapted to local needs. Almost half of the most dynamic Internet performers are from Europe where deeper competition in their Internet markets has led to reduced prices and a boost in demand. There is also strong demand in the Middle East reflected by the inclusion of the Islamic Republic of Iran, Kuwait and Saudi Arabia in the top 20. (UNCTAD, 2009)

Broadband is critical for the deployment of the most recent Internet-based services and can help advance various social and economic development objectives. The number of fixed broadband subscribers around the world was an estimated 398 million at the end of 2008. Developing countries accounted for almost 40 % of these, making broadband one of the few ICTs where developed countries still represent the majority of users. Average penetration was more than eight times higher in the former (24%) than in the latter (2.8%). (UNCTAD, 2009)

This gap appears to be widening: broadband penetration in developed countries grew by 2.9 points in 2008, more than the overall average penetration rate in developing countries, which achieved an increase of only 0.7 points. A key reason for the slow adoption of fixed broadband in many low-income countries is the lack of fixed telecommunications infrastructure. More attention is therefore often paid to wireless technologies, such as 3G mobile, in the hopes that they will help overcome the broadband gap. In 2008, there were an estimated 361 million 3G mobile subscribers, the majority of which resided in developed economies. In terms of mobile broadband, many

developing countries are stuck in the second generation and have yet to seize the opportunities offered by leapfrogging to 3G. Developed countries completely dominate the top 20 list. Furthermore, European economies occupy the first seven positions and eighteen in total. Australia and New Zealand also made the top 20 list, but Canada and the United States do not figure in the list, partly because they already had a relatively high level of fixed broadband penetration. The fact that no developing or transition economy reached the top 20 is a vivid illustration of the widening gap existing in the broadband area. (UNCTAD, 2009)

4. Disparities in ICT diffusion across the world

Despite positive trends in ICT diffusion, much more needs to be done to achieve an information society for all. Important gaps remain within economies and societies (e.g. due to language of content; rural versus urban; gender; generation) that affect the demand for and the ability to use ICT. Improved access to ICTs (especially other than mobile phones) has mainly benefited the urban (Duncombe et all. 2006) and young people speaking a dominant language.

It is important to consider the use of different ICTs in various contexts. Developing countries have embraced mobile technology and the gap with developed countries for that technology is narrowing rapidly. (Duncombe et all. 2006, UNCTAD, 2008) Mobile phones are widely affordable and available and serve dozens of important uses in developing countries.

In the area of broadband access, there is still a large gap between countries at different levels of development, regardless of fixed or mobile high speed connections. (UNCTAD, 2008) This is a concern since many economically and socially relevant applications in the areas of government, business, health and education require broadband access to reach their full level of functionality. As noted above, the digital divide between developed and developing economies is particularly wide in the case of broadband. For example, Australia, a country with 21 million inhabitants, has more broadband subscribers than the entire Africa.

There is furthermore a huge gap in terms of broadband speed. To make things worse, there is also a "broadband price divide" (in 2008, the average fixed broadband price at purchasing power parity was $27.6 for developed countries and $289 for developing countries). (UNCTAD, 2009) There are good reasons for developing countries to prioritize broadband connectivity in their development strategies, because improved broadband connectivity can help to achieve education and health targets set out in the Millennium Development Goals: wider distance education, better disaster management, lower health care costs by using "telehealth" (which can reduce the number of tests, in-person visits and patient transfers), more efficient e-government. Broadband is also essential to support new industries such as ICT-enabled services, and it can help stimulate domestic industry and employment growth in content development, infrastructure roll-out and e-commerce.

5. ICTs and the financial crisis

There are concerns that the current financial and economic crisis will impact negatively on these positive trends and the investment needed in order to ensure universal access to ICTs. The crisis is expected to influence developed and developing countries and various regions within developing countries differently. The crisis could affect users of mobile phones in developing countries if people lose their jobs or see their incomes reduced. On the other hand, a recent survey found that most users in Latin America would give up fixed telephones, Internet and subscription telephone services

before surrendering the mobile subscription, which is now regarded more as a necessity than a luxury. (UNCTAD, 2009)

As for the availability of capital for investments in ICTs, it is likely that manufacturers and strategic investors will continue to invest in markets with strong potential. Where profit opportunities exist, the necessary financing can usually be found. There appears to be continued interest among investors based in both developed and developing countries in expanding and upgrading ICT networks in developing country markets, despite the crisis. South–South investment, already a major source of funding for developing country mobile networks, is also likely to continue despite the crisis. Some local companies in developing countries could profit from the hesitancy of foreign investors. Those with strong balance sheets and cash may see opportunities for domestic telecommunications investments that they might otherwise have been shut out of by larger outside investors. The crisis is likely to affect various segments of the ICT market in different ways. In terms of infrastructure, mobile telephony may be best equipped to resist without important set backs considering its high growth and established players operating the service in most countries.

6. Conclusion

Regarding at all those rising figures, it must be remembered that for most developing countries technological progress is mainly a process of adaptation and adoption of technologies from abroad rather than the creation of completely new technologies. However, despite more rapid improvement in technological achievement among the poorest countries, enormous gaps in technological achievement remain, including in ICT sector. The technological gap between high income and developing countries is more pronounced for new technologies; however, many developing countries are acquiring new technologies at a more rapid pace than older technologies. Given that some new technologies, such as mobile phones and to some extent computers, are substitutes for old technologies, the rapid diffusion of new technologies holds promise for a substantial, widespread advance in technological achievement.

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