

# Vietnam's ICT Enabling Environment: Policy, Infrastructure and Applications

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## A Synthesis of Findings

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**Vietnam: ICT Assessment Synthesis Report**

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## Abbreviations and Acronyms

ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
APEC	Asia Pacific Economic Cooperation
ASEAN	Association of Southeast Asian
ASP	Application Service Provider
BCC	Business Cooperative Contracts
BTA	Bilateral Trade Agreement (U.S. – Vietnam)
CIDA	Canadian International Development Agency
CPNET	Government-to-Government Intranet for National and Province Governments
CPV	Communist Party of Vietnam
DGPT	Department General for Post and Telecommunications
DOT Force	G-8 Digital Opportunity Task Force
FDI	Foreign Direct Investment
HCMC	Ho Chi Minh City
ICP	Internet Content Provider
ICT	Information and Communication Technologies
IFC	International Finance Corporation (WB)
IPR	Intellectual Property Rights
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunications Union
IXP	Internet Exchange Provider
JICA	Japan International Cooperation Agency
MCI	Ministry of Culture and Information
MPI	Ministry of Planning and Investment
MOET	Ministry of Education and Training
MOF	Ministry of Finance
MOI	Ministry of Industry
MOSTE	Ministry of Science Technology and Environment
MOT	Ministry of Trade
OECD	Organization for Economic Cooperation and Development
SME	Small and Medium Enterprise

SOE	State Owned Enterprise
SRV	Socialist Republic of Vietnam
UNDP	United Nations Development Program
USAID	U.S. Agency for International Development
USD	U.S. Dollars
USTAD	U.S. Trade and Development Agency
VIETRADE	Vietnam Trade Promotion Agency (Ministry of Trade)
VAT	Value Added Tax
VCCI	Vietnam Chamber of Commerce and Industry
VDC	Vietnam Data Communications
VND	Vietnam Dong
VNPT	Vietnam Posts and Telecommunications Corporation
VTI	Vietnam Telecommunications International
WB	World Bank
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

# Vietnam ICT Assessment: Synthesis of Findings on ICT Policy, Infrastructure and Applications

## Executive Summary

In the past several years, a number of assessments have been carried out to examine Vietnam's capacity to participate in the global digital economy, otherwise referred to as “E-Readiness.” An assessment carried out in the fall of 2001 by the U.S. Agency for International Development (USAID) examined the status of Vietnam’s enabling environment to support the use of information and communication technologies (ICTs) for sustainable development. This involved extensive interviews with key stakeholders within government, business and donor communities, as well as analysis of available documentation and data on government policy, infrastructure and ICT applications. Since then, the ICT environment in Vietnam has continued to evolve with increasing government emphasis on developing the use of ICTs to support socioeconomic goals. In order to support this growing momentum and to disseminate these findings more broadly, this report reflects a synthesis and update of the USAID ICT assessment and provides recommendations for priority government actions and strategic donor assistance (*see List of References in Annex A*).

## 1. ICT Sector Overview

Vietnam’s socioeconomic development framework assigns ICTs a strategic role in accelerating Vietnam’s transition to a knowledge society and integration into the global economy. In the past several years, several important strategic and policy initiatives have been undertaken to focus national ICT goals and targets for the period 2001-2010. The most important of these, Directive 58 issued by the Communist Party of Vietnam (CPV) in October 2000, reflects official policy guidance for government to plan and implement programs in support of the following goals on the use and development of IT:

- To create an enabling environment for the use and development of IT in support of modernization;
- To ensure widespread and efficient use of IT in all sectors;
- To develop the national information network to reach global levels in coverage, quality and costs;
- To develop human resources to support the use and development of IT; and
- To develop the IT industry as a spearhead economic sector with an increased contribution to GDP growth.

A series of government decisions have subsequently been enacted to guide the implementation of Directive 58, including the establishment of an inter-ministerial IT Steering Committee tasked with developing a National IT Master Plan (2002-2005). Although Directive 58 introduces socioeconomic development to the visions and goals of

IT, the most recent draft IT Master Plan continues to focus heavily on the development of the IT industry while underplaying the crosscutting role of ICTs as an enabler of development in all sectors (*see Annex B for Summary of Government ICT Policy and Program*). A review of findings from numerous studies on Vietnam’s “E-readiness” underscores Vietnam’s rank among countries as the least equipped to prosper in the networked economy in terms of ICT policy and regulatory framework, telecommunications infrastructure, business and trade environment, and human resource base. While the findings indicate that government leadership and political will is strong and recent network dynamics are promising, key bottlenecks remain (*see ITU Telecommunications Indicators in Annex C and Summary of E-readiness Findings in Annex D*).

## **2. An Agenda for Reform**

Beginning with Vietnam’s “doi moi” renovation policy and market reforms in the late 1980’s, the government has cautiously pursued a more liberalized environment to promote market competition and global competitiveness – more recently through the development of the IT industry as a leading economic sector. Yet, persisting government control of the telecommunications sector as a matter of national security impedes Vietnam’s ability to harness the full potential of new digital opportunities to promote sustainable development and economic growth. While trends toward market liberalization are expected to accelerate in the next few years in response to Vietnam’s multilateral trade commitments (e.g., AFTA, ASEAN, BTA and WTO negotiations), restrictive telecom policies will have to be reconciled with the government’s broader socioeconomic goals. As observed by the ITU, “Vietnam is at a turning point: Should it persist with a model of state control or should it move to a free market model? The Internet, a potent symbol of civil liberties, lies at the heart of this dilemma. Can a socialist model of government be reconciled with a user-friendly Internet?”

Assessment findings highlight a number of key constraints in the policy and regulatory environment and institutional capacity that need to be addressed simultaneously if Vietnam is to seize strategic leapfrogging opportunities for socioeconomic development through the use of ICTs. These include:

- ♦ Lack of adequate competition in the telecommunications sector stalls growth and contributes to high telecom costs and poor service delivery;
- ♦ Restrictive regulations governing foreign investment in the telecommunications sector limit funds for capital expansion and growth in infrastructure and service delivery;
- ♦ Lack of strategic goal alignment in government policy for applying ICTs as an enabler of development in all sectors;
- ♦ Government preferential policies (subsidies and tax incentives) targeted to the IT industry ignore ICT needs of all enterprise;
- ♦ Lack of independent regulatory framework and transparent rulemaking procedures;

- ♦ Unequal ICT access, particularly between rural and urban areas;
- ♦ Lack of legal framework and e-payment systems for e-commerce;
- ♦ Weak enforcement of judicial system (e.g., IPR protection, consumer rights, arbitration procedures);
- ♦ Inadequate institutional capacity to apply ICTs widely and effectively due to a weak educational system and poorly organized bureaucracy; and
- ♦ Lack of awareness in government, business and social sectors of the full potential of ICTs as an enabler of sustainable development.

### **3. Recommendations**

Based on a synthesis of findings from this review, the following measures are proposed for government consideration in implementing its National IT Master Plan and areas for strategic donor assistance:

#### **Policy and Regulatory Framework**

- Strategic coordination of ICT policy goals and programs and a shared vision of the benefits of ICTs is needed among government, private sector and donor groups to identify overlapping goals and leveraging opportunities. A national consultative process among key stakeholders from all sectors is recommended to promote this shared vision and to mobilize strategic partnerships across sectors.
- Measures to promote a more rapid liberalization of telecommunications sector is needed to encourage foreign investment and private sector development. This includes loosening restrictions on telecommunications service delivery sector and regulation of content (i.e., the national firewall).
- Regulatory reforms are needed to separate regulatory, policy-making and operational functions and authority in DGPT and VNPT; and a national consultative process involving all stakeholders (i.e., users, service providers and private sector) should be undertaken to identify bottlenecks to streamlining the rulemaking process.
- Telecommunications licensing procedures need to be streamlined and simplified; the number of telecommunications service providers should be increased; restrictions on content through ICP licenses and the national firewall should be replaced by general guidelines that allow self-regulation; licensing for Internet cafes should be liberalized and legal status clarified; and official support should be considered for franchising schemes.
- A rebalancing of price between domestic and international service and between urban and rural service towards regional norms is an urgent priority. Economic modeling could demonstrate the value added of expanding the Internet user base through lowered costs.

- A strategic plan is needed to develop “the last mile” in connectivity and access for underserved rural areas outside the current telecommunications backbone. Consideration should be given to incentives to develop rural network infrastructure, as well as to subsidized Internet access at educational institutions and community centers (e.g., telecentres).
- Government preferential policies targeted to the IT industry (software and hardware sectors) should be aligned with policies to promote business use of ICTs in all enterprise. In particular, VAT and income tax laws need to be reviewed.
- An enabling framework for E-Commerce and E-Trade needs to be developed, including policy and legal provisions for strengthening financial and banking systems, security measures, and consumer financial services.
- Legislative and enforcement measures are needed to control the rampant software piracy and to assure the protection of intellectual property rights of both foreign and domestic software developers.

### **National Absorptive Capacity**

- Strengthen institutional capacity of intermediaries in government, education and private sectors to deliver ICT services (e.g., education and training; hardware and software applications, etc.);
- Rapidly expand digital literacy programs for different segments of the population throughout the country (e.g., public sector workforce; private sector workforce; schools and communities; and disadvantaged groups including youth, women, ethnic minorities);
- Establish key competencies and assessment criteria for digital literacy programs;
- Curriculum development and human resource planning in the education sector should be linked to performance needs rather than target-based;
- A CIO structure should be introduced within government administration to develop a unified state management information system that integrates public administrative reform with computerization goals;
- Integrate sector-based information management systems and technical databases into a national information network with feedback mechanisms to facilitate knowledge sharing and networking across social sectors at local, national and global levels;
- Establish a knowledge base of global best practices and local lessons learned from ICT applications, which is supported by baseline measures and broadly disseminated to all stakeholders across sectors.



# Vietnam ICT Assessment: Synthesis of Findings

## I. Background: Global Context

In the context of an increasingly globalized world, the emergence of a knowledge-based economy challenges developing countries to adjust or be excluded. Comparative advantage of nations is now expressed as the ability to acquire, organize and disseminate information through digital technologies and communication networks. For developing countries, the challenge of a knowledge-based economy is not the scarcity of knowledge, but inadequacies in diffusing and using it. This requires an adaptable workforce that is receptive to innovation and change and an education system that can provide continuous learning opportunities for workers to remain competitive. Countries with widespread access to telecommunication networks, the existence of an educated labor force and consumers, and the institutional capacity to promote knowledge creation and dissemination will thrive in the new economy. Against this background, Vietnam is a significant disadvantage.

***“The danger faced by all is that the gap between the frontrunners of the networking revolution and those lagging behind may grow larger and that the digital divide may reinforce patterns of growing inequality both internationally and within countries.” –DOTForce 2001***

Both between and within countries, access to these tools and networks and the new “digital opportunities” they create is extremely uneven, in ways that both reflect and exacerbate existing inequalities. Based on a UNDP analysis, world inequalities have been rising steadily for nearly two centuries in terms of per capita GDP. Corresponding trends in the global distribution of ICT services reflect a digital divide between industrialized countries and the rest of the world in the development of national information infrastructures.<sup>1</sup> If countries cannot take advantage of new digital opportunities, these same forces may reinforce and deepen current economic and social divides. As cautioned by a recent global task force on ICTs, “the gap between the frontrunners of the networking revolution and those lagging behind may grow larger,”<sup>2</sup> which has serious implications for economic growth, sustainable development, and global security.

Yet, these same observers herald the potential of ICTs to address these gaps once access is assured, and point to growing evidence that ICTs can advance poor nations’ development goals in alleviating poverty and social and economic inequities. Some suggest that ICTs will support a global transformation of society as significant as the Industrial Revolution, in which “information technology and the ability to use it is the critical factor in generating and accessing wealth, power and knowledge in our time.”<sup>3</sup> Growing awareness of the enabling role of ICTs in supporting social and economic development and global competitiveness has mobilized governments to develop multisectoral national ICT strategies, and has led multilateral and donor organizations to re-examine aid assistance strategies.<sup>4</sup> The Government of Vietnam’s socioeconomic development framework assigns ICTs a strategic role in accelerating Vietnam’s transition to a knowledge society and integration into the global economy.<sup>5</sup> While access to digital networks is critical for participation in the global economy, the capacity to assess, adapt and apply new ICT tools is equally important.

Numerous recent assessments of countries' "E-Readiness," or capacity to participate in the global informational economy, underscore Vietnam's position in the region as the least equipped to prosper in the networked economy. Vietnam's commitment to become a full participant in the global knowledge-based economy is reflected by its growing membership in a number of regional and international organizations and conventions. While APEC and ASEAN trade agreements will require a degree of regional harmonization of ICT infrastructure, measures required under the BTA and WTO agreements will shape the deployment and use of ICTs as a strategic component of its economic development strategy. Strong government commitment to develop a market economy while adhering to socialist principles that include state control of information, however, has important implications for the government's policy and regulatory environment to support the deployment and use of ICTs in Vietnam. The following discussion presents the context for a broadened national policy to integrate ICTs effectively into development priorities and offers some recommended actions to mobilize leadership, community resources, and donor assistance to support ICT applications.

## II. ICT Sector Overview: Enabling Conditions

### 1. Policy and Strategic Framework

The Government of Vietnam has made the development of the information technology (IT) sector one of its highest economic priorities for the coming decade. The dawn of the millennium was a true watershed for IT development in Vietnam in terms of government policy and regulatory reforms. Partly spurred by a regional strategy formulated through ASEAN for harmonizing ICT development in the region,<sup>6</sup> a national strategy articulated by the Communist Party's Politburo (Policy Directive #58) pushes IT toward the forefront of the country's industrialization drive for the period 2000-2010. To implement this directive, the government announced specific IT targets for 2005 (PM Decision #81) in four major government program areas that are heavily focused on developing an export-oriented IT industry: 1) upgrading the telecommunications and Internet infrastructures; 2) development of the IT human resource base; 3) developing the software industry; and 4) developing the hardware industry.

A series of government decisions has subsequently been enacted to guide the implementation of Directive 58, including the establishment of an interministerial IT Steering Committee tasked with developing a National IT Master Plan (2002-2005). Contents of the current Plan address the need to dramatically expand its national information infrastructure; strengthen the capacity of its human resource base (especially IT professionals); and liberalize the legal and regulatory environment to encourage foreign investment and growth of the IT sector. Although Directive 58 introduces socioeconomic development to the visions and goals of IT, the most recent version (April 2002) continues to focus heavily on the development of the IT industry while underplaying the crosscutting role of ICTs as an enabler of development in all sectors.

Numerous ministerial and provincial level action plans for IT development are also being developed, but it is not clear how whether they are complementary and sufficient to support the established goals: e.g., IT Master Plan for E-Commerce (Ministry of Trade); Master Plan for Education and Training (MOET); Master Plan for Telecommunications (MOSTE); and IT Master Plan for agriculture and rural development (MARD); and Hanoi and HCMC Peoples' Committees. Other government policies that intend to strengthen the institutional environment to support the deployment and utilization of ICTs include

#### **Key Policy Developments**

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- Party Directive 58 sets national priority to accelerate IT to support modernization; and PM Decision #81 sets targets for deploying and applying ICTs for the period 2001 – 2010.
- Resolution #7 and Decision #128 establishes preferential policies to support the software industry; and #19 for hardware industry.
- National Public Administrative Reform Strategy aims to re-engineer and modernize government operations.
- Decision #112 provides direction for computerizing administrative systems within the government.
- Decree #55 liberalizes ISP service delivery allowing competition from private sector participation.
- Decision #158 approves DGPT 's Telecom Master Plan and opens up telecom service delivery to more operators.
- Establishment of interministerial IT Steering Committee under MOSTE to explore policy and structural reforms, including one entity to govern ICTs in the future;
- National IT Master Plan for 2001-2005 pending review by PM and submission to National Assembly.
- Other ICT Master Plans developed at ministry and provincial levels to support different sectors (e.g. MOT E-commerce, MOET, MARD, DGPT Telecom).

guidelines for the computerization of government operations (Decree #112); the re-engineering and modernization of public administration systems (Decision #136 on Public Administrative Reform); Decisions #128 and 19 on incentives to support the IT industry; Decision #158 approving DGPT's Telecommunications Development Strategy; and Decree #55 which liberalizes ISP service delivery and allows competition from the private sector. (See *Summary of Government Policy and Program in Annex B*)

## **2. Legal and Regulatory Environment**

### **2.1 Legal Framework**

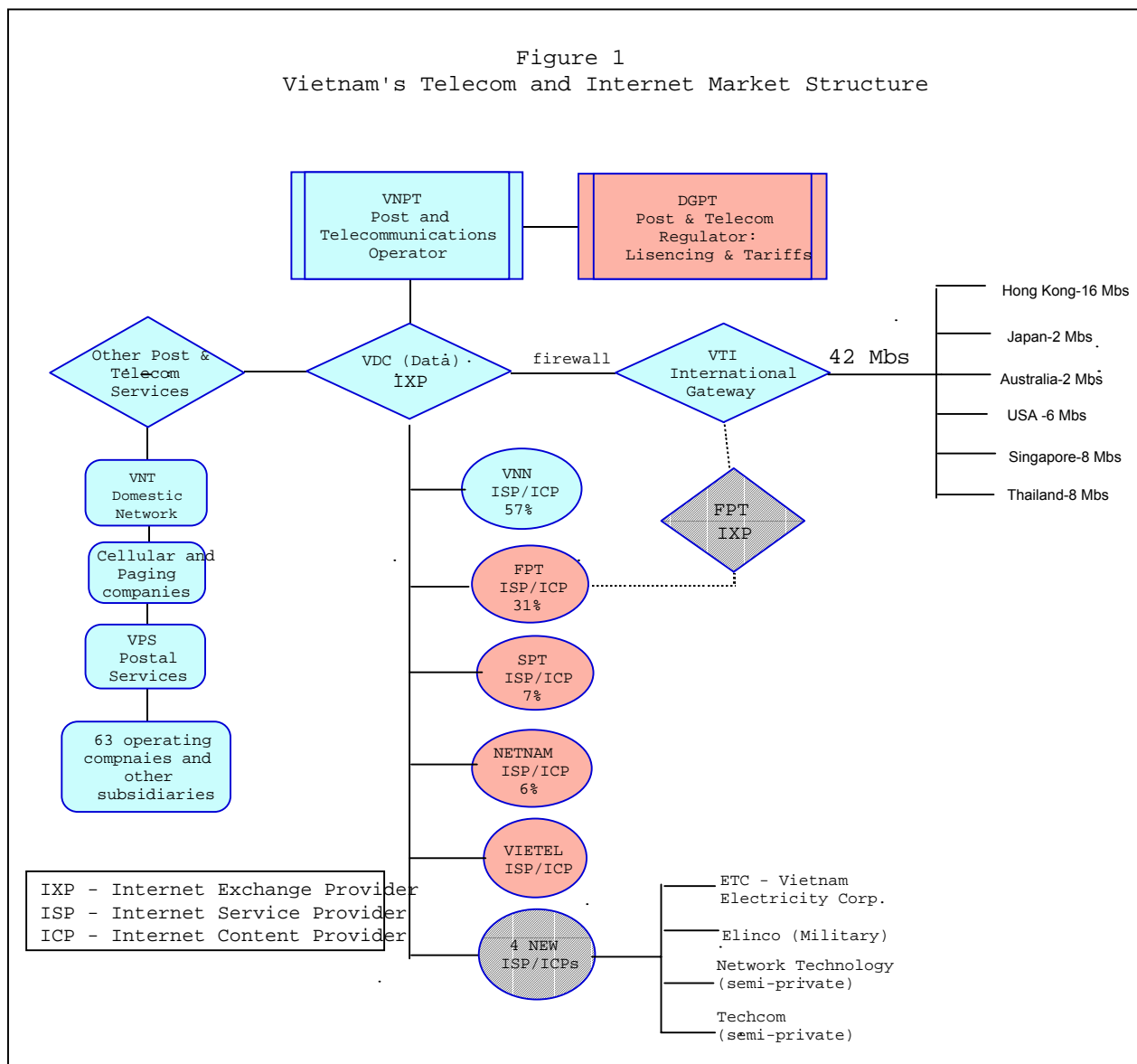
While there is no one law specifically on telecommunications, the current regulatory framework is a patchwork of different commercial regulations and decrees, ranging from who qualifies as an ISP license and tariffs to the rules regarding foreign investment. The primary regulatory agency is the Department General of Posts and Telecommunications (DGPT), which has responsibility for developing policy and establishing laws and standards for telecommunications and postal services; regulating tariffs and fees; and issuing licenses for all services. Although established as a separate entity in 1995, DGPT shares decision-making authority over state-owned telecommunication services with the Post and Telecommunications Ministry (VNPT), which some have observed, "remains far more powerful."<sup>7</sup> A new Telecommunication Act being drafted by is expected to define the regulatory framework (separate policy and regulatory functions), introduce a measure of liberalization, establish a separate ministry-level entity to coordinate the IT sector, and clarify the roles of different players already licensed. The Act is also expected to respond to pressures for increased private sector participation in the telecommunications sector to support the terms and conditions of the BTA and WTO negotiations.

### **2.2 Telecommunications Service Providers**

The Government dominates the telecommunications sector in Vietnam. Under regulatory guidance from DGPT, the Vietnam Posts and Telecommunications (VNPT) participates in almost all activities and enterprises in the sector. As the largest telecommunications provider, VNPT is a conglomeration of SOEs that offers a full complement of telecommunications services, including R&D, training, manufacturing, cellular, paging and Internet services (both ISP and IXP). Since 1997, nine ISPs have been licensed to provide Internet services and are subject to VNPT's control over the international gateway and interconnection tariffs. Of these, two are semi-private.<sup>8</sup>

As reflected in Figure 1 below, VNPT represents an effective monopoly over most forms of telecommunication. In addition to controlling the country's two cellular phone operators (Vinaphone and Mobifone), VNPT has the market share of Internet hosts (58%) through its subsidiary Vietnam Data Communications (VDC). VDC also controls firewalls at each ISP, which restrict access to several TCP/IP protocols, in addition to censoring sites considered to be politically or socially sensitive. Until very recently, VDC has been the only Internet Exchange Provider (IXP) in Vietnam. Two more IXP licenses have recently been issued (FPT and ETC),<sup>9</sup> and plans to award 3-5 IXP and 30-40 ISP licenses by 2005 are included in the government's Internet Development Plan (Decision #33). Until these

new operators come on line under other arrangements, VNPT still maintains an effective price monopoly over the international gateway. Figure 1 below reflects the government’s dominant role in the control of the Vietnam’s telecom and Internet market structure.



### 2.3 Licensing and Tariffs

The licensing process for telecommunication services is lengthy and not well coordinated among overlapping national, provincial and local licensing requirements. In addition to control through the national firewall, web-based content is controlled through licensing agreements with the Ministry of Culture and Information. There are about 20 authorized Internet Content Providers (ISPs and media organizations). While private companies don’t need a separate license for website development, they must be hosted by an ICP. Although Internet and telephone rates have been dropping in the recent past, the ITU notes, “Interconnection fees and lease lines are 30 percent more than the regional average.”<sup>10</sup>

Vietnam maintains a high net margin between the retail price of a call and the international “settlement rate,” which provides the government with a healthy cash flow. American Chamber of Commerce notes that American companies located in Vietnam consistently claim their monthly telecommunications bills run US \$20,000 to \$30,000 USD (100 times more than in the U.S.)<sup>11</sup> Domestic tariffs are also subsidized and not closely aligned to cost: i.e., the tariff for connection in the cities is higher than for rural areas, where real costs are much higher. Licenses to operate Voice Over Internet Protocol (VoIP) have recently been issued to three ISPs, which has cuts costs by half for domestic and international long distance calls. VNPT’s new network with GPRS technology is expected to bring costs down to regional levels by the end of 2002 (*see section III.1 below*).

### **3. Economic and Business Environment**

Two laws to support business development were recently introduced and have important implications for the growth of the IT sector. The Foreign Investment Law enacted in May 2000 has led to an improving environment for foreign investment in recent years. This Law relaxed past limitations on ownership that now permit a foreign firm or individual to wholly own a private sector business within Vietnam—except for the nationally-sensitive telecommunications sector. While joint ventures with foreign partners are expected to gradually be allowed under the Telecommunications Act, the only allowable role at present is via Business Cooperative Contracts (BCCs) where private domestic and foreign investors provide investment capital (mostly technology and network infrastructure) and receive a negotiated return on their investment for a prescribed number of years. Japan, France, Australia, the USA and Sweden hold BCCs in fixed lines, international gateways and mobile cellular services.

BCC arrangements, however, require massive investments and training commitments without any operational power in return, which has led to growing resistance among foreign investors to pursue further BCC arrangements. Growing competition in the region for prospective investors and the current contraction in global growth has also added pressure for the government to accelerate private sector participation in both infrastructure and service delivery.

#### **Key Private Sector Developments**

- ♦ Improved foreign and domestic investment climate through two laws: Foreign Investment Law and Enterprise Law—both enacted in 2000.
- ♦ Private sector investment in telecommunications is currently limited to BCCs (but is expected to liberalize under BTA).
- ♦ IT sector growth is domestically-oriented and hardware driven (hardware sales 80% of domestic demand in 2000, and (70 percent of new PCs sold in 2001 were locally assembled;); goals are to shift to export orientation through software sales by 2005.
- ♦ 300 IT companies operate in Vietnam (one third domestic); of these, 50 in software production and 100 in software services.
- ♦ State-of-the-art software and IT parks are being established throughout country (HCMC, Danang and Hanoi) thru public/private partnerships.
- ♦ Business and trade organizations support expanded use of ICTs in the wider business community through training and awareness raising activities (e.g., VCCI, VAIP, VIETRADE).
- ♦ IT education and training delivery to meet demand is being supported by a growing number of foreign partners (e.g., RMIT/Australia; ApTech/India, NITT/Japan, Microsoft, Cisco, etc.).
- ♦ Growing market confidence in Vietnam’s business climate is evident through two recent contracts: IBM plans to set up a software development center; and public sector contract for outsourcing has been signed by a US state-level government agency.

A second law contributing to an improved business climate for domestic investment is the two-year old Enterprise Law that abolished 100 licensing requirements and streamlined procedures to allow for easier registration of new companies (e.g., in 2000, 14,000 new private SMEs registered). Since the majority of 30,000 private firms in Vietnam are SMEs, which represent the second largest contributor after the oil industry to the national budget, strengthening their capacity to apply new ICT tools will bear on the country's future competitiveness and participation in international trade.

The IT sector in Vietnam is quite young, but very dynamic and experiencing rapid growth. Government support for the IT sector includes a number of tax incentives and subsidies for IT firms and the software industry, which is based on the perceived competitive advantage in Vietnam of a highly capable work force and relatively low wages. IT and software parks being established throughout the country have the added benefits of subsidized high-speed lease lines which are intended to operate outside the national firewall. The sector is currently domestically oriented and hardware driven (i.e., hardware accounted for 80 percent of the domestic demand for IT services and products in 2000). Government strategy to increase software sales to 60 percent of the market by 2005 is based on an aggressive expansion of export markets and outsourcing contracts.<sup>12</sup>

#### **4. Human Resource Base**

Government targets to develop its IT capacity as an engine of economic growth by 2005 include important educational reform objectives. In recognition that the "quality of education and training in the country does not meet current socioeconomic development demands,"<sup>13</sup> government plans to upgrade Internet infrastructure include providing access for all higher education institutions and 70 percent of middle schools by 2005. MOET envisages the use of IT as a teaching and learning tool to promote "innovative thinking, independent problem-solving skills, and information searching and processing skills to facilitate life-long learning for all."<sup>14</sup> MOET's IT Master Plan includes goals to improve curriculum and instructional methods, as well as develop infrastructure, computer networks, and local content to support an educational management system. MOET intends to establish a nationwide intranet linking all academic institutions (i.e., *Edunet*) that will serve as a national coordinating center for network management and content development.

There are an estimated 20,000 public education institutions in Vietnam that include 10,000 primary schools, 5,000 lower secondary schools, and 1,500 upper secondary schools with an estimated enrollment of 22 million students. Plans to provide Internet to secondary schools in the next few years will require major efforts to increase computer literacy skills among teachers and students, as well as to integrate the use of ICTs into the curriculum. At present, the current pool of IT university graduates numbers about 20,000, and about 2,500 are produced each year by Vietnam's 20 IT university faculties around the country. In addition, 45 technical colleges and 67 vocational schools provide IT instruction. Yet, this capacity falls short of government targets of 50,000 IT professionals by 2005. Moreover, the skills of the current pool of 20,000 IT university graduates are not being fully utilized, since only about half are working directly in the IT industry.

In addition to the need for a dramatic increase in the numbers of technically qualified graduates, there is an urgent need to significantly improve the quality of IT education and information literacy skills at the university and college levels. The government education system has been slow in upgrading its curriculum to keep pace with the new digital tool sets being deployed. Inadequate English language skills is an important constraint to competing on the global market since the IT sector is largely based on English language tools and content (i.e., about 75 percent of web-based content is in English). While the education fundamentals in IT appear to be very solid, and the students very capable, they lack adequate opportunity for hands-on experience and practical training in new ICT tools and techniques. Employees must go through extensive search efforts to find a limited number of qualified graduates, and/or invest in their own in-house education programs to develop the needed skills and capabilities. A recent recruitment notice for IT specialists by a Singapore firm yielded only 3 qualified candidates out of 1,000 applicants!

### **IT Human Resource Base**

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- IT higher education programs are not producing the needed numbers of technically-qualified graduates;
- The quality of IT university graduates is not currently up to international standards;
- Current Internet access is limited in formal education institutions at all levels;
- English language skills are limited and instruction is lacking in education system (particularly at secondary school level);
- Lack of practical opportunities with Internet based tools in formal education

The poor quality of Vietnam's education sector and human resource environment was observed in a recent cross-country comparison of neighboring countries based on a selected number of human resources variables.<sup>15</sup> Vietnam ranked low in virtually all categories with Indonesia being the only country in the region with a lower consolidated score than Vietnam! While Internet access capability includes about one third of public schools in Hanoi, monthly connectivity costs are not supported by the budget and are prohibitive. Aside from dedicated computer facilities being built at some higher education institutions, Internet access is very limited at Vietnamese universities, service is slow and unreliable, and costs are high. Moreover, Vietnam's education and training sector suffers from a crumbling infrastructure, lack of instructional materials, and teacher shortages, especially in rural areas. In most public education, existing facilities accommodate up to three shifts of students per day!<sup>16</sup>



### III. Infrastructure and ICT Deployment

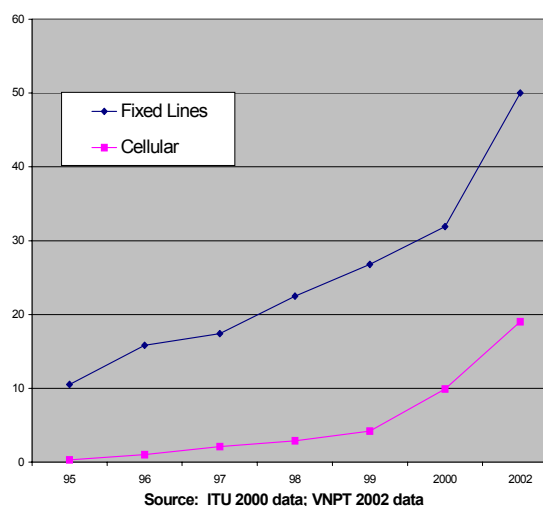
#### 1. ICT Network Growth

Since the launch of the national economic reform process over a decade ago, Viet Nam has vastly expanded its telecommunication infrastructure. Most of the infrastructure has been built in the last decade through joint efforts between VNPT and foreign companies and will eventually comprise optical, broadband, and satellite technologies. The north-south power cable backbone is a fully modern fiber backbone running the full length of the country utilizing digital switches. Government plans to complement this backbone with an undersea fiber cable system along the coast (in cooperation with a Singapore company), which is expected to be operational by end of 2002. The new cable will enable VNPT to introduce new generation technologies (GSM/CDMA, GPRS) that will greatly expand capacity, increase speed of electronic data transfer (e.g., from 50 Mbps to 135 Mbps), and allow more value-added services such as paying bills online.<sup>17</sup> Finally, a national satellite (VINASAT) is expected to be launched in 2003 that will provide a full range of communication services.

***Vietnam has one of the fastest growing telecommunications infrastructure in the developing world and the fastest growing telecom market in Southeast Asia.***  
–ITU, 2002

Over the past five years, Vietnam has sustained an average network growth of 27 percent, slightly ahead of China and one of the highest in the region. Today, all major and regional urban centers have efficient telephone networks with extensive penetration, with fixed line service covering 89 percent of all communes. According to the most recent VNPT statistics, telephone density has grown to 5 terminals per 100.<sup>18</sup> Given current growth rates, ITU projects that fixed line coverage is likely to become widespread over the next decade.<sup>19</sup> The cellular market had a later start and Vietnam still has the lowest ratio of mobile to fixed in the region. However, during 2000, the number of mobile subscribers more than doubled, suggesting that the country is now catching up with trends elsewhere in the world. According to ITU statistics, the number of cellular subscribers grew from 23,500 in 1995 to 788,600 in 2000 representing a CAGR of over 100 percent. News reports indicate that mobile telephony recently surpassed the number of fixed lines for the first time this year with a subscriber base of 1.5 million today. (See *ITU Telecommunications Indicators in Annex C*).

Figure 2 -  
Vietnam Teledensity: 1995-2002  
Fixed Lines & Cellular per 1000 people



Vietnam's Internet user base represents about .22 percent of the country's 80 million inhabitants (172,000 dial-up subscribers as of April 2002). Although this number is far below the regional Internet penetration average of 1.5 percent and global average of about 8 percent, recent growth rates are promising: VNPT estimates an annual growth rate of 100% with 6,000 new subscribers per month.<sup>20</sup>

Given the growing number of Internet cafes (about 3,500), the actual Internet user base is probably 2-3 times that number. Internet service is highly concentrated in urban centers of HCMC, Hanoi, Haiphong and Da Nang (86 percent of user base resides in two cities and represents 10 percent of the population). Furthermore, ISPs mostly cater to the needs of foreign agencies, development community, media and corporate representations, the emerging business sector, academic and research institutes, and an increasing number of government offices. In addition to persisting high costs and skewed coverage, service delivery is described by most as poor, congested, and constrained by the national firewall. The new network underway is expected to greatly expand telecommunications access, increase speed, and to realize costs reductions on par with regional levels by end of 2003.

### **Current Network Dynamics**

- Rapidly expanding telecommunications infrastructure in recent years and high growth rates bringing teledensity to 5/100 inhabitants;
- Saigon Postel (ISP) was awarded a BCC arrangement with South Korea for expanding CDMA-based wireless services to one million new lines over the next 15 years;
- There are an estimated 1 million PCs currently in Vietnam (70 percent locally assembled);
- Current number of Internet accounts include 171,000 dial up subscribers and 200 lease lines; with actual Internet users likely 3-5 times this number (Internet cafes, LANs);
- DGPT has granted three ISPs licenses to introduce Voice over IP (VoIP), cutting rates by about half for domestic long distance and international calls;
- Increased competition in Telecom market evidenced by four new ISP licenses (two semi-private) in 2001; and two more state-owned IXPs (FPT and ETC);
- VNPR plans to double capacity of access lines to speed connections and reduce congestion through new cable network by end of 2002; and
- Telecommunications costs are expected to decline by 30% to reach regional levels by end of 2002.

## **2. E-Readiness: Regional and Global Competitiveness**

Beyond its own national goals, Vietnam's multilateral obligations (ASEAN, AFTA, APEC, BTA, WTO) will require a number of reforms and the harmonization of standards and procedures in the telecommunications sector before realizing network expansion and increased global competitiveness.

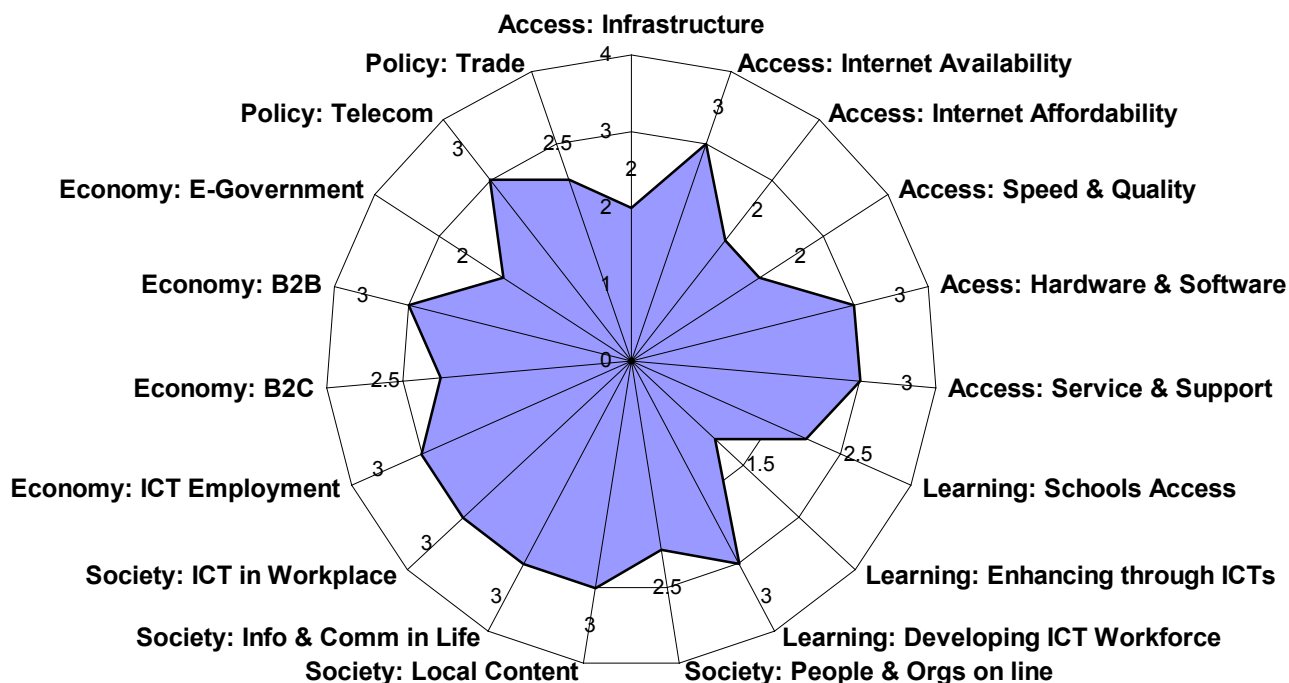
Despite the current network dynamics, a regional comparison of ITU data on selected ICT indicators 2000 demonstrates how far the East Asia and Pacific region, and Vietnam in particular, has to go in catching up to the information infrastructure levels in industrialized countries.

<b>Figure 3 - Comparative ICT Density Rates</b>			
<b>Selected ICT Indicators</b>	<b>Vietnam</b>	<b>EAP</b>	<b>Global</b>
GNP per capita (PPP value)	\$US 2,010	\$US 4,130	\$US 6,870
Fixed Lines per 1000 people	50	109	158
Mobile phones per 1000 people	19	70	86
Radios per 1000 people	107	302	420
PCs per 1000 people	11	21.7	68.4
Internet Penetration (% of pop)	.22%	1.5%	8%
Internet Hosts (# dial-up-000's)	172	51,943	562,371
<b>Source: ITU data 2000 and VNPT data, 2002 (see Annex C)</b>			

With the increased international focus on ICTs in recent years, a growing number of ICT survey and assessment tools have been developed to measure “E-readiness,” that is, the capacity of nations to participate in the digital economy. E-readiness is understood to be the source of national economic growth in the networked century and the prerequisite for successful e-business. Findings from several recent E-Readiness assessments underscore Vietnam’s rank as one of the lowest in the region and the least equipped to prosper in the networked economy. Yet, these findings also suggest that Vietnam’s emerging infrastructure holds a comparative advantage with some of its neighbors who are struggling to upgrade their legacy networks and aging platforms. (See *Summary of E-Readiness Assessments for Vietnam in Annex D*).

The graphic representation of Vietnam’s E-Readiness in one analysis<sup>21</sup> reflects Vietnam’s uneven ICT capacity in terms of network policy, infrastructure and access, and applications of ICTs for networked learning, networked society, networked economy. While Vietnam places great emphasis on social equity and has achieved high literacy and educational levels, recent poverty assessments yield evidence of growing inequality between urban and rural areas, between various regions, and between different segments of the population.<sup>22</sup> Universal and equitable access to ICTs will need to be addressed before Vietnam can take full advantage of new digital opportunities and their applications for social and economic development.

**Figure 4 -  
Networked Readiness: Vietnam**



## **IV. ICT Applications: Emerging Practice**

Government, the donor community, NGOs and the business community are undertaking a variety of ICT initiatives to support the Government of Vietnam's social and economic development agenda. These initiatives fall into the following categories: 1) building human capacity, especially for training of IT experts and enhancing learning communities in all social sectors (i.e., formal education, professional development, community education); 2) promoting e-governance and more efficient public service delivery; 3) promoting economic growth through E-Trade and software development; and 4) increasing access to information and services among rural and underserved populations. The following is preliminary review of emerging practice with ICTs in Vietnam and is not intended to be an exhaustive list, given the lack of available documentation on many of these activities. Moreover, there appears to be little evaluative information on the lessons learned or impact of these kinds of initiatives. *See the inventory of donor and corporate support for ICTs in Vietnam presented in Annex E for more details on specific programs and initiatives.*

### **1. Capacity Building**

#### **1.1 IT Training and Computer Literacy Programs**

The number of state-of-the art IT training centers and software parks is rapidly growing throughout the country, largely through joint ventures with foreign companies and other donor support.<sup>23</sup> Other areas receiving government support include IT faculty and curriculum development at key universities; innovative teacher training and e-learning models, and computer literacy training at schools, in the workplace and community. A growing number of joint university programs through foreign partnerships are beginning to incorporate computer-mediated instruction, distance learning and online resources for their collaborative activities.<sup>24</sup> The Royal Melbourne Institute of Technology (a foreign-owned private university) opened a campus in HCMC and offers an internationally recognized IT degree program based on an innovative educational model for teaching and learning with technology. The Hanoi Open University is planning to offer instruction online in the near future, and an ICT distance-learning program (*Virtual Colombo Plan*) is being planned by AusAID and World Bank funds. Teacher training programs are beginning to incorporate ICTs to enhance instructional practices and learning. One model is being piloted by MOET (with IBM support) in teacher training colleges in Hanoi and HCMC; and Intel is considering supporting a similar program.

Computer skills' training with complementary English language training is being increasingly emphasized in the government's civil service training, which is a strategic component of the National PAR Strategy to modernize and automate government service delivery. Donor supported public sector training programs are also beginning to integrate ICTs in delivery. For example, the Vietnam Development Information Center offers specialized technical courses for government civil servants using distance learning videoconferencing facilities; AusAID's public sector training project established a computer resource center with an English language training component; and European Union established computer and ELT resource center to support capacity building for Veterinary services in the Ministry of Agriculture.

Training in computer skills and business applications is also being targeted to the business community by foreign firms such as Cisco, Microsoft, Siemens, IBM, Intel; by trade support organizations such as the Vietnam Association of Information Processing (VAIP), the Vietnam Chamber of Commerce and Industry (VCCI), the Ministry of Trade's VIETRADE; and by international organizations such as the ILO, ITU, and the UN Committee on Trade and Development (UNCTAD). Several NGOs have supported ICT skills training programs for targeted audiences, and local people's committees are planning community-based ICT training programs. The People's Committee of Hanoi is planning to open an ICT Transaction Center with subsidized ICT access for SMEs.

## 1.2 Knowledge Networks and Content Development

The provision of networked information services for the scientific and academic communities is receiving increased government and donor support. State-of-the-art electronic libraries and information resource centers are being established at universities around the country (e.g., Danang and Hue, with consideration being given to similar facilities at Can Tho, and the National Universities in Hanoi and Ho Chi Minh City). In addition, a World Bank higher education project is providing funding to upgrade library facilities and electronic services at 14 university faculties throughout the country. Several national libraries and key ministries recently adopted common national library standards, which represents an important step in creating an effective information infrastructure to facilitate national networking and resource sharing among academic, scientific and national libraries.<sup>25</sup>

Sector-based knowledge networks are also proliferating in Vietnam in the guise of online databases, management information systems, and web-based discussion groups. The National Center for Scientific and Technical Research (NACESTID) is a leading digital content provider and houses the most extensive collection of Vietnamese bibliographic databases. Its collection includes an Intranet developed by Netnam of

### Knowledge Networking: Databases, Intranets & Websites

- ♦ Netnam's Intranet: national indexed website of R&D information and scholarly publications from over 300 English-language sites and 60 Vietnamese websites with a search engine in Vietnamese;
- ♦ MekongInfo Network-regional web-based information network for sharing information on natural resource management and forestry;
- ♦ The Disability Forum--an MOH website and computer network for medical schools supporting training and service delivery for disabled persons;
- ♦ HYDROMET--a database on meteorological trends and water resources; and other ministry databases and intranets on disaster management, agriculture (many!), remote sensing, trade and finance;
- ♦ AGROVIET: MARD website on agriculture and rural development to support trade development;
- ♦ MOET's EDUNET is being piloted in Hoa Binh province;
- ♦ VNPT/VASC education website for high school students to prepare for university exams (100,000 users);
- ♦ Local chapter of the Geneva-based Internet Society (ISOC) recently established in Hanoi;
- ♦ Other ministry databases and intranets on disaster management, remote sensing, HIV/AIDS, etc.
- ♦ Website for Viet Kieu to attract investment and IT expertise from expatriate Vietnamese (e.g., I-Connect Vietnam at Stanford University);
- ♦ E-Trade support websites (Ministries of Finance and Trade; business associations, and private sector e-commerce and trade promotion services);
- ♦ SMENET provides online information and services for small and medium businesses.

R&D publications from over 300 English language sites and 60 Vietnamese websites with a search engine in Vietnamese. Other technical databases and information management systems are being developed through a variety of sector-based projects: e.g., yet, most of the websites are static and not regularly updated; and ministerial databases are often not networked or integrated. Even less is known about the extent and impact of their use. UNDP has been instrumental in setting up interactive web-based listservs and discussion groups for the development community on a variety of topics. Although much of the content and discussion is in English, membership on lists reflects growing Vietnamese participation. A partnership between an NGO and FPT is planning Vietnamese discussion list on sexual reproduction issues and HIV/AIDs.

## **2. E-Government**

Government commitment to leveraging ICTs includes strategic targets to computerize government administration and management. As a first step, a government Intranet (CPNET) has been established, which links 40 government agencies at the central level and 61 provincial centers. At present, there is a reasonable level of automation within the various government ministries, with a growing number of PCs, technical database development, and local area networks and intranets. Information management systems have been introduced in the banking, financial, aviation, customs, and tourism sectors; and several pilot projects are pioneering the delivery of government services online. The Customs Department (supported by UNISYS) has automated its operations and is planning to process applications, declarations and licenses online in the near future. An enterprise registration system for SMEs that provides greater transparency and eliminates paperwork was established in HCMC several years ago through a UNDP/UNIDO project. Yet, businesses still have to secure applications in person given the absence of digital signature mechanisms. Another e-government pilot project supported by the E-ASEAN initiative demonstrate a “one-stop-shop” approach to delivering government services to citizens through a pilot project in one district of HCMC. This will include an interactive query system between business and government in areas such as taxation, customs, licensing requirements, etc.

Current use of the Internet by government ministries appears to be quite limited and is the object of specific targets in the government’s PAR strategy and computerization goals. While ministries are focusing on improving computer skill levels and developing technical databases and management information systems, skill levels are low, systems are not integrated nor widely used, and existing equipment is underutilized for Internet. In addition to the physical networking requirements, a recent needs analysis<sup>26</sup> of MARD’s Public Administrative Reform project identified a number of constraints including the lack of coordination and information sharing within the ministry, between departments and between central and provincial levels. This lack of lateral coordination is a prominent feature of Vietnam’s vertically integrated organizational structures and will need to be addressed to facilitate broader knowledge networking.

### **3. E-Trade and Business**

The Ministry of Trade E-Commerce Master Plan proposes to bring the majority of Vietnamese businesses on line by 2005 and to promote the expansion of E-Trade. Yet, the barriers to e-commerce are numerous: the absence of a legal infrastructure to support e-commerce; lack of e-payment mechanisms (digital signature and certification authorities); lack of consumer banking services (online banking and ATMs); limited availability and use of credit cards; and scarce market research. Confusing licensing requirements to do business further hampers E-Trade. As cautioned in the recent ITU study on Vietnam's Internet, the country is missing out on many benefits of E-commerce given the conservative timetable for expanding network growth. Several recent surveys confirm that most businesses are not aware of the value-added of ICTs to increasing their productivity, and are not currently considering E-Trade. A MOT survey indicated that 1,500 enterprises have established websites, and few thousand currently advertise their products and services online.<sup>27</sup>

Recent developments in the banking sector, however, are promising: Vietcombank recently launched an inter-bank e-payment system involving 60 local banks, and a recent government Decision (#44/2002) now permits the use of electronic vouchers to authenticate business documents. A new software product developed by VASC, a subsidiary of VNPT, to verify the authenticity of business transactions and payments in cyberspace will be used by two major banks (Vietcombank and Techcombank) in the near future.<sup>28</sup> The following are illustrative of other initiatives underway or planned that promise to support e-commerce:

- ♦ Joint venture between the Japanese company (Fujitsu), the Ministry of Trade and the State Bank of Vietnam involves experimenting with various e-commerce models, designing commercial websites for ministry enterprises, Internet awareness promotions, and the deployment of security and e-payment systems;
- ♦ E-ASEAN training program in the Philippines (Japan funds) to promote e-commerce, with emphasis on e-payment systems, certification, taxation and customs issues;
- ♦ The IDRC of Canada is funding a study on the obstacles to e-commerce for SMEs, that includes the issue of developing a digital signature act;
- ♦ IT and software parks offer IT training and R&D facilities as well as tax and other incentives to promote the development of E-Trade (Quang Trung Software City outside of HCMC, Saigon Software Park in HCMC, SofTech in Da Nang (Oracle support), and Hoa Lac outside of Hanoi; others are being developed);
- ♦ A joint venture between FPT and a U.S. software development company provides online trade support to promote Vietnamese products to overseas buyers ("MeetVietnam.com");
- ♦ Trade support organizations provide web hosting and other services to promote linkages between Vietnamese and international firms and showcase member services and products online (e.g., VCCI, VAIP, VIETRADE). A number of private application service providers (ASPs) are also targeting the needs of SMEs

#### **4. Rural Development: ICT access and service delivery**

VNPT targets for expanding Internet access by 2005 includes plans to connect 5,000 communes nation-wide with Internet service at post offices and village cultural centers. These services are currently being piloted in selected provinces and towns and will eventually provide up-to-date regional and world news, weather forecasts, market and agricultural news, and health and education information services for community members. VNPT is also piloting a WEB-TV service to make e-mail and information from websites available for the country's many television viewers. VNPT is also planning to expand rural access to educational and health services through satellite delivery in 2003 when VINASAT is launched. At the present, the Ministry of Agriculture and Rural Development is pioneering service delivery mechanisms through its administrative reform project. A survey of farmer's information needs is underway which is expected to support MARD's IT Master Plan.



## V. An Agenda for Reform

Vietnam recognizes that sustainable growth and global competitiveness will require a shift from a controlled, centrally planned economy to one that permits freer and broader participation of the private sector. Yet, State control of the information highway continues to impede Vietnam's ability to harness the full potential of new digital opportunities to promote sustainable development. While the twinning of market economy with socialist ideals is officially endorsed, a number of key

constraints in the policy and regulatory environment and in institutional capacity will have to be addressed simultaneously in different sectors. These include restrictive regulations

inhibiting growth and investment in the ICT sector; shortages of funds for capital expansion; inadequate financial and taxation systems; telecommunications policies and market structure has resulted in high costs and poor service delivery; unequal ICT access, particularly between rural and urban areas; the lack of legal framework for e-commerce; inadequate enforcement of judicial system (lack of IPR protection and grievance procedures); and technical and managerial deficiencies due to inadequate institutional capacity (e.g., a poorly organized bureaucracy and weak educational system).

***Vietnam is at a turning point: Should it persist with a model of state control or should it move to a free market model? The Internet, a potent symbol of civil liberties, lies at the heart of this dilemma. Can a socialist model of government be reconciled with a user-friendly Internet?" –ITU, 2002***

### 1. Policy and Regulatory Constraints

**1.1 Lack of Market Competition.** Obstacles faced in the telecommunications sector are exacerbated by a legacy of heavy centralized control. Present arrangements for private participation through Business Cooperation Contracts (BCCs) deter foreign investment since companies have no operational control over their investments. Limited competition in fixed line and cellular telecommunications services also inhibits investment and growth of the ICT sector. Legislative pressures to liberalize the market structure under the terms and conditions of the BTA and WTO entry requirements are expected to be addressed in the new Telecommunications Act. While signs of dismantling VNPT's monopoly are most recently reflected through the licensing of a second IAP/FPT, the pace of reform will need to be accelerated, and specific legislative measures in the Act will need careful study. Economic modeling might help persuade the government to relinquish monopoly control based on a timeframe that will be advantageous to Vietnam. As observed by the ITU, "in order to promote future growth, create sustainability and enhance the sophistication of Internet usage, the government will have to reconcile the contradiction between strong regulatory control and the benefits of a more free and competitive environment." Measures to promote a more rapid liberalization of telecommunications sector is needed to encourage foreign investment and private sector development. This includes policy and regulatory reforms to increase competition and improve the investment climate; and loosening restrictions on telecommunications service delivery and content (i.e., the national firewall).

**1.2 Lack of Independent Regulatory Framework.** The overlapping functions and authority shared among different government agencies obscures a transparent and objective rulemaking process. Policymaking and regulatory functions under DGPT need to be more clearly separated from the operational responsibility of the main telecommunications operator (VNPT). In addition, VNPT's role as the only Internet Access Provider (IAP) until very recently and the country's largest Internet Service Provider (ISP) presents a conflict of interest between VNPT's role as main supplier and competitor. The lack of structural separation in management and accounting between the two sides of the business will need to be addressed. An independent and transparent regulatory framework that bars monopolistic practices and that provides incentives for efficiency improvements, new investment, cost-basing pricing and rollout services to underserved rural areas will provide the market confidence that is needed to attract private sector investors. Regulatory reforms are needed to separate regulatory, policy-making and operational functions and authority in DGPT and VNPT; and a national consultative process involving all stakeholders (i.e., users, service providers and private sector) should be undertaken to identify bottlenecks to streamlining the rulemaking process.

**1.3 Restrictive Licensing Policies.** Current licensing policies and procedures restrict competition and growth. Several requirements that deter foreign investment in the IT sector include the policy that foreign firms use a local distributor to market their products, absent an investment license; dual pricing policies that discriminate against foreigners; and restrictions on local hiring policies, which require recruitment through the State labor service. The restricted number of ISPs allowed to operate further inhibits a competitive environment and limits investment. Although 5 new licenses were recently issued, the number of ISPs is still far below the norm in most countries. While the government Decree 55 managing Internet service opens up the sector to competition from the private sector, new licensing requirements imposed on the operation of Internet cafes will slow down deployment and use of ICTs in the broader population. The control of content by the national firewall and the licensing requirements for ICPs also deters growth, especially in website and local content development. Restrictions on content by the national firewall also prevent the use of more advanced Internet services and business applications (e.g., Lotus notes). Licensing procedures should be simplified for foreign investors; the number of service providers should be increased; restrictions on content through ICP licenses and the national firewall should be replaced by general guidelines that for self-regulation; licensing for Internet cafes should be liberalized and legal status clarified; and official support should be considered for franchising schemes.

**1.4 Tariffs and Pricing Structure.** Current Internet pricing is unaffordable for most Vietnamese: The ITU estimates that 30 hours of monthly use is roughly equivalent to the country's per capita GDP.<sup>29</sup> High interconnection rates for the Internet and lease lines as well as international and domestic tariff structures limit the growth of Internet

***Internet growth may soon reach a plateau, with most of those that can afford access at commercial rates having it.***  
–ITU 2002.

usage, which in turn constrains national goals of creating a vibrant IT sector. High costs not only deter foreign investors from establishing offices in Vietnam in favor of other countries within the region, but also preclude domestic industry from utilizing ICTs to improve management, realize productivity gains, and increase competitiveness. A rebalancing of

price between domestic and international service and between urban and rural service towards regional norms is an urgent priority. Economic modeling could demonstrate the value added of expanding the Internet user base through lowered costs.

**1.5 Lack of Universal Service Policy.** Government targets to reach the global average in Internet density by 2010 lack a supporting policy for equitable service delivery to underserved rural areas outside the current telecommunications backbone. Legislative measures are needed to ensure equitable and universal service delivery in underserved rural areas, which may require government subsidies and incentives. For example, widespread deployment of ICTs could be supported through incentives for network expansion in rural areas and subsidized access for rural communities (e.g., telecentres) and formal educational institutions. A strategic plan is needed to develop “the last mile” in connectivity and access for underserved rural areas outside the current telecommunications backbone. Consideration should be given to incentives to develop rural network infrastructure, as well as to subsidies for Internet access at educational institutions and community centers (e.g., telecentres).

**1.6 Government Incentives and Subsidies.** The disproportionate emphasis on developing the software industry over hardware through special incentives and tax benefits (i.e., specific zones for IT and software parks) ignores an important opportunity for growth and FDI in the hardware industry. Vietnam’s natural comparative advantage to develop its hardware industry beyond PCs and peripherals includes the availability of low cost labor and the lack of language and other barriers faced in the software industry (e.g., copyright protection). In addition, the business community as a whole needs to accelerate ICT usage to improve management, productivity and competitiveness. Incentives and schemes to promote business use of ICTs are needed in all industry sectors. For example, support could be targeted to developing application service providers and trade support organizations to develop ICT business services for SMEs. Government incentives should be considered to support the hardware industry and to promote business use of ICTs all industry sectors.

**1.7 Tax Reform.** Current tax structures inhibit growth of the IT sector, especially VAT and income tax laws. Presently, hardware manufacturers pay a larger VAT tax than what they can charge buyers on components. Getting a refund on the difference requires considerable paperwork and long delays. Computer peripherals are taxed unless sold on the same invoice as a computer. Computer and other telecom equipment are also subject to an import tax (considered to be the highest in the region,) although this is expected to change under the BTA. Income tax rates also undercut national goals for IT professional development. Income tax laws discriminate against senior level Vietnamese employees in favor of foreign experts, which constrains the development of Vietnamese management expertise. The American Chamber of Commerce notes that current Vietnam personal income taxation rates are among the highest rate in the world, making the Vietnam market less attractive and competitive for the high-skilled labor force.<sup>30</sup> These tax issues need to be reviewed and better aligned to support growth in the IT industry.

## 2. National Absorptive Capacity

**2.1 Financial and Banking Systems.** The Ministry of Trade is claiming that by 2005 a majority of Vietnamese businesses and all government offices will be involved in e-commerce. Yet, the lack of an enabling framework to support e-commerce is a significant bottleneck to trade and global competitiveness. The financial system, as in many developing countries, is inadequate to support sophisticated electronic transactions. In addition to legal measures, mechanisms are needed to operationalize electronic financial and banking systems (e.g., inter-bank e-payment systems, ATMs and online banking, and bank credit cards). Although 80 percent of banking transactions are presently computerized, inter-bank networks and consumer services are not well developed. The limited use of credit cards within Vietnam minimizes the potential of near-term B2C E-commerce. Vietnam will also need to harmonize its efforts in this area with the E-ASEAN initiative to establish a common E-Commerce framework for the region. A strategic plan for establishing an enabling framework for e-commerce needs to be developed, including provisions for strengthening financial and banking systems, legal and security measures, and consumer financial services.

**2.2 Legal Enforcement Issues.** Overall, the judicial system in Vietnam is time-consuming and not transparent. Commercial arbitration in Vietnam is not a recommended alternative, putting foreign businesses at a disadvantage when trying to enforce agreements or obtain redress for commercial problems. The lack of enforcement procedures to protect copyright laws (IPR) is an important bottleneck to developing e-commerce and the software industry. It is estimated that 97 percent of the software within Vietnam is copied illegally, reflecting one of the highest piracy rates in the world. While lack of enforcement harms the business operations of such corporations as Microsoft, Oracle, and IBM, local software development companies are also adversely affected. Legislative and enforcement measures are needed to control the rampant software piracy and to assure the protection of intellectual property rights of both foreign and domestic software developers.

**2.3. Public Administrative Reform.** The number of “master plans” and steering committees to implement government ICT policy suggests the lack of central coordination among government ministries and the need for a strategic framework. For example, government IT and educational reform goals have important linkages to the National PAR Strategy. ICT skills training to support the Government’s computerization targets will also facilitate the adoption of modern management practices under PAR’s strategy to modernize government operations and strengthen civil service capacity. The development of network infrastructure and information management systems with feedback loops between ministries, within ministries and between central and provincial levels will help streamline work procedures and facilitate networking and resource sharing possibilities. This kind of networking can reduce work duplication and system compatibility problems, instill best practices and local lessons learned, and monitor performance to improve implementation. Yet, vertically integrated authority relations and lack of information sharing culture prevailing in Vietnam’s organization structure blocks the kind of horizontal linkages needed to realize the benefits of networking. Modern management practices such as team building, collaboration, and independent learning will need to be developed together with network integration. Better coordination among government strategies (e.g. IT, PAR educational reform, etc.) is needed to identify overlapping goals and leveraging opportunities; a CIO structure should be introduced within government administration; and information

management systems and network integration with feedback loops to facilitate knowledge sharing and networking among ministries, within ministries, and between central and local levels.

**2.4 Human Resources Development.** The inadequacy of Vietnam’s education sector and human resource base seriously constrains the government’s socioeconomic development goals. Formal education and professional training programs are target-based rather than linked to performance needs. Training is urgently needed to close the gap between skills and expectations in schools, the workplace and society as a whole. In addition to digital literacy programs at all educational levels, the curriculum for IT-related education needs to be upgraded at universities and technical schools; and new teaching and learning models are needed to integrate technology into the curriculum and promote independent and life long learning. Better strategic coordination is needed to address a lack of linkages between research and practice and lack of lessons learned from local experience across sectors. English language skills are also needed at many levels to access the global knowledge base of best practices, as well as create international linkages and collaborative opportunities for economic and social development (i.e., trade, distance learning, etc.). Digital literacy programs should be rapidly expanded in education, workplace and the community. Training for ministries in computer and English language skills, and management information systems should be rapidly expanded in support of the PAR strategy; mechanisms to link education to practice should include links with global best practices and local lessons learned; curriculum development and training planning should be linked to performance needs rather than target-based; and Internet access should be made widely available at formal educational institutions at all levels.

**2.5 Strategic ICT Coordination.** Given the proliferation of IT Master Plans among different ministries, a strategic framework is needed to coordinate the implementation of national goals and targets under Policy #58. The National IT Master Plan should include a strategic framework with clearly defined targets and benchmarks, responsibilities among different stakeholders, areas of overlap and convergence, and procedures for monitoring and evaluating government performance in meeting these goals. Given the number of donors in Vietnam (about 40) and differing regulations, work practices and reporting requirements, the harmonization of donor activities to support ICT goals is also urgently needed to increase aid efficiency and reduce transactional costs and administrative burden on the government.

## ENDNOTES

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- <sup>1</sup> UNDP, *Human Development Report*, 1999. (e.g., the distance between the richest and poorest country was about 3 to 1 in 1820, 11 to 1 in 1913, 35 to 1 in 1950, 44 to 1 in 1973, and 72 to 1 in 1992)
- <sup>2</sup> Digital Opportunity Task Force Final Report, 2001.
- <sup>3</sup> Manuel Castells, *The Rise of the Network Society*, in the Information Age: Economy, Society and Culture (1998); and The Internet Galaxy (2001).
- <sup>4</sup> UN ICT Task Force; World Bank Global Knowledge Partnership; UNDP Digital Opportunity Initiative
- <sup>5</sup> Politburo of the Communist Party of Vietnam's policy Directive No. 58 (October 2000) calls for accelerating the use and development of IT for the cause of industrialization and modernization.
- <sup>6</sup> E-ASEAN Framework Agreement on ICT Products and Services (April 2000) includes provisions on connectivity and regional content development, a seamless legal and regulatory environment, a common marketplace for ICT products and services, human resources development, and e-governance.
- <sup>7</sup> Cohen, Margot, *Telecoms*, May 2002 (VNIT-1 April 30, 2002).
- <sup>8</sup> Vietnam News, September 2002.
- <sup>9</sup> Reuters and VNN News service, March 4, 2002.
- <sup>10</sup> ITU, Vietnam Internet Case Study, March 2002.
- <sup>11</sup> American Chamber of Commerce: IT Position Paper, October 2001, Hanoi.
- <sup>12</sup> See VIETRADE: E-Trade Bridge Final Draft Report, February 2002.
- <sup>13</sup> Communist Party Leader Manh, Vietnam News, April 30, 2002
- <sup>14</sup> Ministry of Education and Training, IT Master Plan for Education for the period 2001-2005.
- <sup>15</sup> Human Resource Index developed by the Political and Economic Risk Consultancy Ltd. includes indicators of overall quality of local education system, availability of high quality production labor, availability of high quality clerical staff and high quality management staff, English proficiency, and high-tech proficiency
- <sup>16</sup> UNDP, *Vietnam's National Human Development Report*, Hanoi, 2001.
- <sup>17</sup> Vietnam News Service, March 2002
- <sup>18</sup> Vietnam News Service, September 2001.
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- <sup>23</sup> Siemens, ApTech, IFC, Japan, Microsoft
- <sup>24</sup> Hanoi School of Public Health and Tulane University's MPH program; Hanoi School of Business MBA program with University of Hawaii; and the National Economics University's MBA program in Hanoi with Boise State University; Cal Poly at HCMC) the Hanoi University of Technology; the Hanoi Open University
- <sup>25</sup> National Workshop on Library Management Systems, sponsored by World Bank and RMIT, Hanoi, September 2001.
- <sup>26</sup> Elmer, PAR Training Needs Analysis in MARD, January 2002.
- <sup>27</sup> Survey data cited in VIETRADE's E-Trade Bridge Report, February 2002.
- <sup>28</sup> Vietnam News, March 23, 2002.
- <sup>29</sup> ITU Internet Case Study, March 2002.
- <sup>30</sup> American Chamber of Commerce, Vietnam IT Committee Position Paper, Hanoi, September 2001.

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## Annex B

### Table 1 – Key Government Policy and Legislation Governing ICTs

<b>Government Policy Directives and Decisions</b>
Resolution #49 (1993): IT Master Plan 1996-2000 (prepared through the Vietnam Canada Information Technology Project, 1998-2001)
PM Decision #54 (1998): establishes Techno-Economic Program on IT in MOSTE
Decree #55 (August 2001): Establishes policy on the management, provision and use of Internet, allowing for the first time private sector participation in ISP service delivery.
PM Decision #136 (September 2001): Establishes policy for Public Administrative Reform to modernize state administrative management; includes IT component.
PM Decision #158 (October 2001): Establishes DGPT's Telecommunications Master Plan through 2010 and includes measure to dismantle VDC's status as sole IXP.
Decree #175 (November 2001): Establishes National IT Steering Committee and Secretariat based in MOSTE.
PM Decision #33 (February 2002): approves Internet Development Plan for 2001-2005 and provides budget byline.
E-ASEAN Framework Agreement (April 2000): Establishes policy to promote harmonization of regional e-commerce and e-governance goals to support regional trade and growth.
Resolution #7 (June 2000): Establishes policy to preferentially support the software industry as a major contributor to GNP.
Communist Party Policy Directive #58 (October 2000): Establishes policy on the use and development of IT to promote modernization for period 2001-2010
PM Decision #128 (November 2000): Specifies incentives and tax benefits to support investment in the software Industry
PM Decision #19 (2001): Specifies incentives and tax benefits to support investment in the hardware industry (PCs and peripherals)
Prime Minister Decision # 81 (May 2001): Establishes national IT targets in four program areas for 2001-2010 to implement Party Directive #58
PM Decision #112 (July 2001): Guidelines and targets for the computerization and automation of government management and administration to improve public service delivery.



**Annex B: Table 2 – Summary of Government ICT Policy and Program**

<b>Politburo Directive #58: On the Use and Development of Information Technology for Industrialization and Modernization for the period 2001 - 2010</b>				
<b>Create Enabling Environment for IT Use and Development</b>	<b>Ensure Wide and Effective IT Use in every Sector</b>	<b>Develop National Information Infrastructure</b>	<b>Develop Human Capacity for IT Use and Development</b>	<b>Develop IT Industry as Spearhead Economic Sector</b>
<b>Legislative Targets for 2005 (Prime Minister Decisions #81, #112, #136, #158 and #33)</b>				
#81: Develop policy and legal framework for IT use and development; formulate and deploy IT master plans at all government levels; and establish inter-ministerial IT Steering Committee (MOSTE).  #158: Adopt and promulgate policies and measures to boost competition from all economic sectors in telecom and Internet development	#81 (and #33): Expand Internet subscriber base to 1.5% of population (4-5% user base)  #112: Computerize State Management Administration  #136: Apply IT to support Public Administrative Reform	#81: Telecom networks to reach regional norms in coverage, quality and cost;  #158: Universalize posts, telecom and informatics services to all regions: telephone access for all communes and broadband Internet services for all provinces and cities, with teledensity of 8-10 lines/100 people.	#81: Train 50,000 IT experts including 25,000 programmers with foreign language fluency; and popularize computer use at secondary schools;  #112: Computer literacy training for 50% of state managers (20% per year)	#81: IT sector average annual growth rate of 20-25% to reach 4% of GDP: expected software revenue: \$US500 million (\$US200 mil in exports); and hardware revenue from IT and computer equipment: \$US 1 billion (60% exports)
<b>National IT Master Plan Strategic Objectives: 2002 – 2005 (April 2002 draft)</b>				
Establish favorable legal environment for IT use and development: 1) Policies on IT use and Development; 2) Policies on promoting the IT Industry; and 3) Policies on technology transfer and international cooperation (MOSTE and MCI)	Wide and efficient use of IT in strategic socioeconomic sectors: state management, economy, security, defense, culture and society  Establish unified IT state management system (GCOP) Raise awareness of IT in society (CPV/CCES)	Develop and upgrade Internet and Telecommunications infrastructure to meet regional levels in coverage, quality and costs (DGPT)	Develop and use efficiently IT human resources to support IT production, service, research and education (MOET)  Strengthen R&D capacity at training institutions and enterprises to facilitate transfer and adaptation of technology (MOSTE)	Establish and develop IT industry to support key industries to ensure economic growth (MOSTE and MOI)



♦ **Annex B: Table 2 - Summary of Government Policy and Program, continued**

<b>National IT Master Plan Programs and Projects</b>				
<b>Create IT Enabling Environment</b>	<b>Ensure Broad and Effective IT Use in every Sector</b>	<b>Develop National Information Infrastructure</b>	<b>Develop Human Capacity for IT use and development</b>	<b>Develop IT Industry as Spearhead Economic Sector</b>
<p><b>Policy Agenda:</b></p> <ul style="list-style-type: none"> <li>-Framework Law on electronic information</li> <li>-Provision and standardization of information</li> <li>-Protection of IPR/copyrights</li> <li>-Purchase and use of IT equipment and services of state agencies</li> <li>-Build information infrastructure and provide Internet and telecom services</li> <li>-Training and use of IT human resources</li> <li>-Investment in IT research and development</li> <li>-Promotion of IT use in every socio-economic area based on economy, practicability and efficiency</li> <li>-Standardization of IT</li> <li>-Information security/privacy</li> <li>-Preferential tax and investment policies (land use, rent, credit)</li> <li>-Investment in IT and Industry</li> <li>-Support IT businesses to expand markets</li> <li>-Policies on technology transfer, especially for software industry</li> <li>- Foreign investment and ODA cooperation on IT</li> </ul>	<p><b>Proposal/Decision #112: Computerization of State Administration Management (Office of Government) Projects (MOSTE):</b></p> <ul style="list-style-type: none"> <li>1 - Improving and upgrading Party's Information System</li> <li>2 – Modernizing Banking System</li> <li>3 – Completing Financial Information System</li> <li>4 – Modernizing Customs Information System</li> <li>5 – Improving State's Statistical Information System</li> <li>6 – Developing E-Commerce</li> <li>7 – Using IT for Industrializing and Modernizing Ag and Rural Development</li> <li>8 – Developing Pilot Information Systems for Urban Management in Hanoi and HCMC</li> <li>9 – Using and Developing IT in National Defense</li> <li>10 - Using and Developing IT in National Security</li> <li>11 – Electronic Information System on Science &amp; Technology, Education &amp; Training, and Culture and Society</li> <li>12 – Improving Electronic Information System on Law</li> </ul>	<p><b>Program 1 - Develop Telecom and Internet Infrastructure (DGPT):</b></p> <ul style="list-style-type: none"> <li>-National coverage at regional levels of quality and costs;</li> <li>-High-speed Internet access at industrial zones to support e-commerce;</li> <li>-Internet services for government, business and education;</li> <li>-Increased market competition in service delivery (ISPs, IXPs);</li> <li>-Internet access at all higher education, secondary schools and hospitals; and</li> <li>-Government WAN extended to provincial and district levels</li> </ul> <p><b>Projects:</b></p> <ul style="list-style-type: none"> <li>-Telecommunications Master Plan (Decision 158);</li> <li>-Internet Development Plan (Decision #33)</li> </ul>	<p><b>Program 2 - Develop and Use Efficiently IT Human Resources (MOET):</b></p> <ul style="list-style-type: none"> <li>-Establish new training institutions at all levels to link education, training and research;</li> <li>-IT second diploma programs for 2,000-3,000;</li> <li>-IT training for non IT majors;</li> <li>-Overseas graduate degree training for 300 student annually; and 500 experts short-term IT programs;</li> <li>-Free lease line connections to all universities and colleges;</li> <li>-Internet use popularized at senior secondary school (followed by junior and primary) as a tool for renovating content, teaching methods, and management;</li> <li>-IT teacher training at all education levels;</li> <li>-Attract overseas IT expertise;</li> <li>-Develop plan for using efficiently IT human resources</li> </ul> <p><b>Projects:</b></p> <ul style="list-style-type: none"> <li>-MOET IT Master Plan</li> <li>-GCOP SAM/Com (112)</li> <li>-OOG PAR Program (136)</li> </ul>	<p><b>Program 3 - Establish and Develop Software Industry (MOSTE):</b></p> <ul style="list-style-type: none"> <li>-Develop software industry as spearhead economic sector, with annual average growth of 30-35 percent</li> <li>-Implement preferential conditions as per Resolution #7and #128</li> </ul> <p><b>Program 4 - Establish and Develop Hardware Industry (MOI):</b></p> <ul style="list-style-type: none"> <li>-Computer and telecom hardware industry developed to meet international standards;</li> <li>-Implement preferential conditions as per Decision 19</li> </ul> <p><b>Projects:</b></p> <ul style="list-style-type: none"> <li>-MOT E-Commerce Master Plan Projects</li> <li>-HCMC People's Committee IT Master Plan Projects</li> <li>-Hanoi People's Committee Master Plan Projects</li> </ul>



## **Annex C – ITU Telecommunications Indicators**

**Annex D: Table 1 - Summary of E-Readiness Findings: Goal-Level Constraints**

<b>Directive 58: Create Enabling Environment for IT use and development</b>	<b>Directive 58: Ensure Broad and Effective IT Use</b>	<b>Directive 58: Develop National Information Infrastructure</b>	<b>Directive 58: Develop Human Capacity for IT use and development</b>	<b>Directive 58: Develop IT Industry as Spearhead Economic Sector</b>
Lack market competition and foreign and domestic investment in telecom sector; timeframe too conservative	High cost and low quality of Internet access inhibits wider use in all sectors	Shortages of funds for capital expansion	Technical and managerial deficiencies in ICT expertise inhibit potential of ICTs as enabler for development and lifelong learning.	Bilateral Cooperative Contract (BCC) arrangements inhibit foreign investment by restricting operational role.
Lack of independent regulatory regime, especially shared decision-making authority between regulator (DGPT) and operator (VNPT); licensing procedures are cumbersome and not transparent.	Unequal network coverage and ICT access along socioeconomic lines, especially between urban and rural areas	Limited foreign direct investment in telecom service delivery	Poorly organized bureaucracy: lack of management information systems and lateral linkages for information and resource sharing at local, national and international levels.	Preferential policies focused on export-oriented software industry miss other investment opportunities (e.g., hardware beyond PCs and peripherals)
Restrictive licensing policies and monopoly market structure in telecom service delivery results in high costs and poor service.	No policy guidance or benchmarks for “effective use” across sectors: government, education, business and society.	Lack of plan to address “last mile” of network coverage and universal service	Institutional support for improved public service delivery: financial and banking systems, health and educational services, rural delivery services; and agriculture and rural development.	Preferential policies focused on export-oriented software industry ignore ICT skill needs for enterprise development across industry sectors (food processing, textiles, etc.)
Restrictive licensing policies on content limit local content development; national firewall slows service	No baseline data on ICT usage patterns across sectors		Lack of strategic coordination in ICT policymaking, planning and program implementation within and across sectors (government, business and donor).	Preferential policies focused on export-oriented software industry ignore needs for domestic software applications and local content development.
Unbalanced telecom tariff and pricing structure (international settlement rates) results in high telecom and Internet costs			Educational system not meeting current demand in terms of quantity and quality; education and training goals are target-based and not linked to performance-based needs; lack of practice in new ICT tools and techniques and English language skills.	Most SMEs (70% of all businesses) are unaware of benefits of business applications of ICTs for improved productivity, competition and E-Trade (MOT survey)
Lack of enforcement procedures for IPR and consumer protection laws			Lack of centralized knowledge base of global best practices and local lessons learned from ICT applications.	Lack of IPR protection blocks software development for both foreign and domestic markets
Lack of legal framework for e-commerce and e-banking systems			Lack of donor coordination places administrative burden on government and misses leveraging opportunities.	Lack of intermediaries to deliver e-services to SMEs (hardware and software).
Preferential policies for software industry ignores ICT needs of all enterprise.				
Distortions in Tax structure (VAT and personal income tax)				

**ANNEX D: Table 2 - Comparative E-Readiness Assessments of Vietnam**

<b>TOOL</b>	<b>Focus of Measurement &amp; Principal Variables</b>	<b>Data Analysis and Sources</b>	<b>Principal Findings (Indexed Scores and Rankings)</b>
<b>CID Harvard University- Networked Readiness Index: 2001-2002</b>	Assesses Networked Readiness: <ul style="list-style-type: none"> <li>♦ Network usage and</li> <li>♦ Enabling Factors <ul style="list-style-type: none"> <li>➢ Network access</li> <li>➢ Network policy</li> <li>➢ Network economy</li> <li>➢ Network society</li> </ul> </li> </ul>	Statistical analysis of selected indicators and questionnaire; comparative analysis among 75 countries	<p><b>Indexed Score:</b> 2.42 on a scale of 1 – 7  <b>Comparative Rank:</b> 74 out of 75 countries</p> <p>Identifies broad trends, opportunities and deficits; distinguishes between factors determining usability of network (enabling factors) and extent of network use.</p> <ul style="list-style-type: none"> <li>♦ Lowest scores in network use and access; e-government and e-business</li> <li>♦ Highest scores for network policy</li> <li>♦ Qualitative analysis: limited competition in telecom sector</li> <li>♦ High piracy rates</li> <li>♦ Inadequate ICT-skills labor force</li> <li>♦ Lack of independent decision-making in regulator (DGPT)</li> </ul>
<b>Economist Intelligence Unit May 2001</b>	Assesses e-business environment and network connectivity: <ul style="list-style-type: none"> <li>♦ Strength of economy</li> <li>♦ Political stability</li> <li>♦ Regulatory climate</li> <li>♦ Taxation policies</li> <li>♦ Openness to trade/investment</li> </ul>	Statistical analysis of selected indicators; and comparative analysis among 60 countries	<p><b>Indexed Score:</b> 2.76 on a scale of 1 - 10  <b>Comparative Rank:</b> 58 out of 60 countries</p> <p>Findings categorize Vietnam as an <i>E-Business Laggard</i>: includes countries that “risk being left behind and face major obstacles to e-business growth, primarily in the area of connectivity.”</p> <ul style="list-style-type: none"> <li>♦ Principal findings suggest that poverty, illiteracy and infrastructure inadequacies prevent e-business from gaining critical mass</li> </ul>
<b>E-ASEAN/IBM October 2001</b>	Assesses ASEAN E-Readiness: <ul style="list-style-type: none"> <li>♦ Infrastructure</li> <li>♦ E-Society</li> <li>♦ E-Commerce</li> <li>♦ E-Government</li> </ul>	Statistical analysis and questionnaire; comparative analysis among 10 ASEAN countries (Original source not reviewed)	<p><b>Comparative Rank:</b> ranked in lowest category as emerging economy with Laos, Cambodia and Myanmar of 10 ASEAN countries</p> <p>Vietnam is among those “countries least equipped to prosper in networked economy although the basic infrastructure requirements are planned to be in place in the short-term and there is political commitment to positioning the country for the ICT revolution.”</p>
<b>ITU March 2002</b>	Assesses status of Internet using Mosaic framework: <ul style="list-style-type: none"> <li>♦ Internet Infrastructure</li> <li>♦ Sectoral Absorption</li> <li>♦ Sophistication of Use</li> </ul>	Based on Mosaic Framework; and field-based case study	<p><b>Indexed Score:</b> 1.75 on a scale of 0 - 4</p> <p>Identifies problems in the growth of the Internet and proposes reforms in policy, regulatory and legal environment, as well as and institutional bottlenecks in national absorptive capacity.</p>

<b>TOOL</b>	<b>Focus of Measurement &amp; Principal Variables</b>	<b>Data Analysis and Sources</b>	<b>Principal Findings (Indexed scores and rankings)</b>
<b>McConnell International May 2001</b>	Assesses enabling environment to flourish in the networked economy: <ul style="list-style-type: none"> <li>♦ Connectivity</li> <li>♦ E-Leadership</li> <li>♦ Information Security</li> <li>♦ Human Capital</li> <li>♦ E-business climate</li> </ul>	Statistical analysis of selected indicators; questionnaire and interviews; and comparative analysis among 53 countries	<b>Indexed Score:</b> 1.2 on a color-coded scale of 1 - 3 <b>Comparative Ranking:</b> among lowest categories  <b>Substantial improvement needed in conditions necessary to support e-business and e-government in most categories:</b> <ul style="list-style-type: none"> <li>♦ Lowest scores in connectivity, information security, human capital and e-business climate (red)</li> <li>♦ Highest scores in E-Leadership (amber)</li> </ul>
<b>MOSAIC</b>	Assesses “State of the Internet” (socioeconomic and political events and legal and regulatory environment): <ul style="list-style-type: none"> <li>♦ Pervasiveness (2)</li> <li>♦ Geographic dispersion (2)</li> <li>♦ Sectoral absorption (1.5)</li> <li>♦ Connectivity infrastructure (1.5)</li> <li>♦ Internet Service Market (2)</li> <li>♦ Sophistication of use (1.5)</li> </ul>	Statistical analysis of selected indicators based on questionnaire	<b>Indexed Score: 1.75 based on a scale of 0 - 4</b>  <b>Lowest scores in sectoral absorption, connectivity, and sophistication of use:</b> <ul style="list-style-type: none"> <li>♦ Internet established but moderately dispersed</li> <li>♦ Rare to moderate sectoral absorption</li> <li>♦ Thin network coverage</li> <li>♦ Controlled organizational infrastructure</li> <li>♦ Minimal to conventional use (email, chat and info retrieval)</li> </ul>
<b>USAID May 2002</b>	Assesses ICT Enabling Environment and Donor Activities: <ul style="list-style-type: none"> <li>♦ Policy &amp; Regulatory Framework</li> <li>♦ Infrastructure</li> <li>♦ Private Sector</li> <li>♦ ICT Development Applications</li> </ul>	Statistical analysis of secondary sources and field-based case study (interviews)	<b>Comparative Ranking:</b> lowest rankings in regional assessment based on review of ICT indicators and secondary sources (other e-readiness assessments) Identifies key constraints to wide use and deployment of ICTs to support development goals and proposes series of reforms in policy, legal and regulatory, and institutional environments.
<b>World Bank</b>	Knowledge Matrix Index assesses status based on choice of indicators of Economic Regime, Innovative Systems, Information Infrastructure and Education	Statistical analysis of 61 metrics from World Bank databases	Descriptive interactive graphing on choice of indicators, but no analytic framework.

## Annex E – ICT Donor Support

Donor	CURRENT AND PLANNED PROGRAMS	REGULATORY		INFRASTRUCTUR		CAPACITY BUILDING	ICT APPLICATIONS		
		POLICY	LEGAL	IT	TELECOM		ED	GOV	BUS
ADB	E-Governance Loan	X	X			X		X	
	Secondary Education Project					X	X		
	Telecom Liberalization/cable	X			X				
AP	University E-libraries/Learning Centers			X		X	X		
AUSAID	APEC Support Program	X	X			X			
	Governance Facility Project	X*							
	VAT Training Project					X	X		
	Virtual Colombo Plan/Distance Learning					X*	X*		
	IT Scholarships					X			
CIDA	PIAP PROJECT IT COMPONENT	X	X			X*			
	IDRC E-COMMERCE STUDY		X						
ASEAN	E-COMMERCE REGIONAL TRAINING/PHIL					X			
	WORLD LINKS SECONDARY EDUCATION					X*	X*		
	E-ASEAN TASK FORCE PILOT PROJECTS							X	X
EC	UNIVERSITY PROGRAMS/DISTANCE LEARNING					X			
GTZ	MEKONG INFO NETWORK					X		X	
	AGRUVIET WEBSITE							X	
	SMENET								X
	EXIMPRO								X
ILO	ICT TRAINING FOR SMEs					X			X
ITU	E-COMMERCE FOR DEVELOPING COUNTRIES								X
JIBC	JETRO		X						X
	HOA LAC IT PARK/HANOI			X					
	RURAL TELECOM NETWORK PROJECT				X				
JICA	TELECOM MASTER PLAN	X							
	VITTI (IT TRAINING INSTITUTE)			X		X			
	GDPT TRAINING CENTER 1					X			
UNDP	ICT POLICY FORUM	X	X			X			
	PUBLIC ADMINISTRATIVE REFORM	X				X		X	X
	TRADE PROMOTION PROJECT (E-TRADE)	X	X						
USGOV	USAID STAR PROJECT	X	X						
	USAID AERA COMPETITIVENESS PROJECT	X							
	USAID NGO NETWORKS							X	
	USAID DOT-EDU PROJECT*					X			
	USTAD QUANG TRUNG SOFTWARE PARK			X					
	USTAD SofTEch/DANANG			X					
	USTAD CUSTOMS AUTOMATION							X	
	US DEPT OF LABOR/JOB INFO NETWORK							X	
WORLD BANK IFC	POLICY NOTE	X	X						
	VDIC					X	X		
	HIGHER ED PROJECT			X		X			
	GATEWAY/INFODEV							X	
	E-PAYMENT PROJECT	X	X					X	X
	IFC SOFTWARE OUTSOURCING COMPANIES								X
	IFC – RMIT CAMPUS			X					
	IFC BUSINESS FORUM	X	X						



## Annex E – ICT corporate Support

Corporate Agency	INFRASTRUCTURE		APPLICATIONS		
	TELECOM	IT	EDUCATION	GOVERNMENT	BUSINESS
APTECH (INDIA)		IT TRAINING CENTERS	IT TRAINING MODEL		
COCA COLA		E-LEARNING CENTERS (40)	COMPUTER LITERACY /YOUTH		
CISCO			ICT TRAINING CISCO ACADEMY		
IBM		SOFTWARE COMPANY*	ICT REINVENTING EDUCATION MODEL	MOET TEACHER TRAINING PROGRAM	
FUJITSU (JETRO)		CIRCUIT BOARD FACTORY		E-COMMERCE SOLUTIONS FOR MOT	JETRO WEBSITE (E-TRADE)
INTEL	TEXT MESSAGING TECHNOLOGY (NETNAM)	COMPUTER HARDWARE	ICT TRAINING MODEL: "TEACH TO THE FUTURE" *	MOET TEACHER TRAINING PROGRAM *	SUPPORT FOR 400 IT PARTNER COMPANIES
MICROSOFT			COMPUTER LITERACY/YOUTH	MARD DISASTER WEBSITE	
MITSUBISHI		HOA LAC IT PARK/HANOI	E-LEARNING CENTER/HOA LAC		
ORACLE		DANANG IT PARK			DANANG E-MARKETPLACE
SIEMENS	CELLULAR TECHNOLOGY	IT TRAINING CENTERS	IT TRAINING MODEL		
UNISYS				CUSTOMS DEPT AUTOMATION	
SINGTEL (SINGAPORE)	UNDERSEA FIBER BACKBONE				
NTT/JAPAN CONSORTIUM (BCC)	NETWORK EXPANSION IN 10 PROVINCES/HANOI				
FRANCE TELECOM (BCC)	HCMC NETWORK EXPANSION				
US CABLE & WIRELESS					
TELSTRA (BCC)	SATELLITE AND TRANSASIA CABLE				
COMVIK/SWEDEN (BCC)	CELLULAR TECHNOLOGY				
KOREA SLD CONSORTIUM	CELLULAR /CDMA TECHNOLOGY				
ZHELEZNOG ORSK ASSOC.	SATELLITE (VINASAT)				