KRETEK INTERNET:
INDONESIA CASE STUDY

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INTERNATIONAL TELECOMMUNICATION UNION
GENEVA, SWITZERLAND

This report has been written by Michael Minges of the International Telecommunication Union (ITU). It was edited by Vanessa Gray and formatted by Nathalie Delmas. The report is based on field research carried out 30 April – 4 May 2001 as well as articles and publications sourced in the document. The Directorate General of Posts and Telecommunications (Postel) provided incalculable support; without its assistance the report would not have been possible. Equally, the report would not have been possible without the cooperation of the many from the Indonesian public and private ICT sector who offered their time to the report's author. Special thanks to Mr. S. Abdulrachman and Ms. N. Purwati of the Indonesian Infocomm Society (MASTEL) and Mr. R. Rusdiah of the Indonesian Internet Kiosk Association (AWARI) for their comments. The report is one of a series of case studies examining the Internet in South East Asia carried out in 2001. Additional information is available on the ITU's Internet Case Study web page at http://www.itu.int/ITU-D/ict/cs/.

Information in this report is valid as at December 2001.

The report may not necessarily reflect the opinions of the ITU, its members or the government of the Republic of Indonesia.

'Kretek' in the title is Indonesian for the word 'crackle'. This is the sound that burning cloves make. In Indonesia, cloves are combined with tobacco to produce sweet smelling Kretek cigarettes. Kretek is uniquely Indonesian and accounts for over 90 per cent of annual cigarette consumption in that country.

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1. The crisis effect

Unfinished Jakarta Skyscraper - May 2001

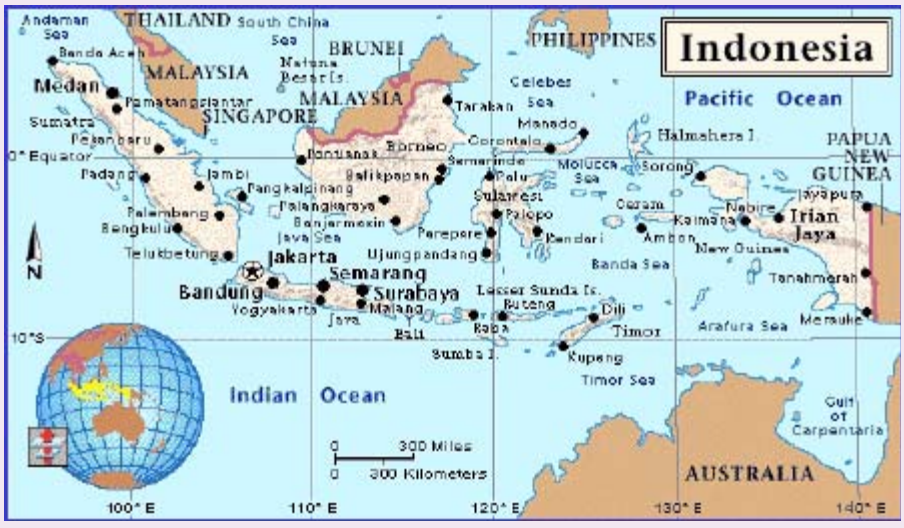
For the past few years, the Republic of Indonesia-the world's fourth most populated country-has been through its biggest turmoil since it declared independence from the Netherlands on the 17th of August 1945. It has not only had to contend with a regional financial crisis beginning in 1997, but a socio-political one as well. Longtime President Suharto left office in 1998. His departure unleashed political uncertainty and internal tension across this diverse nation. The effects of these crises are highly visible. The capital, Jakarta, is littered with abandoned skyscrapers and its previously metamorphic skyline basically unchanged since 1997.

This is a land of deep contrasts-more than a dozen ethnic groups speaking over 100 languages spread across 6'000 inhabited islands (out of more than 13'000). The sharp contrast between old and new, rich and poor is exemplified by packed shopping malls while across the street, bare foot street vendors dispense satay, the ever present kretek clove cigarette dangling from their lips.

1.1 Demographics

Located in South East Asia, the Republic of Indonesia is primarily water. Out of a total area of 9.8 million square kilometres, 81 per cent is sea. The country is divided into 33 provinces, 268 regencies, 73 municipalities, 4'044 sub-districts and 69'065 villages. The population of the country was projected at 210.5 million in 2000, a growth rate of 1.4 per cent compared to the previous year. The growth rate is down

Figure 1.1: Map of Indonesia

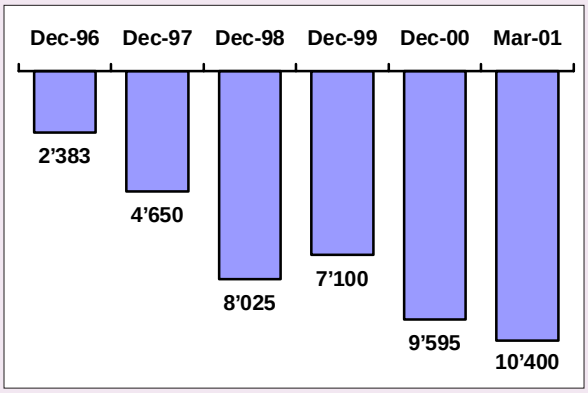


Source: Permanent Mission of the Republic of Indonesia to the UN.

from some two per cent in the period 1980-90 reflecting the success of family planning programmes. The distribution of Indonesia's population is heavily skewed. The capital Jakarta, located on the island of Java, had an estimated population of 9.6 million in 1999, accounting for almost five per cent of the country's total inhabitants. The island of Java is home to some 59 per cent of Indonesians but only accounts for 6.6 per cent of the land area. At the opposite extreme, the province of Irian Jaya, in the far east of the country, accounts for some 22 per cent of the territory but just one per cent of the population. Some 60 per cent of the population lives in rural areas. There are an estimated 51.2 million households or just over four members per household.

Figure 1.2: Freefall

United States Dollar middle rates against Indonesian Rupiah



Source: Bank Indonesia.

1.2 Economics

Indonesia's per capita income of US$ 570 has plunged by almost half since its peak of US$ 1'110, just before the economic crisis.[1] The drop was first a consequence of the Asian financial crisis, which began in Thailand in July 1997 and then rippled through the rest of the region. The Indonesian Rupiah (Rp) plummeted (see Figure 1.2) as investors pulled out. The decline in Indonesia's economy was its sharpest since independence and awakened suppressed political and social chasms. These in turn led to instability that has frozen foreign investment and kept the country in limbo, forcing it to turn to the International Monetary Fund (IMF) for a US$ 10.4 billion loan in November 1997.[2]

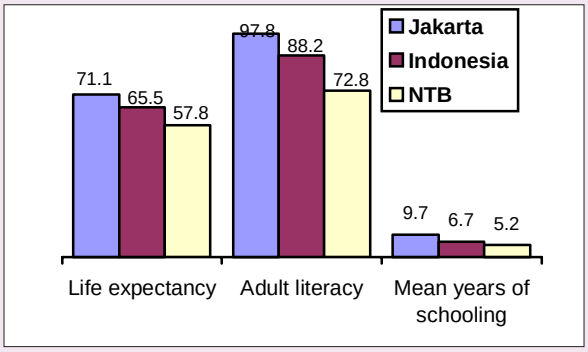
The crisis—capped by a decline of economic output of 13.1 per cent in 1998, the highest in Asia—brought to end several decades of impressive growth. Economic expansion was initially sparked by oil—Indonesia is the only Asian member of the 11-nation Organization of Petroleum Exporting Countries (OPEC). Later, as in most East Asian countries, Indonesia embraced trade—particularly in manufactured goods—to diversify and grow its economy. The results led to an annual average economic growth of 6.3 per cent between 1983-92 and annual average growth of over seven per cent between 1992 and 1996.

1.3 Human Development

In the year 2001, Indonesia found itself ranked 102nd out of 174 countries, placing it in the medium human development grouping. Although one of the lowest ranked South East Asian countries (only above Myanmar, Cambodia and Laos), Indonesia is about where it

Figure 1.3: Human Development Gaps

1999



Note: NTB refers to Nusa Tenggara Barat, the lowest ranking of Indonesia's 27 provinces in terms of human development.
Source: BPS.

should be in terms of human development given its per capita income. There is cause for concern however as Indonesia's rank has been slipping, again caused by the economic crisis. This is reflected in national poverty statistics that show the percentage of the population living in poverty rising over the last few years (although there was a decline in 1999). There is also a national human development divide, with a notable gap in life expectancy, adult literacy and mean years of schooling between Jakarta and other parts of the nation (see Figure 1.3).

[1] World Bank. "Indonesia Data Profile." http://devdata.worldbank.org/external/CPProfile.asp?SelectedCountry=IDN&CCODE=IDN&CNAME=Indonesia&PTYPE=CP.

[2] In support of the loan, Indonesia had to commit to a 48 point 'Memorandum on Economic and Social Policies.' See "Indonesia Letter of Intent." 31 October 1997. www.imf.org/external/np/loi/103197.htm.

2. Telkom Territory

2.1 History

Like many countries around the world, Indonesia has progressively liberalized its telecommunication sector over the last decade. Some of the steps it has taken are related to global trends, others are specific to the South East Asia region and a few are distinctly Indonesian. The choices have been influenced by the tension between the desire to protect entrenched interests on the one hand and the need for private investment on the other. In this traditionally statist country, a reluctance to reduce government control also plays a role.

PT Telkom - Jakarta

The roots of liberalization can be traced to the corporatization of the two state-owned companies for domestic —P.T. Telekomunikasi Indonesia (**Telkom**)— and international — P.T. Indonesian Satellite Corporation (**Indosat**)— telecommunication services in the early 1990s. In October 1994, Indosat completed an initial global public offering of shares. This was followed by the partial privatization of Telkom in November 1995. Unlike many other developing countries, shares in both companies were sold to the public rather than a strategic investor. Today, the government remains the largest shareholder in both companies.

A second international services competitor, PT Satelit Palapa Indonesia (**Satelindo**), was granted a license in 1993 and began offering services in August 1994. However, the degree of competition would inevitably be limited. First, Indosat owned 7.5 per cent of Satelindo (and Telkom 25 per cent). Second, Indosat and Satelindo were obliged to charge identical tariffs, established by the government, with competition to be based on quality

Box 2.1: Indonesia's telecom history

In 1884, the Dutch colonial government established a private company to provide postal services and domestic telegraph services and, subsequently, international telegraph services. Telephone services were first made available in Indonesia in 1882 and, until 1906, were provided by privately-owned companies pursuant to a 25-year government license. In 1906,the Dutch colonial government formed a government agency to assume control of all postal and telecommunications services in Indonesia. In 1961, most of these services were transferred to a newly-established state-owned company to provide postal and telecommunications services in Indonesia, apart from services in Sumatera, which were transferred in the 1970s. The Government separated postal and telecommunications services in 1965 into two state-owned companies, PN Pos dan Giro, and PN Telekomunikasi. In 1974, PN Telekomunikasi was further divided into two state-owned companies, Perusahaan Umum Telekomunikasi ("Perumtel") and P.T.Inti, to provide domestic and international telecommunications services and telecommunications equipment manufacturing, respectively. In 1980, the international telecommunications business was transferred from Perumtel to Indonesian Satellite Corporation ("Indosat").

Source: PT Telkom.

of service. Furthermore, at the time, the government stated that no other licenses for international telecommunications services would be granted before the end of 2004. Satelindo was also awarded a nationwide mobile cellular license and launched its digital GSM network in November 1994. Satelindo is unique in that it is the only fixed services operator that has had a foreign strategic investor since Germany's Deutsche Telekom acquired 25 per cent in 1995 for US$ 676 million.

Telkom is by far the biggest and most influential operator in the country. Apart from its fixed-line and domestic long distance monopoly, until recently, it owned shares in every other telecom operator except Indosat. This is clearly shown in Indonesia's mobile market (see Table 2.1).

2.2 Mobile

The roots of mobile communications go back to 1989 when a Telkom joint venture company, Mobisel, launched an analogue NMT network. An analogue AMPS network, Nacional (since split into Metrocel and Komselindo), was launched in 1991, again partly owned by Telkom. In 1994 two companies, Satelindo and **Telkomsel** were awarded digital GSM licenses. A third GSM license was awarded to **Excelcomindo**, which launched its network in October 1996.

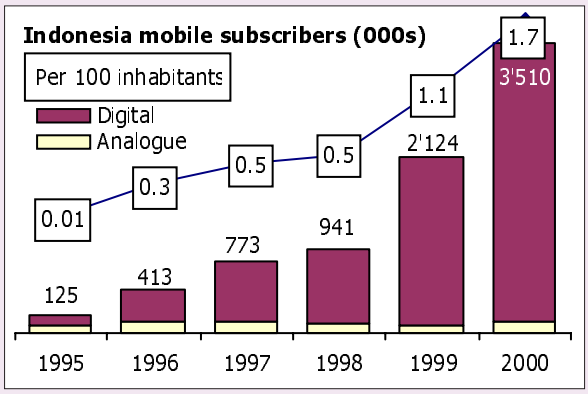
At the end of 2000, there were seven mobile cellular operators: three nationwide GSM-900 networks and four regional analogue networks. They served 3.7 million subscribers, or 1.7 per cent of the population. Most subscribers use GSM, accounting for 96 per cent of all subscribers.

Table 2.1: Mobile operators

Operator	Subscribers Dec 31, 2000	Growth 99-2000 (%)	Type	Coverage	Owners*
Telkomsel	1'687'339	64.58	GSM	Nationwide	Telkom (42.7%); Indosat (35.0%); KPN (Netherlands) (17.3%); PT Setdco Megacell Asia (5.0%)
Satelindo	1'055'306	47.49	GSM	Nationwide	Telkom (22.5%), Indosat (7.5%), Bimagraha Telekomindo (45%), DeTeAsia (Germany) (25%)
Excelcomindo	767'250	100.33	GSM	Nationwide	Telkom (6.9%) Rajawali (64.7%) Verizon (USA) (23.1%) Others (5.2%)
Komselindo	74'858	104.79	AMPS	Jakarta, Bandung, Medan, Manado and Ujung Pandang	Telkom (35%) PT Elektrindo (65%)
Metrosel	62'981	52.04	AMPS	Central and East Java	Telkom (20.17%), CPS (51.23%), Asia Link (20%), Telkom's Pension Fund (3.83%) others
Mobisel	14'037	9.66	NMT	Jakarta Central Java, East Java, West Java, Bali and Lampung.	Telkom (25%), Telkom's Pension Fund (5%) P.T.Rajasa (70%)
Telesera	7'556	16.59	AMPS	Bali, Kalimantan and Southern Sumatera	Revenue sharing split 30%-70% between Telkom and Telesera, respectively.
TOTAL	**3'669'327**	**65.21**			

Note: * Prior to announced share swaps by Telkom and Indosat.
Source: Telkom.

Figure 2.1: Mobile subscribers



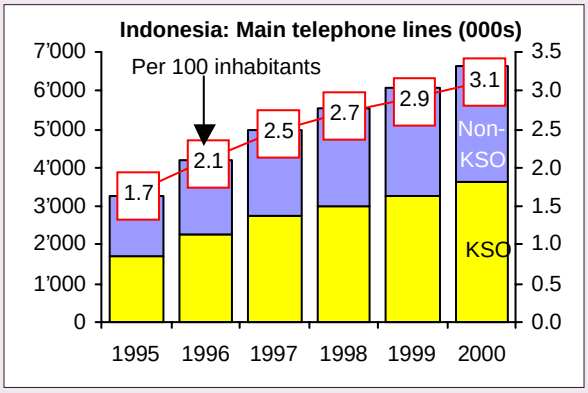
Source: ITU.

were granted in five of Telkom's seven operating regions to provide fixed-line telephone service and share revenues with Telkom. The number of lines in service in the KSO areas amount to just less than half the country total. The financial crisis has had a devastating effect on the KSOs, most of which are technically bankrupt. A series of transactions are underway, which will modify the KSO situation. These are described in the next section.

Seven regional and two nationwide GSM-1800 licenses were awarded in 2000 (the existing three GSM operators were also provided with 1800 licenses). Both Indosat and Telkom were awarded nationwide GSM-1800 licenses of their own for these so-called Personal Communication Systems (PCS). It also marks the first time that mobile companies were established without Telkom or Indosat having a share. In addition, a number of Japanese standard Personal Handyphone System (PHS) licenses were awarded but it is unlikely these networks will ever get off the ground. Some of the new PCS operators are planning to launch second and half generation (2.5G) networks. For example, Telkom plans to launch its network in the fourth quarter of 2001 with Wireless Access Protocol (WAP) and GPRS already enabled. Because of the recent PCS licenses and plans for 2.5 technology, it is unlikely that third generation cellular will be introduced in the country before the 2004/2005 time frame.

Figure 2.2: KSOs

Main telephone lines, 000s



Source: ITU adapted from Telkom.

2.3 KSO

In an effort to attract foreign investment into the fixed-line business, a joint operating scheme known by the Indonesian acronym KSO (Kerjasama Operasi) was created in 1995. Fifteen-year concessions

2.4 Two domestic giants

Two factors are pressuring Indonesia to carry out additional tele-communication liberalization. One is the commitment Indonesia made under the World Trade Organization's Agreement of Basic Telecommunications. Indonesia's schedule for opening its telecommunication market is seen as lengthy compared to other developing countries (i.e., a period of exclusivity for local services until 2011, for national long distance until

2006 and international long distance until 2005).[3] Second, the economic crisis has required Indonesia to meet a number of IMF conditions aimed at restructuring the economy in exchange for financial support. Indonesia's commitments in the area of telecommunications are highlighted in a memorandum sent to the IMF (see Box 2.2).

One step is ending the exclusivity of Telkom, Indosat and Satelindo earlier than planned. For example, a government decree issued in August 2000 ends the exclusivity for local services by August 2002 and for national and international long distance services by August 2003.[4] New operators, rather than the government, are expected to compensate Telkom and Indosat for their loss of exclusivity.

A second step is a severing of ties between Telkom and Indosat through a series of financial transactions approved by their shareholders in May 2001. This calls for:

- Telkom purchasing all of Indosat's shares in the largest mobile operator, Telkomsel, for US$ 945 million.
- Indosat purchasing Telkom's shares in Satelindo for US$ 186 million.
- Telkom transferring its rights and obligations in KSO IV in Central Java to Indosat for US$ 375 million.
- Indosat purchasing Telkom's shares in PT Lintsarta, an important data service provider.

In addition, Telkom is buying out or renegotiating with its KSO partners. For example, it has repurchased the KSO in Region VI serving Kalimantan. The results of these transactions essentially create two major players, Telkom and Indosat, that will for the near term form a duopoly. With its purchase of Telkom's telephone lines in Central Java, Indosat adds to its foothold in the local service market. When combined with its part ownership in the KSO in Sumatra, Indosat will indirectly control some 1.5 million operating telephone lines, around one fifth of the nation's total. Surprisingly, Indosat rather than Telkom gained management control over Satelindo; this effectively once again gives Indosat a monopoly over international telephone traffic until August 2003.

2.5 Policy and regulatory issues

Telecom market changes have not led to a specifically conscious and corresponding change in policy and regulatory organizations. The **Directorate General of Posts and Telecommunications** (**Postel**) is the nominal regulator. It is a unit of the ministry, the **Department of Communications**. There are steps to convert Postel into an independent regulator, reiterated in the Indonesian government's memorandum with the IMF. While some countries have responded to convergence by adopting a revised law creating a unified IT, telecommunications and broadcasting ministry and regulator, this has happened by accident in Indonesia. The word "Information Technology" was simply tacked on to the unit in Postel responsible for telecommunications. Postel's broadcasting responsibilities came about when it absorbed the staff of the former Department of Information, which was abolished in early 2001 for political reasons.

A number of laws, ordinances and decrees regulate the Indonesian telecommunication industry. Other forces also have a bearing on telecommunications policy:

1. **Telecommunication laws and regulations**. In July 1999, a "*Blueprint of the Indonesian Government's Policy on Telecommunications*" was issued. The Blueprint calls for improving telecommunication sector performance; liberalization through competition and an end to monopolies; increasing regulatory transparency; enhancing strategic alliances with

foreign investors; and creating business opportunities for small and medium enterprises. These goals are to be carried out through the "*Telecommunication Law*" (No. 36/1999). The law eliminates the concept of "organizing entities" thus terminating the requirement that Telkom have a stake in all telecommunication operators.

- The law also classifies telecommunications operations into three categories: (i) network operations; (ii) services operations; and, (iii) special telecommunications operations. Telecommunications network operation or provision of telecommunications services may be carried out by any legal entity. A network provider can provide telecommunications services, while a service provider can use its own network or lease network facilities owned by other network providers. Individuals, government institutions, special agencies and legal entities may provide special telecommunications operations for the purpose of self-interest, national defense and security, and broadcasting.

- Under the New Telecom Law, a license is required from the Minister of Communications. Operators determine interconnection rates and end user tariffs based on government guidelines. Telecommunications network operators are obligated to interconnect their network to other network operators on request. Telecommunication operators are obliged to pay a license fee based on a percentage of revenue.

- The new law does not terminate the existing exclusive rights of Telkom. However, it does allow early termination of the rights subject to a compensation agreement between Telkom and the government. In August 2000, the government issued a decree that contains early termination of Telkom's exclusive rights for local services in August 2002 and domestic long-distance telecommunication services in August 2003. A Ministry of Communication decree announced that Telkom had been awarded an international telecommunication services license to commence in 2003. The same decree awarded Indosat a local service license to begin in 2002 and a domestic long distance telecommunication license beginning a year later.

2. **Telecommunication-related aspects of the government's agreement with the IMF and other international organizations**. A Letter of Intent (LoI) signed between the Indonesian government and the IMF stipulated the requirement that Telkom and Indosat resolve their cross-ownership conflicts (see Box 2.2). The LoI also requires Telkom and Indosat to divest their ownership in non-strategic companies by the end of 2001.

3. **Overall ICT policy as outlined in a recent Presidential Decree**. In addition to laying out general government policy for ICT in several areas, the decree includes an Action Plan with projects relating to telecommunication policy and infrastructure. It also calls for the Indonesian Coordinating Team on ICT (TKTI) to take the lead in managing the development of ICT programmes and initiatives as well as among relevant government agencies. This is discussed in more detail in Chapter 5. In August 2001, a new Communication and Information Ministry was created. This suggests that formulation of ICT policy may be carried out by the new ministry.

Table 2.2: Replita targets

Development targets according to Indonesian government plans (Repelita)

Development Targets	Repelita (Year Ended March 31)				
	VI (1999)	VII (2004)	VIII (2009)	IX (2014)	X (2019)
Local exchange capacity (millions of lines)	10.5	19.0	29.0	42.0	60.7
Local exchange capacity per 100 inhabitants	5.1	8.7	12.4	17.1	23.6

Source: Bappenas.

4. **Infrastructure development within government plans**. The Government's national development policies were set forth in five-year development plans known as "*Repelitas*." The plans are developed by the National Development Planning Agency (BAPPENAS <www.bappenas.go.id>. For telecommunications, these included targets for local exchange capacity, line penetration (i.e., local exchange capacity per 100 inhabitants) and quality of service. Although the government has a majority stake in Telkom, and the company considers the targets when establishing its own plans, it is not formally required to meet the government targets. The government established long-term targets (through 2019) in 1995 (see Table 2.2). Because of the economic situation, the government has not announced detailed plans for Replita VII (covering the five year period through March 2004).

Box 2.2: IMF and Telecoms

"The Government continues to give priority to the rapid restructuring and privatization of the telecommunications sector. The GOI plans to issue shortly regulations needed in areas including tariffs, interconnection, and universal service obligations, and to provide for the early establishment of an independent regulatory agency. The Government remains committed to transforming Telkom and Indosat into competing full-service providers, and to requiring these companies to divest their stakes in all non-core businesses. Each company will be expected to divest its holdings in at least two such businesses by end-2000, and all non-core holdings will be divested by end-2001. An inter-ministerial team on telecommunications—established on May 30—will be strengthened and will develop a detailed reform action plan for the sector by end-October."

Source: Government of Indonesia Letter of Intent to IMF, September 2000, <http://www.imf.org/external/np/loi/2000/idn/04/index.htm>.

[3] "Regarding telecommunications, it sought clarification on Indonesia's intention in respect of the review of exclusive rights in telecommunications, which has rather long transition periods compared to other Members." WTO. Trade Policy Review Indonesia. Minutes of Meeting. WT/TPR/M/51. 27 January 1999.

[4] See Sunil Devmurari. "Indonesia: Impact of Market Liberalization Plans Reduced." Pyramid Alert. 10 August 2000.

3. The End of the Free Internet Market

3.1 Market developments

Indonesia connected to the global Internet in 1994, as a result of pioneering efforts by the academic and research community. One of the first links was a 64 Kbps line to the US, opened in May 1994 by the Indonesian Science and Technology Network (IPTEKnet). PT Indo Internet (Indonet) claims to have been the first commercial ISP, launching services in 1994. By the end of 1995, there were some 16 ISPs, 20'000 users and 640 Kbps of international Internet connectivity.[5] At the beginning of 2001, there were some 150 licensed ISPs of which about 60

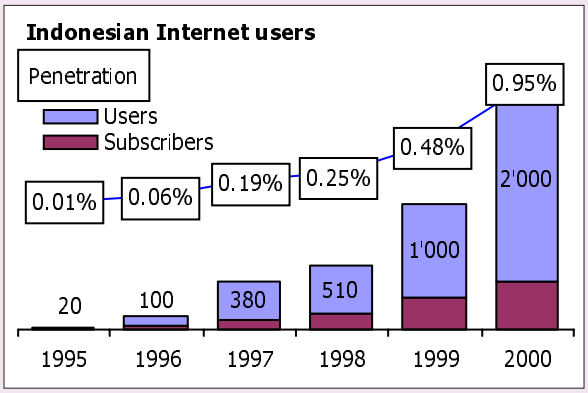
Night food stall - Jakarta

were actually providing service and over 150 Mbps of international bandwidth. For the year ending 2000, there were an estimated 400'000 Internet dial-up subscribers translating to roughly two million users, or just under one per cent of the population.[6] The number of users has doubled over the last two years, following a period of stagnancy during the brunt of the financial crisis.

Despite the large number of ISPs, the market is dominated by a handful of companies. The largest paying ISP is Telkom's TelkomNet with just over 100'000 subscribers at the end of 2000. Many of these users are utilizing TelkomNet's Instan service. As no prior registration is required, TelkomNet calculates subscribers based on usage over the last month. Ironically, Telkom had been prevented from entering the ISP market prior to 1997. At that time, the government wanted to promote new players in the market, especially Small and Medium Enterprises (SMEs). However the SMEs did not perform well so the law was changed to allow bigger companies in and to attract investment.

Indosat also provides ISP services and had over 40'000 dial-up subscribers at the end of 2000. Growth was stagnant in 2000. Indosat claims that this was partly related to delays in obtaining leased lines from Telkom. Another factor was the launch of 'free' (users still have to pay telephone dial-up charges) Internet access by LinkNet in April 2000. By the end of 2000, LinkNet had signed up 197'000 subscribers, making it the country's largest ISP. LinkNet had hoped to make money through advertising and e-commerce transaction fees since Telkom refused to share telephone usage charges. This model provided unsustainable. LinkNet was forced to terminate its

Figure 3.1: Internet market



Source: APJII, ITU.

free service in March 2001, and it now charges like other ISPs. It has lost most of its subscribers who chose not to stay on a pay plan.

Thus far there has been scarce foreign investment in the ISP sector. One exception is M-Web of South Africa that purchased 35 per cent (maximum foreign investment allowed at that time) of Cabinet in August 2000. Cabinet in turn owns Satunet, which claims to be one of the leading Indonesian portals with some half a million daily page views and 80'000 e-mail users.

3.2 Tariffs

There are two Internet dial-up options in Indonesia. One is Telkom's ISP, TelkomNet, which has a nationwide dial number and charges Rp 160 per minute (1.5 US cents). This amount includes the telephone usage charge. The other model is a regular ISP plan to which telephone usage charges apply. The prices basically work out the same. Indonesia's Internet pricing is relatively high considering the low levels of income in the country (see Figure 3.2).

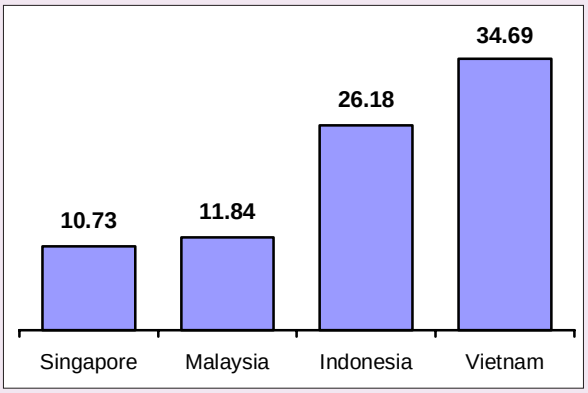
3.3 Interconnection

ISPs require local, national and international connections to provide access to customers, create a national network and connect to the international network. Indonesian ISPs are allowed to have their own international connections. However, they must lease lines (primarily 2Mbps E1s) from the local telephone exchange to their modem banks to provide dial-up access. Several have complained about delays and the terms for leasing lines from Telkom. For example, according to one ISP, the connection charge for an E1 is Rp 13 million. The monthly subscription is Rp 13 million. Although Telkom receives the local telephone charge for dial-up Internet traffic, if an ISP does not deliver a certain amount of traffic per month over the E1 line, then it must pay Telkom the difference. Postel is aware of this issue but has not done anything about it.

The Indonesian ISP Association (APJII), a non-profit organization, operates a domestic traffic exchange (Indonesian Internet Exchange or IIX). Virtually all ISPs are members.[7] There are two nodes to which ISPs can connect. The IIX has a 100 Mbps backbone. There are no port or traffic charges; ISPs simply pay the cost of their connection to IIX. The IIX reduces the cost of international connections by keeping local Internet traffic within Indonesia. In addition, several of the larger ISPs maintain private peering arrangements.

Figure 3.2: Internet dial-up tariffs

30 hours per month, US$, May 2001



Source: ITU.

3.4 Broadband

Until recently, leased lines or VSATs satisfied demand for fast Internet access. However these solutions have proven expensive and Indonesia is now turning to broadband access technologies such as ADSL and cable modem. Telkom is conducting ADSL trials and expects to launch the service soon. Telkom plans to install around 6'000 ADSL lines within the next year in the Jakarta area. Meanwhile Indosat has plans to install a wireless DSL network in Surabaya, and, through its Lintasarta subsidiary, in another 15 cities.[8] The Indonesian market for fast Internet access has been estimated at 1.2 million.[9]

Kabelvision <www.kabelvision.com>, with around 23'000 cable television

subscribers, launched its Kabelnet Internet access through cable modem service in Jakarta in September 1999. At the beginning of 2001, there were some 4'000 subscribers. Forecasts call for some 300'000 cable modem subscribers in the Jakarta area alone by 2004.[10] Thus far, Kabelvision is the only cable television company in the country, but there are plans for others. Telkom recently concluded an agreement with Alcatel for the latter to supply a Hybrid Fibre Coax (HFC) and cable modem network to be constructed in Jakarta and Surabaya.[11]

Telkom also provides broadband satellite delivery through a service dubbed Turbonet. This hybrid solution downloads data at speeds up to 1.5 Mbps via the Telkom 1 satellite to an 80-centimetre antenna. Data is uploaded via a dial-up telephone connection. Bandwidth is shared depending on the number of customers. It costs around Rp eight million per month (around US$ 700). A number of Internet cafés in remote areas are using it. One drawback is that rain has an effect on service quality.

5 Soegiardjo Soegijoko, Onno W. Purbo, Widiadnyana Merati, Priyono Sutikno, Intan Achmad. *Computer Networking in Indonesia: Current Status and Recommendations for its developments*. Institute of Technology Bandung. January 1996. <www.panasia.org.sg/itb/apng2.htm>.

6 Adam Creed. "Indonesian Net Subscriptions To Double This Year – APJII." *Newsbytes*. 2 January 2001. http://www.newsbytes.com/news/01/159955.html.

7 According to data on APJII's web site, there were 81 members in March 2001. However according to a network diagram dated November 2000, only 37 had connections to the IIX at November 2000. See www.apjii.or.id.

8 http://www.airspan.com/press/Press2001/PR13b062001.htm.

9 See Siemens. "PT.Telkom Indonesia installs DSL broadband subscriber access technology." *Press Release*. 7 November 2000.

10 Craig Kuhl. "Indonesia's Sole MSO, K@ablevision, Sets Sights on Growth." *Multichannel News International*. July/August 2000.

11 "Alcatel delivers broadband Internet to Indonesia's PT. Telkom." *Press Release*. 20 April 2001. http://www.cid.alcatel.com/doctypes/newsrelease/20010420.jhtml.

4. Mosques and Warnets

Mosque - South Jakarta

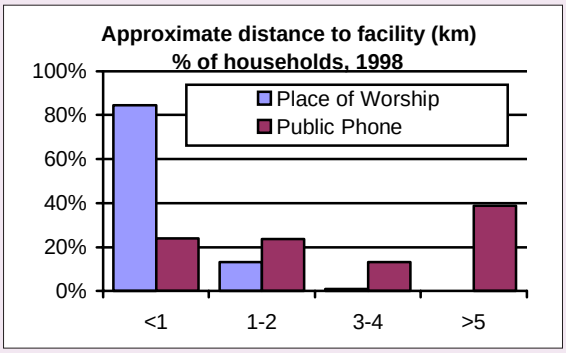
Indonesia has made impressive strides in enhancing access to communications over the last decade. Prior to the financial and political crisis of 1997, Indonesia had one of the fastest growing fixed networks in the world. Teledensity quintupled between 1990 and 2000, from 0.59 to 3.14. The percentage of with a telephone jumped from just over one to over ten. Although fixed telephone line growth has slowed since the crisis, it is almost a miracle that there has been any expansion at all. Nonetheless, significant barriers to universal service remain with some 90 per cent of Indonesian homes without a fixed telephone.

Almost 90 per cent of Indonesia's population practices Islam, making it the country with the largest Muslim Community in the world. This is significant, since according to national statistics, Indonesians are closer to mosques than public telephones (see Figure 4.1). The challenge is to make public Internet access as predominant as mosques, and maybe even in mosques as well as other public locations.

Two initiatives are helping to promote public Internet access. The "Warung" Internet (Warnet) is a public Internet kiosk. Warnets grew out of the successful Wartel model, whereby private entrepreneurs resold telephone service through call centres.[12] By May 2001, there were around 2'500 Warnets in Indonesia. There is no need for an Internet license to operate a Warnet. Some companies are planning to franchise, giving their Warnets a common name and look.

The Indonesian Internet Kiosk Association (AWARI) is working with Warnets to do more than just provide simple Internet access. One promising area is distance education. AWARI has a Memorandum of Understanding with the Open University ("Universiti Terbuka") for distance learning. There are some 300'000 distance-learning students in Indonesia so the potential is immense. AWARI is also working with the Ministry of Education to put Internet kiosks in vocational schools. Another area is e-commerce where small businesses are using the Warnets to exchange e-mails with customers. This could be extended to provide more sophisticated electronic capabilities such as assistance with design of web pages hosted by Warnets, creation of online transaction capability, etc.

Figure 4.1: A mosque is never far away



Source: ITU adapted from BPS.

Warnet - South Jakarta

Future projects include expansion of services in rural areas. In most rural areas, dial-up access is used so that applications cannot be too sophisticated. AWARI is working to educate Warnets about broadband access. Wireless access seems promising in rural areas but the spectrum is not always available. Some Warnets are using VSAT technology and redistributing bandwidth to others over microwave links.

One complaint is that Warnets are treated just like any other customer and therefore pay the full price of telephone connection to Telkom. Warnets argue that they are providing an important community service and should get a discount such as Wartels.

The Indonesian Post Office (PT Pos Indonesia) has its own ISP called "Wasantara-Net" (Wawasan Nusantara Network, W-Net) <www.wasantara.net.id>.[13] It is 60 per cent owned by the Post Office and 40 per cent by the Bakrie Group. W-Net began offering public Internet service in May 1996. It uses the VSAT network created to support the operational needs of post offices such as package tracking and financial transfers. Speeds range from 64 Kbps in Jakarta to 128 Kbps in the provinces. Each of Indonesia's 314 major post offices is a potential W-Net Point Of Presence (POP) although only about half (154) are currently connected. There is a plan to provide access to all main post offices but the economic crisis has delayed this.

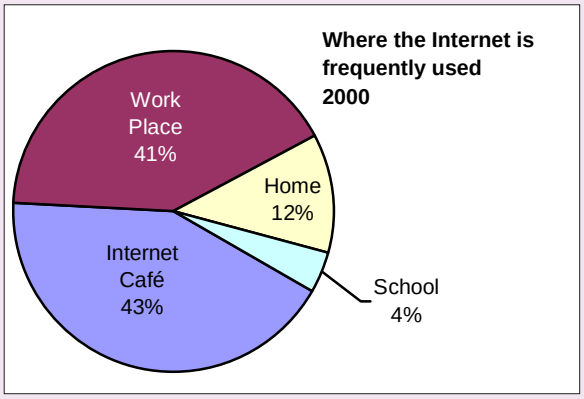
W-Net has around 20'000 subscribers (including 70 corporate customers). Unlike most other ISPs, 70 per cent of W-Net's subscribers are located outside Java. Despite the fact that most users are not in Jakarta, W-Net focuses on corporate and government users rather than the consumer market.

The Post Office also has its own Internet cafés called Warpostnets. They are mainly located in big post offices in large cities and provincial capitals. Warpostnets usually have around five PCs although the central post office in Jakarta has 29. The Warpostnets charge Rp 6'000 (US$ 0.53) per hour. Those in remote areas are staffed to assist users.

One sign of popularity of Warnets and Warpostnets is that around half of Indonesian Internet users access the Internet through Internet cafés (see Figure 4.2). One main reason is the lack of the necessary infrastructure at home or at work. Another reason is that Internet cafés tend to be cheaper than a personal Internet account.

The government is keen to leverage the Internet kiosk experiment by introducing Community Teleservices

Figure 4.2: We like Warnets



Source: APJII.

Warpostnet user at Jakarta Post Office

Centres (CTC, "Balai Informasi Masyarakat" (BIM)). The CTCs are primarily intended for Indonesia's large rural population that has been left out of the digital revolution. More than just an Internet café, the CTCs would provide a range of services as well as training and assistance. In addition, the government is looking for funding to meet a target of half a million Warnets by 2004.[14] This would include retrofitting the existing 187'000 Wartels to provide Internet service.

[12] Pradhan, Rajesh and Smith, Peter. "Franchising telecom service shops: meeting demand from nonsubscribers in Indonesia." *Viewpoint*. March 1996. http://www-wds.worldbank.org/servlet/WDSServlet?pcont=details&eid=000009265_3980420172858.

[13] One irony of the Post Office being involved in the Internet is that conventional letters in Indonesia are on the decline as people use e-mail instead. See "The Internet takes business away from the post office." *Jakarta Post*. 15 October 2000.

[14] "Govt targets 500'000 Internet kiosks by 2004." Jakarta Post. 4 July 2001.

5. Bring me the applications

Imagine a system with the simplicity, interactivity and cheapness of a plain old telephone getting married to the sophistication of ICT. Rather than dialing numbers, icons representing different functions are pushed. For example, instead of the number 1 on the telephone, there is a picture of a cow, representing agricultural information. When pressed, a wealth of information ranging from commodity prices to farming techniques is delivered through an interactive voice system. This is a project being developed by Telkom for illiterate rural dwellers for whom a PC is too expensive and too complicated and for which mass media devices such as radios or televisions do not provide the needed interactivity. A clever blend of the old and the new. This is precisely the type of application Indonesia needs more of.

A lack of infrastructure is not strictly the major barrier to ICT use in the country. Take the tourist island of Bali, the most wired place in Indonesia. The provincial capital Denpasar has 33 telephone lines per 100 inhabitants, ten points above the national capital, Jakarta, and ten times the national average. Hundreds of cyber-cafés dot the island. They range from three PC dial-up mom and pop operations to larger places with dozens of computers and high speed, leased line access. Yet it is rare to see locals using them. At around US$ three an hour, Internet access is not particularly cheap. On the other hand, the one-minute it might cost to send an e-mail (Rp 500) is four times less than what it would cost to call from Bali to Jakarta (Rp 2'010).

Sculpture shop - Bali

The problem is that the majority of Indonesians just do not know what the Internet can do for them or what they can do with the Internet. Even among current users, it is often suggested that the main applications are chat, e-mail and browsing news sites. Locally relevant applications are rare. Indeed, it is amazing that for a country Indonesia's size, there is no standardized Indonesian spell checker for Microsoft Word or a sophisticated web-based English-Indonesian translator. For the Internet to establish deep roots in Indonesia, locally relevant applications in areas such as government services, education, health and business must be developed.

5.1 Government

The economic and political crisis has distracted the government's attention from ICT. There are signs that this may be changing. In April 2001, Presidential Decree No. 6 was issued ("*Guidelines for the Development and Implementation of Information and Communication Technologies in Indonesia*"). The decree is a statement of the government's general policy towards ICT. It calls

on the Indonesian Coordinating Team on ICT (TKTI) to drive ICT development. TKTI, an inter-ministerial group, was formed in 1997 and headed by the Vice President. If TKTI is to succeed, it will need additional resources including the creation of a secretariat. Its leadership status will also have to be resolved especially its relation with the new Ministry of Communication and Information, created in August 2001.

A detailed five-year action plan was also issued as part of the Presidential Decree.[15] This plan identifies projects and associated timetables in four areas: policy and legal framework, human resources, infrastructure and applications. It is unclear where the resources for carrying out the numerous projects will come from. A lack of funding has been a recurring problem in government ICT drives. For example, in 1996 the National Steering Committee for IT Competitiveness (so-called Nusantara-21) was created to drive Indonesia's ICT development. It benefited from a US$ 35 million World Bank loan to carry out its tasks. This included the creation of a national information infrastructure, development of multimedia applications and establishment of public access points. The combination of funding running out and the Asian financial crisis severely affected the programme.

There are a number of on-going projects and networks supporting government ICT use and delivery. "Siskom Dagri" (Communication Network) is the national governmental network coordinated by the Ministry of Home Affairs. It connects the central government to district governments. The network uses 2.4 metre VSATs connected to the Palapa 2E satellite. There are some 300 nodes in 26 provinces as well as the central government (Jakarta), the Ministry of Home Affairs plus the offices of the President and Vice-President. The system is used for e-mail as well as applications in areas such as personnel, finance, and inventory.

IPTEKnet <www.iptek.net.id> has evolved from a project to a full-fledged state-owned ISP that provides connections for government institutions. It has around 50 leased line and some dial-up clients. It leases lines for its backbone and has a 128 Kbps connection to IIX. As it is become more commercial, IPTEKnet is examining the possibility of two tariffs: one for corporate, and one for government clients.

Most ministries have a web site though there is not yet a central government portal. Almost all of them use the .go.id domain name. One area for improvement is civil service ICT training. Of the some three million people working for the government, training is available on only a sporadic basis. It is estimated that less than ten per cent of government workers have some awareness of ICT.

Another problem is the lack of ICT expertise at the provincial level. Few provinces or districts have their own web site. There are a number of projects underway at the local level. One is 'e-province', a system to computerize applications for local identification cards. Another project is 'Simtap' in Sulawesi and East Kalimantan to computerize common forms such as building permits, etc. There is also assistance for helping local governments set up their own web sites. Examples include www.takalar.go.id (Sulawesi) and www.kutaitimur.go.id (District of East Kutai in Kalimantan). However there are major barriers including a lack of funding and awareness. For example few local administrations can afford the cost of ICT. Furthermore, experience has shown that if high-level local officials such as mayors or governors do not have ICT awareness, then projects will not be successful.

5.2 Health

The Ministry of Health has its own web site <www.depkes.go.id> providing information such as an organization chart, health statistics and bulletins. Most ministry departments have a web page. The Ministry also has an Intranet with about 80 users.

There are around 400 government hospitals (out of 1'112) of which

around 20 have home pages. There is a pilot project to connect health sub-centers (around 21'000) to district ones (this already exists in Central and West Java). Less than ten per cent of the 1'148 regional hospitals have the necessary ICT hardware.

Telemedicine is planned in top hospitals such as one using VSAT in Denpasar (Bali) and Soetomo Hospital in Surabaya. One factor holding this back is the high cost of satellite communications.

There are some e-commerce-like applications such as online purchase orders between hospitals and pharmacies. There is also ASKAS, a computer system used to manage private health insurance claims.

The country's pressing health concerns such as communicable disease control and ensuring an adequate supply of medicine, detract attention from ICT. A big obstacle is the managers' lack of awareness about benefits of ICT.[16] In that regard, the ministry has been conducting seminars on ICT for the health industry.

5.3 Education

According to government statistics, Indonesia's school age population (i.e., those between 5-24 years old) numbered 86 million in 1999.[17] This 'Internet Generation' accounts for over 40 per cent of the population. Due to severe budget constraints, there are few government projects to wire Indonesia's 151'000 primary, 20'960 junior secondary, 7'936 general secondary and 4'073 vocational secondary schools.

Other organizations have launched initiatives to wire Indonesia's schools. The Indonesian Internet Service Providers Association (APJII) instigated its Schools 2000 project to try to connect 2'000 secondary schools to the Internet before the year 2000. APJII brought various partners together to work on this goal. This included ISPs and telecom operators (who provided discount communication access rates), banks (to provide school loans), and private sponsors such as Cisco and Oracle to provide hardware and software. APJII worked with the Ministry of National Education to develop a portal for the project. By the end of the year 2000, the project had connected 1'180 schools. Today, 1'800 schools are connected. This translates into half a million new Internet users from high schools.

Distance education is an attractive technology for Indonesia due to its large youth population, lack of educational infrastructure, shortage of highly trained teachers and spread out land mass. Over a dozen institutions provide distance education programmes. Universitas Terbuka (UT) <www.ut.ac.id>, established in 1984, has evolved into one of the largest open universities in the world with over 350'000 students. It had traditionally used radio, television and videocassettes to reach its dispersed students. Faxes are also used for students to communicate with professors. The wide availability of public telephone centres across the nation has made this feasible.[18] The Internet offers exciting new possibilities for interactivity. UT is working with Indonesian Internet Kiosk Association to use their facilities for providing Internet-delivered education applications.

The University of Indonesia estimates that by 2005, around 30 per cent of its 38'000 students will be involved in some form of distance learning. The university recently launched a project with the World Bank to provide distance learning for public and private sector officials.[19] They will be provided access to Internet-based applications. Plans call for a central distance-learning centre to be created at the university campus in Jakarta as well as sub-centres at two regional universities. The main centre will feature two classrooms containing 30 computers each and a link to the Internet via VSAT.

5.4 Electronic Business

Indonesia's demographic and geographic situation would appear to make it an ideal location for e-commerce. There is a large market spread over many islands. However, the country's level of innovation is not sufficient to have the expected impact. This is borne out by comparative studies that typically rank Indonesia at the low-end of e-commerce readiness.[20] The value of e-commerce in Indonesia has been estimated at under US$ 100 million in 2000, or less than 0.1 per cent of GDP. The value of B2C e-commerce is negligible. Barriers to e-commerce development include a lack of infrastructure, awareness, security, culture and habit and lack of online providers.[21] Another obstacle is that the computerization of a business requires a certain degree of transparency, which most Indonesian companies are unaccustomed to. Yet another issue is that with such a huge population and comparatively low wages, companies prefer to use labour rather than invest in ICT.

The lack of a national Certification Authority has led to other approaches for promoting trust in electronic commerce. Sucofindo <www.sucofindo.co.id>, a government-auditing agency, is reviewing a number of options for involvement in Internet-based trade. For example, it has worked with portals to be their certifying agency. This adds to security for the buyer since the site has been 'certified' by a reliable organization. Sucofindo is also in discussion with others about forming a national Certificate Authority.

Electronic Data Interchange (EDI) is being used by around 2'000 private companies and government agencies involved in retail industry and trade. One of the most intensive users is the Directorate General of Customs and Excise. The majority of import forms are computerized, resulting in much faster processing of documents. The Directorate General's web site <www.beacukai.go.id> also publishes custom regulations and allows companies to download trade documentation software. It recently hooked up with its Malaysian counterpart, the Royal Malaysian Customs and Excise, to exchange export data electronically.

The Ministry of Justice is responsible for Intellectual Property Rights. Indonesia has a copyright law and is also a signatory to the Berne Convention <www.law.cornell.edu/treaties/berne/overview.html>. In general, foreign copyrights receive automatic protection in Indonesia but there is a lack of resources for enforcement. The country has been cited as having the third highest software piracy rate in the world, at 89 per cent in 2000 (resulting in a loss of US$ 70 million).[22] Low incomes coupled with steep drop in the exchange rate, have driven up the cost of imported software, increasing the tendency to share applications.

The Ministry of Industry and Trade (MITI) is responsible for developing e-commerce laws covering areas such as digital signatures and computer misuse. There is a small working group to prepare a working draft that includes MITI, Indonesia University, Postel, and the Ministry of Human Rights and Justice. It is planning to submit a draft to Parliament before the end of 2001. MITI is participating in WTO e-commerce work and following developments in UNICTRAL and OECD.

Indonesia's Small and Medium Enterprises play an important role in the economy. They are estimated to account for over 90 per cent of all businesses and employees and almost 60 per cent of GDP.[23] As in many developing countries, e-commerce awareness by SMEs is low. Most lack ICT skills and equipment. A number of initiatives have been designed to improve the situation. MITI has been running awareness courses. There is also a World Bank project to sensitise SMEs about ICT. The government has also offered tax rebates for the purchase of ICT equipment and liberalized foreign investment laws.

Box 5.1: Indonesian Silicon Valleys

In Indonesia, there has been scant government support for the development of software parks. Instead, initiatives have come from the private sector. The Lyman Group, which started as a trading and timber business and has now diversified into property and telecommunications, has proposed the "West Java Digital Corridor" to, among other things, "kick-start the development of IT industry in the country." The corridor would extend from Jakarta to the university city of Bandung and would include enhancements to existing transport and communication links. Within Bandung, a "high-tech valley" is proposed that would include a "learning e-village" housing educational and research institutions. Kota BNI is to be a new "Intelligent City within a city" that would feature state-of-the-art housing and recreational facilities. Links would be created with the universities and research centers situated in Bandung. The proposal also calls for the creation of a venture capital fund as well as tax breaks and other inducements for businesses located in the cyber area. Funding for the project is expected to come from the government, multilateral agencies and the private sector.

BaliCamp <www.balicamp.com>, located in Tabanan on the tourist island of Bali, was inaugurated in October 2000. It is the brainchild of the Sigma Group which has thus far invested US$ three million in the project. Bali was chosen because it is an attractive and safe location and has good international air connections. In addition, though most of the initial programmers are Indonesian, the attractions of Bali may create a reverse brain drain by drawing foreign programmers. BaliCamp has around 100 programmers that generated around US$ two million of sales in 2000.[24] Main services include around the clock software development for international clients. Sigma has established an office in Canada to seek out customers and promote the service. It is forecasting a staff of 1'000 and sales of US$ eight million in 2001.

One issue that Indonesia must address if it is to be successful in software development is a lack of skilled IT human resources. Though precise statistics are not available, there is general agreement that there is a shortage of skilled ICT staff.[25] Proposals to remedy the situation include preferential communication access pricing for educational facilities, links between companies and academic institutes for on the job-training, development of training centers and creation of an ICT industry certification.

One strategy for ICT training is to encourage private sector involvement. In March 2001, Cisco Systems signed an agreement with the Ministry of National Education to create 20 Networking and Training Academies in technical and vocational schools across the country. This complements seven existing Academies in Indonesian universities and schools. The eight-semester, 560 hour course trains students to design, build and maintain computer networks.

The lack of business connectivity has not discouraged some SMEs from conducting business over the Internet. Many are using the popular Warnet Internet cafés to exchange e-mail with potential buyers.

Box 5.2: News hungry

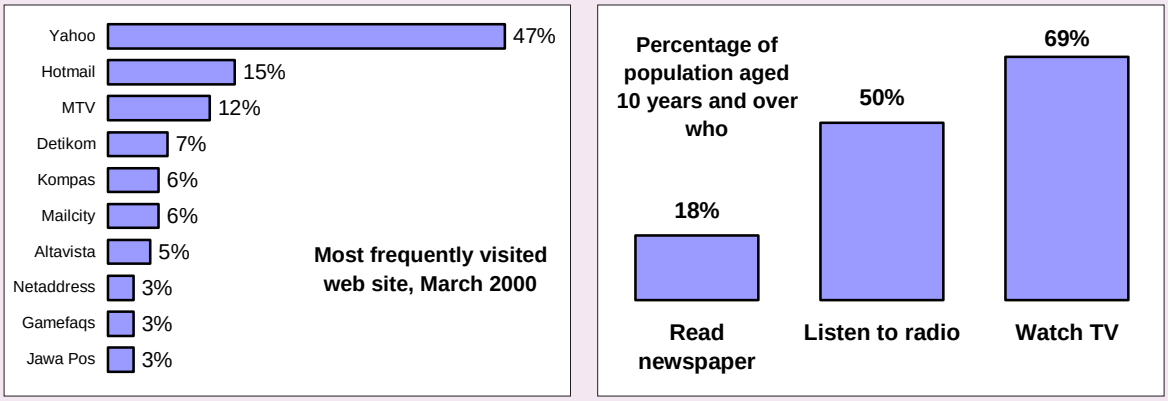
One of the country's most popular television stations is Metro TV, Indonesia's answer to CNN. Indonesia's first non-stop television news channel broadcasts in Indonesian as well as in English and Mandarin, which was previously forbidden. This is possible due to press liberalization that has taken place since the downfall of President Suharto. A pent-up hunger for information has led to an explosion of media outlets. Today the country has some 700 news publications, close to 1'000 radio stations and a dozen television stations.

The information hunger has driven Internet use with Indonesians eagerly browsing the web for news. This is readily evident in a list of the most frequently visited web sites by Indonesian Internet users (see Box Figure 5.2, left chart). The three local sites in the top ten are news portals. The top Indonesian site, Detikom <www.detik.com>, was created expressly for the web. Today there are around ten online publications in the country, helping to satisfy the nation's thirst for news. This just could not have happened a few years ago when there were strict censorship laws. Today, there is no law governing content on the Internet.

The Indonesian Internet Top ten says a lot about the who and how of the Internet in the country. The most popular sites are e-mail-based (Yahoo, Hotmail, Mailcity) or youth-oriented (MTV, Gamefaqs). This is consistent with one survey that found that almost half of Indonesia's Internet surfers are between the ages of 21-25.

Unlike other countries, none of the leading portals in Indonesia spring from the broadcast media. Instead, apart from Detikom, they are online versions of popular newspapers or magazines. The main government-owned television stations have a reputation of stodginess and one-sidedness. In an effort to revive the television industry and inject badly needed funds, a bill allowing foreign investment is being debated in Parliament. Foreign investment in broadcasting has been banned to protect "Indonesian identity" even though exactly what that meant was never adequately explained. In any case, in a country as diverse as Indonesia, there is no one identity and a flourishing of media outlets is the best reflection of the nation's variety. Despite the lacklustre image of the state-run channels, television is still one of the most popular information outlets in the country. Some 60 per cent of households have a television and television is a more popular source of information than radio or newspaper (see Box Figure 5.2.2). In addition to Metro TV, several other stations have been launched to meet this demand. This has a number of implications for Internet diffusion. Perhaps television will grow in popularity, reducing time spent on Internet access. Or television channels may get into the portal business, developing links and tie-ins between their online and broadcast content. Another possibility is reaching the large base of television watchers through Internet-delivered content over web-like television sets.

Box Figure 5.2: Indonesian Top Ten web sites and where Indonesians get their information from



Source: ITU adapted from Tempo Magazine (left chart) and BPS (1996) (right chart).

[15] "Five – Year Action Plan for the Development and Implementation of Information and Communication Technologies (ICT) in Indonesia." http://www.bappenas.go.id/bap_eng.html

[16] "Information Technology in the Health Sector." 23 January 2001. http://infoserv2.ita.doc.gov/ocbe/ForeignM.nsf/679c088699b484498525674e0000eb9f/bc56785cfff06377852569de0069fd3d!OpenDocument

[17] Ministry of National Education. "Indonesia Education Statistics 1999/2000." September 2000. http://www.pdk.go.id/serba_serbi/Fact&Figures.htm#Tabel%201.3.

[18] Hardhono, A. P. and Belati, T. "Baseline Surveys for the Utilization of Fax-Internet Integration Technology for Distance Learning Support; a study conducted with funding assistance from Pan Asia Networking." 1999. http://www.panasia.org.sg/grants/awards/98221s.htm.

[19] See World Bank. "Indonesia-Global Development Learning." Report No. PID10214. 12 April 2001.

[20] For example, The Economist Intelligence Unit/Pyramid Research e-readiness rankings places Indonesia 54th out of 60 countries. Of the ASEAN countries ranked, Indonesia is placed ahead only of Vietnam. See http://www.ebusinessforum.com/index.asp?layout=rich_story&doc_id=367.

[21] Zuraida Boerhanoeddin. " E-Commerce in Indonesia." http://www.isoc.org/inet2000/cdproceedings/7c/7c_3.htm.

[22] Business Software Alliance. "BSA Unveils 2000 Global Software Piracy Study." *Press Release*. 21 May 2001. http://www.bsa.org/usa/press/newsreleases//2001-05-21.566.phtml.

[23] See "Outline of Tentative Policy Recommendation for SME Promotion in Indonesia" at www.jica.or.id/FOCI_urata.html.

[24] Warren Caragata. "Bali High-Tech Paradise." *AsiaWeek*. http://www.asiaweek.com/asiaweek/technology/article/0,8707,106825,00.html.

[25] "Currently there is a shortage of ICT human resources in Indonesia to satisfactorily cater to the demand of the ICT industry…" Indosat. "Development of Human Resources in Information and Communications Technology (ICT) in Indonesia." Document 48-E. Presented at the ITU Asia Pacific Preparatory Meeting for the World Telecommunication Development Conference, Bali, April 2001. http://www.itu.int/ITU-D/asp/WTDC02/PDFs/48-e.pdf.

6. Archipelago@Crossroads

Indonesia is at a crossroads in the path to becoming an Information Society. Ironically, the socio-economic crisis has created demand for instantaneous access to information, manifested in an explosion of Indonesian web sites. Unprecedented liberalization unleashed by the open political environment has also resulted, whether intentionally or not, in one of the freest Internet markets in Asia. There are no limits on the number of Internet providers nor is content restricted in any way. The country has also made noteworthy strides in public communication access. The successful Wartel model for public telephone centers has been transplanted to Warnets for public Internet access. The Post Office has also been leading a drive for expanded public access. Despite these trends, Internet access at the end of the year 2000 remained very low, at less than one per cent of the population. And even that figure masks a large Digital Divide within the country with the majority of Internet users in the large cities of Jakarta, Bandung and Surabaya.

For the Internet to go further in Indonesia, for it to become rooted and sustainable and for it to permeate all strata of the society, will require government support. Until lately, the government has been distracted by the country's serious economic and political situation. The recent Presidential Decree covering ICT development in the country illustrates government recognition of the growing national Digital Divide and signals its intention to do something about it. It remains to be seen if the intention can be translated into concrete actions and, more importantly, if the financial resources will be available.

The title of this report is '*Kretek Internet*.' The kretek is a uniquely Indonesian invention and if the Internet is to be widely permeated in the country, it too will have to be Indonesian in content, focus and applications. Refreshingly, the country recognizes its huge domestic potential and is not obsessed, such as many developing countries, with building up a software export industry. Rather it knows that it must build up domestic applications and usage. If this can be done, then an Indonesian Internet will take root. If this can happen in one of the world's largest developing countries, then it could serve as a relevant model for many other developing nations.

6.1 Recommendations

Presidential Decree No. 6 issued in April 2001 addresses in general terms many of the areas affecting Indonesia's ICT development. It lacks specificity about concrete steps to be taken. While the Action Plan attached to the Decree outlines actual programmes, these will take some time to be implemented and they do not go into a great deal of detail. The recommendations below outline short-term measures without major resource implications that would help enhance ICT diffusion in the country.

- **Level playing field**. There is an obvious conflict of interest when the incumbent local telephone monopoly, Telkom, also provides Internet access. A number of ISPs have complained about problems obtaining high-speed lines from Telkom. Whether this problem is an infrastructure constraint or whether Telkom is exploiting its competitive advantage, the remedy is the same: opening up the market for the provision of domestic infrastructure. Although there are plans to open the market soon—and indeed Telkom and

Indosat will already be competing in some areas—it will take a while before true competition materializes. In the meantime, it might be useful to allow ISPs to provide their own infrastructure when needed. Alternatively, the regulator could review the terms and conditions of Telkom's leased line offerings to ISPs to try to ensure a level playing field.

- **Local applications**. The majority of Indonesian Internet use constitutes e-mail or information searching. There is not generally a lack of local content as there are a growing number of web sites in the Indonesian language. What is lacking are local applications that would generate more demand for Internet access and really help it take root in the country. There are a number of areas where application development could yield gains. One is the development of applications for rural communities. This includes the creation of agricultural portals that provide pricing information, weather forecasts, transport schedules, farming techniques and other related information. In addition to Indonesian, these applications should be developed in languages that are used in the rural areas. Programmers should work closely with the local community to find out what kind of information they need. This could be in the form of a sort of Indonesian 'Digital Scout' programme where ICT-skilled youth go to rural areas to work with local communities to develop applications and train local users. While traditional web access via a PC will be important, other innovative ways of disseminating information may be appropriate. This can include relaying information downloaded from the web via photocopies or broadcasting over a local loudspeaker system or local radio. Another technique is to use audio and video streaming to create and disseminate information, particularly for illiterate users.

  Another area that could drive Internet awareness and usage is the development of a few 'killer' applications. These could apply to government-related services that are widely used. One example would be the local identity card that is required of every adult and typically time consuming to obtain. Allowing citizens to complete the application for the identity card online would save time, make the process more transparent and just might be the sort of thing that drives people to the Internet. Arrangements could be made with Wartels to assist users in completing the form, take and upload digital photos and distribute the completed identification card when it is ready.

  Parallel to this effort, the government might want to designate a number of 'flagship' applications and provide support for the local Research and Development community to build them. This could include help for special software centers.

  The development of dot-com companies should also be facilitated. This could include tax breaks and other incentives for content creators. Dot-com incubators could also be explored, perhaps as part of the development of software development parks. Partnerships with Singapore, Brunei and Malaysia where the Malay language is used and closely related to Indonesian, could be explored as these countries could provide expertise and resources.

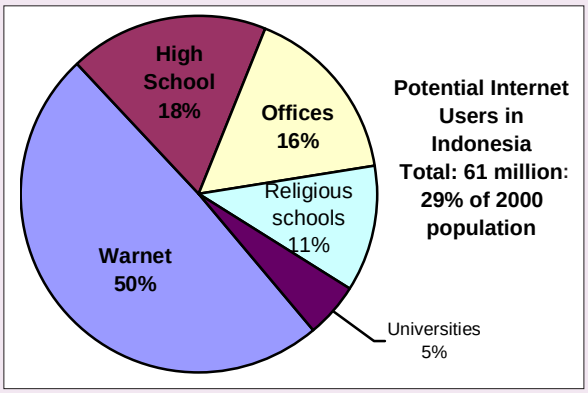
- **Flexible pricing**. Indonesian Internet prices are relatively high compared to other South East Asian nations. This is exasperated by the lower incomes in Indonesia, which

makes access expensive. The price of 30 hours of Internet access in Indonesia is more than twice the average monthly per capita expenditure. If Internet use is to increase, then the price of access must be reduced. One component of the dial-up Internet charge is the telephone tariff. According to one Indonesian Internet expert, if telephone tariffs were lowered, the number of Internet subscribers could reach 20 million in the country.[26] It is recommended that telephone usage charges for dial-up Internet access be waived or reduced. Another idea is to share the telephone usage charge between ISPs and Telkom. This would allow ISPs to provide 'free' Internet access. The example of LinkNet's free ISP plan is pertinent here. In less than one year, LinkNet acquired almost 200'000 subscribers, making it the largest ISP in the country. However this model provides unsustainable since Telkom would not share the telephone charge.

- **Universal access**. The majority of Indonesians cannot afford individual Internet access. Additionally, roughly 90 per cent of homes do not have telephone lines let alone computers. Thus if the Internet is to become widespread in the country, it will have to be through public locations. Indeed, statistics indicate that the majority of Indonesians already access the Internet from public locations such as Warnets. This has happened despite few government policies for supporting public Internet access. The potential for expanding Internet access through public locations such as schools or Warnets is immense. According to Postel, the potential size of the Internet market in Indonesia is over 60 million users (i.e., 30 per cent of the population), some 30 times higher than it is today. Most of these new users would access the Internet from schools and Warnets if the facilities were available. As a first step, the same agreement that allows Wartels to purchase wholesale airtime from Telkom should be extended to the Warnets. This will allow them to reduce their costs and make service even more affordable. Other incentives such as tax breaks should be provided to Warnets that locate in rural or underserved areas. The government should also deploy some of its education budget for the purchase of ICT equipment and Internet access. In addition, it should devise a universal access policy that includes discounted Internet access to schools.

- **Foreign investment**. The government will be hard pressed to both provide adequate social services as well as provide the

Figure 6.1: Indonesia's Potential Net Market



Source: POSTEL, 2000.

needed expenditures to promote ICT development. One important source of funding could be international investors that are attracted by Indonesia's large market source and potential. There is legitimate concern that opening markets too quickly might affect weaker domestic companies. However the government must resist the temptation to champion local companies over foreign ones in order to attract badly needed investment. It must explore ways to attract investment while ensuring widespread access.

- **Market research**. There is a serious shortage of ICT market information for Indonesia. This ranges from reliable surveys on the number of Internet users to the current ICT workforce. The national statistical agency (BPS) does not collect ICT indicators nor does the government agency responsible for telecommunications, Postel. Although some market research firms occasionally compile ICT-related data for the country, these are scarce or costly to obtain. Therefore information about a number of important indicators such as users, user profiles or web sites visited are based on irregular media reports that are typically limited in coverage or of questionable methodology. Thus far, the limited number of operators in the telecommunication sector has facilitated the aggregation of national statistics. However this will change as new operators enter the market. It is recommended that BPS and Postel jointly develop an online ICT statistical system. This would include collection of key market indicators from telecommunication operators and ISPs and aggregation at a country and provincial level. It is also recommended that BPS include a number of questions about ICT equipment ownership in household surveys. It is further recommended that the government sponsor ongoing surveys to obtain ICT-related information about key sectors of the economy such as the value of e-commerce, ICT human resource situation and requirements, ICT usage in the educational sector, etc.

[26] "ISPs Show Promising Future, As Subscriber Numbers Increase." Detikworld. 19 April 2001. http://www.detikworld.com/inet/2001/04/19/2001419-180116.shtml.

Annex 1: State of the Internet in Indonesia

The Mosaic Group <www.agsd.com/gdi97/gdi97.html>, has developed a framework for characterizing the state of the Internet in a nation. They consider six dimensions, each of which has five ordinal values ranging from zero (non-existent) to four (highly developed). The dimensions are as follow:

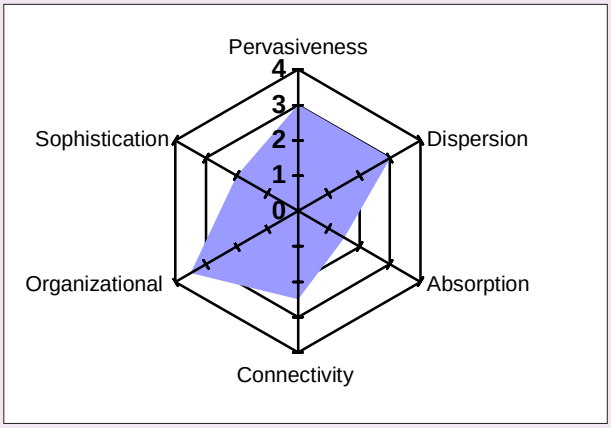
- **pervasiveness**: a measure based on users per capita and the degree to which non-technicians are using the Internet.
- **geographic dispersion**: a measure of the concentration of the Internet within a nation, from none or a single city to nationwide availability.
- **sector absorption**: a measure of the degree of utilization of the Internet in the education, commercial, health care and public sectors.
- **connectivity infrastructure**: a measure based on international and intranational backbone bandwidth, exchange points, and last-mile access methods.
- **organizational infrastructure**: a measure based on the state of the ISP industry and market conditions.
- **sophistication of use**: a measure characterizing usage from conventional to highly sophisticated and driving innovation.

Indonesian values for these dimensions are in Figure 1.1.

Pervasiveness is rated at level 3, *Common*. At December 2000, there were approximately 400'000 Internet subscribers in the country translating to an estimated two million users, or 0.95 per cent of the population.

Figure 1.1: State of the Internet in Indonesia

Dimension	Value
Pervasiveness	3
Geographic Dispersion	3
Sectoral Absorption	1.5
Connectivity Infrastructure	2.5
Organizational Infrastructure	3.5
Sophistication of Use	2
TOTAL	**15.5**



Note: The higher the value, the better. 0 = lowest, 4 = highest.
Source: ITU adapted from Mosaic Group methodology.

Geographic Dispersion is rated at level 3, at *Highly dispersed.* Internet access is available from all provincial capitals. Nationwide dial-up access is available via a four-digit telephone number at a standard tariff of Rp 160 per minute (0.92 US cents per hour).[1] The main constraint to nationwide connectivity is local access since most households do not have a telephone, let alone a personal computer.

Sector Absorption is rated at level 1.5, between *Rare* and *Moderate.* This ranking is a function of the type of connectivity in education, government, health care and business. There is a good degree of connectivity at the university level. Connectivity at the primary and secondary level is less profuse. Less than 2'000 out of 13'000 secondary schools are connected and very few primary schools have an Internet connection. A number of government ministries are on the web although there is no central portal. Few provincial governments have a web site. The Ministry of Health has its own web site and an Intranet with about 80 users. Around 20 of some 400 government hospitals have a web page. Large businesses have web sites but few Small and Medium Enterprises (SMEs) do.

The **Connectivity Infrastructure** is at level 2.5, between *Expanded* and *Broad*. International connectivity of the three largest ISPs is over 146 Mbps; other ISPs have varying levels of international connectivity. The main domestic operator has a nationwide fibre/microwave/satellite backbone that operates at various speeds. There is a domestic traffic exchange with two connection points. In addition, the larger ISPs also peer amongst themselves. High-speed local access is growing with leased line being the main access methods. ADSL is being tested and access via cable modem access has several thousand users. High-speed satellite connections are also being used.

The **Organizational Infrastructure** is at level 3.5, between *Competitive* and *Robust*. There were around 60 operational ISPs at the end of 2000. There is no limit on the number of licenses that can be granted to provide Internet access service (around 150 have been issued). There is an ISP association that runs a public traffic exchange. However the market is dominated by a few ISPs including the main telecom operators. Most ISPs are not allowed to provide their own national infrastructure and must lease from telecom operators. There have been allegations from some ISPs that the largest telecom operator has an advantage since it dictates the availability and conditions of leased lines.

Sophistication of Use is at level 2, *Conventional*. The most popular applications among most users appear to be e-mail and information retrieval.

[1] Using a conversion rate of Rp 10' 785 to US$ 1 at 20 April 2001.

Annex 2: Telecommunication statistics

INDONESIA

Area: 1'919'443 km2 National currency: Rupiah

			Year Ending 31.12							
		Unit	1991	1995	1996	1997	1998	1999	2000	30.09 2001
DEMOGRAPHY, ECONOMY										
Population	1	10x3	181'064	195'283	198'320	201'353	204'393	206'517	212'092	
Households	2	10x3	40'851	45'653	47'195	48'281	49'383	51'204	48'300	
Gross Domestic Product	3	10x9	249'969	454'514	532'568	627'695	955'753	1'109'980	1'290'680	
Gross Fixed Capital Formation	3	10x9	70'200	129'218	157'653	177'686	243'043	240'322	313'915	
Average annual exchange rate per	3		1'950	2'249	2'342	2'909	10'014	7'855	8'422	
Consumer price index (1995=100)	3		71	100	108	115	182	219	227	
Telecom equipment exports (US$)	4	10x6	...	86	262	200	383	284	298	
Telecom equipment imports (US$)	4	10x6	312	690	1'230	1'397	424	135	149	
TELEPHONE NETWORK										
Main telephone lines		10x3	1'295	3'291	4'186	4'983	5'572	6'080	6'663	7'101
Main telephone lines per 100			0.72	1.69	2.11	2.47	2.70	2.91	3.14	
Residential main lines per 100 homes			1.6	5.5	7.2	8.6	9.2	10.5	11.3	
Digital main lines		%	55	93	96	99	99	100	100	100
Public payphones		10x3	25	108	135	167	217	269	345	375
MOBILE SERVICES										
Cellular mobile telephone subscribers		10x3	25	211	563	916	1'066	2'221	3'669	5'303
- Digital cellular subscribers		10x3	—	120	419	780	941	2'124	3'510	
Cellular subscribers per 100			0.01	0.11	0.28	0.45	0.52	1.06	1.73	
TELEPHONE TRAFFIC										
International outgoing (minutes)		10x6	100	206	262	290	310	251	251	
International incoming (minutes)		10x6	138	260	345	408	408	403	346	
Total international (minutes)		10x6	238	465	607	698	718	654	596	
National (pulses)	5	10x6	10'451	28'256	35'347	42'143	45'905	47'259	52'859	58'665
STAFF										
Full-time telecommunication staff	6		41'134	39'839	40'009	40'309	40'468	40'317	39'908	
QUALITY OF SERVICE										
Faults per 100 main lines per year	7		65.8	19.7	18.6	13.7	13.2	7.4	16.0	
TARIFFS										
Residential telephone connection	8		300'000	700'000	700'000	590'000	295'000	295'000	295'000	
Business telephone connection	8		300'000	900'000	900'000	800'000	450'000	450'000	450'000	
Residential telephone monthly fee	8		7'500	20'500	20'500	20'500	22'700	22'900	22'900	
Business telephone monthly fee	8		7'500	31'000	31'000	35'800	34'900	39'100	39'100	
3-minute local telephone call (peak)			100	110	110	114	144	168	168	
Cellular connection	8		...	300'000	300'000	300'000	200'000	200'000	200'000	
Cellular monthly	8		...	58'000	58'000	58'000	65'000	65'000	65'000	
3-minute local cellular call (peak)	8		...	825	825	810	975	975	975	
REVENUE										
Total telecom services		10x9	2'379	6'150	6'907	8'222	10'911	14'729	19'126	
- Telephone service		10x9	1'947	5'153	5'358	6'141	7'160	8'522	9'791	
- Mobile communication		10x9	...	208	608	858	2'203	4'200	6'900	
CAPITAL EXPENDITURE										
Annual telecom investment	9	10x9	1'009	3'712	4'909	4'368	4'892	2'072	2'253	
BROADCASTING										
Television sets	10	10x3	13'000	22'000	25'000	27'000	28'000	30'000	31'700	
Home satellite antennas	10	10x3	...	2'000	3'000	3'300	3'500	3'700	3'900	
INFORMATION TECHNOLOGY										
Personal computers	11	10x3	260	980	1'300	1'600	1'700	1'900	2'100	
Internet hosts	12	10x3	—	2	10	10	15	21	27	
Internet users	13	10x3	...	50	100	250	500	900	2'000	

(1) Source: UN (1991, 2000); 1995-1999: BPS. 1999 excluding East Timor. (2) 1995:1999 BPS. Other years: ITU estimate. 1999 excluding East Timor. (3) Source: IMF. (4) UN. From 1998, unofficial estimates, source US Department of Commerce. (5) Excluding payphones and mobile cellular phones. (6) Telkom and Indosat. (7) Yearly estimate from monthly data. (8) Maximum tariffs not including taxes. (9) Telkom and Indosat. (10) ITU estimates. (11) Source: Computer Industry Almanac, ITU estimates. (12) Source: Internet Software Consortium. (13) APJII.

Annex 3: Schedule of meetings

Date	Time	Person
Monday, 30 April 2001	10:00	Mr. Pandji Chesin, APJII Mr. Gandung Murdani, PT. Indosat Mr. Agus Abdillah, PT. Telkom
Monday, 30 April 2001	13:00	Mr. Otto Murdianto, Pos Indonesia (WASANTARANET)
Tuesday, 1 May 2001	10:00	Dr. Imron Bulkin, BAPPENAS Dr. Zainal Hasibuan, Universitas Indonesia KADITBINTEL DAN INFORMATIKA Suryatin Setiawan, KaDiv. RISTI - PT. TELKOM
Tuesday, 1 May 2001	13:00	Mr. Aizirman Djusan - TKTI Mas Wigrantoro, Mastel Mr. Rudiantara, Excelcomindo / Mastel Mr. Arifudin, Mastel Sdr. Kepala Biro Pusat Statistik (BPS) Sri Yanto - APWI Rudi Rusdiah, AWARI Mr. William Yin, Lyman Mr. Wendra Natasendjaja, Lyman
Wednesday, 2 May 2001	09:00	Dani Sumarsono, CBN
Wednesday 2 May 2001	10:00	Mr. Mujiono, Kapusdatin Depdagri Mr. Marsetiawan, Depdagri Mr. Sudung Nainggolan, DepKes Mr. Hari Purwanto, DepKes Ms. Lolly Amalia, IPTEKNET
Wednesday 2 May 2001	13:00	Mr. I Putu Suryawirawan, DITJEN ILMEA Mr. Insan Prakasa, PT EDI Mr. Safar Idham, PT. Sucofindo
Thursday 3 May 2001	10:00	Mr. Sunarya Ruslan, Directorate General Radio, TV & Film Mr. Handoko Tanuadji, KabelVision Mr. Hillman Sulaiman, Indonesian Chamber of Commerce Mr. Gunadi, Postel
Friday 4 May 2001	10:00	Mr. Noor Iza, Postel Mr. Azhar Hasyim, Postel

Annex 4: Abbreviations and Acronyms

ADSL	Asymmetrical Digital Subscriber Line
APJII	Indonesian ISP Association
AWARI	Indonesian Internet Kiosk Association
B2C	Business to Consumer
BAPPENAS	National Development Planning Agency
BPS	National Statistical Office
GoI	Government of Indonesia
GPRS	General Packet Radio Services
ICT	Information and Communication Technology
IMF	International Monetary Fund
ISP	Internet Service Provider
IT	Information Technology
KSO	Kerjasama Operasi (Joint operating scheme)
LoI	Letter of Intent
MITI	Ministry of Industry and Trade
PC	Personal Computer
PCS	Personal Communication Systems
PoP	Point of Presence
Rp	Indonesian Rupiah, the national currency. At June 30 2001, the rate was Rp 11'400 to US$ 1. Note that the Rupiah has been subject to wide variation and US$ figures in this report should be treated with caution.
SME	Small and Medium Enterprises
TKTI	Indonesia Coordinating Team on ICT
UT	Universitas Terbuka

Annex 5: Useful web sites

Government	
Postel (Telecom regulator)	www.postel.go.id
BAPPENAS (National Planning Agency)	www.bappenas.go.id
BPS (Central Bureau of Statistics)	www.bps.go.id
Main telecom operators	
Indosat	www.indosat.com
Satelindo	www.satelindo.co.id
Telkom	www.telkom.co.id
Leading ISPs	
CBN	www.cbn.net.id
IndosatNet	www.indosat.net.id
LinkNet	www1.link.net.id
TelkomNet	www.telkom.net.id
ICT industry associations	
APJII (Indonesian ISP Association)	www.apjii.or.id
Mastel (Indonesian Infocomm Society)	www.mastel.or.id
Media	
Kabelvision	www.kabelvision.com
Detikom	www.detik.com
Kompas	www.kompas.co.id
Tempo	www.tempo.co.id
The Jakarta Post	www.thejakartapost.com

Annex 6: Bibliography

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