



Industry at the Edge

Electronic and Mobile Business for Industrial Development

December 2000

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ACRONYMS AND GLOSSARY

ASP	Application Service Provider. A company that provides software application capabilities on a rental basis according to a service-level agreement.
Bandwidth	A measure of information-carrying capacity on a communications channel. The greater the bandwidth the greater the capacity. It is measured in Hertz (analog) or bits per second (digital).
Browser	An application program that provides a way to look at and interact with all the information on the Internet.
CA	Certification Authority.
Domain name	A domain name locates an organization or other entity on the Internet. It is part of the URL.
E-commerce	The buying and selling of goods and services on the Internet.
EDGE	Enhanced Data Rate for GSM Extension. Future technology with a bandwidth of 384 Kbit/s.
EDI	Electronic Data Interchange. A long-established standard for sending predefined electronic messages across a network for integration with back-end business applications.
EMB	Electronic and Mobile Business. The conduct of business on the (mobile) Internet, not only buying and selling but also servicing customers and collaborating with partners.
EMC	Electronic and Mobile Commerce. See as well e-commerce, m-commerce and EMB.
Encryption	The process of disguising the text of a message in order to hide its content for secure transmission, thus providing confidentiality.
Extranet	A private network of a firm using the same foundation technologies as the Internet and Intranet with extension to other firms, e.g. supplier and/or customer.
Fixed Line Telephones	Telephones connected to the network by a permanent physical link, such as a copper telephone line, cable, fiber or fixed wireless connection.
Gateway	A device forming the interface between two types of network, allowing each network to appear to the other as one of the same type. For example a gateway is required for WAP applications.
GPRS	General Packet Radio Service. This future technology as the successor of GSM will start to be introduced end 2000 and provides high-speed packet data rates up to 170kbit/s.
GSM	Global System for Mobile communications. The European standard for digital cellular systems, now adopted in many other countries, equivalent to the North American TDMA.
Home page	First web page that is displayed after starting a web browser. For a web site developer it is the first page presented when a user selects a site on the www. The home page gives access to all other pages.
Host	Any computer that has full two-way access to other computers on the Internet. In other contexts, the term means a large server or devices used as a host provider of services.
Hosting	The business of housing, serving, and maintaining files for one or more web sites. A fast connection to the Internet is a precondition for hosting.
HSCSD	High-Speed Circuit-Switched Data. Future/new technology enabling a transmission speed from 38.4 to 56 Kbit/s.
HTML	Hypertext Mark-up Language. A formatting standard mainly used for Internet pages, that enables text files to be enriched with multiple text styles, images and hypertext links.
Hyperlink/Link	A selectable connection from one word, picture, or information object to another. The most common form is a highlighted word/picture that can be selected by the user.
ICT	Information and Communication Technology.
Internet	A system of independent, interconnected computer networks. One of its parts is the world wide web.
Intranet	A private network using the same foundation technologies as the Internet. (No general access)

IP	Internet Protocol. The most widely used network layer protocol and the foundation and standard of the Internet.
ISP	Internet Service Provider, a company that provides access to the Internet, enables the use of e-mail and provides space on the Internet to display documents.
IT	Information Technology.
ITU	International Telecommunication Union. The premier standardization body for telecommunications networks and services.
M-commerce	Mobile commerce is the buying and selling of goods and services through wireless handheld devices such as cellular telephones. It enables users to access the mobile Internet without needing to find a place to plug in. See as well WAP.
Operator	A generic term for all companies that run their own mobile/fixed network and provide public telephone services.
Portal	Service providing access to the Internet. Portal services take the form of web pages that provide search engines or other directory services and further information.
SMEs	Small and Medium-scale Enterprises
TDMA	Time Division Multiple Access. The actual mobile telephone standard of North America. See as well GSM.
UMTS	Universal Mobile Telecommunications System. The international standard for third-generation (broadband) mobile communication. UMTS is going to reach bandwidth up to 2Mbit/s. See also WCDMA
URL	Uniform Resource Locator. The unique address of a file/page (resource) accessible on the Internet, which tells a domain name server whether and where to forward a request for a web page. See also domain name
WAP	Wireless Application Protocol. A specification for a set of communication protocol to standardize the way that wireless devices, such as cellular telephones and radio transceivers, can be used for mobile Internet access.
WCDMA	Wideband Code Division Multiplex Access. A generic term for the type of air interface that seems most likely to be the core of third-generation systems. See also UMTS
Web site	A related collection of WWW files that includes a home page (see above)
WWW	World Wide Web. A world wide, public system of independent, interconnected computer networks. It is a part of the Internet.

FOREWORD

The present study is the first result of a new knowledge partnership between the United Nations Industrial Development Organization and L.M.Ericsson. It will serve as a basis and point of reference for future cooperative efforts aimed at raising awareness of the potential of electronic and mobile commerce in developing countries and for supporting the effective application of new information and communication technologies by small and medium enterprises.

The study was carried out in a six-week period during September-November 2000. Given the severe time limitations, the study was not aimed at providing a comprehensive and detailed account of all relevant issues. Rather, the objective has been to review pertinent trends, assess their broad implications and draw up an agenda for future action.

In preparing the study, the following groups worked together closely as a team:

UNIDO

- Wilfried Luetkenhorst (Team leader)
- Kai Bethke
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The work of the entire team was supported by UNIDO consultant Paul Hesp.

SUMMARY

The context

The process of economic globalization is unthinkable without information and communication technologies (ICTs), which have also created great business opportunities for the developing countries. The worldwide diffusion of these technologies and the Internet reduces the importance of physical distance and transportation costs as barriers to entry into international markets. Connectivity is improving through the expansion of fixed and mobile networks, which now allow cellular network operators to connect widely dispersed areas.

Recent technological developments in the field of mobile devices and applications represent another major leap forward, and could help remedy many of the technical problems that still prevent entrepreneurs in developing countries from participating in the electronic economy. These technologies are much faster, more versatile and compatible with existing systems. A greater number of users can be online at the same time and complex information is available at a mouse click. Instant feedback is possible. The mobile phone's advantages are no longer just its portability and its ability to reach a business partner anytime, anywhere. It now becomes a portable "smart terminal". The advantages of the new generation of mobile devices can be summarized as follows:

- They are full size business communication tools, independent from traditional telecommunication and power infrastructure;
- They are tools to connect to digital networks at a fraction of the cost of the conventional personal computer allowing them to do new business, to access new business opportunities and promote their own business;
- They provide a possibility for SMEs, even in remote and rural areas, to get connected to the global information infrastructure and permit SMEs to participate in national and international supply chains;
- They enable SME manufacturers more easily to adapt new process and product technologies.

With the most recent technologies and applications, the world is entering the era of *electronic and mobile business* (EMB), where not just trade but the full range of business operations will revolve around ICT networks. EMB can be divided in three categories: business-to-business (B2B), business-to-government (B2G) and business-to-consumer (B2C). From the point of view of industrial development, the former is the most important category. B2B is expected to grow much faster than the others, accounting for about 80 per cent of global electronic and mobile commerce by 2005.

Thresholds to EMB participation are drastically lowered by mobile applications. In the coming five years, the number of SMEs with an Internet connection will on average rise by about 500 per cent in the developing regions, well above the average for the developed countries; even faster growth is expected in Latin America.

A tenfold increase in the value of electronic and mobile commerce is expected, with growth slightly faster in the developing than in the developed countries.

In spite of these trends, EMB will in the short and medium term remain largely confined to the developed countries. This is due to inadequate fixed and mobile telecommunications infrastructures and support services, the relative cost of connections and the greater awareness in developed countries of the opportunities offered by EMB. The “digital divide” between the developing countries and the developed countries may widen further if the conditions for participating in the ICT-based economic revolution do not improve soon. At present, only some countries in East and Southeast Asia and Central and Eastern Europe are catching up with the developed countries.

The problem is not so much the survival or success of individual developing country firms in the global market: successful entrepreneurs can be found in the most hostile environments. But a country that does not face the challenge systematically at the level of its overall economic and industrial strategy will lag behind in development and is likely to face a worsening of internal economic and social divisions. On the other hand, a serious commitment to the integration of ICT in society and the economy may enable a developing country to start narrowing the gap, as some Asian countries are doing.

The role of international cooperation

The global character of ICT-based development means that many aspects of that development cannot be handled by the individual enterprise or country. International cooperation is essential for several reasons:

- Rapid technology change requires stable long-term framework conditions, just as fast traffic requires good long-distance roads. A globalizing electronic economy needs a stable long-term *global* environment for development, in terms of international law, standards, security, telecommunications structures, etc.
- Many developing countries need external support in order to create the conditions for successful participation in EMB.
- A very important part of these conditions is the provision of universal access to ICT infrastructure.

Public-private partnerships play a very important role in providing universal access. This is more than the technical provision of links to global telecommunications networks: it also means affordable access for the population and business sector of developing countries in general. The knowledge, the technical and managerial skills and the enormous investments needed to achieve this goal make partnerships between national and multilateral actors and the private sector imperative.

A joint UNIDO – L.M. Ericsson project

To promote the participation of SMEs in developing countries in global EMB in the context of a new knowledge partnership, UNIDO has joined hands with L.M.

Ericsson, one of the world's largest telecommunications enterprises, with a specific know-how in mobile Internet solutions, covering the whole spectrum of applications. This partnership makes it possible to formulate an integrated approach to SME participation in EMB, from technical applications to policy making.

The first joint UNIDO-Ericsson project had two components: a desk study of present trends in EMB and their implications for developing countries, and three brief case studies of Egypt, Sri Lanka and Uganda. The studies will form the basis for future joint initiatives of a more general nature, in the context of a Cooperation Agreement signed by L.M. Ericsson and UNIDO on 13 November 2000.

The basic argument underlying the project can be summarized as follows:

- SMEs play a key role in development. Under the right conditions, EMB can become a great catalyst of SME development and development in general.
- Global business-to-business EMB (supply chains, etc.), in particular, is rapidly increasing in importance, and represents a vast field of opportunity for SMEs.
- SMEs in developing countries need better capacities and a better business environment to grasp the opportunities.
- The creation of these is to a large extent outside the scope of individual private initiative. It requires public sector action and public/private sector partnerships.

The studies had the following objectives:

- Identifying development possibilities for developing countries, and in particular for their SMEs, with regard to EMB, electronic networks and the Internet;
- Identifying barriers to and essential preconditions for EMB development;
- Creating an awareness of and a guide for the introduction/expansion of EMB in developing countries, and recommending measures for EMB development;
- Defining crucial support areas for international organizations in general and for UNIDO in particular, and joint action of these with the private sector.

The challenges for developing countries and SMEs

Technically, it is now possible for developing countries and their enterprises to skip a stage in development. But conditions at the firm level and in the business environment are rarely adequate to exploit the vast opportunities. The new developments pose special challenges to *small and medium-scale enterprises* (SMEs), which are a major source of income, a breeding ground for entrepreneurs and a major provider of employment. Large firms have more resources to deal with the continuous adaptation to new developments. For SMEs in the developing countries, coping with these problems is a particularly severe problem. At the same time, the potential for SME development are greatly expanded:

- Subcontractors can now participate in global supply chains. These again can develop into integrated value chains of enterprises cooperatively planning and managing flows of goods, services and information from point of origin to point of consumption. With the technologies now becoming available such value chains can be transformed into digital value networks, in which clusters of firms become increasingly interconnected.
- Apart from networking among “traditional” manufacturing activities, there are many opportunities for SMEs in the ICT sector itself (software production, specialized hardware or components, etc.) and in the provision of ICT support services. Firms moving into EMB need external technical know-how and skills as well as advisory services to succeed in the volatile world of the knowledge economy.

Exploiting this enormous potential means meeting a large number of conditions. All stages of a firm’s production, sales and management systems are affected. EMB also needs a supportive external environment, from telecommunications infrastructure and security of data transmissions to financial systems, trade legislation and education systems. *E-readiness*, in other words, is a very complex matter - particularly in the case of manufacturing, where electronic business deals with material products.

Public sector initiatives and public-private sector partnerships have a decisive impact on e-readiness. A key element is a national strategy supported by all major players in the economy, serving as a basis for policy-making and projects that encourage widespread understanding and use of ICT. The problem is that developing and transitional countries are forced to make decisions in an environment that changes very fast while they are short of the required expertise. This makes it extremely difficult to make sound assessments of global trends. In addition, administrative structures are often an obstacle to initiative, flexibility and quick decisions.

To overcome the weaknesses and threats and exploit the opportunities offered by EMB, action is required in a number of areas: e-leadership; awareness and acceptance of EMB; knowledge building (information systems, human resources development); infrastructure and connectivity; trust and security; financial services; and the legal and regulatory environment for EMB.

Areas for future support to SME

Keeping in mind the major development issues outlined above, UNIDO’s industrial development mandate and Ericsson’s special expertise, future support to SMEs would broadly focus (i) on creating the conditions for the effective participation of developing countries in EMB and (ii) collective support systems for SMEs. Within this framework, actual support services (which can in many cases build on existing UNIDO services) would concentrate on the following areas:

- Awareness and training

The main tool would be a series of awareness raising and training workshops for the public and private sector. Specific training could be organized for EMB know-how and skills in manufacturing enterprises. Training centers could also be established on a permanent basis, nationally or for country groups.

- Governance

Ensuring that EMB fulfils its development role requires a national strategy and adaptations of the legal and regulatory environment. Advice and capacity building is needed at the government level; for national business or SME associations and Chambers of Commerce; and at the local level, to promote public-private partnerships for exploiting the potential for decentralized development that EMB offers.

- Information systems for SMEs

SMEs often do not have adequate access to information and EMB tools. An expansion of UNIDO's national business information network program, giving particular attention to the EMB requirements of SME, would help to overcome this obstacle.

- Integrating SMEs into value chains

UNIDO's work on investment promotion, subcontracting and the promotion of SME clusters aims at integrating SMEs in national and international supply chains and end-user markets. A logical step would be to further integrate EMB concerns in these services.

- Shared local infrastructure

EMB centers used collectively by a group of firms, such as e-kiosks, will reduce the costs of EMB and allow SMEs to bypass intermediaries and trade directly. They are particularly useful for small and micro enterprises in rural areas. The initial focus should be on pilot projects for enterprises that are likely to benefit most from EMB. The success of such projects would stimulate other enterprises to venture into EMB and create widespread interest in and support for the expansion of EMB infrastructure.

Many of the above activities can be linked to *UNIDO Exchange*, a business intelligence network with UNIDO's Vienna headquarters as the central hub. UNIDO Exchange serves as a platform for debate on global development issues, including those related to EMB. This UNIDO service, in short, offers a good starting point for SME participation in global EMB networks.

Chapter 1 BACKGROUND TO AND PURPOSE OF THE STUDY

1.1 Background

The process of economic globalization is unthinkable without information and communication technologies (ICTs). While, initially, their development was largely driven by the interests and needs of the developed countries, ICTs have also created great opportunities for business in the *developing countries*. The worldwide diffusion of these technologies and, in particular, the Internet:

“...reduces the importance of physical distance and transportation costs as barriers to entry into international markets, making it possible for even small firms to market their products in a competitive manner. Developing countries tend to have an extensive small business sector and therefore such a development will be beneficial provided that their firms are capable of capturing the opportunities presented by e- and m-commerce developments to market their potentially competitive products.¹”

This poses a special challenge to *small and medium-scale enterprises* (SMEs). Although the use of external expertise and suppliers is very much part of ICT-based business operations, large firms will naturally have more resources to deal with the continuous adaptation to new developments. For SMEs in the developing countries, coping with these problems is a particularly severe problem.

In developing countries, the SME sector is a major source of income, breeding ground for entrepreneurs and provider of employment. Economic liberalization and trends towards outsourcing in manufacturing have in recent years provided strong boosts for the sector. New perspectives for its development are opened by the recent mobile electronic technology applications, which in principle make it possible to do business anywhere on the globe - independent from the usually inadequate fixed telecommunication networks of developing countries. Technically, it is possible for these countries and their enterprises to skip a stage in development. But conditions at the firm level and in the business environment are rarely adequate to exploit the vast opportunities.

The “digital divide” between the developing countries and the developed countries, where ICT and e-commerce have become part of everyday life and everyday enterprise operations, may widen further if the conditions for participating in the ICT-based economic revolution do not improve soon. With the most recent applications, the world is entering the era of *electronic and mobile business* (EMB), where not just trade but the full range of business operations will revolve around networked ICT. The problem is not so much the survival or success of individual firms in the global market: successful entrepreneurs can be found in the most hostile environments. But a country that does not face the challenge systematically at the level of its overall economic and industrial strategy will lag behind in development and is likely to face a

¹ UN-ECOSOC, “Development and international cooperation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy”, *Report of the Secretary General*, E/2000/52

worsening of internal economic and social divisions. On the other hand, a serious commitment to the integration of ICT in society and the economy may enable a developing country to start narrowing the gap, as some Asian countries are doing.

1.2 The role of international cooperation

The global character of ICT-based development means that many aspects of that development cannot be handled by the individual enterprise or country. International cooperation is essential for several reasons:

- Rapid technology change requires stable long-term framework conditions, just as fast traffic requires good long-distance roads. A globalizing e-economy needs a stable long-term *global* environment for development, in terms of international law, standards, telecommunications structures, etc.
- Many developing countries need external support in order to create the conditions for successful participation in EMB.
- A very important part of these conditions is the provision of universal access to ICT infrastructure.

Public-private partnerships play a very important role in providing universal, affordable access. Universal access is more than the technical provision of links to global telecommunications networks: it also means broad access for the population and business sector of developing countries. The knowledge, the technical and managerial skills and the enormous investments needed to achieve this goal make partnerships between national and multilateral actors and the private sector imperative. The private sector also reacts faster than Governments to changes in its environment, and this dynamism is essential if the problems are to be tackled successfully.

1.3 A joint UNIDO – L.M. Ericsson project

In order to promote the participation of SMEs in developing countries in global EMB, UNIDO has joined hands with L.M. Ericsson, one of the world's largest telecommunications enterprises, with a specific know-how in mobile Internet solutions, covering the whole spectrum of applications. This partnership makes it possible to formulate an integrated approach, from technical applications to policy making, to SME participation in e-business.

The UNIDO-Ericsson project had the following objectives:

- Identifying development possibilities for developing countries, and in particular for their SMEs, with regard to EMB, electronic networks and the Internet;
- Identifying barriers to and essential preconditions for EMB development;
- Defining crucial support areas for international organizations in general, and for UNIDO in particular, and joint action of these with the private sector.

- Recommending measures to stimulate EMB development;
- Creating an awareness of and a guide for the introduction/expansion of EMB in developing countries.

The basic argument underlying the UNIDO-Ericsson project can be summarized as follows:

- SMEs play a key role in development. Under the right conditions, EMB can become a great catalyst of SME development and development in general.
- Global business-to-business EMB (supply chains, etc.), in particular, is rapidly increasing in importance, and represents a vast field of opportunities for SMEs.
- SMEs in developing countries need better capacities and a better business environment to grasp the opportunities.
- The creation of these is to a large extent outside the scope of individual private initiatives. It requires public sector action and public/private sector partnerships.

1.4 Structure of the report

The project had two components: one was a desk study of the present trends in EMB and the situation in the developing countries, the other a series of three illustrative case studies on Egypt, Sri Lanka and Uganda, based on interviews with SMEs, support institutions, telecommunications providers and Government policy makers. The desk and the field studies were carried out jointly by the two organizations. On the basis of this work, areas for follow-up action were identified. The results are summarized in this report.

The report concentrates on issues related to enterprise development and the creation of an environment conducive to this. Technological issues will be discussed to provide the context. ICT provides tools that allow firms to make better decisions (*what* to offer, produce, etc., and *how*), and it facilitates improvements in enterprise organization and production processes. But these technologies, being available, are not the problem. The problem is making them work for SMEs in the developing countries. Among SMEs, the focus will primarily be on those that are already at a point in development where investing in the human and technical capacities needed for EMB is likely to be profitable. In addition, the issue of lowering thresholds for micro-enterprises will be discussed.

The study is structured as follows:

In *Chapter 2*, the general setting for EMB is discussed, in terms of the global impact of technologies and their applications; the types of EMB; and the conditions that must be met to ensure the “e-readiness” of countries and enterprises for successful participation in EMB.

Chapter 3 gives an overview of the e-readiness of 42 countries from the point of view of connectivity, information security, human capital and e-business climate. These

points are then illustrated with examples of action undertaken by developing countries and economies in transition, after which the importance of EMB for SMEs is discussed.

Chapter 4 summarizes the findings of the previous chapters by means of a SWOT analysis on EMB and the developing countries. It then discusses the main areas in which action is required: e-leadership; awareness, acceptance and human resources development; information systems; infrastructure improvements and connectivity; trust and security; financial services; and the legal and regulatory environment for EMB. The chapter concludes with a short note on the phasing of support activities.

Chapter 5 discusses the role of international support in stimulating widespread participation in EMB by the developing countries. Examples are given of international programs and projects, with a special section on UNIDO's present activities. The chapter concludes with a series of suggestions for future cooperation between UNIDO and L.M. Ericsson in helping to create the preconditions for EMB and providing collective infrastructure and applications for SME.

The report's *Annexes* contain:

- Selected information sources – both printed and digital – that can be used to explore the various issues discussed in this document in more detail;
- Summaries of the case studies on Egypt, Sri Lanka and Uganda;
- A note on the Draft Model Law on Electronic Commerce and the Draft Uniform Rules on Electronic Signatures prepared by the UN Commission on International Trade Law (UNCITRAL);
- An outline of Sri Lanka's proposal for a national information technology policy, as an example of the efforts undertaken by developing countries in the area of ICT.

Chapter 2

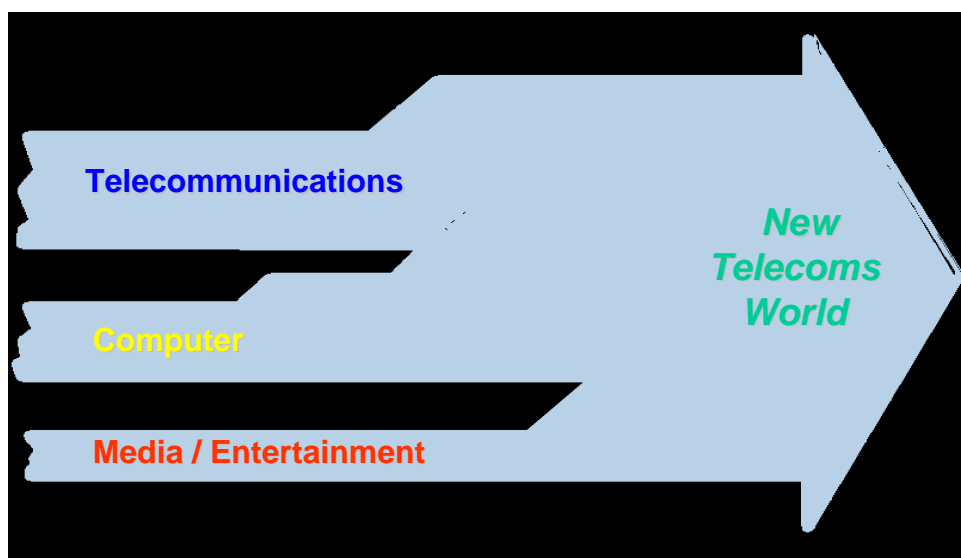
THE SETTING FOR ELECTRONIC AND MOBILE BUSINESS

2.1 The impact of information and communication technologies

The term information and communication technologies covers a wide range of hardware, including computers, wired and wireless communications technologies, and the software needed to operate the hardware. Within one generation, the role of ICT has undergone a fundamental change. “Being online” has become a synonym for being part of the information society and is in many respects more important than an entry in the telephone book.

Until the 1980s, the telephone was the only form of communications technology that had been diffused internationally on a significant scale: there were only a few million personal computers worldwide in the early 1980s. Electronic data networks existed, but their use was strictly limited. By 2000, there were 400 million personal computers and projections indicate that by 2010 there may be 1 billion personal computers. The processing capacity of each of these could be 10 million times higher than that of a mid-1970s computer. The number of computers connected to the Internet, used commercially for the first time in 1991, increased from 1 million in 1993 to 20 million in 1997 and is expected to reach 120 million by 2001. Unit prices for equipment and connections have dropped dramatically. Technological advances, moreover, are increasingly facilitating the combination and integration of different ICT applications as shown in Figure 2.1.

Figure 2.1 The convergence of industries



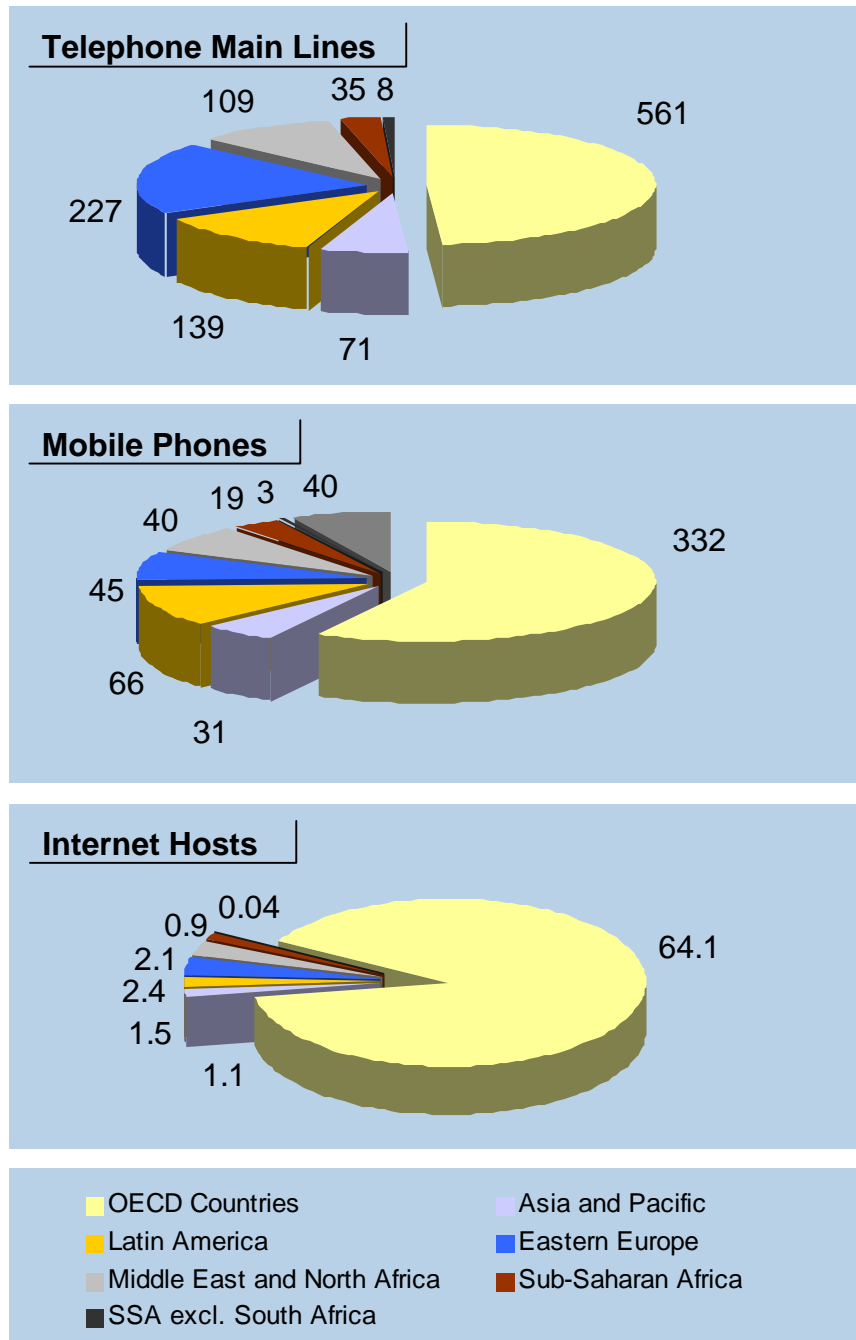
As a result of ICT and electronic networking advances, the role of time and distance in many economic activities has been dramatically reduced, favoring globalization and rapid change:

- ICT can boost the efficiency of almost all firm operations;
- ICT facilitates access to information;
- Information can be sent anywhere at very low cost; the trade off between focusing on specialized, high quality information and reaching a wide audience is eliminated²;
- The process of innovation is speeded up by all of these factors.

Access to ICT is very unevenly distributed. As Diagram 2.1 shows, the OECD countries accounted for about half of all connections to fixed telephone lines, over 60 per cent of all mobile phone connections and about 90 per cent of all Internet hosts (firms, organizations, etc., with a web site) in 1999. The picture is modified when looking at trends for the coming years. Diagrams 2.2 and 2.3 show that mobile phone connections are expected to rise by about 240 per cent worldwide in the period 2000-2005. This is not only much faster than for fixed telephone connections, but there is also a marked difference in growth patterns by region. North America, Western Europe and Asia-Pacific (dominated, in this table, by the developed countries in that region) have growth figures ranging from 200-220 per cent. The Central and East European countries are slightly above world average. The figures for South America, Africa, the Middle East and Central Asia (covering the People's Republic of China and India as well, in this case) are well above 300 per cent.

² Evans and Wurster 2000

Diagram 2.1 ICT and Internet penetration per 1,000 inhabitants, 1999



Source: World Bank 2000

Diagram 2.2 Cellular and fixed subscribers, projection for 2000-2005 (millions)

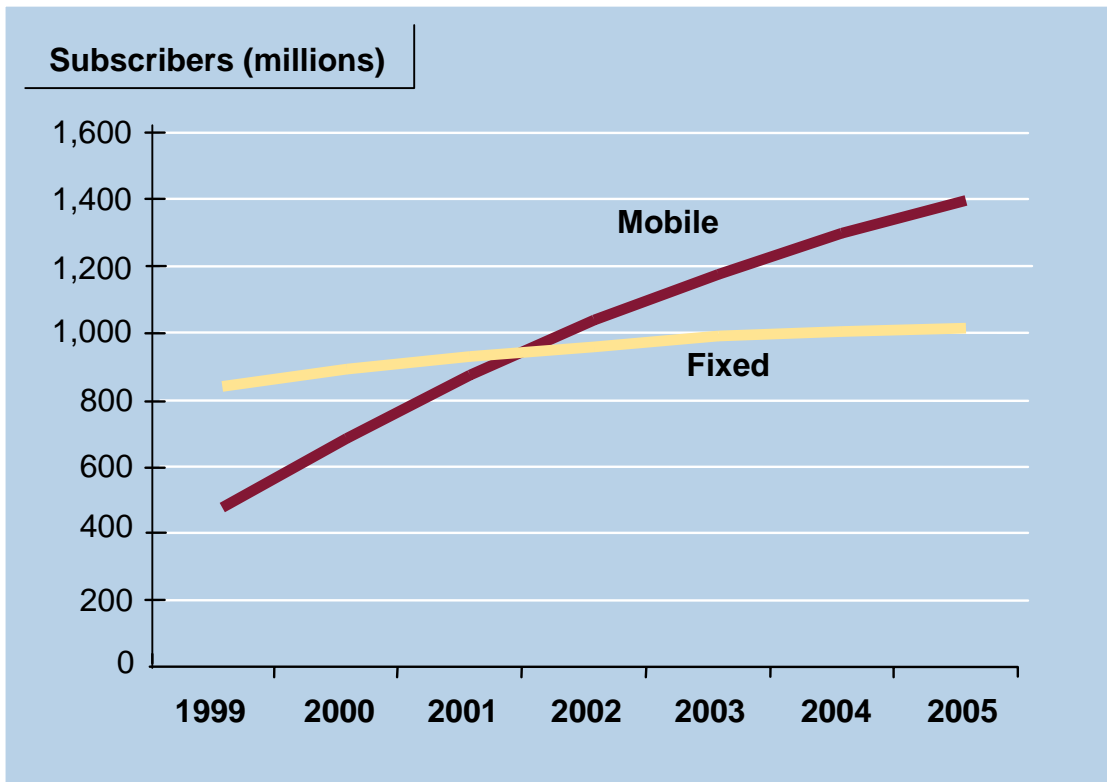
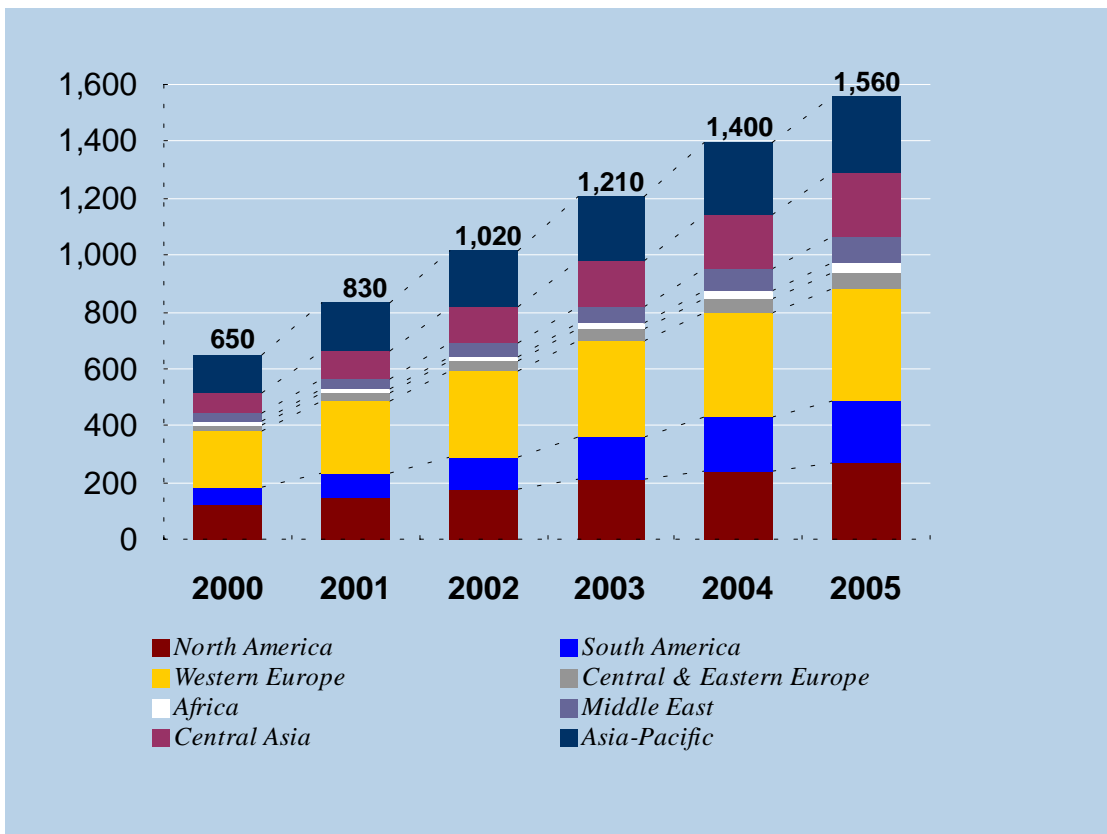


Diagram 2.3 Cellular subscribers, projection for 2000-2005 (millions)



Source: Derived from John Davison, Ann Walsh and Duncan Brown, *Mobile E-commerce: Market Strategies*, Ovum Ltd, London 2000;

Note: Central Asia includes the People's Republic of China and India; all figures are rounded

Table 2.1 Internet users, by type – projections for 2000-2005

Internet Users	2000	2001	2002	2003	2004	2005
World	222.6	293.2	376.6	470.8	570.6	676.6
Large businesses	73.4	97.0	120.3	142.0	162.1	182.4
SMEs	11.6	18.0	25.8	34.1	43.4	53.1
North America	94.0	117.8	143.7	169.0	196.0	221.1
Large businesses	25.9	33.3	40.0	45.9	51.1	56.3
SMEs	6.5	9.7	13.4	17.1	21.1	25.0
South/Central America & Caribbean	7.9	11.6	16.9	23.7	31.4	40.2
Large businesses	4.6	6.7	9.2	11.8	14.4	17.0
SMEs	0.4	0.7	1.1	1.7	2.4	3.2
Western Europe	56.9	76.6	102.9	135.0	165.3	196.8
Large businesses	18.4	24.1	29.3	34.0	38.1	42.1
SMEs	2.3	3.7	5.5	7.3	9.4	11.6
Central & Eastern Europe	6.6	9.7	12.7	15.8	20.0	25.1
Large businesses	1.4	2.1	3.1	4.0	5.0	6.1
SMEs	0.1	0.1	0.2	0.3	0.5	0.6
Central Asia	6.0	9.2	14.3	21.6	31.7	44.8
Large businesses	2.3	3.4	5.1	7.0	9.1	11.3
SMEs	0.3	0.4	0.6	0.8	1.1	1.4
Asia Pacific	47.1	62.3	77.6	93.6	109.7	127.4
Large businesses	18.9	24.7	30.1	34.9	39.2	43.4
SMEs	1.9	3.1	4.6	6.2	8.1	10.1
Middle East & Africa	4.1	5.9	8.4	12.0	16.4	21.3
Large businesses	1.9	2.7	3.6	4.4	5.3	6.2
SMEs	0.2	0.3	0.5	0.6	0.8	1.1

Source: John Davison, Ann Walsh and Duncan Brown, *Mobile E-commerce: Market Strategies*, Ovum Ltd, London 2000

Note: Central Asia includes the People's Republic of China and India

Mobile phones do not require a fixed network of lines. With the present technologies, this means a vast increase in potential Internet connections, and this again will lower thresholds to participation in ICT-led development.

Table 2.1, for example, shows that in the coming five years the number of SMEs with an Internet connection in the developing regions will on average rise by about 500 per cent; even faster growth is expected in Latin America. The shares of North America and Western Europe in general Internet use and Internet use by enterprises will drop from some 70 per cent in 2000 to about two-thirds and 60 per cent, respectively, by 2005.

In spite of the trends, ICT access and use will in the short and medium term remain largely confined to the developed countries. There are figures that suggest that the actual *use* of mobile phones, in terms of traffic time, will rise about twice as fast in the developed countries as elsewhere³. This is probably due both to the relative cost of mobile connections (see below) and the greater awareness in developed countries of the opportunities offered by mobile phones. A recent World Bank publication⁴ shows that the technological gap between countries in terms of general access to ICT has actually widened during the 1990s. Only some East and Southeast Asian countries are catching up with the OECD countries. To these, one could add some East European countries, such as Estonia, Hungary and the Czech Republic.

Access depends heavily on *economic position*. In the OECD countries the great majority of the population at least has a phone connection, but in most developing countries this is confined to a mainly urban, middle class minority. In Nepal, for example, only 0.11 per cent of rural households have a telephone, and private telephones are basically unknown to the poorest 60 per cent of the Nepalese. In Panama, where average buying power is seven times that of Nepal, phone connections are still rare among the poorest 40 per cent. Most people in developing countries cannot afford a computer or Internet access. Adjusted for relative wage rates, a computer is five or even more times more expensive in a developing country than in the USA. In 1998, monthly Internet fees exceeded average income in Uganda and were four times as high as in Australia. The reason is that the costs to providers are much higher due to the small number of subscribers and the lack of established telecommunications networks. Additionally, global Internet connections are overwhelmingly via North America. Using these connections is very costly for a developing country operator.

Additional obstacles to ICT use are related to *education, gender and age*. Information technology requires literacy, and illiteracy is still widespread in developing countries. About 80 per cent of the content of the Internet is in English, which effectively excludes the larger part of the world population from using it. In Latin America, only 38 per cent of the computer and Internet users are women; figures for some African countries show that upwards of two-thirds of the Internet users are male. The difference between computer skills of the older and younger generations is obvious enough in the developed countries; in many other parts of the world, where general access to ICT is rare, older people may be left out completely.

³ Ovum Ltd, *Ovum Forecasts: Global Telecoms and IP Markets*, London 2000

⁴ Wilson III, E.J., and F. Rodriguez, "Are Poor Countries Losing the Information Revolution, *InfoDev Working Paper*, 2000 (can be downloaded from the World Bank web site, see Selected Information Sources)

Because of the essential role of ICT in the world economy, the implication is that – unless corrective action is taken soon - the “digital divide” will also increase the economic gap between OECD countries and most of the others, and among population groups in individual countries. Section 2.3 will argue that mobile technologies, being independent from fixed telecommunications networks, could become an important instrument for closing the gap.

2.2 The knowledge economy

With the growing impact of ICT on the global economy, the term knowledge-based economy has made its appearance. Knowledge in its different forms is the engine of economic progress; an economic system not based on knowledge is unthinkable. But the present changes in the world economy, in which a firm’s access to know-how, the speed with which knowledge grows and is communicated, and the increasing knowledge content of output are central factors, make it more obvious than ever that knowledge (and its acquisition) is the main determinant of development. The salient characteristics of a knowledge-based industrial sector, as compared to a traditional industrial sector, are shown in Box 2.1.

Box 2.1 Classical and knowledge-based industry – a comparison

Classical	Knowledge-Based
Energy-intensive Standardized Stable product mix Automation Single firms, branches Centralization Specialized skills Vocational training Government control, planning and sometimes ownership	Information-intensive Customized Rapid changes in product mix Systemization Networks of firms, clusters Distributed intelligence Multi-skilling Continuous training and re-training Government information, regulation, coordination and vision

Source: UNIDO

The spread of ICT, itself a product of the economic application of knowledge, has become a key factor in the development of the knowledge-based economy. ICT has created a global awareness of knowledge as the driving force of the global economy, through the vast amount of information made accessible via the computer, and it allows the process of knowledge accumulation to feed on itself by networking all sources of knowledge.

Some of the economic aspects of the use of ICT have already been mentioned in Section 2.1. The generalized use of ICT and the knowledge-based economy is changing economic life in several other aspects:

- In the knowledge-based economy the nature of work, the range of occupations and the skills requirements are in many ways radically different from the type of economy that preceded it.

Flexibility and adaptability to changing production structures is essential, which means that greater demands are made on the know-how and resourcefulness of staff and managers and that work arrangements will be less regulated. Some types of work are rapidly becoming obsolescent, while demand for labor in new categories – especially those related to ICT – easily outstrips supply. Human capital becomes the key to competitiveness.

- Technologies that allow instantaneous communication, the increasing role of digital (i.e. disembodied) products and the inherently non-hierarchical character of the Internet make it easier to disperse economic activities. The trend of recent decades to move away from vertical integration is reinforced. Firms can bring down costs by searching all over the world for suppliers offering the best combination of price, product and product support; firms can target customers anywhere on the globe.
- Although market economies have in a sense always developed in a decentralized way (because of the wide spread of entrepreneurial activity), decentralized initiative is an all-pervading norm in the knowledge-based economy. Decentralization implies a decrease in top-down controls and an increasing reliance on others for inputs, know-how, and so on. The knowledge-based economy is characterized by networking and trust among partners. This forces enterprises and government to change many of their practices.
- Many ICT applications, including the use of the Internet for business purposes, are not or hardly constrained by considerations of scale. A number of barriers to SME operations are removed, enabling them to occupy niches in new and foreign markets. This development is favored by the trend to outsourcing and the fact that SMEs are often less locked into traditional trade channels and established technologies, making it easier to adopt business models based on ICT - provided that they have the skills and know-how allowing them to exploit the potential of ICT.

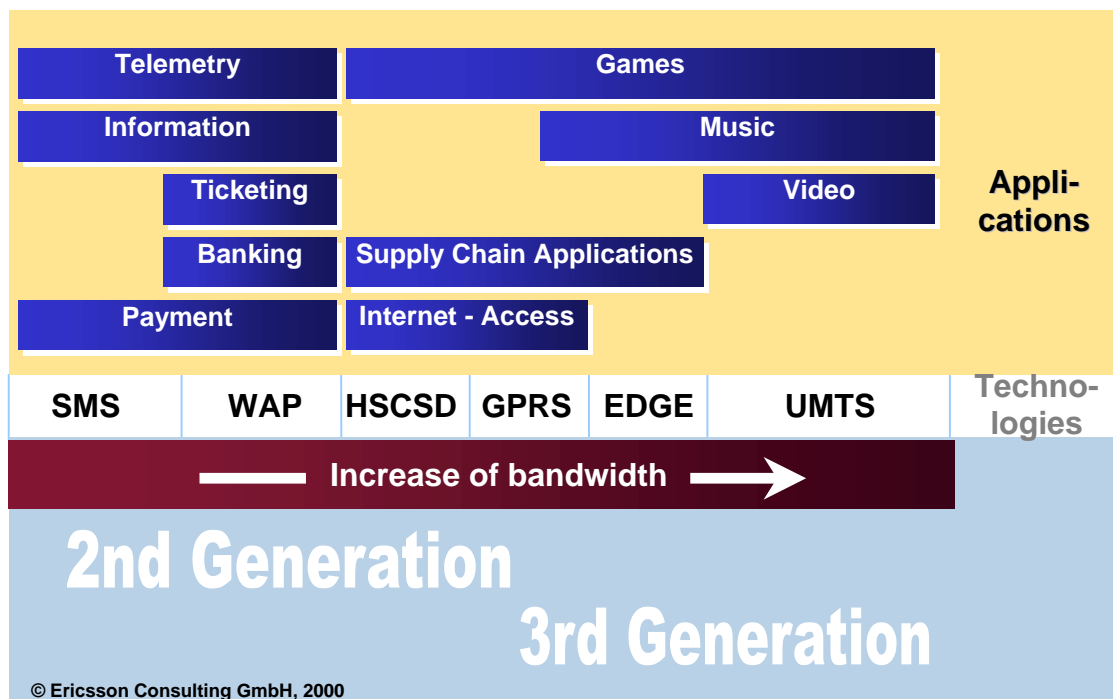
2.3 EMB – some basic notions and data

2.3.1 The implications of recent technical developments

The poor telecommunications infrastructure of developing countries, especially outside the main urban areas, may be circumvented by enterprises through satellite communications, GSM (global system for mobile communication) networks or other technologies. But these are only partial solutions to the problem of connectivity, and costs are high. Where e-commerce is possible at all, the number of participants may be too limited to make it competitive with more traditional forms of trade. Due to lack of capacity and high international tariffs, obtaining sufficient bandwidth for delivering web pages over the Internet is still a major problem in most developing countries. Users therefore face “traffic jams” on the Internet, and slow connections discourage firms (and customers) from using the net.

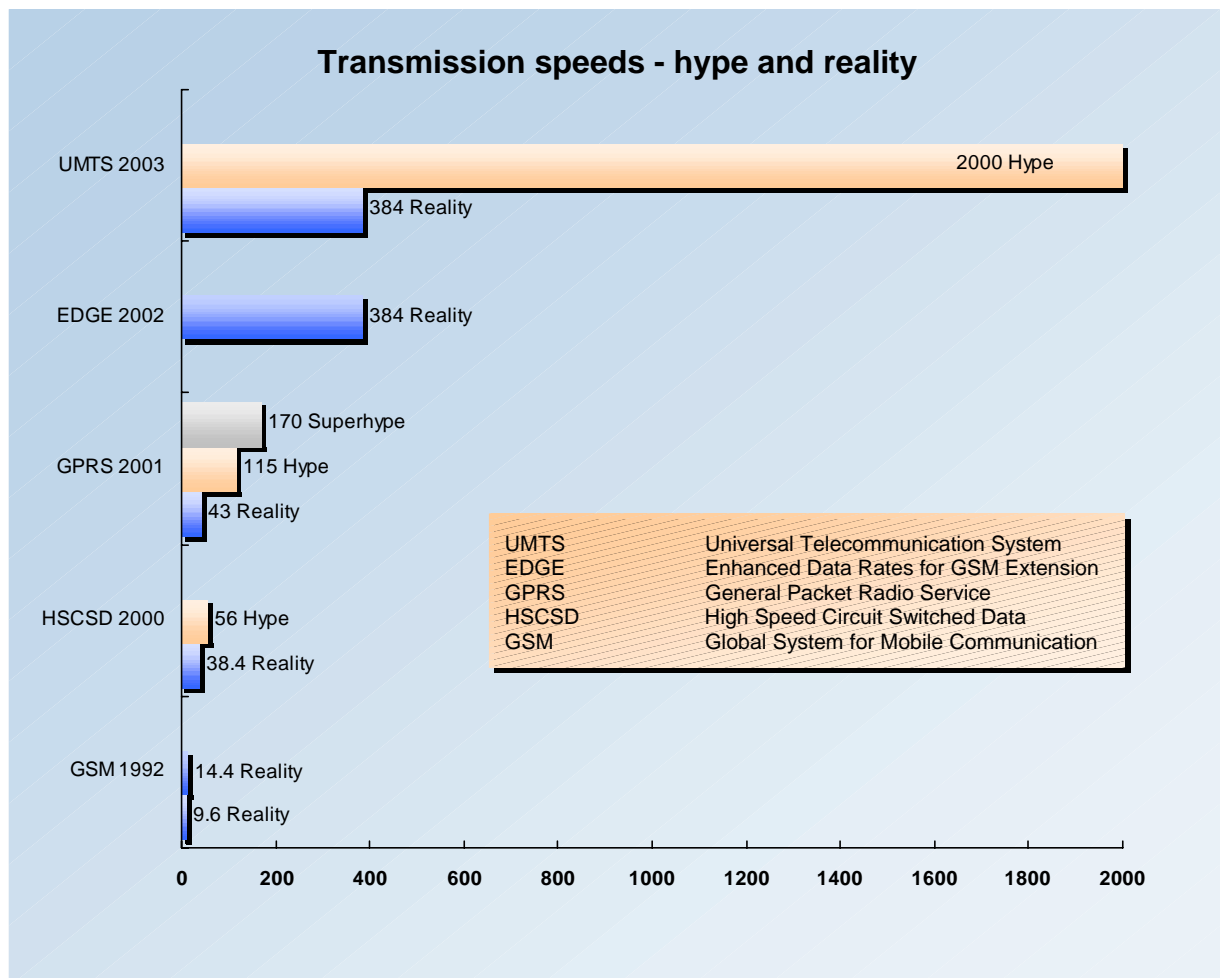
Connectivity is improving through the expansion of fixed and mobile networks, which now allow cellular network operators to connect dispersed areas. Technologies based on Wireless Application Protocol (WAP), a global standard for mobile solutions, including mobile Internet terminals, permit the design of interactive real-time mobile telecommunications services that are also more user friendly. As shown in Figure 2.2 much more applications will be available as soon as future technologies emerge. This means a great increase in the potential for EMB.

Figure 2.2 Future technologies and applications



The technologies embodied in the third generation of mobile devices and applications represent another major leap forward and could help remedy many of the technical problems that still prevent entrepreneurs in developing countries from participating in the e-economy. As shown in Diagram 2.4 UMTS (Universal Mobile Telecommunication System), for example, is at least 40 times faster than the present GSM and can be developed to much higher speeds. It is also far more versatile than existing mobile systems yet compatible with these.

Diagram 2.4 m-business enabling technologies



Source: Durlacher 2000

“Packet switching” technologies allow data compression, which means (a) that a greater number of users can be online at the same time; (b) that the connection is never “engaged”; (c) that complex information is available at a mouse click. Instant feedback is possible. The mobile phone’s advantages are no longer just its portability and its ability to reach a business partner anytime, anywhere. It becomes a portable “smart terminal”.

Apart from their capacity for handling information, the advantages of the new generation of mobile devices can be summarized as follows:

- The devices are easy to use and control by the user;
- The mobile device is highly adaptable to individual (firm) needs (the third generation of mobile technologies “is driven by end-user services and applications, NOT by technologies”⁵);

⁵ Ericsson Consulting GmbH.

- The technologies are stable (less risk of “crashing” than with today’s average computer);
- Sophisticated security systems (among others for secure payments) are integrated;
- Their position can be localized, which among others has great advantages for transport management and targeting customers (efficiency and speed of delivery, etc).

Of course, these advantages are also enjoyed by a firm’s competitors all over the world, which means that there is more and more pressure on enterprises to be internationally competitive. Another implication is that information must not only be available, but be made available in a standards-based form - all equipment in an enterprise network and the equipment of the end-consumer must “speak the same language”, use the Internet protocol standard.

The implication of all this is that business networking and customer contacts are simplified and speeded up. Worldwide subcontracting in high tech industries with continuously changing, highly complex specifications, for example, no longer faces technical barriers. For the time being, these technologies are still very expensive, they need a complex support infrastructure, and they have not matured completely. But their widespread introduction, accompanied by measures promoting e-readiness (see Section 2.4 for a definition), could have strong economic spread effects: it could increase the “footlooseness” of industrial activities and bring marginal areas into the mainstream of the economy by facilitating local initiative. It will also create a widespread basic understanding of the development potential of mobile technologies, which again will facilitate the introduction of more complex technologies such as General Packet Radio Service (GPRS) and Universal Mobile Telecommunications System (UMTS).

2.3.2 Types of electronic and mobile commerce

A simple definition of electronic and mobile commerce (e- and m-commerce) would cover the marketing, sale and distribution of goods and services by electronic means and by mobile technologies. E-commerce predates the Internet. Electronic data interchange and electronic funds transfers (EDI, EFI) have been available for quite some time for transactions among firms, and at least until recently EDI was a more important medium for business-to-business (B2B) commerce than the Internet. But EDI is costly and mainly takes place via proprietary networks, so that access and participation are limited. The Internet - *the* network of electronic networks - and the mobile phone have dramatically increased the scope for electronic commerce through:

- World-wide market access (for both consumer goods and business-to-business sales) and networking;
- Greatly improved market information, which brings down prices;
- Low barriers to entry (assuming that a number of conditions are met); this means:

- Great opportunities for SMEs and developing countries.

In cross-border trade, according to UNCTAD, e-commerce may soon account for 10-25 per cent of all trade.

In addition to B2B commerce, business-to-consumer (B2C) commerce is rapidly developing. Table 2.2 gives projections for both categories until 2005, by region. It should be emphasized that projections differ widely among sources – not surprisingly, given the recent nature of the phenomenon – and the figures should be taken as giving orders of magnitude. The figures reflect the levels of ICT penetration or connectivity. Most of the trade will continue to take place in North America and Western Europe, the developed parts of the Asia and Pacific region coming third. Roughly, a tenfold increase in the value of e- and m-commerce is expected, of which B2B will account for about 80 per cent.

B2B will continue to dominate e- and m-commerce for a few simple reasons: the great majority of the world population uses cash only and will not be able to afford anything but locally-bought basic consumer goods for a long time to come. Even if there is access to the Internet, it often makes no practical sense to use the Internet for shopping; and shopping is often as much a social activity as it is a commercial one. In any case, B2C companies operating only via the web, such as Amazon, have yet to make a profit even in the USA.

Table 2.2 Projected e-commerce transactions, by region, 2000-2005 (billions of US\$)

E-Commerce Transactions	2000	2001	2002	2003	2004	2005
All e-commerce transactions						
World	247.2	393.2	623.7	990.9	1,574.2	2,503.8
North America	148.6	233.1	366.2	576.1	907.6	1,431.6
South/Central America & Caribbean	4.3	6.8	11.0	17.8	28.6	45.9
Western Europe	46.9	75.8	122.3	198.1	319.5	515.7
Central & Eastern Europe	1.9	3.0	4.8	7.7	12.3	19.8
Central Asia	5.7	9.1	14.7	23.6	38.2	61.9
Asia Pacific	37.4	61.4	98.4	157.5	251.7	402.7
Middle East & Africa	2.4	3.9	6.3	10.1	16.3	26.1
Business-to-business e-commerce transactions						
World	218.3	344.5	543.1	857.8	1,355.6	2,145.9
North America	124.8	194.9	304.7	477.2	748.6	1,176.4
South/Central America & Caribbean	4.2	6.7	10.7	17.1	27.3	43.5
Western Europe	44.1	70.2	112.0	178.9	285.2	455.4
Central & Eastern Europe	1.9	3.0	4.7	7.6	12.1	19.4
Central Asia	5.5	8.8	14.1	22.7	36.6	59.1
Asia Pacific	35.5	57.2	91.0	145.0	231.0	368.6
Middle East & Africa	2.3	3.7	5.8	9.3	14.8	23.5
Business-to-consumer e-commerce transactions						
World	28.9	48.7	80.6	133.2	218.6	357.9
North America	23.8	38.3	61.6	99.0	159.0	255.3
South/Central America & Caribbean	0.0	0.1	0.3	0.7	1.3	2.3
Western Europe	2.8	5.5	10.3	19.2	34.3	60.4
Central & Eastern Europe	0.0	0.0	0.0	0.1	0.2	0.4
Central Asia	0.2	0.3	0.5	0.9	1.6	2.8
Asia Pacific	1.9	4.2	7.3	12.5	20.7	34.0
Middle East & Africa	0.1	0.2	0.4	0.8	1.5	2.6

Source: Richard Kee, *Global Telecoms and IP Markets*, Ovum Ltd, London 2000

Note: In this table central Asia includes the People's Republic of China and India

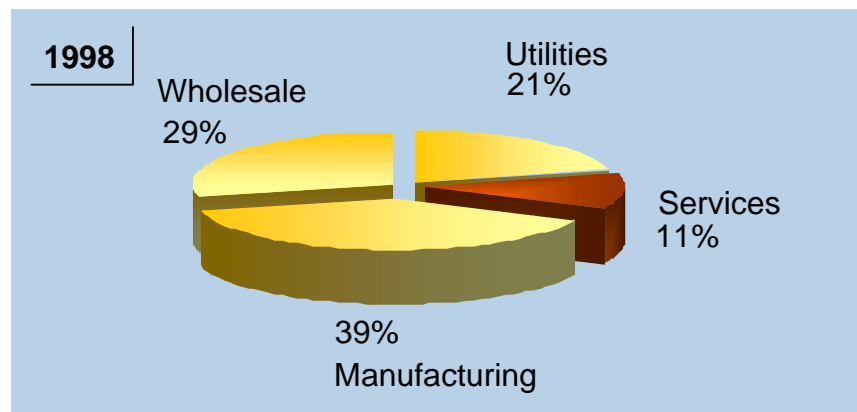
The focus in the coming chapters will mainly be on B2B commerce, emphasizing the role of industrial products and services. Some attention will also be given to business-to-government (B2G) commerce, which may become important in, for example, the context of development programs. But while it would help to make public procurement more efficient and would also help to increase the understanding of the issues involved in the public sector, its scope is limited compared to B2B commerce.

With regard to the types of goods that are traded, it is sometimes thought that e- and m-commerce mainly concerns services. All available figures however show that most of it concerns material goods. In the USA, for example, services are expected to account for only 14 per cent of B2B in 2002, as Diagram 2.5 shows.

Diagram 2.5 B2B e- and m-commerce in the United States of America – projected development 1998-2002

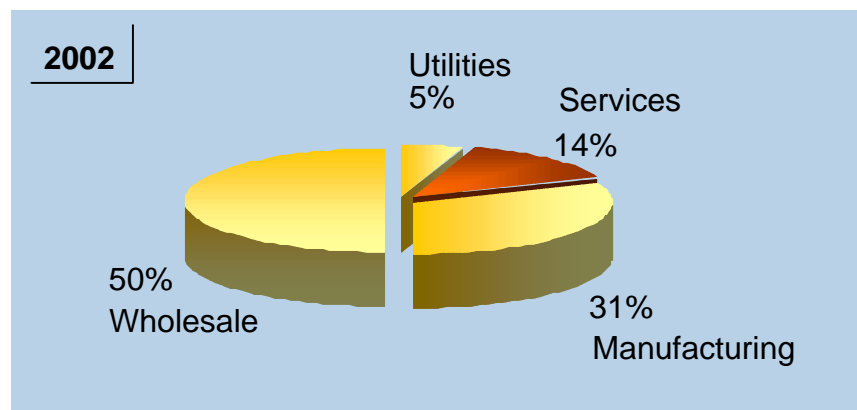
1998

(Total: US\$ 12.5 billion)



2002

(Total: US\$ 131.2 billion)



Source: UNCTAD 2000

There is of course an inherent problem in the trade in goods via the Internet: the Internet allows an entrepreneur to do instantaneous business, but the delivery of goods takes the same time as before. It is obvious that issues such as logistics, infrastructure and the trading laws/customs environment have a great impact on the success of a firm or a country in e- and m-commerce. In addition, operations in the great majority of enterprises are only partly digitized and most trade is “traditional”. An existing enterprise venturing into e- and m-commerce must mesh electronic and non-electronic operations to avoid bottlenecks. Even the most advanced firms and economies are struggling with all these issues. In short, buying and selling electronically must be seen in a wider context.

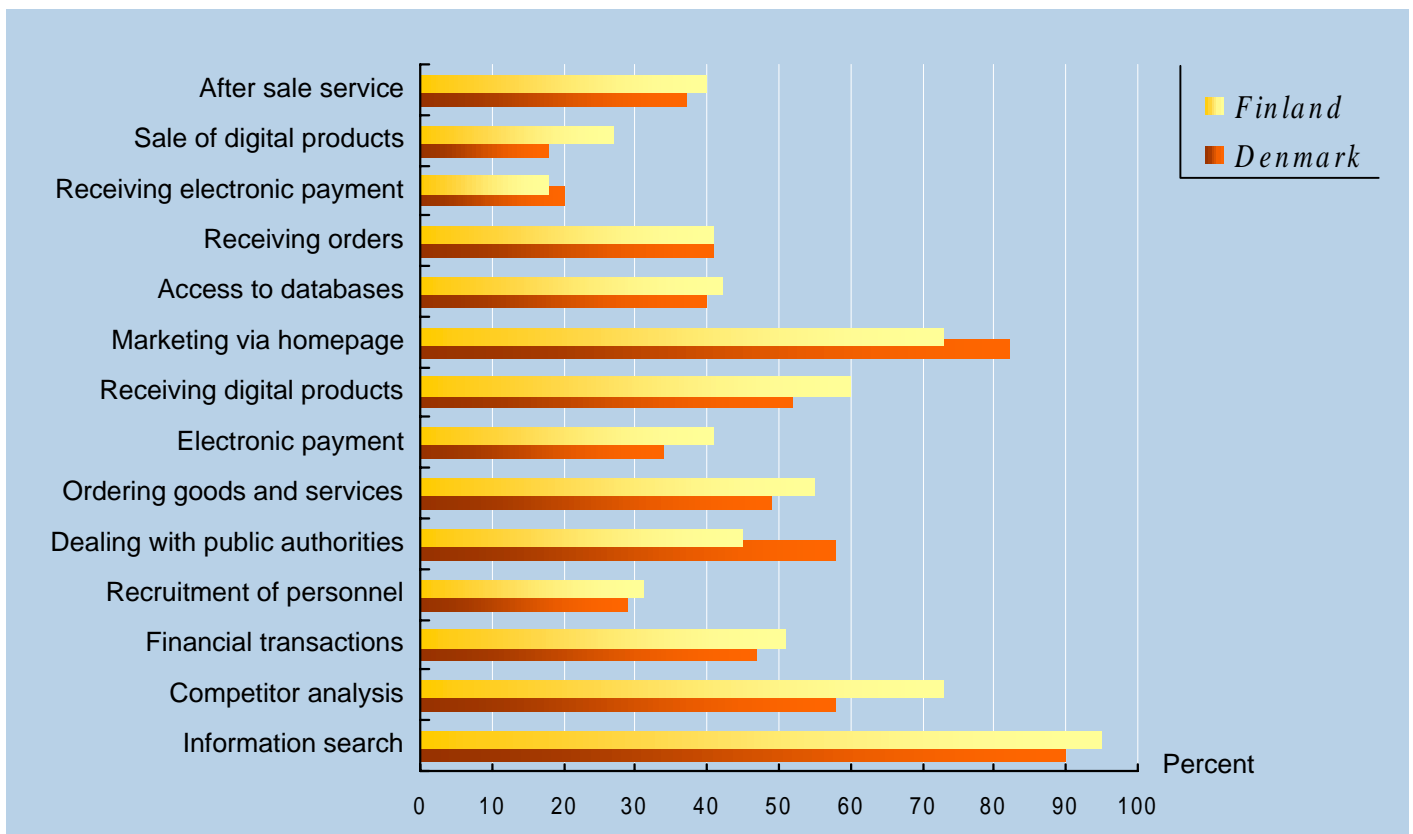
2.4 EMB, e-readiness, e-leadership

Each commercial transaction by a firm assumes that a large number of conditions making that transaction possible have been met. Successful participation in e- and m-commerce requires a detailed understanding of its complex reality. Within the firm, all stages of production and sales as well as the management system are affected.

Production is affected because of the much wider competition and the need to respond fast. Heavier competition and the availability of interactive multimedia technologies means that producers and customers - whether these are other firms or consumers – are much closer linked than in the past. Firms must be able to deliver (in all senses of the word) round the clock, and must continuously innovate. Flexibility, quality, customer and service-orientation are essential.

Radical changes in the character of production and trade are unthinkable without radical changes in management. Flexibility requires flat hierarchies, clusters of operators working more or less independently and first-class internal communication. Management and firm strategy, production and sales will make increasing demands on know-how and skill levels, and continuous learning becomes essential to keep abreast of changes. In all facets of enterprise operations, moreover, the Internet will play a role. From this broader perspective it makes sense to speak of EMB. The pervasive character of Internet use is illustrated in Diagram 2.6.

Diagram 2.6 Internet use by small enterprises in Denmark and Finland



Source: OECD 2000

Apart from a well-managed sequence of business transactions from raw material sourcing to customer payments based on ICT, the quality of the external environment is of crucial importance - even more so than for traditional forms of enterprise. Important framework conditions and the main actors responsible for them include:

- Telecommunications infrastructure (governments, private sector);
- Standardization and harmonization of electronic messages (private sector, governments, international agencies);
- Payment systems (banks, other financial intermediaries, governments);
- International trade, intellectual property rights, patents, laws, etc.; regulations on e-message contents (international agencies, governments);
- EMB policies, rules for economic sectors (governments, business associations);

To make EMB possible, new forms of business organization, logistics, human resource development (HRD), and so forth, must be added to the issues already outlined. *E-readiness* becomes a very complex matter - particularly for manufacturing, where electronic business deals with material products. Keeping in mind the discussion in Section 2.2 on the knowledge economy, it can moreover be argued that a flourishing e-business sector needs an environment that is also conducive to the emergence of a knowledge-based economy.

The different issues and key actors that have an impact on the e-readiness of SMEs are summarized in Table 2.3 on the next page. The column *joint action firms* refers to business associations as well as to enterprise groups such as clusters. The column *other private sector* refers to a variety of actors. In most of the areas, external private support services will be needed, opening up a vast field of business opportunities. Private business schools are often in the forefront of ICT-related human resource development (HRD). In addition, the private sector is heavily involved in the provision of telecommunications and transport infrastructure. The column *other* includes among others the science sector, which can provide solutions to hardware and software problems, and international organizations that provide support in many of the areas and play a crucial role in legal and standards issues.

It is clear that, to maximize the opportunities of individual firms to benefit from the business potential offered by the Internet, public sector action and joint action by (and with) the private sector are essential – locally, nationally and internationally. *E-leadership*, the active promotion by key actors of all key aspects of e-readiness, is a basic condition for success in e-business.

Table 2.3 E-readiness and SME: issues and actors

Issue	Main actor(s)				
	Enterprise	Joint action firms	Other priv. sector	Government	Other
Awareness, training and staffing	X	X	X		
Hardware/software in firms	X	X			
Firm management	X		X		
Products, production process	X		X		
Markets, marketing and sales	X	X	X		
Logistics	X	X	X		
Certification/authentication of EMC firms		X		X	
Contracts	X			X	
E-payments	X		X	X	
Financing EMC-readiness			X	X	X
Telecom infrastructure			X	X	X
Power infrastructure			X	X	X
Transport infrastructure for physical goods			X	X	X
Trade legislation, customs				X	X
Tax legislation				X	
Investment policy				X	
Intellectual property				X	X
ICT standards			X	X	X
Customer, privacy and data protection; payment security; fraud	X	X	X	X	X
HRD			X	X	X
Science, research, technology		X	X	X	X
National strategy		X		X	X

Section 2.1 has shown that the ICT revolution has so far mainly affected the developed countries. Therefore e-commerce also mainly takes place in and among these countries now. Few other countries have adequate conditions for joining the ICT and EMB revolution, even if individual firms or industries may have overcome the obstacles. For SMEs, which have a very important role to play in the knowledge economy, the obstacles are even greater. On the other hand, technologies and applications allowing business operations to take place without fixed networks open up many new fields of economic opportunity to regions and enterprises that hitherto have found themselves on the margins.

Chapter 3

EMB, DEVELOPING COUNTRIES AND THE ROLE OF SMEs

3.1 The present state of e- and m-commerce

It is difficult to find systematic information on EMB in developing countries. Even on its most discussed aspect, e- and m-commerce, reliable, comprehensive data are scarce. The figures in Table 2.1 are projections and should, as indicated, be regarded as showing orders of magnitude. There is anecdotal information on e- and m-commerce in a number of developing and transitional countries, some of which is summarized in Box 3.1.

BOX 3.1 E- and m-commerce in developing and transitional countries – selected examples

- The trading space of <http://www.mbendi.co.za> in the *Republic of South Africa* normally has some US\$ 250 million of goods for sale at any time.
- Software exports from *India* are expected to reach US\$ 4 billion in 2000.
- The Information Industry Ministry of the *People's Republic of China* expects EMC to reach US\$1.2 billion in 2002, up from US\$ 96 million in 2000. Almost all trade so far is B-to-C.
- In the *Czech Republic*, only 5 per cent of the 5000 largest firms purchase on-line; in Central and Eastern Europe as a whole, B-to-C commerce is expected to account for US\$ 6 billion by 2005.

It is not surprising that finding comprehensive data is a problem, given the very recent character of the phenomenon in developing countries. The scattered information can to an extent be complemented by checking web sites. Web sites in countries such as Turkey and Estonia, which have made much progress in ICT, are basically electronic business directories, and do not serve as platforms for direct business exchanges. In many cases, web sites that do have B2B facilities unfortunately provide access to buyer and supplier information to subscribers only. A random selection of sites⁶ giving direct access to the names of firms seeking partners is shown in Box 3.2.

While these examples are important in terms of facilitating international business contacts, the examples confirm that although EMB is becoming established in the largest developing economies, it is still largely restricted to the developed countries.

⁶ There were language limitations to the search. Web sites targeting international trading partners, however, are almost always in English.

BOX 3.2 A selection of web sites with an EMC component

<http://www.chemconnect.com>: Advertises offers to sell and requests to buy by producers and buyers from across the world. Though most of the firms listed were from developed countries, a fair number of developing country firms can be found as well, especially from Asia.

<http://www.freemarkets.com>: Organizes worldwide online auctions for industrial parts, raw materials, commodities and services. While the web site covers a wide range of manufacturing industries, only a few partners (mainly Asian) from outside the OECD countries could be identified.

<http://www.india-invest.com>: Both public sector agencies and (large) private enterprises use this web site among others to invite tenders for goods and services nationally and internationally.

<http://www.meetchina.com>: Via this web site, an extensive industrial supplier database as well as information on shipping, supplier reliability, insurance, etc., can be accessed. Online support from branch specialists is also available. Services are supported by a Swiss private company.

<http://www.metalsite.com>: Allows enterprises to find, buy and sell metals, also includes metal industry news. All participants listed on the generally accessible pages were from developed countries.

<http://www.oportunidadescomerciais.com>: On this Brazilian web site (available in Portuguese and English versions), a list of e-mails from firms looking for trading partners in Brazil may be found. The messages are not categorized by economic activity and the information is not standardized.

<http://www.purchasingcenter.com>: On-line B2B trade service focusing on electronic hardware and software. Among enterprises offering software solutions, some Asian and Latin American ones were found; the very great majority of participants, however was North American and West European.

3. 2 Conditions limiting EMB

The limited spread of ICT in non-OECD countries, discussed in Section 2.1, is one of the major obstacles to the development of EMB. But there are serious obstacles in most other fields as well. This is the conclusion of a comprehensive survey of e-readiness, covering 42 countries, carried out in 2000 by the information and technology consultants McConnell International. With a few exceptions, all of the countries in the survey are developing countries or transitional economies. The results are summarized in Diagram 3.1. The survey was structured around five issues, basically covering the e-business environment factors of Table 2.3:

- E-leadership (government policies to promote an inclusive “e-society” – i.e. ICT access for all social groups, partnership with business);

Diagram 3.1 E-readiness: a survey of 42 countries

Country	Connectivity	E-Leadership	Information Security	Human Capital	E-Business Climate
The Americas					
Argentina	Y ↗	Y	Y	Y	Y ↗
Brazil		Y ↗	Y	Y	R ↗
Chile	Y ↗	Y	Y	Y	Y ↗
Costa Rica	Y	Y ↗	R ↗	G	G
Ecuador	R	R	R	R	R ↗
Mexico	R	Y	Y ↗	Y	Y
Peru	R	Y ↗	Y	R	Y
Venezuela	R ↗	R ↗	R ↗		R ↗
Asia/Pacific					
China	R	Y	R	Y	Y
India	R	Y ↗	Y ↗	Y	Y
Indonesia	R	R ↗	R ↗	R ↗	R
Malaysia	R ↗	G	Y	Y	Y
Pakistan	R	R ↗	R	R	R ↗
Philippines	R	R ↗	R ↗	Y	R ↗
South Korea	Y ↗	Y ↗	Y ↗	G	G
Sri Lanka	R	Y	Y	Y	Y
Taiwan	Y ↗	G	Y ↗	G	G
Thailand	R	Y	R	R	R
Vietnam	R	R ↗	R	R	R
Europe					
Bulgaria	R ↗		R	Y	R ↗
Czech Rep.	Y ↗		Y	Y	
Estonia	Y ↗		Y	G	
Greece	Y			R	R
Hungary	Y ↗			G	Y
Italy	Y ↗			Y ↗	Y
Latvia	R ↗	R ↗	Y	Y	Y ↗
Lithuania	Y	Y	Y	Y	Y
Poland	R ↗	Y	Y	Y ↗	Y
Portugal	Y ↗	G	Y ↗	Y	Y ↗
Romania	R	Y	R	Y	R ↗
Russia	R	R	R	Y ↘	R
Slovakia	Y	R ↗	Y ↗	Y	R ↗
Slovenia	Y ↗	Y ↗	Y	Y	R ↗
Spain	Y ↗	Y ↗	Y ↗	Y ↗	Y ↗
Turkey	Y	Y	R ↗	Y ↗	Y
Ukraine	R	R	R	Y ↘	R
Mid. East/Africa					
Egypt	R	Y ↗	R	R ↗	R ↗
Ghana	R	Y	R	R ↗	R ↗
Kenya	R	R	R	R	R
Nigeria	R	R	R	R	R
Saudi Arabia	R	R ↗	R	R	R ↗
South Africa	R ↗	Y	Y	R ↗	R ↗
Tanzania	R	R	R	R	R
Uganda	R	R	R	R	R
	G	Green: Indicates the majority of conditions are suitable to the conduct of e-business and e-government			
	Y	Yellow: Indicates improvement needed in the conditions necessary to support e-business and e-government			
		Red: Indicates substantial improvement needed in the conditions necessary to support e-business and e-government			
	↗	Up arrow: Indicates improving relative to prior time period			
	↘	Down arrow: Indicates weakening relative to prior time period			

Source: McConnell International 2000, UNIDO

- Connectivity (telecommunications, electricity and transport infrastructure; internet access);
- Information security: (intellectual property rights, data security, privacy, prosecution of computer crimes etc.);
- Human capital (broad-based HRD for a knowledge-based society, culture of information sharing);
- EMB climate: (investment climate, efficient e-services providers, transparent legal framework, political stability, sound financial sector).

Among country groups as a whole, those that have moved furthest towards e-readiness are Central and Eastern Europe and Latin America. The educational inheritance of the central planning period is the most obvious advantage of Europe's transitional economies: even if the educational system had (and often still has) serious shortcomings in fields related to ICT and business studies, the high general educational levels make it comparatively easy to cope with that problem. This must be kept in mind when developing HRD strategies for ICT and EMB: without a good general educational basis such strategies will not succeed, or will succeed only in preparing a minority of the population for the knowledge economy. ICT and e-business are then likely to fail as instruments for widespread poverty alleviation.

The most problematic issues in the transitional economies are related to the business climate: legislation and the financial sector still face great problems in adapting to the needs of the market economy. In Latin America, with its large rural populations and often very skewed income distributions, a phone connection remains a luxury for most people. Both regions, however, have an interesting example of a country where e-leadership is removing the obstacles: Costa Rica and Estonia. More details on the initiatives taken in these countries will be found in Section 3.4.

The Asian countries in the survey offer a very mixed picture. If the developed Asian countries are excluded, only Malaysia, India and China have so far succeeded in creating a situation where most of the conditions may be considered adequate even if they are not optimal. The greatest problem facing these countries is again connectivity, a particular problem for China and India with their huge rural populations and low average incomes. Malaysia's government has invested large amounts of money in promoting ICT, among others through the establishment of technology hubs that are to serve as the growth poles for the knowledge economy. Sri Lanka has recently drafted an information technology policy, a brief outline of which may be found in Annex C.

The number of countries surveyed in the Arab and African regions is very small, but this was to be expected given the low degree of ICT penetration indicated in Diagram 2.1. South Africa is a rather special case, spending more on ICT infrastructure than the Arab states combined.

Nevertheless, the legacy of *apartheid* remains visible in low overall connectivity and educational levels. In all other countries, there is a great backlog with regard to all the

essential issues, although the Egyptian and Ghanaian Governments are making serious efforts to bring their countries into the information age. The very serious problem of connectivity in Sub-Saharan Africa can partly be overcome by collective access to ICT, such as provided in Zimbabwe or Costa Rica, (see Sections 3.3 and 3.5.2) - mobile phones connections are too costly for most small businessmen to be a real solution. But the other problems - lack of information security, inadequate education levels, unfavorable business climates and a lack of e-leadership among political and business leaders – must also be tackled.

3.3 E-readiness, public sector and joint public-private sector action: some examples

3.3.1 E-leadership

The public sector and public-private sector partnerships can have a decisive impact on e-readiness through a national strategy that links the different elements, and the execution of projects that encourage widespread understanding and use of ICT. The problem is that developing (and transitional) countries are forced to make decisions in an ill-defined field that changes very fast while they are short of the required expertise. This makes it extremely difficult to make sound assessments of the implications of global trends and international agreements. In addition, existing administrative structures are often an obstacle to initiative, flexibility and quick decisions. Nevertheless, there is an increasing number of positive examples of e-leadership:

- A strategy for the widespread adoption of ICT is part of *Costa Rica's* national sustainable development program. The country attributes much of its rapid GNP growth (8.3 per cent in 1999 – the highest in Latin America) to that strategy. Its success was due to strong political leadership. Components of the strategy include a strong drive to develop the skills needed and a determined effort to use ICT to help integrate isolated rural populations in the national economy. Among the steps undertaken were the installation of computer laboratories in *all* high schools, the nationwide introduction of “smart cards” for use in public services and the development of self-contained mobile multi-purpose/multimedia units that can be transported to any rural community and provide ICT training, Internet access, and the like⁷.
- Andhra Pradesh was the first state in *India* to design a computerization program for all administrative levels. In 1995, a computerized database for the administration was created. The land registry is now equipped with computers. The Twin Cities Network provides citizens of Hyderabad and Secunderabad with access to computerized Integrated Citizen Service Centers where many administrative routine procedures can be handled. Help desks are available and take account of literacy problems. Administrative transparency has improved; the amount of red tape and the influence of middlemen in, among others, the property business have been reduced. The project is to be replicated in some 20 other urban locations, and a rural pilot project is to be set up as well. Thresholds are to be lowered further through

⁷ Source: UN-ECOSOC E/2000/52

Internet kiosks and Internet community centers where the administration's services can be accessed as well. The state web site contains a citizen feedback option.⁸

- *Venezuela's* Chamber of Electronic Commerce (Camara Venezolana de Comercio Electronico – CAVECOM-e) was set up under the joint leadership of public officials and private entrepreneurs. This independent body has several priorities and areas of activity, including: (a) promotion of EMC by Venezuelan enterprises at home and abroad; (b) establishing EMC as a well-recognized sector of economic activity; (c) contributing to improving the legal and normative frameworks; (d) strengthening R&D and training related to EMC; and (e) being an interlocutor for public and private players in EMC, nationally and internationally, and participating in discussions with them. Recent activities include awareness seminars, a publication on legal issues and the promotion of practical software for EMC⁹.
- In the *Republic of South Africa*, a national ICT development strategy was launched in 1998. Under the strategy, a wide range of activities are being undertaken to stimulate ICT and EMC in the private sector and to facilitate citizen access to ICT. A public debate was started on the Internet on issues such as e-commerce policy issues, infrastructure and regulatory requirements, privacy, etc. A public-private sector committee is studying the introduction of a multipurpose universal smart card. On a pilot basis, Public Internet Terminals have been set up in post offices, providing Internet access and e-mail facilities. Web site links have been established for TV and radio shows, papers, etc. and 40,000 enterprises are now registered under the co.za domain.¹⁰
- In *Estonia*, connectivity is on a par with many developed countries thanks to numerous Government initiatives supported by its developed Nordic neighbors. In February 2000, the Estonian parliament approved a proposal to guarantee Internet access to each citizen. Equity issues are being addressed by offering free Internet access points. At the moment, 28 per cent of the population is connected to the Internet and 90 per cent of the public sector employees have a computer. The Government has also provided a framework for coordinating the efforts of dozens of NGOs dedicated to the development of the information society.¹¹
- The economic ministers of the *Association of South East Asian Nations* (ASEAN) have recently agreed to set up a high-level public-private sector task force to develop a comprehensive action plan for establishing the physical, legal and economic infrastructure that will increase ASEAN's ability to compete in the knowledge-based economy. It has also been agreed to establish a free trade area for goods, services and investments for the ICT industries. A "draft e-ASEAN Framework Agreement" is to be signed at a summit meeting in Singapore on November 24-25, 2000.

⁸ Source: <http://www.andhrapradesh.com> (Telugu and English).

⁹ Source: UNCTAD 2000

¹⁰ Source: ITC 2000

¹¹ Source: McConnell International 2000

Practical measures include, among others, the identification of “digital gaps” in drafting of framework legal and technical guidelines, and forums on certification and making the flow of Internet traffic more efficient.

3.3.2 Connectivity

Telecom liberalization and the extension of cable or satellite-based networks are improving connectivity across the globe. In many countries, however, connectivity on an individual basis will long remain a privilege of a minority, even for m-commerce. Community access to the Internet is a solution. It can take the form of shared multi-purpose public access facilities (e-kiosks, telekiosks, telecenters), run by entrepreneurs or the local community. Such centers assume a secure infrastructure (providers, power supply), good local governance and access to back-up services (repairs, software expertise). Similar solutions are being explored for SMEs, as Section 3.5.2 on e-readiness and the individual SME shows.

- *Ghana* was the first country in West Africa to become connected to the Internet, through a private-sector initiative. The telecommunications industry has been liberalized in recent years, stimulating the appearance of new providers, and the Government has announced new initiatives to stimulate the industry. Two key public-private sector projects are designed to connect 42 telecommunications sites across the country, utilizing wide area networks to link Government ministries and agencies with each other and to computerize all aspects of the public finance system. If executed, these projects will lay the basis for long-term ICT development in Ghana.¹²
- As part of a program covering other transitional economies as well, the Soros Foundation has equipped high schools in *Romania* with computers and Internet access. About 80,000 students were provided with Internet access by the late 1990s. The computer laboratories are open to other schools. Apart from being particularly useful for science teaching, the computers also allow students to acquire marketable ICT skills, such as computer publishing. E-mail and Internet connections were provided to 70 schools. This has enabled students and teachers to communicate nationally and internationally on educational and non-educational subjects, to download large amounts of information not available in the school libraries, etc. The need to share facilities and the inherent flexibility of the technologies has also stimulated attitudes that are more cooperative and less hierarchical than in the past.¹³
- In the *United Arab Emirates* (UAE), Dubai Internet City (DIC) has recently become operational. This can be described as a round-the clock electronic export processing zone serving ICT and EMC.

The aim is to create a local cluster integrating software developers, logistics companies, venture capitalists, incubators, education (with an Internet University), R&D and major ICT brand names. There are no limits to foreign investment, and DIC provides a one-stop-shop for all services and state-of-the-art infrastructure.

¹² ITC 2000

¹³ Source: <http://www.dntcj.ro>

3.3.3 Security

EMB assumes a whole set of new legal and business practices that even in developed countries still shows considerable gaps. It will often be a major challenge to translate the requirements of EMB with regard to security, as it covers a wide spectrum of issues, including data transfer (cryptography), the computer systems itself (firewalls, passwords, etc.), the stability of the electronic network (disposability, rate of data transport etc.), security of payments as well as the avoidance of political risks. The different aspects of security are crucial for the creation and establishment of trust within the group of users in a value chain (see Section 3.4.1).

On account of the global nature of the Internet, information security in EMB is not just a problem of the individual firm, but one that has international dimensions. The Organization for Economic Cooperation and Development (OECD), for example, is drafting guidelines for consumer protection in e-commerce transactions. The UN Commission on International Trade Law (UNCITRAL) has drafted Uniform Rules on Electronic Signatures (see Annex B). Private sector associations are also active in this area: the trade association for suppliers of security devices for computers, the International Computer Security Association, founded the Alliance for Internet Security in early 2000 to identify and solve security problems.

National governments should, on the one hand, cooperate with such international initiatives and, on the other, work with the business community and consumer organizations on drafting and enforcing customer protection laws. Some Asian countries, such as the Republic of Korea have made great progress with security issues:

- In the *Republic of South Korea*, e-business has recently been declared a national priority. As part of this initiative, the Government is aggressively pursuing improvements in information security. A cyber crime office has been established in the Ministry of Interior. Rules for protecting information on individuals have been formulated, with fines for violators. Laws and security standards are being developed to protect critically important ICT centers. Pirated software has been removed from all Government computers, in recognition of the importance of intellectual property protection.

In addition, a major effort is underway to establish a national public key infrastructure, which will enable the widespread use of digital signatures (made legal in 1999) and encryption, promoting trust and confidence in e-business and Government interactions. Three private sectors and one Government organization have already been certified to issue and manage signature keys.¹⁴

3.3.4 Human capital

ICT should be introduced in schools, by simultaneous action at the primary, secondary and university levels. Primary and secondary education lays the basis for the knowledge economy, but tertiary education is needed to create world-class human capital.

¹⁴ Source: McConnell International 2000

Education must challenge and reward those with extraordinary talents and skills. In addition, low-threshold access through Internet cafés can help to create general awareness and basic familiarity with ICT in an informal way.

The pool of expertise on ICT and EMB in most countries is very small, and training must correspond to business needs. Joint public/private sector efforts are therefore desirable. The Venezuelan Chamber of Electronic Commerce initiative mentioned above is an example. In addition, qualified private training institutions must be given plenty of scope to complement public-sector education. The right type of project can remove social and national barriers to participation in the knowledge economy:

- The Zayed University in the *UAE* is one enormous computer network. All assignments, exams and library books are completed, revised and accessed through the laptops of the students. This can be done from classrooms, libraries, the cafeteria and, of course, from the homes of the students. Education is based on interactive methods and much attention is given to English language training. When the first students graduate in a few years time they will be well equipped to fill key positions in the *UAE*'s industry, bringing skills for a fully computerized working environment with them. The Zayed University is an all-women's institution (<http://www.zu.ac.ae>)¹⁵.
- Cross-border initiatives may help to overcome training capacity limitations where language is not an obstacle. France, for example, is supporting an Internet training program, Internet pour les Ecoles Inter-Etat d'Afrique de l'Ouest et du Centre, in a number of *West and Central African countries*. This is oriented to the educational sector, and will provide students with skills enabling them to start their own e-business.

The acceptance of what the Internet offers and the spreading of its benefits depends to a large extent on the way in which it represents national language and culture. This has implications for the ways in which awareness of and skills for ICT are transmitted. In addition, governments and NGOs should promote local content on the Internet.

One danger, given the present world shortage of people with advanced computer skills, is the migration of young trained people to developed countries offering them a far larger income without running business risks. The best answer to this is probably to make the environment for EMB as attractive as possible, encouraging start-ups through an incubator program, providing common ICT facilities, etc.

¹⁵ Source: UNIDO, "In search of an industrial policy for the post-oil era in the Sultanate of Oman", *Final Report*, UNIDO Project SF/OMA/99/001

3.3.5 The EMB environment

Many legal aspects of EMB transcend national boundaries. A number of international organizations such as the World Trade Organization (WTO), UNCITRAL (see Annex B), the UN Conference on Trade and Development (UNCTAD) and the OECD as well as the International Chamber of Commerce (ICC) are working with governments and business on many of these issues (see Chapter 6 on international cooperation).

As EMB is rapidly gaining momentum, it poses tremendous challenges to existing legislation and administrative systems. Tax on transactions is a particular problem. A developing country that abolishes taxes to facilitate EMC may well see a large part of its government income disappear. Some of the tax issues that have to be clarified are:

- Personal tax (it is easy for individuals not to declare income generated by services provided via Internet);
- Residence (an internet user can effectively live and work in a number of jurisdictions);
- Enterprise taxes (EMB companies can easily transfer profits from a high tax jurisdiction to a low tax jurisdiction);
- Tax on goods and services (it is hard to subject Internet transactions to such taxes);
- Tax regimes that categorize telecommunications and computer equipment as luxuries - an important obstacle to ICT adoption in many countries.

Some developing countries are confronting these issues systematically:

- In *Peru*, the national export promotion commission has created the Peruvian Institute for Electronic Commerce (Instituto Peruano de Comercio Electronico, IPCE), which is to play a leading role in formulating suggestions for legal and regulatory changes that would help stimulate EMC. These include:
 - Removing and preventing the creation of new barriers to EMC;
 - Adapting national accounting and auditing regulations to e-commerce;
 - Modifying commercial law to support e-commerce practice;
 - Adopting a non-regulated approach to e-commerce, relying on mediation in case of conflicts, with the creation of a Cyber Tribunal.¹⁶

¹⁶ Source: <http://www.ipce.org.pe>.

3.4 The main types of EMB

3.4.1 Business-to-business

Because of the speed with which information flows and the massive reductions in transaction costs, EMB is rapidly becoming a characteristic of business-to-business relations. Direct networking that uses ICT helps firms to increase efficiency throughout, from raw material purchases and product/process quality management to distribution and contract administration. Personnel formerly engaged in various administrative jobs can be freed for value-added activities.

Large multinational companies are increasingly insisting that suppliers or subcontractors have an Internet link. Supplier networks led by large firms are an important trend in EMB. Apart from the business opportunities offered, the pooling of knowledge and know-how in these networks will potentially have a positive influence on the participating firms as well. For the smaller firms, the fact that the investment is made for a whole group is an added advantage, although a large firm's suppliers will usually have little to say about the technologies proposed, and profit margins will be squeezed through worldwide competition.

Box 3.3 ANX, a worldwide supply chain

The Automotive Network Exchange (ANX) is the world's largest extranet: it already involves over 5,000 companies in the automotive supply chain. Sponsored initially by the major US car manufacturers, ANX will provide the industry with a non-proprietary, global communications network. Over time, AMX will promulgate a series of standards for different kinds of transactions, which will then be mandated by the large firms. Teams will be able to share applications on ANX servers so that engineers from companies anywhere in the world can share computer-aided design files. Specification changes can be passed along the whole chain in a matter of minutes. It is estimated that, if 20,000 firms join, the savings in communication costs will be around US\$ 1 billion per year. In addition, ANX will lower production costs through intensified competition throughout the chain. The traditional supply chain hierarchy can be leapfrogged, enabling direct cooperation between participants at different levels; it will also be much easier for small enterprises to cooperate

Source: Ph. Evans and Th. S. Wurster, *Blown to Bits – How the New Economics of Information Transforms Strategy*, Boston 2000

Box 3.4 Bicycle assembly and the Internet

A European bicycle manufacturer imports bicycle parts from *Vietnam* for assembly in the UK. These used to be shipped by each Vietnamese supplier individually: 10 to a box, with a label indicating the part number, covered with cutting fluid, greased paper and straw. At the UK plant, three people were employed to unpack, clean, grease, label and re-arrange the parts on trays according to each bicycle type's "bill of materials".

Now, designs, delivery box quantities, bar code labels and production pipeline information are sent to the suppliers via an Internet link established by the UK buyer. The largest Vietnamese supplier collects the parts from all the others, greases and pre-assembles them before packing them on single trays in boxes containing up to 250 parts, according to the assembly plant's requirements. The trays are labeled with the bicycle model number and bar codes and the boxes go straight to the assembly line without further handling. The logistics problem was simplified drastically; the plant's quality problems, production disruptions and lead times were strongly reduced; and the resulting cost reductions were such that the suppliers could obtain higher prices for their parts. The suppliers were also able to attract more foreign customers.

Source: ITC 2000

Another trend is the establishment of EMB partnerships. To improve coordination and interoperability, exchange information and lower costs, SMEs are increasingly becoming partners in projects in which methods, procedures and formats are standardized for a group of enterprises. Projects initiated by industry-wide associations are of special interest to SMEs, as they benefit from the network effects while avoiding the effects of hierarchy and dependence in supply chains. This can lead to major rationalization and productivity gains for all participants, and improvements in the international competitiveness of the industry as a whole.

BOX 3.5 Cooperation in fishing boat construction

The Japan Foundation is supporting a project being carried out by 21 shipbuilders, 66 equipment manufacturers and the Fisheries and Ocean Foundation in *Japan*. The three-year program started in 1998 with the aim of boosting the sector's international competitiveness through computerizes technical and production information. A web server will allow all project members to exchange the information – specifications, references, plans, estimates, designs - needed to work together.

The greatest investment is not technical but, initially, working together to ascertain needs and select standards for encoding and transmitting the information. The development of standardized information flows via the web is expected to increase competitiveness by helping to cut costs and heightening competitive pressures among rivals taking part in the project. It is also hoped that the standards developed will be promoted at the global level, consolidating the participants' position in the international market.

Source: OECD 2000

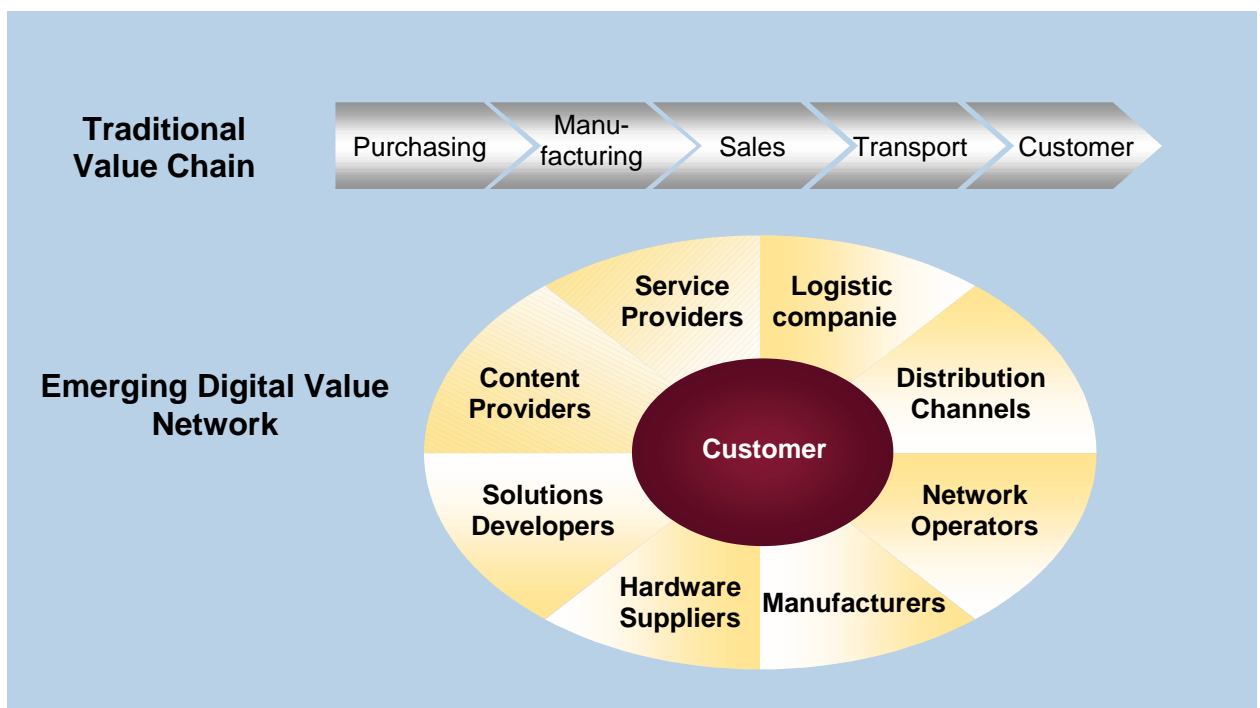
Partnerships can result in *integrated value chains*. A value chain describes how firms receive inputs, add value to these and sell finished products. Value chain integration means that groups of enterprises within a shared market cooperatively plan, implement and manage the flow of goods, services and information from point of origin to point of consumption (which can be anywhere in the world).

From value chains, the technologies now becoming available allow firms to form *digital value networks*. Separate trading clusters may become increasingly interconnected, so that firms can source goods both indirectly and (increasingly) directly through a central entry point. Industry-specific EMB hubs can, for example, link up with enterprise e-clusters providing maintenance/repair services and ICT operations goods or smaller clusters of specialized goods and services suppliers.

Apart from the actual (networks of) manufacturers, such a network may contain (see Figure 3.1):

- Distribution channels;
- Logistics companies;
- Content providers (databases, etc.);
- Service providers (among others re-engineering firms for e-readiness, integration of networks);
- Systems integrators;
- Solutions developers (encryption, network security);
- Hardware suppliers;
- Network operators

Figure 3.1: The evolution of business models



3.4.2 Business-to-government¹⁷

Government procurement is a major market for enterprises in many countries. On-line bidding for public sector contracts has not yet been studied in detail but, as Section 3.3 has shown, the application of ICT in government agencies is growing and that also increases the scope for EMB.

Information on how to enter the public procurement market can usually be obtained from the Chamber of Commerce, a firm's business association or the Ministry of Finance; it may also be possible to directly contact a Central Tender Board or its equivalent. Public works are one obvious source of contracts; ready-made on-line solutions for various government ICT application another. An example of how Indian Government invites tenders via the Internet may be found at <http://www.india-invest.com/tender>.

In many developing countries, up to 90 per cent of the opportunities are associated with local procurement for international agency projects. The United Nations published a bi-weekly, *Development Business*, available by subscription; alternatively, the *Development Business* web site (<http://www.devbusiness.com>) can be consulted. It carries information on business opportunities generated through the World Bank, regional development banks and other development agencies. *Development Business* includes the following information:

- A Monthly Operational Summary (MOS), listing all projects being considered for financing, up to credit signing. This allows companies to begin targeting projects that may provide a market for their products.
- An Approved Projects section with detailed project descriptions, including the scope of the project, funding arrangements, address of the implementing agency, consultancy requirements and a procurement schedule.
- General Procurement Notices (GPNs) issued by the recipient of funds for projects requiring international bidding. These describe the type of procurement expected to take place during project implementation. This is the earliest public notice of procurement, and this is the time for companies to contact the recipient.
- Specific Procurement Notices (SPNs), invitations to bid for specific goods or works. SPNs describe these and give details about the documents required, submission deadlines, etc. (SPNs are also published in the national press of the recipient country).
- Major Contract Award Notices identify successful bidders. This is useful information for firms seeking collaboration with them on future occasions.

¹⁷ This section is largely based on ITC 2000

3.4.3 Business-to-consumer

Although this document does not emphasize the role of enterprise – end-consumer transactions, a brief discussion of their role may help developing and transition countries to explore their potential. In most countries, the internal e-market is very small because of income and ICT limitations. Of the countries surveyed in the context of this study, for example, Sri Lanka had a GDP of US\$15.2 billion and Uganda a GDP of US\$ 6.7 billion in 1998. This is comparable to the figures for Luxemburg and Iceland, which are among the smallest economies in Western Europe. But per capita income in these countries is among the world's highest, while per capita income was US\$ 810 in Sri Lanka and US\$ 320 in Uganda.

Even without looking at the obstacles in the e-business environment, it is clear that the scope for B2C in countries such as these is extremely limited. For most people shopping is restricted to basic consumer goods, they will usually buy these locally and they use cash. Those who can afford it will e-shop for luxuries around the globe (domestic producers venturing into this market will often find well-established foreign firms on their path), if they are not put off by domestic delays in deliveries.

At present, only the most populous or advanced developing and transitional countries have an internal e-market large enough to offer niches for domestic producers. Proximity to markets (in the case of goods) and the absence of cultural, language and customs barriers would be among their advantages. However, enterprises that decide to explore the potential of EMB will in most cases target export markets as a priority. The following are examples of small enterprises using the Internet for access to international consumer markets:

- *Ethiopia*: the EthioGift service targets both Ethiopian living abroad and international customers (<http://www.ethiolink.com/EthioGift>, Amharic and English versions), offering Ethiopian crafts and food products as well as holiday information. There are links to Ethiopian restaurants and suppliers of Ethiopian crafts in other countries. Customer feedback is invited.
- Small-scale artisans in *Egypt, Lebanon, Morocco and Tunisia*, supported by among others the World Bank, have created a Virtual Souk, with a web site in French as well as English (<http://www.southbazar.com/elsouk>) to provide direct access to their crafts, increasing the job and business opportunities of poor households. As in a real souk, bargaining is possible. Customer can give feedback, and the visitor is not only provided with background on the products but on the whole value chain.

3.5 EMB and the SME sector

3.5.1 Development potential and obstacles

The SME sector is a major source of income, breeding ground for entrepreneurs and provider of employment in developing countries and transitional economies. Economic liberalization and trends towards outsourcing in manufacturing have increased the importance of the sector in recent years.

In the ICT-based economy, the potential for traditional subcontracting in manufacturing is greatly expanded by the creation of worldwide supply chains. In addition, there are many opportunities for SMEs in the ICT sector itself (software production, specialized hardware or components).

The provision of support services opens up whole new fields for SME development. Even in countries that have made the greatest advances in adopting ICT, firms need external technical know-how and skills for EMB as well as advisory services to succeed in the volatile world of the knowledge economy. Section 3.4.1 has shown how complex the web of firms in a digital value network may become. In most cases, such services can be provided by SMEs: producers of custom-made software solutions, electronic helpdesks and troubleshooters, designers of web sites and computer graphics, “infomediaries” who provide electronic matchmaking between buyers and sellers, and so on.

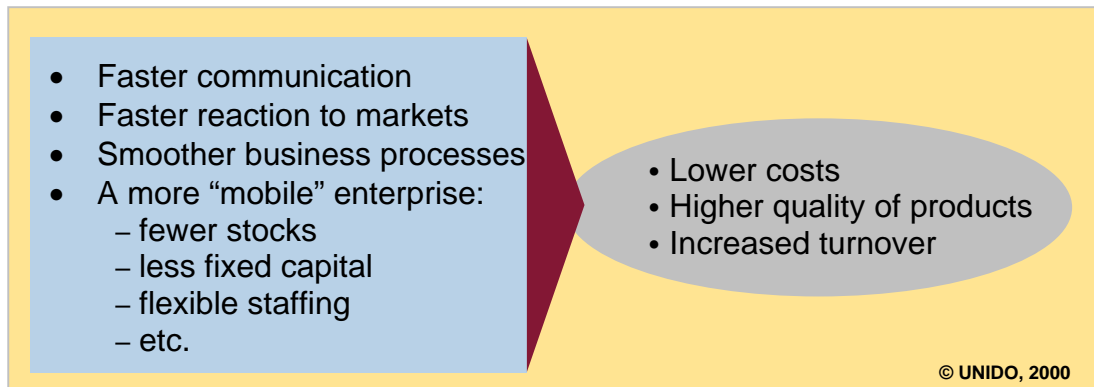
Not all economic activities offer the same scope for EMB, and how existing enterprises in these countries will adapt to the challenges is probably a more important issue right now than the emergence of Internet start-ups. “Hybridization” of traditional enterprise activities and ICT-supported operations are the logical way forward for the great majority of firms. Small firms that can identify and exploit an ICT niche can potentially become world players, just as in the most advanced economies. Medicom, for example, is an integrated hospital management software produced by Oman Computer Services. In a few years, it has developed from a small local ICT services provider to a competitor in global markets. However, as in the developed countries, failure rates among start-ups are very high: nine out of ten Chinese Internet start-ups are expected to close down during this year.

In developing countries and transitional economies, SMEs usually face serious obstacles in adapting to and participating in EMB. Small enterprises, with their limited resources, are more affected than large ones by the problems in the e-business environment that have been discussed, which makes it very hard for them to penetrate markets where established firms from developed countries are operating already. HRD systems are inadequate, the business environment is often unfavorable for SME (access to loans tends to be a great problem) and legislation is sometimes biased in favor of large enterprise. Added limitations to EMB in the SME sector are the lack of formalized contractual relations and the reliance on cash payments. On the positive side, small start-ups do not face the obstacle of outdated management and production structures.

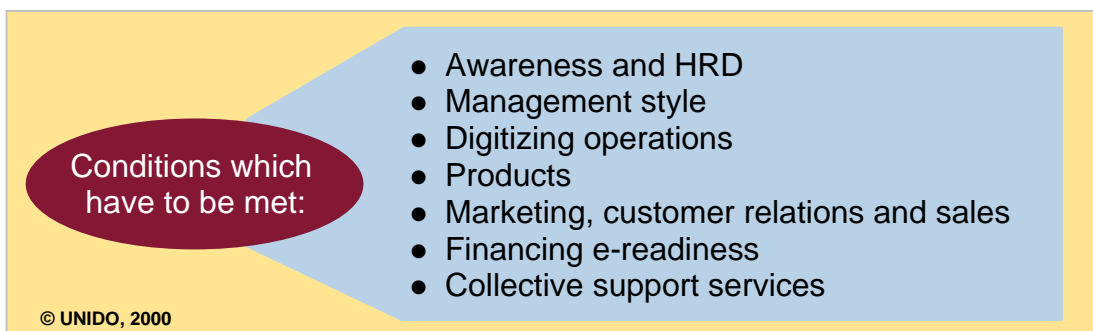
SME associations can play an important role in, among others, raising awareness of e-business issues, setting up market and technology information systems, finding solutions for common problems (finance, HRD, etc.), lobbying for equal treatment and actively participating in the public-private sector dialogue on the knowledge economy. The web site of the Federation of Indian Micro, Small and Medium Enterprises (FISME, <http://www.fisme.org>), for example, serves as a global contact and networking point for importers and exporters.

3.5.2 E-readiness and the individual SME

Successful participation in EMB will have profound effects on the operations and the results of a firm, which can be summarized as follows:



To achieve a successful participation in EMB, a number of conditions have to be met.



Awareness and HRD

Being unfamiliar with many ICT applications, SMEs are often unaware of the benefits of EMB. A number of studies have confirmed this for the OECD countries¹⁸, and logically the awareness of the benefits is even lower among SMEs in countries where access to ICT is limited. By all accounts, however, e-mail is very rapidly becoming a popular medium of communication among firms that do have Internet access, and from e-mail to EMB is a logical enough step.

While a number of governments have initiated campaigns to promote ICT and the awareness of its potential, the business community should take the initiative to promote EMB awareness out of sheer self-interest, joining forces with the public sector where the opportunity presents itself. The same is true for HRD: in-house training is usually not affordable for individual enterprises, but can be (co-) organized by business associations or Chambers of Commerce, as Venezuela’s CAVECOM-e example in Section 3.4 has shown.

¹⁸ OECD 2000, p. 12

Refresher courses are indispensable in this rapidly changing field and knowledge of one major international language is indispensable for global B2B commerce.

Learning by doing and by interaction must complement formal education and training. This is a very important part of ICT skill development. One side benefit of introducing ICT in SMEs is that it fosters this learning, and because the ICTs available nowadays are multifunctional and ideally suited for networking, SME employees will discover new ways to use them and improve business performance.

Management style

Chapter 2 has already referred to the changes in management and management styles that are needed. If an Internet presence is to be part of an SME's main business goals, it should be a senior management concern and not be relegated to IT technicians; therefore, senior managers must also have ICT skills.

EMC requires agility and great managerial ability, to operate successfully in a continuously changing constellation of networks. One problem is that many of the older generation of managers and owners find it hard to adapt to ICT and the business culture that goes with it. Rigid hierarchies are enemies of speed, flexibility and initiative. A recent UNIDO project report pointed out that knowledgeable persons exist at all levels of an organization, not only at the top. Knowledge, however, cannot just be bought; it has to be nurtured. To achieve this and to use that knowledge productively, acceptance of, access to and development of advanced information technology is crucial.¹⁹

This issue is to a large extent determined by enterprise or business culture, but general attitudes in society also play a role. The fact US culture emphasizes entrepreneurship and individual responsibility has doubtless been a major factor in rapid growth of the knowledge economy in that country.

Digitizing operations

Even those that have not become involved in EMC yet are increasingly faced with the need to integrate ICT in their operations. Even if business operations – including buying and selling - are still carried out by traditional methods, the longer-term trend is obviously towards integrated e-business systems in firms, from inputs to end sales.

When SMEs decide to take part in B2B commerce, they should search for systems integrating various in-house operations and linking them with other businesses that minimize resource requirements while maximizing benefits. This means:

- Buying off-the-shelf equipment and software or download software;
- Using interchangeable modules where possible;
- Selecting systems that minimize HRD, financial and maintenance requirements;

¹⁹ UNIDO – *In Search of An Industrial Policy for the Post-oil Era in Oman*, final report, UNIDO Project SF/OMA/99/001

- Selecting systems that give maximum connectivity;
- Looking for possibilities to share investments with other enterprises.

With regard to the latter: if the intention is to form a supply chain, it is essential to assess the applications used by other enterprises. Those who do not participate in EMC yet should be made to see the usefulness of investing in it. Firms that have already developed an extranet (a web site allowing them to do business with other firms or consumers) may be able to link partners in the chain to this. Developing country business institutions such as Chambers of Commerce can play a useful role in initiating such cooperation.

Products

Worldwide competition means that a company's products sold over the Internet must incorporate international standards and have a very good price/performance relation. Determining which products sell well via the Internet means taking account of several factors:

- Competition – the “unique selling point” is even more important on the Internet than in traditional business, as customers are not limited in their comparisons;
- Price – the transparency of the market also puts great pressure on prices;
- The “touch factor” – consumers often still want to handle a product;
- Consistency of product characteristics;
- Immediate availability;
- Return policies and product guarantees.

Increasingly, competitiveness will depend as much on the quality of the product package (shipping and after-sales services, etc.) as on the individual product. In B2B commerce, the e-link between suppliers and buyers greatly facilitates cooperation on product specifications, product quality and product innovation.

Marketing, customer relations and sales

The Internet should be part of an overall marketing strategy that includes all other promotion methods relevant to the firm and its products. Establishing an Internet “presence” in terms of visibility and accessibility is difficult due to the enormous amount of information that is circulating. Worldwide competition is another factor - Figure 3.1 shows graphically that the customer is indeed king. Like the product, the web site must be superior to that of a competitor: it must look attractive; the contents must be well-focused and formulated, giving a clear message about the unique advantages of the product(s); allow easy navigation as well as customer feedback; and be sensitive to cross-cultural issues – in terms of web contents and products offered.

The web site must be updated regularly and be registered with the major search machines.

Responses to customer queries and orders must be fast. Shipping of goods requires electronic coordination with transport firms – there is little point in ordering a product via the Internet if the product takes as long to arrive as it did in pre-EMC days. Security of payments and privacy of personal data is a serious concern as breaches may result in a rapid loss of customers and customer confidence, areas in which small enterprises are very vulnerable. In addition to legal shortcomings with regard to information security, there is also the problem of viruses and hackers to which all computer operations are vulnerable. Safeguarding against these requires investment and continuously updated knowledge.

Financing e-readiness

One of the main causes of failure of SMEs entering electronic markets is the lack of finance. Investments, as may have been deducted from the above, are costlier than is popularly assumed. Financial resources must be adequate for marketing and ICT support/maintenance costs and not just for the installation and initial design of a web site. Some experts suggest that one-third of resources should be dedicated to start-up costs, another third to promotion and the final third to updating and maintenance.

SMEs will very often face obstacles to getting affordable bank credit, and in most developing countries venture capitalists and “business angels” with an interest in ICT or EMC are hard to find. For the smallest businesses, a lease-buy system or a system of micro-loans supported by the government and/or donors might be a solution. Such loans are common enough for traditional small enterprises, and are now being given to telecenter operators in several countries, for example in Bangladesh.

Box 3.6: Low-cost telephone connections for rural women

The Grameen Bank has provided rural women in *Bangladesh* with mobile phones and loans for telephone connections. This will allow them, among others, to follow price developments in the cattle market, breaking the traditional control of landowners and intermediaries. Another possibility is the provision of collective support services.

Source: <http://www.grameenphone.com>.

Collective support services

Internet incubators have been set up in a number of developed countries. These provide the full range of financial and other resources needed by start-ups to develop strategies and innovative products or services.

Apart from funding, the resources include office space with network infrastructure, and support services for research, product development, marketing and legal issues, organizational advice, etc. Such facilities are now also being made available to developing and transitional economies through various international programs (see Chapter 5).

Fast and reliable market information, etc., is essential for EMB. In UNIDO's experience²⁰, the best way to provide information services to SMEs (which usually lack sufficient in-house information capacity) is to network the services that already exist, providing a single entry point, and operate the network and the support services commercially, as an SME itself. This network can also serve as a portal for enterprises from other countries seeking business opportunities in the country and contacts with the relevant institutions, for example in finance and government, in that context.

BOX 3.7: Business information for SME – two examples from Africa

- The Business InfoBus is intended to bring ICT within reach of *Zimbabwe's* small-scale rural and urban enterprises. It is an initiative of the Intermediate Technology Development Group, which is part of the Information Communication Technologies for Sustainable Livelihoods project. The Business InfoBus will travel around the country, providing enterprises with Internet access for links with financial and technical support institutions, identification of markets and marketing of their products.

- In the *Republic of South Africa*, the Mbendi web site (see Section 3.1) also serves as a matchmaker between firms. A major North American company bought a smaller company with an interest in an African country. The acquiring company found information on doing business in that country on the Internet and a search engine directed them to MBendi's web page on that country. This took them to a MBendi client page describing how to do business there. It was then a short step to finding what services the Mbendi client provided there and send an E-mail asking for assistance.

(Source: IPS Daily Journal, <http://www.mbendi.co.za>)

Collective ICT services such as telecenters can have *non-economic side benefits* as well:

- They provide access to health-oriented information and tele-medecine support programs via the Internet or WAP/mobile phone; doctors and medical centers can access tele-medecine support programs via these media.
- They provide access to information for local education and skills building. Where local labor and enterprises have relevant skills or know-how, involving them in setting up the centers offers opportunities to transfer general ICT know-how and skills for establishing and maintaining EMB infrastructure and services.
- The dialogue between the public and private sectors will be facilitated, and local communities can directly initiate cooperation across borders.

²⁰ See UNIDO, *Information and Networking for Small and Medium-Sized Enterprises (SMEs)*, prepared for the Conference on National Information Management Strategies for SMEs, Lisbon, Portugal, January 1998.

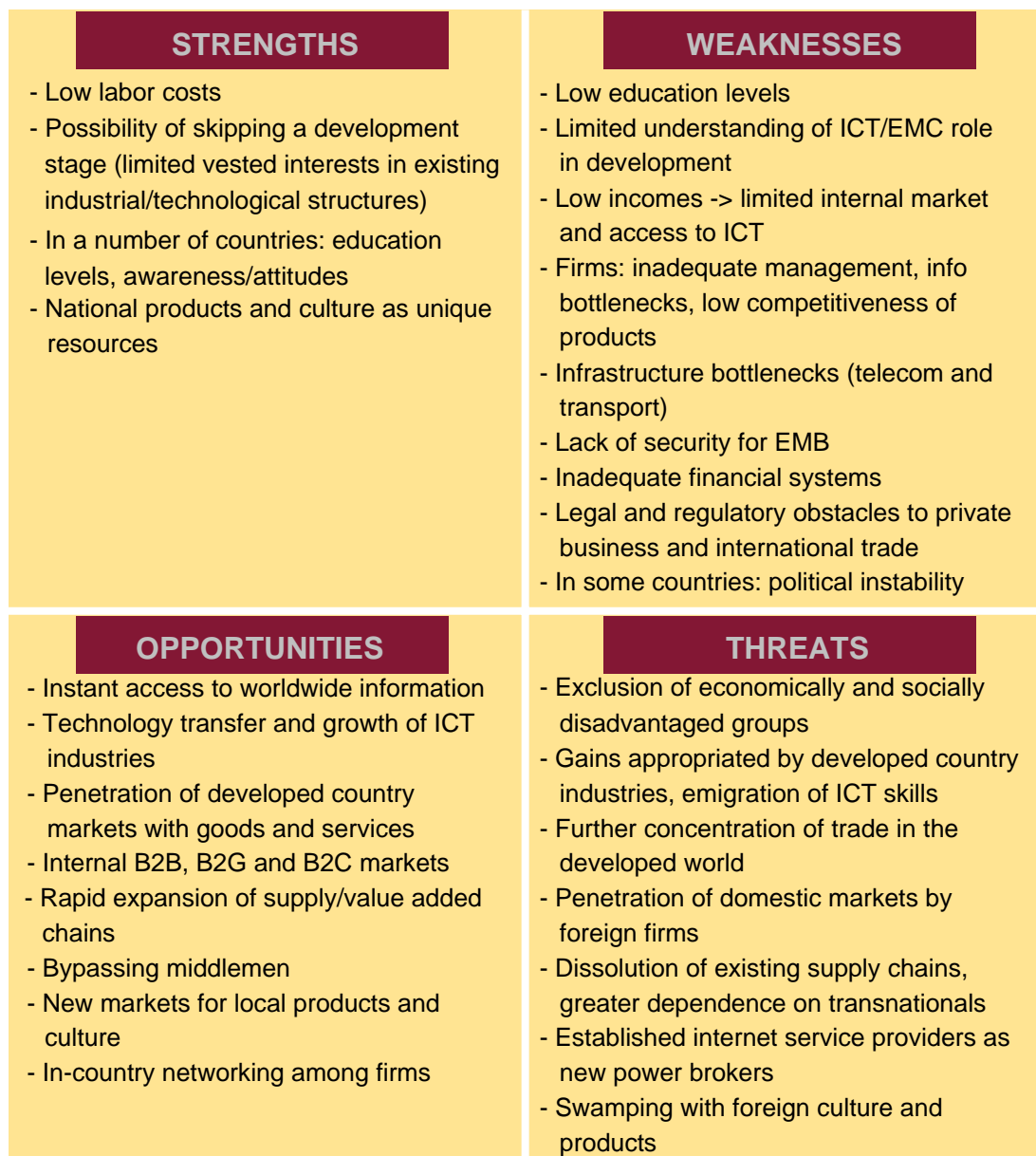
Chapter 4

MAJOR ISSUES FOR DECISION MAKERS IN DEVELOPING COUNTRIES

4.1 Opportunities and threats, strengths and weaknesses

For developing countries, EMB is not a matter of choice but a challenge that has to be faced; otherwise they will be increasingly marginalized in international trade and fall behind in development. Even if skipping a development stage is not an option and if the great majority of enterprises will only gradually adapt to ICT, the economies of *all* developing countries will be affected by global electronic networking. Therefore, EMB is a key policy issue for developing countries. They must understand, assimilate and gainfully use these new technologies to improve their positions in the global economy. The strengths of these countries, the opportunities that are available to them, the weaknesses that may prevent them from exploiting those opportunities and the resulting threats to development can be summarized as follows:

Diagram 4.1 EMB and developing countries: a SWOT analysis



4.2 Main actors main areas of action

The following sections focus on ICT-related aspects of EMB. Two additional areas of action should be mentioned here that are of special importance to manufacturing and the harnessing of the potential spread effects of mobile technologies for development:

- Local business initiative can only flourish in a supportive local business environment. This requires *decentralization* of administrative and development responsibilities, in addition to joint public-private sector efforts. Much of what has been said about e-leadership also applies to the local level.
- *Transport and power infrastructure* is often a great obstacle to participation in global EMB (for example, in supply chains), especially outside major urban centers. The gap between electronically offering selling and physically producing and delivering goods must be minimized. This will require a comprehensive national transport and power infrastructure policy and large investments.

4.2.1 Exercising e-leadership

The previous chapters have shown that technological and enterprise development is embedded in political, economic, educational and cultural conditions. On an individual basis, some firms will always manage to become successful in EMB. But successful broad participation in EMB requires a *development framework* - a strategy on which key players in a national economy agree to: (a) link up individual ICT related issues for synergy and harmony, and (b) help create a long-term framework for long-term development.²¹ In many countries, support for ICT, Internet and EMB at the various policy levels and cooperation between (and within) the public and private sector is lacking, as the previous chapter has shown.

The actors in the process are many, ranging from central and local governments to individual firms, groups of firms (as in subcontracting), business associations, the education and science community, and certain NGOs. It is crucial to set up a generally accepted body, an “*EMB champion*” or task force to draw up the strategy and generally promote the e-readiness of the economy. Such a body needs a strong and active government representation. In formulating and executing a national strategy, the following principles should be observed:

- Transparency: clear and coherent policy development.
- Partnership between the private and public sectors, and national and international organizations.
- Co-ordination within and among government organizations and with non-governmental organizations and the private sector (workflows, lines of control).

²¹ “Today’s fast changing economic and technology environment creates great uncertainty, and increases the risk to investors. This ... increases the value of predictability in governance”. McConnell International 2000, p. 9.

The government must also actively participate in the process of formulating *international agreements* to ensure that the country's interest and/or the interests of the country group to which it belongs are taken into account. Country group initiatives are also important because they encourage countries within a region to adhere to specific initiatives, plans, standards, etc. for mutual benefit - as illustrated by the ASEAN initiative in Section 3.4.1 on e-leadership.

4.2.2 Awareness and acceptan

By paving the way to the acquisition of EMB know-how, awareness and acceptance contribute to the creation of trust in EMB, which again is essential for effective legislation and a good business climate (see below). *Customer awareness* is another important aspect. In most developing countries, for example, GSM is growing much faster than traditional telecommunications, although the prices of the technologies (PC and mobile phone) and access (GSM premium, fees) are quite similar. But GSM service is almost only used for voice transfer - the added value of Internet services is not perceived by many people yet.

While the promotion of intercultural understanding is one positive effect of the Internet, the use of *local content and local language* (and perhaps iconographic content) must be encouraged. The language barrier (82 per cent of web sites are in English) and the use of Latin script are obstacles to worldwide Internet use and EMB. It may be necessary to provide special stimuli for EMC sites in the local language. Local content is important for motivating local and regional customers to use the Internet. But local content can also serve to balance the vast amounts of often low-grade information on foreign culture with which the Internet is swamped. Local content can also help to lower resistance to change, one of the most typical obstacles in attempts to bring about technological change, and EMB is no exception. Culture and religion may encourage or discourage change.

Business culture itself is often a hurdle to change. "Our system is working, so why change it?" is a very common attitude, which will not only lead to many lost EMB opportunities, but also carries the risk of totally marginalizing the firm. Many senior staff in developing countries do not use e-mail – although it is much cheaper than the telephone and more reliable than the postal services in many countries - for the simple reason that they were not raised in the information age. ICT is not a part of their daily routine and makes them reluctant to understand the value and invest in IT and thus fail to perceive the added value. Top-level decision-makers often also believe that they would be losing control over the company if they were to participate in EMB. They will not give their employees open access to e-mail or the Internet, which is a serious obstacle to knowledge-based operations, both in terms of access to information and to taking responsibility for initiatives.

4.2.3 Knowledge: HRD and information services

Expertise for EMB is very scarce in most developing countries. As training must correspond to business needs, the private sector and governments should work together to develop *human resources policies* that will provide students and workers with the skills for the digital economy and raise the general understanding of ICT.

ICT should be introduced in schools, by simultaneous action at the primary, secondary and university levels. Primary and secondary education lays the basis for the knowledge economy, but tertiary education is needed to create world-class human capital. Education must challenge and reward those with extraordinary talents and skills. Special attention is needed to ensure equal access of all population groups to ICT-related training. In addition, low-threshold access through Internet cafés can help to create general awareness and basic familiarity with ICT in an informal way.

In a global economy, *electronic information services* are indispensable. Firms need fast access to reliable, comprehensive information on:

- Customers and markets;
- Product-design;
- Process technology/operation, maintenance and repair of existing equipment;
- Financing sources and terms.

Typically, developing country firms - and especially SMEs - are not equipped (both in terms of hardware and know-how) to obtain fast access to global information. Most developing and transitional countries have institutions that can provide such information, but they are rarely well developed or networked with each other and worldwide networks. As pointed out in Section 3.5.2, the most effective and efficient way to provide information services to firms is to network those services that already exist, and/or to provide collective access.

4.2.4 Telecommunications infrastructure and connectivity

Telecommunications infrastructure is a strategic investment for maintaining and developing a competitive advantage in both local and international markets. The private sector should be encouraged to invest in *upgrading local telecommunications infrastructure and services*. This would have the side effect of building expertise and creating employment. In addition to identifying sources of funding, governments should investigate means of reducing the costs related to ICT and EMB. To exploit the full possibilities, infrastructure supporting the third generation of mobile technologies is needed. Network auctions should therefore not overemphasize existing infrastructure and should also ensure that the network operators are selected on the basis of the coverage they offer (access in rural areas, etc.).

An important goal for developing countries is the development of a *managed Internet backbone* – a secure, widely accessible, fully interconnected high-speed network that can guarantee the availability of bandwidth sufficient for EMB requirements. However, the charges for international bandwidth in most developing countries are sometimes several times the international tariff, and volume discounts may not be given. Information service providers therefore cannot afford to buy large amounts of bandwidth, resulting in tremendous lag time affecting the usability of the Internet.

In addition to network building, there is also the issue of *teledensity*. In developing countries, the cost of obtaining a new fixed line is high and the installation entails often a waiting period of several years. Mobile phones and services are even more expensive. Furthermore, telephone services (fixed and mobile) are not available everywhere, meaning that quite often only a small part of the inhabitants living in major cities has access. The development of mobile and networks for EMB is still some way from practical usefulness for these countries.

While mobile telecommunications provide a technological basis for widespread, decentralized development, its potential cannot be fully exploited right now. Without general access it is not possible to fully participate in the global information-based economy, and the advantages of instant networking through ICT are lost. *Collective access* to know-how and hardware at the firm group (or community) level may often be the solution to problems of limited funding and low purchasing power of the individual (firm). Such EMB centers should be operated by qualified professional staff.

4.2.5 Trust and security

A strong disincentive to EMB is the lack of security in transactions. In many countries the spoken word is more valuable than written contracts, let alone electronic transactions. *Laws regulating trade transactions* are not always enforced, and in any case legislators have rarely confronted the issue of e-commerce. Laws therefore do not provide an adequate basis of trust for electronic transactions. However, this is no reason for not promoting EMB. The hardware, software and expertise needed to build an EMB-enabled environment adapted to national laws and business practice is available internationally, and once it is clear that there is potentially a critical mass for EMB, such an environment should be created. Foreign expertise, etc., can often be made available through international cooperation projects.

A major impediment in most developing countries is the absence of a *certification authority* (CA). Usually, it is not even clear yet whether such an authority should come under the private or public sector. Yet the creation of a CA is crucial because of the general need for a trusted, impartial, and knowledgeable third party which operates in a transparent way, offering expert advice on legal issues and raising the general awareness of EMB issues.

Secure *electronic financial transactions* are another major obstacle. The creation of trust centers in the banking sector that are charged with ensuring the security of e-transactions through ID checks, etc., is still in its infancy in most developing countries. Most central and private banks have not yet begun to adopt measures that will guarantee secure electronic transactions. *Trust centers* are needed which can certify the content of Internet pages, keep track of the creditworthiness of customers, authorize payments, etc.

4.2.6 Financial services

A general *policy for financial services*, credit systems and standards for financial transactions is needed to make EMB possible. In some developing countries, basic information on money and the capital market is still not available on the Internet via mobile device. A general lack of competition in this area, decreasing the rate of its development, is common. A more liberal policy for the exchange of basic financial information is desired.

Co-ordination among banks is another issue that must be tackled. This is usually still right at the beginning. A clearinghouse for transactions among banks, for example, is needed. Though ATMs (automatic teller machines) are quite common in developing countries now, most banks have their own proprietary cards that function only on their own respective ATMs. Local area networks, linking all member banks to report fraudulent credit cards to the donor bank, are something of a rarity. Often a bank's client is only the client of a particular bank branch, not of the bank as a whole.

The limited use of *credit cards* in developing countries is another barrier to EMB. The income of most consumers and micro-businesses is too low and the banking system often too unreliable to encourage their spread. Banks often require a deposit that may be twice the credit limit – an effective deterrent for many potential customers. Legal systems, national culture and lack of awareness may also inhibit the use of credit cards. Where secure electronic transactions are lacking, local companies may use credit card validation services abroad. The fee may amount to 10 per cent on every transaction, money that is lost to the national economy. “Smart cards” of the kind now being introduced in Costa Rica (see Section 3.4.1) could conceivably be a solution and could be used in commercial transactions as well - but this still leaves open the question of a reliable financial system supporting such cards.

4.2.7 The legal and regulatory environment

Business in cyberspace requires a *stable, transparent legal environment* governing different aspects of EMB, contract enforcement, intellectual property protection, liability, jurisdiction, privacy and security. Policies, including competition policy, must ensure that a level playing field is created for all enterprises. International trade and customs are issues by themselves, not least because EMB is likely to involve imports and exports of technologies that may be considered “sensitive”.

Many existing national law systems are not ready for EMB implementation and for the resolution of disputes that may arise through electronic transactions. Judges and lawyers require training and specialization in specific fields of EMB and general ICT-related expertise. Specialized legal circuits are needed as well. The banks' trust centers mentioned above must be the subject of appropriate laws and regulations.

Complicated and unclear *business rules* form one of the most serious barriers. Governments should be encouraged to recognize, accept, and facilitate electronic communication of contracts and other legal documents. Coherence, transparency and co-ordination should be the guiding principles.

Additionally, where vital components of the EMB cycle (such as logistics and imports/exports) are heavily influenced by government operations, the government's information systems for these operations should be digitized on the basis of these principles to remove bureaucratic barriers.

The issue of *tax* on EMC transactions is still the subject of much debate. In adapting tax systems to EMC, the following principles formulated by the OECD may be kept in mind:

- Technological neutrality (traditional and electronic transactions should not be treated differently);
- Efficiency (compliance costs should be minimized);
- Certainty and simplicity (simple and clear rules);
- Effectiveness and fairness (minimization of the potential for tax evasion);
- Flexibility (rules should be adaptable to rapid technological and commercial changes).

Section 5.2.1 on e-leadership referred to an “*EMB champion*”. For the business sector, such a champion is especially important because effective national projects with a direct impact on the sector (such as government procurement or electronic government services) can have a tremendous impact on EMB development in the country.

4.3 Phasing support for EMB development

EMB development is a cumulative process. The initiation of projects in support of certain framework conditions should not wait until all others are in place; and when certain issues are resolved, new ones that are just as important will appear. While this should be kept in mind, a distinction should be made between short and long-term support measures:

Short-term measures

Existing infrastructure and services should be used or adapted, wherever this is practical, to enable developing countries to acquire EMC technologies and benefit from them. For a fast response to EMB challenges and immediate benefits, the initial focus should be on enterprises that already have an export market and trade with partners and/or clients in developed countries. In this way, an international clientele can be accessed at low cost, footholds in the EMC market can be acquired, and the transfer of EMB technologies as well as of know-how and skills can be initiated.

Long-term measures

Full participation in EMB means expanding the ICT infrastructure and other essential services, such as electronic banking, a sectoral user base to make it easier for industries to venture into EMB, help centers for SMEs, telecenters, etc. EMC successes in the initial phase will stimulate investments in ICT infrastructure by other entrepreneurs interested in reaching partners and/or clients world-wide. As more businesses go online, the public in general will become aware of EMC. In this way, a cumulative process is started that in the long run will also have a positive impact in the educational, health, and social domains.

A long term, successful collaboration between the public and private sector in establishing priorities and policies for the development of ICT and EMB should also serve as a basis for further explorations of the possibilities offered by the knowledge economy through science and technology parks, centers of excellence, etc.

Chapter 5

CREATING THE CONDITIONS FOR EMB: THE ROLE OF INTERNATIONAL COOPERATION

5.1 Some examples of international support

The main goal of international organizations should be to assist developing countries in creating the business environment, the skills and the infrastructure and services necessary for efficient and secure EMB - tailored to the needs and objectives of the community, region, or country. This helps to “prime the pump”. As more enterprises participate in EMB, it will stimulate the development of the ICT infrastructure, increase the level of awareness and encourage the adoption of policies and strategies that will enhance the deployment of EMB, initiating a cumulative development process.

The examples that illustrate the main areas of international support below are only a small selection. The range of projects is too large for a full survey. The purpose of the following paragraphs is merely to show that international cooperation is making an impact in the essential fields, helping to ensure that the long-term benefits of the ICT revolution do not remain limited to the developed countries.

E-leadership

- The World Bank’s InfoDev programme, supported by 21 governments and private-sector donors, stimulates the pooling of intellectual, technical and financial resources in the public and private sector of developing countries for innovative use of ICT in a wide variety of areas, such as education, health, government, rural development and environmental protection.

Awareness and HRD

- The International Telecommunication Union (ITU) is supporting the two African centers of telecommunications training in Senegal and Kenya, which are to be transformed into Centers of Excellence in Telecommunications Administration for senior-level managers and policy makers in the field of ICT. The ITU has also established a Global Telecommunications Academy that will serve as an international brokerage service for distance learning.
- The Carl Duisberg Gesellschaft, a German international technical training agency, has a broad approach to the transfer of ICT related skills. It has over the last twenty years sent hundreds of ICT trainees to Germany and also organizes workshops on information technologies for executives, researchers and ICT services providers in developing countries in the ASEAN regions.
- Word Links for Development (WorLD), a World Bank initiative facilitating school connectivity, provides teacher training and educational content and evaluates the impact of ICT on education. Together with other aid agencies and private sector partners, the program now runs in 15 African, Arab, Asian and Latin American countries. Students are linked to students in more than 20 industrialized countries in Internet-based learning programs.

The aim is to reach at least 40 developing countries and 3 million students by 2004, and to stimulate the creation of “schoolnets”.

Infrastructure and connectivity

- UNCTAD’s Electronic Trading Opportunities (ETO) System provides subscribers around the world with a single point of contact for trade, investment and business opportunities, using standard structures to allow international communication through the connection to the Global Trade Point Network (GTPNet).
- Working with industry partners and local governments, the ITU has set up a number of multipurpose community telecenters in Bhutan, India, Mali, Tanzania and Uganda. This program, which is to be expanded, provides collective access to personal computers with Internet access, public telephones and faxing/photocopying services in rural areas.
- The World Bank has supported private initiatives in the building of ICT infrastructure, focusing on Africa and Latin America and the more difficult markets. By mid-1999, the World Bank’s International Finance Corporation (IFC) had participated with over US\$ 2 billion in 41 telecommunications infrastructure projects in 30 countries. This included projects in manufacturing directly related to improvements in ICT infrastructure.

International and national legal/regulatory/security issues

- UNCITRAL’s pioneering work with regard to the legal issues of electronic commerce has already been referred to. A note on its Model Law on Electronic Commerce and Draft Uniform Rules on Electronic Signature may be found in Annex B.
- The ITU provides assistance to member states in the preparation and implementation of telecommunications sector reform. Apart from direct support, activities include maintenance of a database on regulatory issues (accessible via the ITU’s web site), workshops on regulatory issues in transitional economies and developing countries and surveys and publications on these matters.

ICT-based enterprise development

- The Commonwealth Secretariat has developed the Commonwealth Business Network (COMBINET), which enables the participating Chambers of Commerce, industry associations and enterprises (some 300 participants altogether) to do business on-line. COMBINET provides market intelligence and contacts, promotes investment and technology transfers and training opportunities.
- The World Bank’s Incubator Initiative will provide central management, technical assistance and venture funds to a network of ICT incubators. The initiative will focus on countries where the “critical mix” of local ICT and business skills, connectivity and market opportunities is not yet available.

The ICT-Softbank joint venture, working with a network of global and local business leaders, supports the creation of local Internet-based enterprises in developing countries by investing seed money and providing support services.

- The International Chamber of Commerce (ICC) has founded the World Chambers Network, which provides an online global business exchange service. It also has a global database on best practices, legal resources and contract models addressing issues related to EMC. A new Electronic Sales Contract Generator, soon to be available on the ICC's web site, will deliver customized contracts through a step-by-step procedure.

The impact of ICT on development is also bringing about changes in the character of international cooperation. In this context, the Report of the Secretary General of the United Nations quoted in Chapter 2 indicates that the UN system needs a new knowledge-sharing and learning culture to face the new challenges, with more networking and cross-functional teams.²²

5.2 UNIDO's role

The mandate of UNIDO is to promote sustainable industrial development in developing countries and countries with economies in transition. The primary beneficiaries of UNIDO's programs and projects are small and medium-sized industrial enterprises in these countries. The ability of these enterprises to meet the challenges of new technological developments is increased by helping them to achieve collective efficiency through network and cluster approaches and by supporting their effective integration into global value chains. A major dimension of UNIDO's work is related to building up or strengthening specialized support capacities of both government and private sector institutions.

Recently, UNIDO has developed a number of activities in the area of ICT aimed at preparing SMEs for electronic business. A selection of examples follows.

Cluster building and e-commerce in India

In India, UNIDO supports a wide range of different SME clusters. As a result of a UNIDO awareness seminar on information technology, for example, the KNIDGRO knitwear consortium in Ludhiana, India, acquired an Internet connection and a dedicated web site. In due course, other organizations joined this web site. It soon attracted much attention from domestic buyers. Later, value added services such as design sourcing and specific market information were added to the program. The use of e-mail and personalized Internet connections are now common in this cluster. Some entrepreneurs have taken the initiative to create individual B2B and B2C portals.

²² UN-ECOSOC, "Development and international cooperation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy", *Report of the Secretary General*, E/2000/52.

Another awareness building workshop on information technology was conducted for the Jaipur textile-printing cluster. As a result, members of COTEX (an export consortium in the village of Sanager promoted by UNIDO) created their own web site (www.jaipur-textile.com). Recently, COTEX members have decided to create a B2B portal. A similar development has taken place in the village of Bagru. In this case, the portal is ready (www.bagru.com), along with an offline payment mechanism.

For the Tiripur cotton knitwear cluster, UNIDO intervention focused on providing services like information retrieval through the Internet on issues related to WTO regulations. UNIDO helped the Tiripur Exporters Association to set up its own web site (www.tiripurknitwear.com) which lists all members of the Association – most of which now have their own web sites - and the products manufactured by them.

Finally, the Pune food-processing cluster was supported by UNIDO in setting up a center for information on food sector regulations, standards, etc. This web-based information center is being restructured to provide information for the food sector as a whole, to allow it to meet the challenges of international competition.

Incubators in Tunisia

In an upcoming project in Tunisia, UNIDO is assisting in establishing a business incubator in the Park of Telecommunications in Tunis to forge international ventures between local entrepreneurs and foreign SMEs. In partnership with a US firm, Tunisian entrepreneurs in the Park will be linked up with foreign know-how, capital and markets. The project focuses on information systems for traffic management; software for GPS systems; visio-conferencing for medical, educational and other purposes; and low-cost telecontrol systems (measurement, management, supervision).

Italian SMEs have shown interest in this initiative and appear willing to relocate part or all their activities to the incubator, which is fully equipped with administrative and ICT support services. Once the matches are made, the new generation of Tunisian entrepreneurs can develop their entrepreneurial potential with the assistance of their foreign partners.

The Industrial Information Network in Sri Lanka

UNIDO has a program to establish national infomediaries as commercially operating entities. An example of an information service established by UNIDO is the Industrial Technology and Marketing Information Network (ITMIN - www.itmin.com) in Sri Lanka. This one-stop shop is part of a network of national and international information sources, and provides information and value-added services to client SMEs, as complete solutions. These one-stop-shops, tailor-made to local SME demand, often also provide other commercial services, such as e-consultancy and executive IT training.

Tunisian Consortium of Car Components Manufacturers

This consortium of eight manufacturers of car components (tires, exhaust pipes, batteries, etc.) was created with joint support from UNIDO and the Tunisian Government in August 2000. The intention is to create a communal web site by the end of 2000 in order to promote their participation in B2B commerce. The main target is the European market, but the consortium is also looking at the markets of the Middle East and Africa.

UNIDO Exchange

UNIDO Exchange is a business intelligence network with its Vienna headquarters as the central hub. UNIDO Exchange members can search and obtain information and knowledge developed and managed by the organization's different units. This information covers UNIDO's technological and investment projects; company, investor and project promoter profiles; potential subcontracting partners; and technology databases. UNIDO Exchange also offers members an electronic platform for B2B, B2G and government to business interaction, and serves as a platform for debate on issues that are at the core of the organization's transformation process, actively enhancing UNIDO's global forum function.

5.3 Areas for future SME support

It can safely be assumed that EMB will rapidly become an important and powerful business tool for SMEs in developing countries, mainly because high-speed Internet access can now be made available at low cost for all players in the market. In order to facilitate the introduction of EMB in the SME sector, UNIDO should design specific support programs. Keeping in mind the major development issues discussed in this report, UNIDO's industrial development mandate and Ericsson's knowledge and foresight, future support to SMEs would broadly focus on:

- i. Creating the conditions for the effective participation of developing countries in EMB;
- ii. Collective support systems enabling SMEs to take part successfully in EMB, emphasizing the potential of business-to-business cooperation.

Within this broad framework, actual support activities would concentrate on a selection of areas briefly described below. The activities would in many cases build on existing UNIDO services. Additionally, to reinforce their ability to provide effective support to EMB in developing countries and transitional economies, UNIDO and Ericsson will exchange methodologies, analytical tools and experiences.

5.3.1 Creating the conditions for EMB

Awareness and training

A first step towards understanding and acceptance of EMB is to raise awareness of its potential and challenges, its effects on the economy, and its impact on manufacturing in particular. This could be done through awareness raising and training workshops for the public and private sector, which would:

- Provide an overview of EMB issues and requirements and how they apply to the situation of developing countries;
- Illustrate the particular opportunities and challenges for SMEs in the manufacturing sector and related services;
- Provide advice on adapting the existing ICT infrastructure, business support and HRD systems to the requirements of EMB;
- Organize training for EMB know-how and skills in manufacturing enterprises, involving the relevant business organizations. Training centers could also be established on a permanent basis, nationally or for country groups.

Governance

Ensuring that EMB fulfils its role in national development requires a national strategy and adaptations of the legal and regulatory environment. Here, support would be needed in the following areas:

- Advice to and capacity building in policy-making bodies and government agencies responsible for EMB-relevant aspects of the business environment (customs, tax, trade promotion, and so on);
- Advice to and capacity building in national business/SME associations and Chambers of Commerce. These can play a key role in promoting EMB among their members, and in working with governments on policy issues. They could also be assisted in the creation of collective support infrastructure for their members;
- Advice and capacity building at the sub-national level (towns, districts, etc.), to promote awareness of the potential for decentralized development offered by EMB and to stimulate public-private sector cooperation. This is essential for creating an environment in which local SMEs can exploit that potential (supporting the establishment of rural telekiosks, for example, would be a typical task for a joint public-private partnership).

Information systems for SME

Adequate EMB support for SMEs is essential. An expansion of UNIDO's national business information network support, with particular attention to the EMB requirements of SMEs, would help to overcome this obstacle. The program would improve the use of national information sources and support services and provide SMEs with a platform to develop EMB, in particular with respect to new technologies; export markets; investment and financing opportunities; and subcontracting and other industrial cooperation partners.

In addition, the information base at the enterprise level would have to be assessed and improved. This would again benefit from working with SME or branch associations, among others to ensure the adoption of common quality standards, methodologies and applications facilitating electronic information exchanges among firms.

Integrating SMEs into value chains

UNIDO's existing support to subcontracting exchanges and clusters aims at integrating SMEs in national and international supply chains and end-user markets. A logical step would be to further integrate EMB concerns in these services, giving particular attention to:

- Information, legal and commercial issues;
- Identifying potential partners, appraising projects and promoting them, and minimizing associated risks;
- Promotion strategies and techniques, based on the specific strengths and advantages offered by a country, industry or locality, packaged and offered to targeted potential investors.

These activities would take place in cooperation with international and national chambers of commerce and industry, professional associations, national technology centers and regional development agencies.

Shared local infrastructure

EMB centers such as small "e-kiosks", used collectively by a group of firms (either nationally or locally) and integrating existing local support services, will greatly reduce the start-up and operational costs of EMB, allowing SMEs to by-pass intermediaries and start selling their products directly. Small/micro enterprises in rural areas can benefit particularly from such collective infrastructure. Provided that all other enabling conditions are met, such centers can make a great contribution to decentralized industrial development.

The initial focus should be on pilot projects for enterprises that are likely to benefit most from EMB. The enormous growth potential for EMB and Internet services and the reduced cost of running the centers will maximize the chances of sustainability.

The success of such pilot projects would stimulate other industrial enterprises to venture into EMB; increase demand for ICT infrastructure; encourage the establishment of Internet (and e-commerce) service providers; and help to mobilize public and private sector sources of finance.

Summary of Challenges and Actions requirements

The following table provides a summary overview of the challenges of the SMEs and the related action requirements in the relevant development phases of EMB:

- Connectivity
- Information Networking
- Supply-chains and B2B transaction systems
- Re-engineering existing and creating new business

TABLE 5.1: EMB FOR SMES IN DEVELOPING COUNTRIES – SUMMARY OF CHALLENGES AND ACTION REQUIREMENTS

EMB PHASES	CHALLENGES FOR SMES		ACTION REQUIRED		
	OPPORTUNITIES	CONSTRAINTS	GOVERNMENT	BUSINESS COMMUNITY	INTERNATIONAL SUPPORT AGENCIES
CONNECTIVITY	Independence from traditional telecom infrastructure. Digital divide narrowed as telecom stages can be leapfrogged	Investment in rural mobile connectivity not always commercially attractive; high ICT import tariffs; expensive on-line charges; slow speed of data transfer; unreliable connectivity	Promote and enable investments for mobile connectivity in rural areas; lower ICT import tariffs; liberalize markets; enable competition	Provide faster communication technologies by upgrading to GPRS, EDGE and ultimately UMTS; invest in rural connectivity	Demonstrate potential of value-added services for rural SMEs through the use of e-kiosks or multi-purpose telecentres; support internet connectivity projects
INFORMATION NETWORKING	Cost-effective connectivity to global information infrastructure enabling transfer of knowledge; enabling expansion of existing business and access new business opportunities	Expensive website developments; difficult to find reliable information and business solutions; lack of local currency payment systems; lack of banking practices; language barriers; international competition	Promote ICT infrastructure; promote awareness and standards	Create content and multi-lingual web portals; create trust and content quality; create secure web-based transaction systems; create quality certification mechanisms	Establish knowledge networks for business support; support capacity building for information networking support services and web-consulting
SUPPLY-CHAINS AND B2B TRANSACTION SYSTEMS	Low-cost tools to allow integration with national and international supply chains	Lack of awareness; lacking EMB infrastructure, such as national regulations, consulting capacity, security systems	Create conditions for successful participation in EMB: establish national EMB policies, including security, legal environment	Establish national EMB consultancy services; promote awareness on potential EMB	Promote awareness; undertake EMB needs assessment studies for SME sector; create subcontracting and trade support networks; promote international partnerships; promote the establishment of SME supply chain structures; advise on international EMB best practices and policies; provide capacity building for EMB consultancy and training
RE-ENGINEERING EXISTING AND CREATING NEW BUSINESS	Introduction of EMB based process and product technologies enabling increased scope for business	Limited EMB consulting and ICT training opportunities; lack of business support; international competition	Promote ICT training and awareness	Develop ICT products (software, hardware), including EMB software	IT training; demonstration of EMB applications; EMB/ICT incubators; promotion of EMB in SME clusters

ANNEXES

Annex A

SELECTED INFORMATION SOURCES

This not intended to be full list of the information sources used in preparing this study. The web sites and documents mentioned below have been selected on the basis of their value either as all-round reviews of the present state of the debate on e-business or as practical tools allowing the reader to learn more about the issues that were discussed.

Web sites

<http://www.bytesforall.org>

This is a voluntary South Asian on-line initiative. The web site provides access to information on ICT related issues, focusing on developing countries and non-profit applications of ICT, and also serves as a platform for exchanges.

<http://www.commerce.net>

Provides research for over 600 corporate members worldwide on trends in technology, applications, and business models and helps members establish new approaches to doing business over the Internet and to capitalize on emerging business opportunities. Members participate in collaborative project opportunities in R&D. Brings together vendors and end-users. CommerceNet asks a large fee for joining, but some of the studies can be downloaded free of charge.

<http://www.enterweb.org>

Annotated meta-index and information clearinghouse on enterprise development, entrepreneurship, business, finance, international trade in the age of cyberspace and globalization. The focus is on micro, small and medium scale enterprises, cooperatives and community economic development, both in developed and developing countries. Internet resources in these areas are listed and rated.

<http://www.gin.sme.ne.jp>

The Global Information Network for SMEs is a project resulting from the 1995 G7 Ministerial Conference on the Information Society. Its goal is to help develop an international environment where SMEs can exchange information on products, technologies, human resources, etc. Countries and individual organizations can join the network. So far, most participants are developed and more advanced developing countries and bodies like the International Small Business Congress.

<http://www.manufacturing.net>

This US web site combines comprehensive product and supplier databases with industrial news and editorial content and very detailed search and retrieval capabilities. It also serves as an industrial e-marketplace for all phases of the purchasing process. Good example of possible practical functions web site for the industrial sector.

<http://www.unctad.org/ecommerce>

This web site provides an overview of current UNCTAD activities with regard to EMC and also contains a list of background documentation, which can either be downloaded or ordered as hard copy.

<http://www.undp.org/info21/e-com>

Provides an overview of electronic commerce issues and of its implications for developing countries. It covers among others the impact of Internet technologies on business processes and looks at issues related to copyright and intellectual property rights. Includes an EMC ToolKit Resource Page.

<http://www.worldbank.org/knowledgebank>

Apart from outlining the World Bank's vision and programs with regard to ICT and knowledge-led development, this web site offers a large number of useful links to relevant commercial and non-commercial sites, discussion groups, etc.

Printed publications

Durlacher Corporation plc, *Business to Business EMC: Investment perspectives*, London 2000 (can be downloaded from web site <http://www.durlacher.com>)

Economist, *The New Economy – Untangling E-economics*, September 23 2000, p. 5-44

El-Nawawy, M.A., and M.M. Ismail (Internet Society of Egypt): *Overcoming Deterrents and Impediments to Electronic Commerce in Light of Globalization: The Case of Egypt* (can be downloaded from http://lyris.isoc.org/inet99/proceedings/1g/1g_3.htm)

Evans, Ph., and Th. S. Wurster, *Blown to Bits – How the new Economics of Information is Transforming Strategy*, Boston 2000

International Trade Center UNCTAD/WTO, *Secrets of Electronic Commerce – a Guide for Small and Medium-Sized Exporters*, Geneva 2000

McConnell International, *Risk E-Business: Seizing the Opportunity of Global E-Readiness*, n.p. 2000 (study of 42 countries; can be downloaded from <http://www.mcconnellinternational.com>)

Organization for Economic Cooperation and Development, “Realizing the Potential of Electronic Commerce for SMEs in the Global Economy”, report for the conference *Enhancing the Competitiveness of SMEs in the Global Economy: Strategies and Policies*, Bologna 14-15 June 2000

UN Conference on Trade and Development, *Building Confidence – Electronic Commerce and Development*, Geneva 2000 (can be downloaded from the UNCTAD web site)

UN-ECOSOC, “Development and international cooperation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy”, *Report of the Secretary General*, E/2000/52.

World Bank, “The Networking Revolution – Opportunities and Challenges for Developing Countries”, *InfoDev Working Paper*, 2000 (can be downloaded from the World Bank web site)

Annex B

SUMMARIES OF THE CASE STUDIES ON EGYPT, SRI LANKA AND UGANDA

EGYPT

EMB Framework

Egypt is the most developed country of the three in this study observed countries regarding ICT and economic development. The average per capita income of its 68 million people is around US\$ 1,200, the literacy rate is 60 per cent. Almost 10 per cent of the inhabitants have a fixed telephone connection and 2.9 per cent mobile phones (forecast mobile penetration for 2004: 9.8 per cent). While only 0.7 per cent of the population possess a PC, the Internet user rate is 7.6 per cent, indicating high interest in and high potential for EMB in Egypt. The privatization process of the GSM network was completed in April 1998, but some regulations are still obstacles to the potentially competitive environment with two operators. More than 90 per cent of the industries in Egypt are SMEs.

Main issues: opportunities and constraints

Due to the lack of telephone connectivity in rural areas, one of the main opportunities in Egypt created by the introduction of mobile telecom will be T- commerce: business by telephone. The latter is the first step towards a more structured introduction to EMB. The Government could help the business community through e-government initiatives, for example providing its statistical information and transaction procedures through EMB applications. Although it was felt that EMB could offer new business opportunities, the main constraint mentioned by the business community in Egypt was the lack of awareness of the EMB opportunities, including possible ideas for WAP applications.

Key support requirements:

An SME need analysis should be made in order to find out where the SMEs could make use of the WAP with second-generation GSM mobile technology. It was also suggested that UNIDO should establish EMB support services to assist the industry to enter into the new ways of doing business. Ericsson Egypt is starting a commercially based training facility for EMB, introducing SMEs to Ericsson's IT infrastructure for the development and marketing of WAP applications. The center could be used as a regional training center supporting EMB development in other countries of the region.

SRI LANKA

EMB Framework

Sri Lanka is a very different country from the others. Its low population growth rate (~1.3 per cent), very high literacy rate of 92 per cent, high general education and a concrete ICT strategy by the government promise a high EMB potential in Sri Lanka. The GDP per capita amounts to US\$ 829 (1999) and 3.05 per cent of the almost 20 million inhabitants have fixed telephone lines. A huge growth in mobile penetration is

forecast for the next years, from 2.2 per cent in 2000 to 12.8 per cent in 2004. However, only 0.5 per cent of the population owns a PC and the Internet user rate is even less than half that figure, according to industry officials. WAP was introduced in July 2000. The Information Technology Committee of Sri Lanka (CINTECH) has already prepared an IT policy, an e-commerce policy and an electronic transaction act for approval by the government (see Annex D).

Main issues: opportunities and constraints

Lack of awareness, low bandwidth, high costs and low speed were mentioned as major constraints for EMB in Sri Lanka. Since e-commerce among local companies has to take place via dollar transactions, the need for a local payment system was emphasized. It was considered important to increase the accessibility to rural areas. This could be done by increasing the areas covered by mobile operators. New mobile licenses could for example have rural coverage requirements. Proper technology training and financial support were mentioned as requirements for EMB success. According to the private sector, the Government should adopt more market-oriented approaches in promoting EMB.

Key support requirements

The SME sector would require support for EMB related services. The establishment of local payment systems was felt to be a particularly important step towards the national use of EMB. The Industrial Technology and Marketing Information Network, ITMIN, which was established by UNIDO to provide information and value-added services to SMEs, could be instrumental in providing EMB solutions. Support is needed to provide standards and quality guarantees for exports via web-based transaction systems.

UGANDA

EMB Framework

With a GDP per capita of US\$ 347 (1998), Uganda is one of the poorest countries in the world. The literacy rate is 61.8 per cent. As in most Sub-Saharan countries, the relatively high population growth rate (2.72 per cent in 1999) is a main obstacle to economic development. Only 0.25 per cent of the 24 million inhabitants have fixed telephone connections and around four times as many have mobile phones (1.1 per cent). Mobile penetration is expected to grow heavily in the next years and may reach 9.4 per cent in 2004. However, the call cost per hour of US\$ 8.4 is very high if average incomes are taken into account. The number of personal computers is quite limited, 0.14 per cent of the population possesses a PC and only 1.41 per cent uses the Internet regularly. The liberalization of the telecommunication industry is still not completed.

Main issues: opportunities and constraints

The business community in Uganda is quite positive about the future potential of EMB. They expect an impact for the SMEs in terms of improved communications, productivity and profitability. In particular for SMEs in the rural areas, where

telephone lines are scarce and electricity supply unreliable, mobile telecommunications would create important business opportunities. As immediate B2B opportunities in Uganda, on-line computer repair, software troubleshooting and the tourist industry were mentioned. Due to the high level of informal trading and banking, mobile payment systems offered through m-commerce are expected to play an important role in Uganda. Secure online payment technologies would help Uganda to compete in the global market

Again, the issue of awareness emerged, requiring a national effort to promote the issue of EMB to the business community as well as Government officials. Other problems mentioned were the high cost of hardware and Internet access, high cost of web site development, lack of national regulations, local payment systems, security risks and infrastructure problems. Furthermore, the SMEs felt a need for executive training outside normal office hours.

Key support requirements

Uganda's immediate needs are awareness and preparation of the business community as well as a regulatory environment for EMB. There is a draft IT policy, but the EMB policy must still be elaborated. Telecenters for e-business that could be linked with the existing initiatives in Uganda would be an important EMB tool for rural SMEs. The District Promotion Centers established by UNDP could also be mini Internet service providers and/or telecenters, linked to the recently established business information support entity, UBINnet.COM. The latter could also look into providing some form of certification for quality of web sites for EMB. Alternatively, some form of trust certification by insurance companies could be set up to generate trust for a local payment gateway, making it possible to pay for goods and services from rural locations through EMB without using banks.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. Private sector sources indicate that the penetration rate of mobile phones will increase steadily in the developing countries, making the potential for EMB in these countries very high.
2. In particular where fixed telephone lines are not available, mobile penetration could spread rapidly. The developing countries could leapfrog an ICT development stage, avoiding costly investments in building up a fixed network.
3. Mobile telecommunications are mainly provided in capital cities; rural areas and smaller cities are not considered commercially interesting for Internet providers and mobile network operators.
4. In many developing countries, the cost of ICT is quite high, preventing local SMEs to purchase ICTs and enter into EMB.
5. There is a huge lack of awareness in the developing countries about the potential of EMB could provide and possible industrial applications. Without assistance

programs to support SMEs, EMB applications might not take off as fast as they could.

6. Due to high prices and low bandwidth, the spread and use of mobile Internet applications by SMEs in developing countries is still very low. However, the use of Wireless Application Protocol (WAP) would accelerate with the introduction of new technologies (Sri Lanka and Egypt will introduce GPRS in 2001).
7. The mobile phone as a payment tool with e.g. pre-paid cards will be important for SMEs. However, the most important development is the availability for SMEs in rural areas to access the Internet using new mobile telecommunication with high-speed connectivity at relatively low prices.
8. High-speed Internet access enables SMEs to use Application Service Providers (ASPs) who provide on-line software services on-demand to the SMEs from a central location. The latter would save investment in IT.
9. An important issue to enable international EMB is the quality of the content and the trust of reliable transactions that offered via the Internet and mobile pages.
10. Based on the existing technical infrastructure for the GSM technology, the developing countries can increase bandwidth in the short term without large investments by introducing new mobile technologies, such as HSCSD, GPRS and EDGE.
11. There is a lack of local payment systems and credit cards, required for EMB.

Recommendations

1. Governments should consider the mobile telecommunications network infrastructure as a public investment, which is as important as the overall infrastructure build-up. Since rural SMEs will be able to do more business with improved access to the Internet, creating that infrastructure should not be left to the private sector alone. One way to achieve this outreach objective is to include requirements for rural coverage when issuing new licenses.
2. Governments should formulate national IT and EMB policies as soon as possible, and include issues like promotion and awareness, legal framework, security, liberalization and financing. Import taxes on ICT should be kept as low as possible, in order to make it affordable for SMEs to purchase hardware and software.
3. SME associations, Chambers of Commerce and Industry and other SME support institutions should actively promote EMB by providing information on international EMB trends, new opportunities and best practices, and promoting awareness. They should support common activities and campaigns, e.g. newsletters, training or even create a web portal for small enterprises.
4. In order to promote international EMB for local industry, guarantees and standards are required. Among others, a certification authority for the content of

Internet pages would be needed. Such an authority should be supported by the government but have its basis in self-regulation by the business community.

5. SMEs should be supported in the introduction of EMB by training, credit and other EMB services, including support for local payment systems, so that they can gather experience as early as possible. It is essential to be fast in order to establishing a close customer relationship, acquiring new clients and stepping into new markets. WAP applications could be developed by local SMEs. This would be a new area of SME activity, with the advantage that the income generated by the use of WAP applications will stay within the country.
6. Network operators and service providers can support SMEs with good infrastructure, including a high bandwidth, high coverage as well as a sensible and acceptable price policy. It is therefore important that network operators and service providers be encouraged to invest in new technologies in order to facilitate companies to become more competitive on the international market.
7. In view of the limited possibility for SMEs in rural areas to access, it would be necessary to establish rural EMB centers which can be integrated with existing rural support centers, such as telekiosks, telecenters, technology access community centers, etc. These centers should be able to provide not just access, but also additional services in support of EMB development.

Annex C
A NOTE ON UNCITRAL'S MODEL LAW ON ELECTRONIC COMMERCE
AND DRAFT UNIFORM RULES ON ELECTRONIC SIGNATURE

(For full texts, see the documents section of <http://www.uncitral.org>.)

UNCITRAL's Model Law on Electronic Commerce

The Model Law on Electronic Commerce, adopted by UNCITRAL in 1996, aims at facilitating EMC by providing a set of internationally acceptable rules and legal principles which governments can use to remove uncertainties about legal aspects of EMC. A Guide to Enactment provides legislators and those involved in EMC with explanations on the meaning of the various provisions of the Law.

The law establishes a number of key principles with regard to such issues as the legal validity of electronic information, the admissibility of electronic messages as legal evidence and definitions of "writing", "signature" and "original" in an electronic message.

Since its adoption, the Law has been used by a number of countries to address legal problems connected with EMC; in some cases, the Law has been incorporated in national legislation.

UNCITRAL's Draft Uniform Rules on Electronic Signature

Upon completion of the Model Law on Electronic Commerce, UNCITRAL started work on uniform rules that would help to promote trust in EMC. Initially, work focuses on digital signatures and certification authorities. The Draft Rules are intended to cover all forms of electronic signature, independent of technology. Signature technologies capable of providing a higher degree of reliability are described as "enhanced electronic signatures".

Work on the Draft Rules has so far covered issues like party autonomy, requirements for signature, responsibilities of signature device holders and suppliers of certification devices, cross-border issues, etc. It is expected that the Draft Rules will be completed in 2000. A Draft Guide to Enactment, serving the same general purpose as the Guide for the Law, has been prepared as well.

Annex D
**AN OUTLINE OF SRI LANKA'S PROPOSAL FOR A NATIONAL
 INFORMATION TECHNOLOGY POLICY**

The draft proposal for Sri Lanka's National Policy for Information Technology singles out information technology (IT) as one of the key factors for promoting all spheres of economic development. The proposal covers the following issues:

Governance

The apex agency for IT, the Council for Information Technology (CINTEC) is to be entrusted with all the tasks of policy formulation, review, implementation and monitoring. CINTEC is to be represented on the relevant policy bodies for the main sectors of economic and social development. Standards on IT education, quality of products and services will be determined and applied by CINTEC in collaboration with the relevant agencies.

Public finance and administration systems and development banks are to be encouraged to adopt IT-enabled information sharing and delivery. Legislation to facilitate e-commerce will be introduced.

Human resources development

IT-related HRD is to receive the highest priority, and is to be introduced at the primary and secondary levels. There will be incentives for the training of trainers for the different levels of IT education, and a system of national examinations for the different employment levels in the field of IT will be set up. The universities are to be encouraged to play a greater role in IT-related HRD, with an emphasis on professional courses in emerging technologies. To facilitate this, close liaison between the universities, research institutions and industries has to be established.

Infrastructure

Telecommunications within the country and international linkages are to be improved. Transmission and delivery through the highest economical bandwidth, security and privacy and affordability for users are to be given highest priority. The Internet is to be used to maximize the scope of coverage, reach and content provision and also to minimize the cost of telecommunications to users.

IT and the business sector

Financial institutions, commercial banks and enterprises are to be encouraged to introduce new technologies that will steer the business sector towards electronic commerce and other forms of IT use. Assistance and guidance is to be provided to enterprises in using IT for research and analysis, information sharing and delivery and decision making. The IT industry, including new investments, is to be promoted by providing fiscal and other incentives, including special zones.