

# .mm

## Myanmar

Thein Oo and Myint Myint Than

### OVERVIEW

One of the more significant information and communication technology (ICT)-related developments in Myanmar is the completion of the first phase of the Yatanarpon cyber city. Officially opened on 14 December 2007, the city includes a telecommunications hub and seven incubation centres. The telecommunication hub is connected by fibre to the national fibre backbone linking all of the big cities. International fibre links to China, India, and Thailand are also to be established. Together with the South East Asia–Middle East–Western Europe–3 (SEA–ME–WE–3) submarine cable and Thai Com satellite links, these three new links will provide a reliable international connection, thereby removing a major constraint to the development of Myanmar’s ICT industry.

The establishment of the USD 52 million cyber city is widely considered to be an indication of the government’s commitment to ICT development and a clear invitation to the international ICT community to invest in Myanmar. A law establishing special industrial zones is being prepared and it is expected to offer investors various incentives, such as tax breaks and financial facilities.

Another significant development is the establishment of the government fibre network linking all ministries and head offices of government agencies, and a data centre housing servers for all ministries. The government broadband network provides a good opportunity for the development of e-government. There are already some e-Government efforts, such as the Government Personnel Management System (GPMS) and Electronic Document Management System (EDMS). There are also efforts by various government agencies to computerize operations.

A less positive development is the exodus of Myanmar’s ICT professionals to other countries, especially Singapore. But

Total population	56.5 million (as of December 2007) <sup>a</sup>
Literacy rate (adult)	94.75% (as of December 2007) <sup>a</sup>
GDP per capita	USD 11,664 (2004–2005 est.) (MMK 75,814) <sup>b</sup>
Computers per 100 inhabitants	0.88 (2007) <sup>a</sup>
Fixed-line telephones per 100 inhabitants	1.37 (as of December 2007) <sup>a</sup>
Mobile phone subscribers per 100 inhabitants	0.44 (as of December 2007) <sup>a</sup>
Internet users per 100 inhabitants	0.16 (June 2007) <sup>c</sup>
Domain names registered under .mm	400–500 (as of December 2007) <sup>c</sup>
ADSL subscribers per 100 inhabitants	0.02 (as of February 2007) <sup>c</sup>
Internet domestic bandwidth	198 Mbps (as of June 2008) <sup>c</sup>

(Sources: <sup>a</sup>Information and Public Relations Department 2008; <sup>b</sup>Department of Labour and UNFPA 2007; <sup>c</sup>Myanmar Posts and Telecom 2007)

this potential crisis also poses an advantage: the lure of high-paying jobs abroad is good motivation for Myanmar’s young people to study hard and participate in local on-the-job training in private computer training institutes and ICT companies. This in turn could impact positively on the quality of local ICT training programs and ICT personnel. Already, some foreign ICT companies are establishing off-shore development centres in Myanmar. With improvements in the telecommunication infrastructure and the increasing number of skilled local human resources, significant outsourcing to Myanmar can be expected.

On the legal and regulatory front, an Electronic Transactions Law is being implemented and a root Certification Authority (CA) is being established. These will improve confidence in electronic transactions and change the way government and business are done.

All of these are indicators that ICT development is a priority in Myanmar.

### TECHNOLOGY INFRASTRUCTURE

Compared to other member countries of the Association of Southeast Asian Nations (ASEAN), Myanmar has a relatively weak access network. Teledensity, including mobile telephony, is only 1.32 percent, the lowest in the ASEAN. The number of Internet users is also negligible. But the demand for telephone services is high and the minutes of use and average revenue per user (ARPU) are increasing, which implies that there are network externalities and the return on investments in telephone services will improve in the future.

The number of automated switching systems has been increasing in urban areas, while manual switches continue to be

used in rural areas. The transmission systems consist mainly of microwave links and satellite links except in Yangon and the Yangon–Mandalay route where the optical fibre cables are buried. The microwave links consist of analogue and digital links. The current transmission systems are more than enough to meet the country’s telecommunications demand. Myanmar’s international link is also satisfactory in the sense that the main submarine cable is backed up by a satellite link.

The current telecommunications infrastructure in Myanmar consists of the following:

Local satellite ground station	
– VSAT (station)	13
– MPT Satellite Terminal (station)	1,050
Local satellite channel	
– VSAT (station)	62
– MPT Satellite Terminal (station)	4,200
Overseas satellite ground station	3
Overseas satellite channel	543
Overseas submarine cable terminal	3
Overseas submarine cable channel	1,248
Fibre cable link (station)	240
Overseas telephone channel	2,031

As of February 2007, there were about 91,450 Internet users using dial-up (71.25 percent of users), Asymmetric Digital Subscriber Line — ADSL — (12.64 percent), broadband wireless (6.73 percent), satellite terminal (5.66 percent), fibre optic cable line (2.9 percent), X.25 line (0.65 percent) and E1 line (0.17 percent). There are 163 public access centres (PACs) in Yangon, 13 PACs in Mandalay, and 43 PACs in regional areas.

The short-term goal of Myanmar’s ICT Infrastructure Master Plan is to install 100,000 lines and achieve 3.2 percent teledensity by 2010, deploy mobile base stations and switching systems in major cities to achieve a 3.5 percent mobile subscription rate, and install village phones in rural areas. The long-term vision is to achieve 30 percent teledensity with each household having access to telephone lines, reach a 25 percent mobile subscription rate, and make telephones and the Internet available at a government office in every village by 2025.

## KEY INSTITUTIONS AND ORGANIZATIONS DEALING WITH ICT

The Myanmar Posts and Telecommunications Enterprise provides all telecommunications services, including fixed and mobile access, local, national and international calls, and leased lines.

Other key institutions dealing with ICT development are the Myanmar Computer Science Development Council (MCSDC), the e-National Task Force (e-NTF), the Myanmar Computer Federation (MCF) and three associations, namely, the Myanmar Computer Professionals Association (MCPA), the Myanmar Computer Industry Association (MCIA), and the Myanmar Computer Enthusiasts Association (MCEA).

The Ministry of Science and Technology (MOST) upgraded the 24 Government Computer Colleges (GCCs) to Universities of Computer Studies on 19 January 2007. There are now 26 computer universities dedicated to professional education in ICT fields.

## ICT AND ICT-RELATED INDUSTRIES

It is estimated that there are about 400,000 PCs in Myanmar, with about 20,000 personal computers (PCs) distributed monthly. The hardware industry does only trading and assembling and no manufacturing. Software development and training are the most popular business activities, with more than 50 percent of ICT businesses engaged in these activities. Hardware sales and system integration are the second and third most popular ICT businesses, respectively. This suggests that software-related businesses rather than hardware-related businesses are the key drivers of ICT development in Myanmar, although the hardware sector can be a key driver in the long-term. Since the Yatanarpon cyber city includes an area allocated for hardware manufacturing, it is expected that some foreign manufacturing companies especially from China will set up shop in the cyber city.

Most of the software used in the country is developed locally. A few software houses are doing outsourcing and joint product development with foreign partners. There are more than 50 local and two foreign software companies based at the first Myanmar ICT Park. Established in January 2002, the Park provides a very good environment for software companies.

Issues in ICT industry development in Myanmar include infrastructure, government support, technology transfer, international exposure, quality assurance, legal frameworks, standardization, and business practices.

## KEY ICT POLICIES, THRUSTS, AND PROGRAMS

An ICT Master Plan for Myanmar covering the period 2006–2010 has been drafted with funding support from the Republic of Korea under the Initiative for ASEAN Integration. But the Master Plan has not been officially adopted or approved. The lack of an ICT Master Plan or a coherent set of ICT policies is the biggest weakness in Myanmar’s ICT development efforts.

Adopting a Master Plan will provide direction not only to government agencies, but also to ICT business enterprises and investors.

The draft ICT Master Plan specifies strategic directions in eight areas: (i) infrastructure development, (ii) ICT industry development, (iii) ICT human resource development, (iv) e-government, (v) informatization and e-commerce, (vi) e-education and awareness building, (vii) ICT liberalization, and (viii) ICT legal framework.

The strategic directions for ICT infrastructure include: separating the regulatory and administrative management of telecommunications; taking appropriate action to attract foreign investment; minimizing the cost of telephone installation through cooperative efforts with the road/railroad construction department and the electric power department; investing in the most profitable market segments such as urban mobile subscribers, village phones, and business customers; and building the ICT infrastructure as soon as possible.

In ICT industry development, the thrust is to develop the software industry in the short term and to build a policy implementation and evaluation authority that would also support ICT human resource development and research and development (R&D). Another thrust is providing a favourable environment for ICT business in order to establish the ICT cluster and inducing low-level ICT outsourcing service from abroad in the mid-term. Developing a pool of highly skilled ICT human resources and opening up the market in line with ASEAN targets are also among the strategic directions to be pursued in this component.

The ICT Human Resource Development Master Plan is in accordance with ‘The Thirty-Year Long-Term ICT Promotion Plan for Universities of Computer Studies and Government Computer Colleges’ of the MOST and ‘The Thirty-Year Long-Term Education Development Plan’ of the Ministry of Education. The Master Plan focuses on providing appropriate incentives to facilitate ICT knowledge and technology transfer through various channels. It calls for the adoption of policy initiatives that would help the training and education sector meet the specific requirements of industry. The cooperation of all stakeholders is required to support the expansion and improvement of the quality of ICT education and training, and to promote the software industry.

The e-government component of the ICT Master Plan aims to build up fundamental infrastructure, including networks, basic applications and databases, based on lessons learned from pilot projects since 2001. It also seeks to document success stories in leadership, management, and priority projects to encourage citizens and leaders to continue to support e-government projects. A third aim is ‘triggering snowball effects’ or encouraging more investments in the expansion of e-government from the country’s

leaders and from the citizens through the publication of success stories.

The informatization and e-commerce component aims to reflect the needs of citizens and businesses and, given the limited resources available, identify and concentrate on enhancing important industries that have a high probability of success. Best practices shall be documented and replicated in other industries in order to justify the investment in informatization and e-commerce projects. It is considered important to learn from the experiences of other countries, especially those similar to Myanmar. Targets for each stage shall be set, and informatization and e-commerce projects shall aim to promote the local ICT industry.

The e-education and awareness building component of the Master Plan consists of: (i) benchmarking against success factors in other nations; (ii) making full use of existing resources (including traditional media); (iii) encouraging the participation of opinion leaders; (iv) setting priorities and targeting the young talents first; and (v) cooperating with private, civil, and international entities.

In ICT liberalization, one of the prerequisites for a competitive market is the privatization of telecommunications services. The first step toward this is the separation of the service entity from the policy entity. This may be achieved by establishing a 100 percent government-owned public corporation, which may be called the Myanmar Telecommunication Authority. In the long run, shares in the company may be sold to the private sector and eventually to foreign investors. Thus, the Myanmar government will have control as structural preparations for privatization are being made. While it may be too early to liberalize and introduce competition in basic services, such as fixed and mobile voice telephony and Internet services, the government should consider relaxing regulation of the value added services (VAS) sectors. In this connection, the law should be amended such that only postal and basic telecommunications services are provided solely by the government instead of all telecommunication services.

The strategic directions for an ICT legal framework may be summarized as follows: (i) overhaul the ICT legal framework; (ii) reduce uncertainties in implementing telecommunications policy; and (iii) modernize the ICT legal framework.

The ICT Master Plan covers only the period 2006–2010. The preparation of the next plan is urgent if ICT development efforts are to be compatible with the national socio-economic plan.

## LEGAL AND REGULATORY ENVIRONMENT FOR ICT DEVELOPMENT

Current ICT laws consist of the Myanmar Telegraph Act (1885), the Myanmar Wireless Telegraphy Act (1934), the Computer

Science Development Law (1996), the Electronic Transactions Law (2004), and the Wide Area Network Order (Notification No. 3/2002) concerning the establishment of a computer Web using a wide area network.

Although it includes regulations related to ICT industry promotion, the Computer Science Development Law focuses on the utilization of computer science technology. The e-Transactions Law is only a small part of a comprehensive informatization promotion law that Myanmar needs to put in place. The Wide Area Network Order focuses mainly on prohibiting illegal acts relating to networks, and not on facilitating the building and upgrading of telecommunications networks. In addition, it deals with licence regulations that should be covered by a Telecommunications Law.

Myanmar needs to adopt a Telecommunications Law. A draft has been completed and it is now being circulated among government and private organizations by the e-National Task Force. The Telecommunications Law is supposed to regulate all kinds of computer- and ICT-related activities, including: (i) permission to establish a telecommunications business; (ii) issuing licences for ownership of accessories and network service businesses; (iii) import and export of telecommunications materials; (iv) a licence to establish computer networks; (v) administration of the frequency spectrum; (vi) technological norms and standards; (vii) protecting users; (viii) prohibiting anti-competition; and (ix) installing and maintaining networks and accessories.

The Myanmar ICT Master Plan addresses liberalization, but only in terms of investment, production, and distribution of ICT products and services, and not in terms of telecommunications networks and services.

Until now, Myanmar’s legal framework for ICT has been developed not via a systematic blueprint, but in response to temporary needs. Thus, there is a lack of harmony in some cases and regulations need to be amended in light of technological developments and changes in the ICT market.

## DIGITAL CONTENT INITIATIVES

Currently, three types of fonts are in use in Myanmar: ASCII-based fonts (more than 50 fonts with various codes), partial Unicode fonts, and Unicode (Open Type) fonts. The standardization of the Myanmar character code set was approved in 1998 (between Uni1000 and Uni109F) according to ISO 10646 in Unicode Standard 3.x. But encoding standards were not defined in that version. In Unicode Standard 4.x, the Unicode Consortium has defined Myanmar Unicode encoding standards and canonical order. Some Myanmar script extension and minority languages were approved by the Unicode Consortium and published in

Unicode Standard 5.1. However, the implementation of the script has been delayed due to its complexity and the lack of uniscribe support in Microsoft operating systems.

Localization is important for bridging the digital divide. The Myanmar Unicode and Natural Language Processing (NLP) Research Centre, a non-profit and non-government organization, is spearheading localization efforts in Myanmar. Despite the lack of uniscribe support in Microsoft operating systems, the centre has successfully developed the Myanmar1 Unicode font according to Unicode Standards 4.1 and Myanmar3 Unicode font according to Unicode Standards 5.1. These can be downloaded from <http://www.myanmarmlp.net.mm/>. For open source platforms, the Pango module can be downloaded from <http://fontforge.sourceforge.net/>.

Open source alternatives are at an early stage of development and the preference for now is to have Microsoft come up with an Enabling Language Kit (ELK) for Myanmar in the near future.

## ONLINE SERVICES

### e-Government

In 2004 Myanmar ranked 123rd among 191 countries in the United Nations e-Government Readiness Index. Among the sub-indexes, Myanmar ranked 100th out of the 191 in the Web index and 182nd out of 191 in the telecommunications index.

A study by the MCF, which included a department-level survey and in-depth interviews with local experts, has found that very few staff of government agencies are allowed to use PCs and local and wide area networks. There are 1.3 computers per 100 people and the percentage of PCs connected to the Internet and email servers is about 0.06 and 0.03, respectively. This means that the PCs, the Internet, and email are hardly used and are not integrated in the government business process. According to the survey, while 46 percent of agencies have more than one information system, only 11 percent of agencies provide online public services.

Lack of skilled personnel, poor communications infrastructure, and insufficient budget were identified as the obstacles to operating information systems. Other obstacles mentioned include electricity problems, resistance of users, and lack of awareness among government leaders.

The government officials surveyed identified the following as the most important issues to be addressed by e-government: improving efficiency, reducing time spent, and information sharing. They consider public information as one of the most important factors for improving interaction between the government and citizens. Cutting bureaucratic red tape and reducing

time spent waiting for public services were also considered to be important.

In May 2005, the Myanmar government received a loan of KRW 11 billion (about USD 12.5 million) from the Korean Economic Development Cooperation Fund for the establishment of a Myanmar Basic e-Government System. The project sought to connect ministry buildings to a high-speed network and computerize basic government administration processes. The project has been completed and the fibre optic connection, network equipment and servers, data centres, and basic e-government applications are now in place. Two basic applications, the GPMS and EDMS, have been developed. However, the systems have not yet been implemented.

The delay in implementation suggests that getting the commitment of national leaders and improving telecommunication infrastructure are necessary but insufficient. Myanmar needs to put in place other fundamentals, such as setting reasonable e-government goals, developing a citizen-focused and business-centred e-government plan, prioritizing projects according to well specified criteria, reengineering business processes, and managing change.

### e-Commerce

The e-ASEAN Readiness Assessment conducted by IBM at the end of 2001 puts Myanmar, Vietnam, Cambodia, and Laos at the ‘emerging’ stage of development of an information economy. Myanmar was ranked lowest in e-commerce. This situation has not changed much.

According to the MCF survey, less than 1 percent of the businesses surveyed have introduced informatization. Those interviewed said that informatization should first be pursued in agriculture, which accounts for more than 60 percent of the Gross Domestic Product (GDP), and finance, the foundation of industrial development. As for the level of business process informatization using an application system, about 40 percent of survey respondents said they handle less than 10 percent of business processes using an information system, and only 12 percent said they handle more than 50 percent of business processes using an application system. Most of the latter were companies in the ICT and financial industries.

More than 40 percent of the respondents were not interested in informatization. However, those from the banking, retail, travel, and agriculture industries showed a strong interest in informatization. About 40 percent of the respondents said they do not need e-commerce.

In sum, business informatization and e-commerce in Myanmar are characterized by a lack of informatization strategies, lack of awareness about informatization and e-commerce, lack of

ICT infrastructure, and lack of skilled personnel and enabling legislation.

## ICT-RELATED EDUCATION AND CAPACITY-BUILDING PROGRAMS

### ICT Human Resource Development

Developing skilled human resources particularly for the software and ICT services sectors is considered a key to Myanmar’s economic growth. Twenty-six universities of computer studies are helping to substantially increase the country’s supply of ICT professionals. The Ministry of Education and New Century Human Resource Development NHRD Department also have their own programs for developing ICT graduates. The Ministry has a Bachelor of Computer Science program at Dagon University and Yadanabon University, and a Postgraduate Diploma and a Master of Computer Science program at Yangon University. The New Century Human Resource Development (NHRD) Department has various graduate, diploma, and certificate programs related to ICT and its graduates have been increasing steadily.

The private sector also plays an important role in ICT human resource development. Currently there are more than 100 computer schools, including 80 in Yangon, providing basic computers skills training to about 50,000 students annually.

The National Computing Centre (NCC, [www.nccedu.com](http://www.nccedu.com)) alone accounts for an annual supply of 500–600 International Diplomas in Computer Studies, 400 International Advanced Diplomas, and 120 Bachelors in Computers and Information.

A recent survey conducted by the MCF found that 62 percent of the people in Yangon see the ICT industry as a promising field. This acute public awareness of the importance of ICT is identified as a major strength of ICT human resource development in Myanmar.

It is estimated that there are currently about 1,000 senior and 8,000 junior software engineers and that 25,000 software engineers will be available by 2025. The main issue in ICT human resource development is the mismatch between supply and demand, not lack of supply. The mismatch is a consequence of poor quality ICT education. There are many graduates but few who are qualified to work in the international market.

On the other hand, local companies are unable to pay skilled ICT professionals competitive salaries, and many qualified ICT engineers are migrating to Singapore, Thailand, Japan, and Australia. Although it is an issue, the brain drain may also have positive effects. First, it can increase the motivation of

individuals to seek better skills and it could encourage local ICT companies to pay higher salaries. Second, it could lead to knowledge flows and collaboration with foreign companies and research institutions. In addition, it poses opportunities for exporting technologies.

Myanmar needs to study international best practices in ICT human resource development to build a high-quality ICT workforce.

### e-Education

The ultimate goal of e-education and awareness is to achieve an inclusive e-Myanmar society in which everyone — those living in urban and rural areas, the young and the old, rich, and poor — has access to information services. This is the key to a full-fledged information society where e-government and e-commerce are part of everyday life for all citizens. The three main pillars for achieving an inclusive e-Myanmar society are promoting awareness of ICT, improving digital literacy and ensuring universal access. While the vision of an e-Myanmar society is not one that can be realized quickly, two targets that may be achieved in the short term (i.e. by 2010) are: an Internet usage rate of 20 percent and a telephone penetration rate of 40 percent. By achieving these two targets by 2010, Myanmar will develop confidence in implementing the ICT Master Plan and be in a good position to initiate the next stage of development.

The Myanmar government aims to ensure that every child leaving school should be familiar with computers and be scientifically literate. To this end, the government is collaborating with the private sector and local communities to establish multimedia classrooms and small computer laboratories in high schools. Furthermore, college students are now required to complete 30 hours of IT literacy courses.

IT learning centres, electronic resource centres and computer training centres are also being set up in colleges and universities. The Ministry of Education is developing an educational Intranet system linking all universities and colleges. Moreover, the Ministry of Education, in cooperation with the Ministry of Information, has launched a data broadcasting system for distance education, with more than 150 learning centres established in various colleges, universities and institutes, and multi-media high schools.

## CONCLUSION

Myanmar’s commitment to ICT development is apparent in the establishment of the Yatanarpon cyber city, improvements to the national backbone and international connectivity, the government fibre network and e-government projects, computer universities in regional areas, public access centres in the rural areas, and efforts at localization.

These efforts are characterized by an emphasis on hard infrastructure over soft infrastructure, quantity of ICT graduates over quality of ICT training, and computerization of government procedures rather than business process reengineering. Such a one-sided approach is not sufficient to produce a good outcome. In fact, ICT development in Myanmar to date has had little impact on socio-economic development.

Nevertheless, these efforts are necessary and we can expect ICT development in Myanmar to improve as lessons are learned and good and proven practices from other countries are emulated.

Given its strategic location between two of the world’s biggest countries, China and India, its abundant natural resources, and its cheap labour force, Myanmar has the potential to become a high growth country. But it is still at an early stage of ICT development. The supply side of ICT development, such as the telecommunication infrastructure, computer penetration and access points, will be improved if the present level of effort is maintained. Improving the legal framework and developing relevant applications will require more time and effort from both the public and private sectors. Devising a mechanism for effective collaboration and cooperation will be a key success factor.

## BIBLIOGRAPHY

- Department of Labour and UNFPA. (2007). *Handbook on human resources development indicators 2006* (Special ed.). Yangon: Ministry of Labour.
- Information and Public Relations Department. (2008). *Chronicle of national development comparison between period preceding 1988 and after (up to 31–12–2007)*. Yangon: Ministry of Information.
- Myanmar Posts and Telecom. (2007). *IT Statistics*. Myanmar: Ministry of Communications, Posts and Telegraphs.