Laos

Phonpasit Phissamay

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Overview

The application of IT in Lao PDR is only at the infant stage of development compared to other countries in the region. Of to the whole population of Lao PDR, those currently using computers make up less than 1 percent. One could attribute this low rate to the limited purchasing power of the population. However, compared with the purchasing patterns of items such as motor vehicles, motorcycles and televisions, the pattern for PCs seems to be related to not only monetary constraints but also other factors such as a lack of awareness of the utility of PCs, lack of knowledge and lack of skills to operate a computer. Thus, the key factors to overcome here are awareness and training in IT.

At present, the growth rate of computer usage in Lao PDR is low compared to the rates of population growth and economic development. Computer usage is also sporadic and is not promoted through any guided directions or campaigns.

Currently, the educational infrastructure in Lao PDR is inadequate, especially with regard to written material in the Lao language. A considerable amount of existing information is out of date, especially information related to modern science and technology. Lao PDR is thus lagging behind in access to current information. This situation must be addressed urgently.

The present lack of a Lao language software platform does not appear to be a deterrent to the use of ICTs in commercial enterprises and the public sector. Those who can afford to purchase a computer, or are educated and trained to use one, are also reported to be able to read and write in English. As economic conditions continue to improve and government services become more widespread throughout the country, including rural areas, the lack of Lao language applications may become an inhibiting factor.

There are many non-standard Lao character support solutions available in the country. These solutions are not compatible and are not interoperable with ISO/IEC FTC1 and Unicode standards.

Lao PDR was one of the last Southeast Asian countries to adopt the Internet. Its late introduction manifests itself in the limited use of ICTs in the country. Government ministries make little use of the global information network, and the business sector has been equally slow in implementing Internet-related applications.

Skilled ICT experts are urgently needed in the country to help plan, design, install and maintain ICT facilities, including the computer networks which serve as the conduits and backbone for such services.

The following is a list of inhibitors to ICT development in Lao PDR:

• Lack of coordination: There are many areas of overlap and redundancies in current activities to develop the country's ICTs. A coordination system is needed to manage the limited resources, minimise inefficiencies and maximise development output and benefits.

• Lack of standards: There are virtually no IT standards. Both the private and public sectors use various conventions to integrate ICTs into their current organisational structures. These conventions relate to character sets, software and hardware for LANs, WANs and intranets.

• Lack of IT knowledge and capacity: There is a lack of expertise in the government in areas relating to the formulation, implementation and maintenance of national ICT strategies and policies. At the same time, there is a lack of resources and knowledge in educational institutions for the integration and promotion of ICTs.

• Limited infrastructure: The current telecommunications infrastructure does not support technologies for high-speed information access. The power supply is also unstable, suffering from regular failures and fluctuating voltage.

• Limited purchasing power: The low purchasing power within both the private and public sectors.

• Localisation issues: There is a lack of software in the Lao platform, as well as a lack of online content and resources in the Lao language.

ICT infrastructure

Universal telephone service is still a long way off for Lao PDR. It is estimated that less than 1 percent of Laotian households currently have a telephone (there are now a total of 48,557 lines in the country). Less than half of Lao districts (58 out of 142) have fixed-line telephone service. Only the urban areas in some of the provinces are covered by mobile cellular signals. There are currently no specific plans for developing universal access to telecommunications.

An AMPS analogue cellular network was launched in 1993 serving Vientiane, and a GSM 900 network was introduced in December 1994. The AMPS network has since

been shut down. The GSM network is now available in 9 of the country's 18 provinces. Coverage is usually available only in the largest towns of the provinces covered. It is estimated that less than 10 percent of the population is covered by mobile signals. Despite eight years of implementation of mobile communications, Lao PDR has not yet experienced a wireless boom to the same extent as other developing nations. As of September 2001, there were 29,545 mobile subscribers and mobile density was a mere 0.25 percent. There are several possible explanations. Lao PDR was the last country in the region to introduce competition in the mobile sector. Prepaid service was launched only in 2000. Some argue that the country's economic and geographic conditions work against wide mobile penetration. Incomes are low, the vast majority of its population lives in rural areas, and much of the terrain is mountainous. The number of subscribers grew by 75 percent between January and September 2001; this was significantly the annual average growth of 44 percent experienced between 1997 and 2000. One reason for this significant increase is the commencement of the M-Phone prepaid service. Launched in 2000, there were 5,402 prepaid subscribers as at September 2001, accounting for 21 percent of all mobile subscribers.

As of September 2001, there were 6 ISPs, about 200 Internet cafés and approximately 2,900 subscribers to ISPs in Lao PDR. It is estimated that there were around 9,000 Internet users in the country. The ISPs have their own international gateways (three commercial and one government). Since Lao PDR is landlocked, connectivity is mostly via satellites, such as LANIC (Lao National Internet Committee), which operates a link to THAICOM in Thailand; GlobNet (private ISP), which links to SUBIC in the Philippines; and Laotel (an ISP run by Lao Telecommunication Company), which has a link to SINGNET in Singapore. Only Planet (private ISP), has a fibre link to ETL (Enterprise Telecommunication due Lao PDR). The government is keen to merge all gateways into a single connection with a capacity of 2 Mbps. This national gateway project will initially be hosted and managed by LANIC. So far, little progress has been made in this area. One advantage of the merger, might be to consolidate bandwidth requirements, thus theoretically, obtaining cheaper prices. However, the main motive for the government seems to be the desire for control, both over content and over potential revenue. It is alleged that firewalls are already in place to restrict access to sensitive websites. Disadvantages of the single gateway proposal include a lack of redundancy, and the inability of ISPs to plan their network growth and to manage the quality of their services and expenditure. Most Internet cafés have wireless links to the local ISPs with a speed of either 2 Mbps or 11 Mbps, but individual users have to use dial-up connections via the public telephone service at the speed of 56 Kbps.

Laos facts

Total population: 5,377,000 (2000)[a]
Rural population as a percentage of total population: 85% (2000)[a]
GDP per capital: US$290 (2000)[a]
Literacy in national language: 60% [d]
Literacy in English: Less than 5%[d]
Computer ownership per 100 inhabitants: 0.18[b]
Telephone lines per 100 inhabitants: 0.91[a]
Cell phone subscribers per 100 inhabitants: 0.54[a]
Internet users per 100 inhabitants: 0.16[c]
Internet hosts per 10,000 inhabitants: 0.011[c]
Internet cafés/telecentres per 10,000 inhabitants: 0.371[c]
Number of websites in English and other languages: Approximately 20 websites, all in English[c]
National bandwidth within the country: No backbone in Lao PDR, but the government intranet is 11 Mbps[c]
National bandwidth to and from the country: 2 Mbps for uplink and 4 Mbps for downlink (combined total for the six ISPs operating in the country)[c]

Sources:
(a) National Statistics Centre.
(b) Science Technology and Environment Agency, Prime Minister's Office, Lao PDR.
(c) Lao National Internet Committee.
(d) Ministry of Education.

Estimates from the Science Technology and Environment Agency indicate that there are about 10,000 computers in Lao PDR and the number is growing at about 300 per month currently. Even if the current annual growth rate were to decline from about 40 percent at present to about 10 percent by 2005, perhaps due to saturation of the market, there would still be about 50,000 computers in Lao PDR by 2005. Most of these computers are presently located in Vientiane, but an increasing number are being purchased for use in provincial centres for word processing and for the compilation of statistical information in a format compatible with the requirements of the Vientiane headquarters of the various ministries. Most of the PCs used are clones as they are cheaper and easier to maintain.

Education

Lao PDR has the lowest expenditure on education compared to the rest of the ASEAN countries, accounting for 7.4 percent of all expenditures. The education system comprises general education, technical and vocational training

(including teacher training), and tertiary education. Likewise, the education system can be conceptualised as three interrelated systems, through which both children and adults acquire knowledge and skills. The three systems are formal, non-formal, and informal education. Each of these systems has differing but overlapping goals, organisation, curriculum and pedagogy. IT- or computer science-related education is only available at the tertiary level. The following is a list of some institutions and centres that provide education on IT:

The Science Technology and Environment Agency (STEA) has set up an Informatics Training Centre in its newly established Informatics Technology Centre. UNESCO contributed US$30,000 for renovating the premises, and the Centre of International Cooperation for Computerization of Japan (CICC) donated 19 used PCs, three servers and five printers, which are used to conduct basic computer training courses. The International Development Research Centre of Canada (IDRC) has supported the building of urban-rural digital links by providing ten new PCs to the training centre for conducting advanced courses. All the PCs at the centre are connected to the Internet and also serve as the Internet access points for STEA and other organisations of the Prime Minister's Office. So far, the centre has conducted 12 IT training courses and over 400 participants from various government agencies have been trained. Most of the courses were supported by foreign and international organisations, which provided funds for engaging trainers and training material production; two courses were supported by UNESCO and six courses by CICC.

The National University of Lao PDR (NUOL) is a fairly new institution, formed in 1995 via the consolidation of ten higher education institutions and the Centre of Agriculture. The first academic year of NUOL commenced in October 1996. The current total student enrolment is 11,740, of which 30 percent are female. The largest number of students is enrolled with the Faculty of Engineering and Architecture. Internet access in NUOL is mostly reserved for faculty and staff members. It is available to the main administrative building and the finance and management departments located on the main campus. Internet access is also available at the Faculty of Medical Science to support research activities. Only faculty members at the Faculty of Law and Administration have Internet access. The Faculty of Engineering and Architecture campus has a computer laboratory in their Lao-Japan Technical Training Centre, which houses 20 computers with shared Internet access. In 1998, NUOL started the first computer science programme in the Department of Mathematics and Physics, Faculty of Science. Upon completion of the course, graduates of the programme will receive a Bachelor of Science degree in Mathematics-Computer Science. The computer science degree involves a five-year programme, beginning with two years of foundation studies mandatory for all NUOL students, and then three years of studies in the Faculty of Science. The programme focuses on theories of mathematics and computing, as opposed to computer engineering, which deals more with hardware fundamentals and actual hardware design. In 2001, 29 students of the first intake of the computer science degree programme graduated from NUOL.

Smart schools: With assistance from the Malaysian government, the Multimedia Development Corporation of Malaysia has established a pilot project for "smart schools" at Sikhottabong High School in Vientiane and Champasak High School in Champasak Province. Twenty PCs with Internet connections were provided to each of the two schools. Some Lao subjects will be taught using the electronic equipment. IT-related training courses will also be conducted at these schools.

Private schools: The demand for IT-related training is growing rapidly in Lao PDR. This is reflected by the shortage of IT skilled workers in the workforce. Since the public system lacks the capacity to meet the growing demand, the private sector plays a vital role in providing IT training for the general public.

Companies currently providing IT-related training courses fit into two main categories:

Business administration schools provide IT-related training as part of their general business administration courses. The aim of the IT training course is to prepare students for the modern office environment.

Computer retailers provide specialised as well as basic short-term IT training popular software applications.

Centres of engineering (COEs): Currently, there are six COEs that provide computer-related training courses. All of them have two or three computer laboratories and about 30 PCs without Internet connections. The centres are as follows:
- Lao-Japan Technical Training Centre
- Centre for Skill Development
- Lao-German Technical Training Centre
- PAKPASAK Technical Training Centre
- Vocational Education Training Centre
- Agriculture Training Centre

Government

A number of ministries are now sending information collected in the provinces to Vientiane on computer floppy disks. There are plans to establish LANs in various ministries in Vientiane and, ultimately, for them to share common databases. A variety of LAN software is being used. In many ministry headquarters in Vientiane, a common purpose is lacking between different departments in establishing such LANs and sharing common databases. This is inhibiting the beneficial use of such networks. However, the power and

usefulness of computers, their ability to interact over local and wider-ranging networks, and the resulting benefits are being recognised in a several areas. Plans are being formulated in a number of ministry departments to extend data networks into provincial centres to gather and exchange information. At this stage, the objective is limited to the collection of statistical information on a more regular and timely basis. Unfortunately, there appears to be a tendency for individual departments within the same ministry to plan their own regional networks, thus failing to capitalise on the economies of scale possible for ministry-wide networks or large public service networks. This would have ensured that the scarce resources in the country are mobilised within effective units to form a critical mass of expertise to undertake these projects.

The government does not use extensively the Internet or ICTs. Not all ministries have Internet access; and for those who have, access is also limited to a few Internet accounts. The average number of PCs with Internet access in each ministry is about 10 to 15, limiting access to the top administrators. Consequently, only a few government employees have their own e-mail accounts at work. Although most ministries are planning to set up their own websites, so far only three ministries are online. The Foreign Investment Management Committee, with assistance from the World Bank, has set up an investment portal that provides information to investors to enable them to make online investment applications.

Under the e-government programme, the government ISP was launched in 2001 by LANIC, which aims to establish wireless links among government offices in Vientiane and long-distance connections between provincial administrative offices. So far, 16 ministries and 2 provinces have been networked to the system.

Agriculture

The Lao economy is based mainly on agriculture, which employs over half of the workforce and contributes over 50 percent of GDP. However, as most of the farmers live in rural areas, which have very limited access to the national infrastructure system, such as roads, electricity and telecommunications, the Ministry of Agriculture and Forest still uses conventional media and on-site training courses for educating and disseminating information to the people. Only staff of the Agriculture Research Centre in Vientiane use ICT facilities and the Internet to support their work.

Commerce

Computerised systems can be found only in large companies, and only companies that need to communicate with overseas partners have established e-mail and Internet connections. There is limited utilisation of ICTs in the small and medium enterprises because of the high cost of ICT products and because their businesses are concentrated on the local market, which does not need to be reached via the Internet. The only feasible e-business and e-commerce enterprises relate to tourism as visitors are increasingly using the Internet to research on Lao destinations and to make arrangements for their visits to the country.

Important local sources of content

Science Technology and Environment Agency <http://www.stea.gov.la>
The website aims to provide information on science, technology and environmental matters.

Ministry of Commerce <http://www.moc.gov.la >
The ministry recently established the Trade Information Centre, which created a website for promoting trade with Lao PDR.

National Tourism Authority <http://www.mekongcentre.com>
The authority has established the Tourism Information Centre, which provides online information to promote tourism in the country.

Ministry of Information and Culture <http://www.mic.gov.la>
This site provides information related to Lao culture, traditions, history and art.

***Vientiane Times* <http://www.vientianetimes.gov.la>**
This is a weekly newspaper published in English.

Foreign Investment Management Committee <http://www.invest.laopdr.org>
The site provides detailed information on foreign investment regulations and policies as well as useful contact information.

Planet Online ISP <http://www.laopdr.com>
This is a business-oriented site, providing news and resources to users.

Golden Pages Online <http://www.gp.laopdr.com>
This is the official online version of the national telephone directory, *Golden Pages*.

Lao Embassy in the USA <http://www.laoembassy.org>
This is the first Lao government website, which provides information about Lao PDR in general.

IT industries and services

The IT industry in Lao PDR was established two decades ago, with some companies dating back to the 1980s. However, because of the small population of computer users, it has not developed much since then. In the early stages, the industry was limited to a small number of computer stores. These stores were usually happy to accept any IT-related projects, including software development and computer related training. It was not unusual for a company to subcontract parts of its projects to its competitors to fulfil requirements that it could not meet by itself.

The current IT industry in Lao PDR can be divided into four sectoral categories:

Computer retailers: These provide computer retailing and servicing; LAN design, installation and maintenance; software development; training; and consultancy. There are about 30 such companies.

ISPs: These provide a variety of Internet services (ISP services, Internet café, designing and hosting websites). There are 6 ISPs and about 60 Internet cafés in Vientiane.

IT Training: About six IT training companies are operating in this segment of the market.

Wireless network solutions: These companies design, install and maintain wireless LANs and WANs. There are three companies involved in this business.

Specialisation in a particular sector of the market has proven to be unprofitable. This is particularly true for computer retailers. All computer retailers in Lao PDR are highly diversified. Besides computer retailing and services, their activities usually include software development, consultancy, training, and LAN design and installation.

The Lao IT market is very small so most computer service companies are located in the capital city. Only a few smaller companies serve the provinces. Most of the big computer companies have significant foreign investment which accounts for 50–100 percent of its capitalisation. Some of these companies have been awarded distributor licences or dealerships by international companies. Since this kind of arrangement restricts the business activities of a company, most companies tend to operate independently of major suppliers. Hardware and equipment are imported based on market demand. Low-cost computers are usually imported from China, Thailand and Vietnam by retailers or assembled locally from imported parts. Larger retailers import brand-name equipment mostly from Malaysia, Singapore and Taiwan.

There is a 5 percent tariff on all imported hardware. There is also a 10 percent turnover tax applied to all computer retailers. These two taxes are passed on directly to customers, along with an additional 20–50 percent mark-up as operating profit.

Most of the larger retailers rely heavily on sales to international organisations, projects and the government; these sales, on average, account for 85 percent of all their computer sales. Private businesses are the next largest group of customers, accounting for 13 percent of total sales. Sales for personal use accounts for only 2 percent of total sales. Small shops usually target the low-end computer market, providing cheap computers to customers with tight budgets.

There is little in the way of e-business and e-commerce in Lao PDR. There are five main reasons for this:

• E-business and e-commerce are very new concepts in the country. Little is known about the culture and technologies that drive e-commerce, so it is very difficult for businesses and individuals to identify with their potential benefits.

• Overall Internet access and the number of Internet users in the country are too low to justify the investment required to establish an e-commerce operation for the domestic market.

• There is a lack of expertise and experience. Local businesses that have websites often use their sites only for advertising their products and services.

• There is little need for local businesses to extend their operations overseas. Their focus is on the local market.

• There is a lack of credit card, e-banking and e-payment facilities in the country, or relevant laws to govern electronic transactions.

Research into ICTs

There are no publications available that would indicate the presence of genuine R&D on ICTs in the country. There are no local research centres in ICTs. Independent researchers carry out a limited amount of research on their own. Most of the R&D activities are undertaken by the Informatics Technology Centre of STEA with the following objectives:

• To develop and promote IT in Lao PDR and to communicate and network researchers within the country with their international counterparts, STEA started a pilot project to establish e-mail and Internet for the country. The project is PAN-Laos, which is supported by IDRC of Canada. PAN is conceived as a programme for linking key development research institutes and researchers working in the field of equitable and sustainable development infrastructure. Within PAN are opportunities for the development of information services and content-based networks, along with policy research activities.

• In February 2002, STEA implemented the research project on "Building Urban-Rural Digital Link", which is also supported by IDRC. The overall objective of this project is to increase accessibility and to improve ICT skills for the purpose of developing both urban and rural areas via the following activities:

- Expansion of STEA's training capacity so that it can better support training of national government staff in Vientiane and provincial government staff in Luang Prabang. The enhanced capacity includes a web server and an e-mail server at STEA's gateway to the Internet.
- Provision of Internet connectivity from STEA to NUOL by installing a microwave link between the university and STEA's gateway to the Internet.
- Provision of Internet connectivity to Luang Prabang provincial government offices so as to improve communication with the Vientiane government offices, leading to faster information gathering, dissemination and decision-making related to policy-making and administration.
- Introduction of ICTs at the community level by creating and equipping the Luang Prabang Multipurpose Community Telecentre to support training of a larger number of people in the community in basic ICT skills.
- STEA is also undertaking research on Lao language information processing with the cooperation of the CICC of Japan.

Open source movement

There is no organisation in the country that promotes open source products, but suppliers and vendors from various companies are marketing open source software in the country. However, Microsoft applications such as Windows and Office remain very popular. However, most of the LAN systems are switching to Linux-based solutions.

The Informatics Technology Centre of STEA established the Open Source Laboratory in December 2002 with the assistance of the Francophone Organisation. The organisation has donated two servers, 15 PCs, and other IT facilities to this laboratory. It will initially focus on the promotion of open source software and the creation of awareness about the subject. It will also conduct training courses on the use of such software. The Francophone Organisation is providing technical expertise for these activities.

IT-related projects

Almost all existing projects in Lao PDR involve some form of ICT equipment or rendering IT technical assistance, such as computer training and designing online content. The following is a list of IT projects:

Intranet for the government: LANIC is currently implementing an intranet system for the government. There are three major components in this project:
- Establishing a private network for the government, which will cover all the ministries and agencies in Vientiane.
- Linking provincial officers to this private network.
- Establishing a national gateway system for the Internet in Lao PDR.

Intranet of the Ministry of Education: This ministry is also currently implementing an intranet system spanning Vientiane and outlying provinces. There are three major components in this project:
- Establishing an information system within the ministry for data collection and analysis.
- Linking NUOL and provincial offices to this information system to facilitate information collection and processing.
- Installing facilities to support distance learning through the intranet system.

Euro-TAL ASEAN Support Project: Its objective is to facilitate the participation of Lao government officials in ASEAN matters. The project is funded by the European Union. The government partner for the project is the Ministry of Foreign Affairs.

Computerisation of Tax and Customs Department: This is part of the tax and customs administration reforms.

Information management system: This is a project of the Government Public Administration Reform programme.

Legal/law information system: This too is a project of the Government Public Administration Reform programme.

Aid coordination and management system: This is a project of the Committee for Investment and Cooperation.

IT education: This is undertaken by the Faculty of Engineering and Architecture at NUOL.

IT policy and strategy

There is at present no national ICT policy and master plan. However, at the beginning of 2002, the Politburo of the Central Committee issued the following guidelines for promoting ICT utilisation and development in the country.

Expectations:
- Utilisation of ICT should be expanded to all areas to become one of the priority enablers of social-economic development and national security.
- The National Telecommunications Network should be extended throughout the country with the capacity and capability to carry more data at higher speed, better quality and cheaper prices in order to increase the number of Internet users.
- The nation's economic capability should be further exploited by encouraging the implementation of new economic strategies in order to accelerate the modernisation of the Lao economy, increase the opportunity for competition, improve the living

standards of the Lao population, as this is an important factor for elevating the country to the industrialised and modernised era.

- National security as well as national culture should be preserved.

The policy must be inclusive of the following considerations:

- The increased utilisation of ICT is a priority in the national strategy for social-economic development. ICT is also the basic tool to accelerate the development and expansion of the industry and to reduce the gap with other developed countries.
- All key sectors such as economy, culture, social, defence and national security have to use ICT.
- To create conditions that will encourage the increased utilisation of Information Technology and its deployment in the National Telecommunications Network (which will be the infrastructure for social-economic development) and to ensure that the network has high speed, good quality and cheaper prices.
- To create and increase the human resources in ICT fields as this is necessary for improving ICT utilisation and development in the country.

Future trends

Lao PDR is a country beginning to transform itself into a modern economy. It intends to do this by marshalling its natural resources, both human and material. Because it currently does not have all the knowledge and expertise within the country to optimise its development process, it must gain access to this information from external sources to allow it to accomplish its development objectives. Much of the information it needs is available outside the country in electronic form on the Internet at costs which are far less than the benefits this knowledge can deliver. Hence, it is essential to develop the skills to exploit such a facility and find the funds to build the necessary infrastructure.

Lao PDR has yet to make a commitment to exploit this essential new innovation in order to industrialise the country. To make such a commitment, the benefits of ICTs need to be better understood at all levels of government. Such an understanding should include both the benefits and the costs, as well as the needs of supporting infrastructure including power, telecommunications and technical education.

An ICT policy cannot be implemented without a critical mass of skilled technical personnel who can plan, design, install and operate such technologies. Additionally, skilled human resources are needed to compile information for publication on the Internet.

The following elements and intitiatives are urgently required to help spur the growth and expansion of the sector:
- Skilled, professional and technical ICT experts to plan, design, install and maintain information facilities

- A national IT policy and master plan
- An environment to facilitate the networking of researchers and trainers in the IT sector
- Improved IT education through localisation and updating of the curriculum and publication of technical books in the Lao language.
- Broader access to the Internet to help nurture e-commerce opportunities.
- An operational government intranet to help build an e-society
- Better-defined and strengthened national standards
- Incentives for the IT industry in the form of fiscal measures and protection of intellectual property rights

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