

Indonesia

Regional Telecommunications Networks In Suravaya (1, 2)

Report Date: January 2003

Field Survey: November 2002

1. Project Profile and Japan's ODA Loan



Project area location map



Optical transmission system installed in the course of the project

1.1 Background

The Surabaya Metropolitan Area (GKS) is one of the commercial and industrial centers of Indonesia with the second largest city Surabaya at its core, consisting of 6 districts and one city¹. At the beginning of the 1990s, the government of East Java Province set out a 5-year plan for regional development of the province under the Fifth Five-Year National Development Plan (1989-93). Under this plan, the government was seeking ways to increase the population and employment, foster industries, centering on the manufacturing industry, and promote a shift in the industrial structure. Specifically, promotion of industrial investment in GKS was set as a goal for the period, with emphasis on the improvement and expansion of infrastructure.

On the other hand, this region is falling behind the Jakarta Metropolitan Area in the construction of communications networks, which is one of the basic infrastructural requirements. This is a bottleneck for the implementation of the regional development plan, working as a negative factor discouraging companies from branching out in GKS. Under these circumstances, the "Survey for a Telecommunications Network Improvement Plan in Surabaya Metropolitan Area" was conducted with technical cooperation from the Japan International Cooperation Agency (JICA) and a Master Plan (M/P) for the improvement and expansion of the telecommunications network in this region was drawn up. This project was carried out as an effort to help realize this M/P and meet the demand for communications that is spreading from Surabaya to the surrounding areas.

¹ City of Surabaya and Districts of Lamongan, Gresik, Sidoarjo, Mojokerto, Bangkalan and, for the purposes of a telecommunications network, Jombang. This area is covered by East Surabaya and West Surabaya Regional Telecommunications Offices (Kandatel) under Vivre V, a regional division of TELKOM serving the Province of East Java.

1.2 Objectives

The objective of the project was to rectify disparities in the communications infrastructures between GKS including Surabaya and surrounding cities and the Jakarta Metropolitan Area, and to improve and expand the communications network in GKS as a mean of regional development.

1.3 Project Scope

The outline of the plan for the project is as follows:

- 1) Installation of local switching equipment for the Surabaya multiexchange area and the surrounding areas
- 2) Local transmission lines
 - a) Construction and extension of optic transmission lines: within Surabaya multiexchange area
 - b) Sectional conversion to microwave (radio) transmission sections
- 3) Long-distance transmission lines: establishment and extension of and shift to radio transmission sections
- 4) Remote areas communication network: base stations, relay stations, subscriber terminal stations
- 5) Subscriber cables: outside facilities – primary subscriber cables for the remote area communication network
- 6) Consulting services
- 7) Training in operation and maintenance of loaned equipment

1.4 Borrower/Executing Agency

The Republic of Indonesia/Telecom Indonesia (PT. TELEKOM)

1.5 Outline of Loan Agreement

Loan Amount / Loan Disbursed Amount	Phase I: 2,941 million yen / 2,817 million yen Phase II: 8,091 million yen / 7,864 million yen
Exchange of Notes / Loan Agreement	Phase I: September 1992 / October 1992 Phase II: October 1993 / November 1993
Terms and Conditions -Interest Rate -Repayment Period (Grace Period)	2.6% 30 years(10 years)
-Procurement	General untied
Final Disbursement Date	Phase I: November 2000 Phase II: December 2000

2. Results and Evaluation

2.1 Relevance

The target for the communications sector set in the Fifth Five-year National Development Plan (1989-93: REPELITA V) was “to make positive capital investment in urban areas where the demand for communications is continuing to grow, with the aim of expanding and firmly establishing communications networks and ensuring stable improvement of the quality of communications services”. The basic policy of the communications sector in GKS for the same period was 1) reduction of the gap with Jakarta in the

communications services (qualitative and quantitative improvement), and 2) provision of services which support socioeconomic activities and the regional development plan.

This project was to improve and expand the communications network in GKS as part of efforts to improve communications systems and promote regional development in this area. Therefore, the objective of the project was consistent with the policy of the 5-year development plan and the basic policy of the communications sector in GKS at the time of appraisal, and the relevance of the project may be considered valid.

At the time of evaluation, GKS is noted to be one of Indonesia's most densely populated centers of commerce, mining and manufacturing. Rectifying the disparity in communications services between this region and Jakarta is not a significant target at present, as stated in the section on effectiveness, while the target of improving the communications network aiming to support economic activities within GKS is highly relevant. The long-term plan made by the executing agency (Corporate Strategic Scenario) also set forth a vision of improvement and expansion of the communications services with a view to contributing to promotion of industrial activities. As approaches to achieve this goal, the plan put emphasis on further installation and extension of switching equipment and related transmission lines, and updating of applied technologies.

2.2 Efficiency

2.2.1 Project Scope

Significant changes and modifications have been made to the original project plan. Major changes and modifications include increases in the number of local switching units installed, the number of line sections where local optical transmission systems are to be introduced, the number of the systems established, the number of subscriber cables (OSP) constructed, and the change of switching stations where these facilities have been installed. The reasons for and details of these changes and modifications are as follows:

- At the time of examining the facility designs and the facility installation drawings, the project plan was reviewed in order to adjust to the then current state of communications network facilities which were being constructed by other donors or the executing agency on their own (to ensure consistency between the systems of different facilities).
- Following the review of the demand-and-supply balance, there arose a need to take urgent and additional measures to meet the rapidly growing demand in certain areas. Subscriber cables were procured based on the demand estimated at the time of the rebidding held after the failure of the first bidding.
- In addition to the introduction of a competitive bidding system, sharp declines in the price of communications-related equipment as a result of technological innovation contributed to drastic reductions of the costs for procurement of materials and machines from the projected amount. The executing agency made an additional plan for improvement and expansion of the communications network and decided to increase the number of units installed under the project.
- When the above-mentioned increase of the units was decided, a target was set for the improvement

of the communications network as of 2001, under which a plan was drawn up to further meet the potential demand for communications. The components of the additional plan were same as those of the initial plan.

Since then, the executing agency has suffered a shortage of funds as a consequence of the currency crisis in 1997, and the project scope has been changed. Indeed, due to these background circumstances, the entire scope of the project has been drastically changed.

In deciding to increase the number of units installed under the project, the consultant in charge of supervising the project prepared an implementation plan after setting the target number of units of switching equipment to be installed based on a review of the facility installation target and projected demand for 1999-2003, conducting a study on the communications traffic routes and calling rates², and making a traffic projection. The relevancy of the project after the large expansion of the project scope is discussed in 2.3 below from the viewpoint of facility utilization and improvement of communications in the project area. There was no problem in the process which led to the review of the scope, as stated above.

2.2.2 Implementation Schedule

According to the Project Completion Report (PCR), the project was completed in March 2000, three years and six months behind the scheduled date of September 1996. This delay is mainly attributable to the installation of additional units using the remaining budget, which took time. Other causes for delay include the failure of the bidding for procurement of subscriber cables, which required rebidding, and the lengthy period required for approval of the additional project implementation plan and making a direct contract with the contractor. The political and economic confusion caused by the currency crises and the presidential election held in 1998 were external factors that added to the delay.

2.2.3 Project Cost

Supposing that the project had completed within the initially planned project scope, it would have resulted in a significant cost under run (on a yen basis) because of a drastic reduction of the cost for procurement of materials and machines from the projected amount. (The reduction was achieved by the introduction of a competitive bidding system, and also a sharp decline in the price of communications-related equipment thanks to technological innovations.) As a result of the increase in the number of the units installed, about 93% of the project budget (on a yen basis) has been spent in total in the first and second phases. The cost for the installation of more units accounted for about 45% of the total project cost.

2.3 Effectiveness

2.3.1 Increase in Telephone Lines

As shown in Table 1, the telephone (switch) capacity and the number of lines in service have increased drastically both in the project area of GKS and in East Java Province including GKS. Under the project,

² The percentage of the maximum number of households out of 100 households which place phone calls at the same time on a certain timing.

switching equipment with a total capacity of 222,000 units was installed during the project period from 1992 to 2000 (installation of facilities such as switching equipment started in 1995). As of 2002, project switching equipment has accounted for 23.5% of the total switching capacity in GKS and 25.2% of the lines in service.

Table 1: Increase in switch lines and lines in service

	Switching Capacity East Java Province* ¹	Available Lines East Java Province	Lines in Service East Java Province	Line Utilization Rate East Java Province	Switching Capacity GKS* ¹	Lines in Service GKS	Line Utilization Rate GKS
1991	184,155	n.a	164,556	89.4%	113,876	101,964	89.5%
1994	414,514	n.a	305,772	73.8%	-	-	-
1996	931,756	897,664	667,200	71.6%	-	-	-
1998	1,230,742	1,178,315	935,372	76.0%	681,032	510,627	75.0%
1999	1,302,816	1,228,968	1,048,556	80.5%	684,032	544,809	79.7%
2000	1,391,228	n.a	1,198,142	86.1%	818,629	625,204	76.4%
2001	1,530,528	1,430,341	1,317,384	86.1%	n.a	676,315	n.a
2002	-	-	-	-	943,885	741,678	78.6%

Source: TELKOM Indonesia, appraisal materials, World Bank

Note 1: The data for East Java was provided by Vivre V, a regional division of the executing agency, and the data on the project area GKS was provided by two branch offices of Vivre V (East Surabaya and West Surabaya regional telecommunication offices (Kandatel)).

The utilization rate of the switching capacity in GKS and East Java Province was 78.6% (2002) and 86.1% (2001), respectively (see Table 1). These rates are almost same as the national average and the average in the Jakarta Metropolitan Area, both of which stand at 81.9% (as of December 2001). With respect to the switching equipment installed under the project, about 84% of the line capacity was in service as of March 2001 (according to PCR)³. Therefore, the large increase in switching capacity created under the project is considered to be an appropriate adjustment as far as the capacity utilization rate is concerned, as compared with the averages in GKS and East Java Province.

The ideal line utilization rate is over 90%, or close to 100%. However, as pointed out by World Bank and the executing agency, in developing countries where installation of underground subscriber cables is difficult, the number of lines in service does not keep up with increases in the number of units of easily installable switching equipment. In addition, the line utilization rates in GKS and East Java Province are less than those in 1991 because a large quantity of switching equipment was installed quickly during the first half of 1990, and the number of lines in service seems to have been always below the capacity level. Moreover, installation of subscriber cables in urban areas requires more complicated work and takes time. These are negative factors which keep the line utilization rate in GKS at a low level, the executing agency says.

2.3.2 Quality Improvement of the Telephone Service

The Answer to Seizure Ratio (ASR) or Call Completion Rate (CCR), which is a yardstick of the quality of telephone services, has improved remarkably since the 1990s. The rates in GKS shown in Table 2 have

³ According to feedback from the executing agency, over 90% of the total capacity of the switching equipment installed under the project is in service.

increased from 25.3% in 1992 to 74.6% in 2001, indicating that the service reliability has improved a great deal. The ASR or CCR, which is an indicator reflecting service reliability, is affected by transmission capability between switching equipment, the degree of deterioration of subscriber cables, and other factors.

Also, under the project, the transmission capacity has been increased by the installation of fiber optic transmission lines, and new subscriber cables have been constructed in the areas surrounding Surabaya. During the project period, the transmission system of fiber optic lines has been shifted from PDH (Plesiochronous Digital Hierarchy) to SDH (Synchronous Digital Hierarchy), which can offer high-capacity high-speed transmission as a standard, in order to deal with the expected demand increase. Networks for each switching station were built in a loop structure using the SDH system. The loop structure of the network system greatly contributes to the improvement of reliability of the communication service, as evidenced by the remarkable improvement in the above-mentioned indicator.

Table 2: Changes in ASR (or CCR) (local calls)

	1992	1993	1997	2000	2001
East Surabaya in GKS	n.a	n.a	n.a	74.8 %	75.6 %
West Surabaya in GKS	n.a	n.a	n.a	73.3 %	73.6 %
Entire GKS	25.3 %	39.8 %	n.a	74.1 %	74.6 %
Average in East Java Province					
(Local calls)	53.5 %	48.2 %	60.9 %	77.0 %	78.3 %
(Domestic long-distance calls)	24.9 %	32.2 %	56.6 %	69.3 %	69.7 %
National average					
(Local calls)	37.2 %	43.7 %	60.4 %	73.0 %	73.9 %
(Domestic long-distance calls)	26.3 %	36.5 %	56.5 %	65.8 %	65.7 %

Source: TELKOM Indonesia, appraisal materials

Note: All the data other than those for East Java and the national average are for local calls.

In Indonesia, the low ASR of long-distance calls has been a cause of concern and the insufficient local network in Surabaya (and Jakarta) has been pointed out as a bottleneck. Today, the ASR of long-distance calls (nation wide) has remarkably improved, a situation which may be regarded as an effect of the project. At the same time, the fault rate, which is another yardstick of the quality of the telephone service, has reduced significantly.

Table 3: Fault incidents (100 lines/month)

	1992	1993	1997	2000	2001
East Surabaya in GKS	n.a	n.a	n.a	0.41	0.33
West Surabaya in GKS	n.a	n.a	n.a	0.43	0.45
Entire GKS	n.a	n.a	n.a	0.42	0.39
Average in East Java Province	4.53	2.46	1.02	0.42	0.47
National average	3.50	2.70	1.14	1.33	1.67

Source: TELEKOM Indonesia, appraisal materials, World Bank

It is difficult to analyze improvement in GKS because of the lack of data for the early 1990s, as is evident in Table 3. However, as compared with the provincial average in 1992, the figure for GKS in 2001 has decreased by more than 4 points (from 4.53% to 0.39%), indicating that the service has been improved significantly in this respect.

2.3.3 Satisfaction of the Demand for Communication

As a result of a series of projects to establish communications network facilities including this one, the users of the communications services, mainly the fixed telephone service, have increased sharply over the

past 10 years. In 1998, the executing agency projected the increase in the demand for telephone lines for the following 3 years as shown in Table 4. As one can see, the projected demand has been fully satisfied as of 2001.

Table 4: Projection for increase in the demand for telephone lines as of 1998 and actual results

	1998	1999	2000	2001
East Surabaya in GKS				
Projected demand for telephone lines (accumulated total)	-	275,635	287,274	298,970
Telephone lines actually in service (accumulated total)	262,881	283,889	323,307	352,972
West Surabaya in GKS				
Projected demand for telephone lines (accumulated total)	-	267,054	280,872	296,495
Telephone lines actually in service (accumulated total)	247,746	260,920	301,897	323,343

Source: TELKOM Indonesia

However, the above table only shows the projections for demand increase made by the executing agency based on their past experience, and it does not present the “total potential demand”, including demand from impoverished people and the demand in rural and remote areas. Among the indicators which suggest the level of potential demand for telephone lines in the past and for the future is the number of waiting applicants, which has not been presented by the executing agency.⁴

The basic stance of the executing agency is to primarily pursuit profit as an incorporated company, and there is no reason to keep applicants who will bring additional profits waiting for a long time. With regard to the expansion of the communications facilities, they are presently drawing up a plan for capital investment for the next 5 years and seeking new sources of fund raising. However, the existence of public telephone services such as WARTEL⁵ and the rapidly growing mobile phone service make it less important to grasp the potential demand for fixed telephones.

2.3.4 Achievement level of the Master Plan for Improvement and Expansion of the Telecommunications Network in GKS (1993)

The effectiveness of the project can also be evaluated by the achievement level of the Master Plan for Improvement and Expansion of the Telecommunications Network in GKS (M/P) made by JICA in 1993 through technical cooperation, and the degree to which the project contributed to that achievement. The M/P expected that by the end of 2004 an accumulated total of 442,676 telephone lines would be put in service in the project area of GKS.

⁴ No data on waiting applicants is contained in the annual report by the executing agency.

⁵ Basic telephone service posts operated both in urban and rural areas. The operators other than the executing agency pay a certain portion of their income to the executing agency as an operational cost. The call charge is lower than that of the ordinary telephone subscription service and this service is widely used by those who have neither a fixed nor a mobile phone.

Table 5: Comparison between switching facilities and service expansion plans in M/P (GKS) and actual results

	Switching capacity	Lines in service	Line utilization rate
Projection in M/P (2004)	580,613	442,676	76.2 %
Actual cumulative total (2002)	943,885	741,678	78.6 %
(Contribution of the project)	222,000	187,226* ¹	84.3 %
Projection in M/P (1999)	375,945	284,506	75.7 %
Actual cumulative total (1999)	684,032	544,809	79.7 %

Source: TELEKOM Indonesia and JICA

Note 1: As of March 2001

As shown in Table 5, the number of lines in service as of August 2002 exceeded 740,000, well over the planned number. The executing agency explains that it has been active in expanding communications facilities over the past 10 years also by other projects. Behind the active investment are the following factors: 1) the sharp decline of the price of communications facilities such as switching equipment coupled with remarkable improvements in technology in recent years, which have enabled more cost-effective facility expansion than before; 2) the executing agency was incorporated as a government owned company in 1991, which made fund raising easier; 3) in the project area, as shown in Table 6, other donors have been providing support for facility expansion concertedly and intensively since 1996 under the “Communication Sector Modernization Project”.

Table 6: Support for facility improvement in the project area and the surrounding areas by other donors

Donor	Project	Project area	Contents
World Bank	Customer Access Network - Fiber Optic Cable Project	Surabaya	• Subscriber lines, optical transmission lines
KfW (Germany)	Sentral Telephone Digital Inegration-1 Phase VII-B	East Java	• Switching equipment: 7,524 units
	Sentral Telephone Digital Inegration-1 Phase VIII REMOTE Area IV		• Switching equipment: 101,102 units • One remote communication system
ADF (France)	RURAL Phase-IV	East Java	• 4 remote communication systems and 12 sites
	Northern Route Fiber Optic Cable		• SDH system optical transmission line (the second backbone between Jakarta and Surabaya)

Source: TELKOM Indonesia, World Bank

2.3.5 Recalculation of Financial Internal Rate of Return (FIRR)

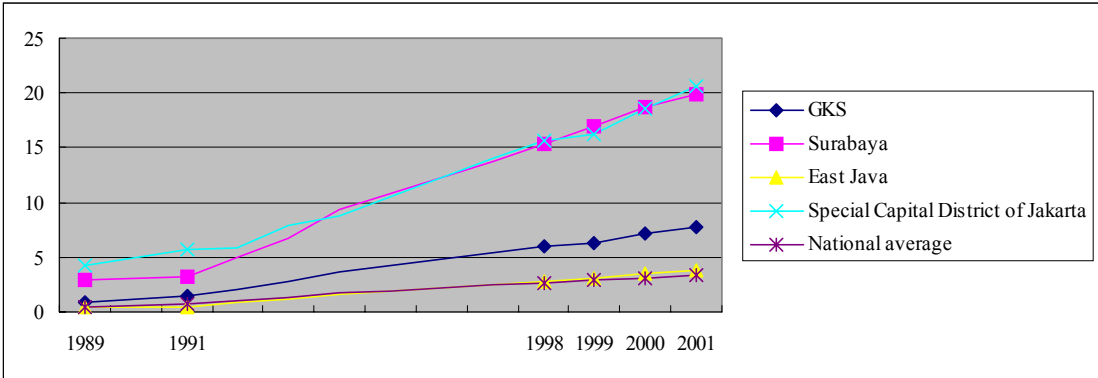
FIRR, which was calculated at 13.1 % for the first phase and 13.2 % for the second phase (both after tax) at appraisal, is recalculated at 25.8% (throughout both phases, after tax). This significant improvement of FIRR is mainly attributed to the sharp decline of the unit price of equipment. In other words, while there was little change in the project cost, the income increased due to a doubling in the capacity of switching equipment (number of lines) installed, which pushed the cash flow upward.

2.4 Impact

2.4.1 Changes in Telephone Density

As a result of the improvement of communications facilities, including switching equipment, subscriber cables and optical transmission lines, which has been promoted through the 1990s under this project and others, the switching capacity and the number of users have increased significantly. Consequently the telephone density, which shows the spread of telephone service, has also improved remarkably.

Figure 1: Changes in telephone density (lines in service/ 100 population)



Source: prepared based on the data from TELKOM Indonesia, World Bank, appraisal materials, and JICA
 Note: the figures for 1991 through 1998 are estimates.

As shown in Figure 1, the telephone density per 100 persons in GKS, which was only 1.4 in 1991, has increased to 7.7 as of 2001. The gap with the Jakarta area in telephone services, which raised concern at appraisal, has almost been rectified as the ratio of telephone density in Surabaya to that in Jakarta has improved from 0.56:1.00 in 1991 to 0.97:1.00 in 2001. The project is considered to have helped eliminate this gap greatly. While in M/P, the target telephone density in GKS for 1999 was 6.1, the actually achieved figure was 6.3, exceeding the target. The telephone density in 2004 is also expected to achieve the target 8.0.

The high-level objective of the project is “to vitalize economic activities in GKS and promote regional development”. The improvement in telephone density is considered to have contributed to the achievement of this objective by improving convenience for the local residents in their daily lives and promoting welfare in the project area.

2.4.2 Contribution to Industrial Development

In spite of the influence of the currency crises, the economy in East Java Province marked an annual growth rate of 3.9% on average from the early 1990s to 2001. Particularly, the manufacturing industry achieved an average annual growth rate of 6.4% in the same period. Although the industrial sector in Eastern Java was hard hit by the currency crisis in 1997 to 1998 and fell into negative growth, it is on track for slow recovery.

Table 7: Growth in East Java's manufacturing sector (Unit: million Rp)

	1993	1996	1997	1998	1999	2000	2001
Total regional production (at current prices)	44,629	77,004	88,772	135,753	150,556	169,681	196,499
Of which, manufacturing industry	10,202	22,454	26,344	38,258	41,158	45,616	51,617
Of which, commercial/service industry	10,252	16,050	19,027	32,069	34,478	39,166	46,476
Total regional production (1993 fixed)	44,629	61,794	64,854	54,399	55,059	56,857	58,758
Average 1-year growth rate	-	11.5%	5.0%	-16.1%	1.2%	3.3%	3.3%
Of which, manufacturing industry	10,202	17,815	19,410	15,104	15,096	15,358	15,538
Average 1-year growth rate	-	20.4%	9.0%	-22.2%	0.0%	1.7%	1.2%
Of which, commercial/service industry	10,252	12,906	13,828	11,369	11,404	11,908	12,838
Average 1-year growth rate	-	8.0%	7.1%	-17.8%	3.1%	4.4%	7.8%

Source: BPS Propinsi Jawa Timur

The output and added value in the manufacturing industry also marked a significant growth (see Table 8). However, taking the price increase into account, the performance of the industry is thought to be on the same level as the total regional production. The increase in the number of companies and investment amount has been slow recently due to the impact of the currency crisis. Still, in general, the whole economy and the manufacturing industry have grown over the past 10 years from the early 1990s. The percentage of total regional production represented by the manufacturing industry has increased from 22.9% in 1993 to 27.0% in 2000, which evidences the advance of industrialization.

Table 8: Transitions in manufacturing industry (medium-scale and above) performance in East Java (Unit: million Rp.)

	1992	1995	1998	2000
No. of medium & large-scale companies	3,997	4,742	5,004	4,999
Output	21,328	36,013	79,396	162,482
Value-added	8,733	17,393	34,516	98,256
Investment (incl. small-scale companies)	n.a	15,287	17,857	10,913

Source: BPS Propinsi Jawa Timur

At appraisal, the focus for the early 1990s was on the promotion of industrial development in East Java Province, particularly in GKS, with emphasis put on the sustained growth of industrial investment in Surabaya and the Districts of Sidoarjo and Gresik for the period covered by REPELITA V (the fifth Five-Year National Development Plan, 1989-94), and facilitation of investment in the region around Gresik District for the period covered by the sixth Plan (1994-1999). It was recognized that further improvement of infrastructure such as the communications services, the field in which this region was lagging behind the Jakarta Municipal District, was essential to the achievement of these goals.

As a result, the Districts of Sidoarjo, Gesik and Pasuruan turned out to be the most rapidly industrialized areas in the region (except for Surabaya city) during the past 10 years. As is obvious from Table 9, the manufacturing industry in Gresik District, in particular, kept on growing in spite of the negative effects of the currency crisis.

The percentage of total regional production represented by the manufacturing industry in each city and district increased by 1997 to 36.3% for Surabaya, 48.6% for Sidoarjo, and 46.5% for Gresik. As of 2000, these areas were continuing to grow as industrial areas with the manufacturing industry, generating 31.9%,

46.2% and 45.7% of the total regional production respectively. In these cities and districts, which have good access to ports, airports and highways, many plans for development of industrial estates were carried out. At the same time, infrastructure such as electricity and communications facilities has been improved intensively under the project and other related ODA loan projects.

Table 9: Transitions in manufacturing industry performance in recent years in Surabaya and surrounding districts

	1997	1998	1999	2000	2001
Surabaya					
Total regional production (1993 fixed)	15,373	11,933	11,904	12,303	n.a
Of which, manufacturing industry	5,586	3,957	3,862	3,919	n.a
No. of medium & large-scale companies	n.a	486	546	654	n.a
No. of employees (medium & large-scale companies)	n.a	88,252	92,720	97,512	n.a
Sidoarjo					
Total regional production (1993 fixed)	5,698	4,533	4,581	4,764	n.a
Of which, manufacturing industry	2,767	2,114	2,135	2,202	n.a
No. of medium & large-scale companies	325	325	336	341	351
No. of employees (medium & large-scale companies)	43,093	43,093	45,450	45,600	47,787
Gresik					
Total regional production (1993 fixed)	5,109	6,933	7,866	9,213	n.a
Of which, manufacturing industry	2,377	3,089	3,402	4,206	n.a
No. of medium & large-scale companies	n.a	n.a	n.a	433	472
No. of employees (medium & large-scale companies)	n.a	n.a	n.a	151,792	159,330
Pasuruan					
Total regional production (1993 fixed)	3,164	2,740	2,777	2,888	n.a
Of which, manufacturing industry	1,219	997	1,005	1,050	n.a

Source: BPS Propinsi Jawa Timure

It is apparent that the improvement of the communications infrastructure provided support and necessary conditions for industrialization, though it is difficult to pick out a specific example. The East Java Provincial Planning Authority (BAPEDA), the Chamber of Commerce and Industry, and the management companies of industrial estates in GKS recognize that the communications situation (the quality of the fixed telephone service) has improved to a satisfactory level over the past 10 years. It means that throughout the period before the currency crisis and in recent years, when the number and output of medium and large size companies (including industrial estates tenants) have increased, there has been no time at which the provision of communications service was regarded as a bottleneck preventing sound growth and the expansion of industry in GKS.

The advancement of industrialization is clearly shown in the development of industrial estates. The number of industrial estates planned to be developed in Surabaya and the surrounding areas by government affiliated agencies and developers as of 1990 and the number of those actually developed by 2000 are presented in Table 10. As for the districts for which data are available for comparison, the actually developed areas are smaller than planned. However, the number of industrial estates is larger than planned. In general, investment in the development of industrial estates in Surabaya area has been made mostly as planned during the 1990s.

Table 10: Progress in new industrial estate development in Surabaya and surrounding districts

	Planned figures (1990)		Actual figures (2000)		Difference	
	No. of industrial estates	Area (Ha)	No. of industrial estates	Area (Ha)	No. of industrial estates	Area (Ha)
Surabaya	8	2,373	12	1,653	4	-720
Sidoarjo	n.a	n.a	6	813	n.a	n.a
Gresik	6	1,900	11	1,148	5	-752
Mojokerto	1	200	2	500	1	300
Bangkalan	1	1,350	1	900	0	-450
Pasuruan	-	-	3	1,445	3	1,445
Total	16	5,823	35	6,459	13	-177

Source: BPS Propinsi Jawa Timur, BAPEDA Jawa Timur

Note: Difference figures do not include the data on Sidoarjo.

According to the management company of an industrial estate⁶ which we visited, since its establishment, no company has mentioned the situation of the communications services as a condition for moving into the industrial estate, nor has any company left the industrial estate for any reason related to the quality of the communications services (ASR or telephone voice quality). There has been no case where a company had to wait before moving into the industrial estate because of delays in the procedure to obtain telephone lines due to a capacity shortage at the executing agency, they say. The number of companies located in this industrial estate (and inquiries about moving in) has increased sharply from 1996 to 1997. Since this period coincides with the implementation period of the project, this increase seems to be related to the project. At the Rungkut Switching Station near this industrial estate, 2,600 primary subscriber lines are installed. This is an example showing that the executing agency properly dealt with an expected increase in local demand.

2.4.3 Existence of Communications-related Problems in Regional Development

As already stated, at the time of appraisal of the project in the early 1990s, the focus was on the promotion of industrial development in East Java Province, particularly GKS and the surrounding areas. Except for the impact of the currency crisis in 1997, industrialization and industrial growth has been promoted in GKS on a steady basis in terms of the proportion the manufacturing sector contributes to regional output and total regional production. Judging from feedback from commerce and industry related organizations, the communications services did not bottleneck the process of industrialization.

2.4.4 Other Impacts

Land acquisition for the construction of new switching stations went smoothly and without any problems because the subject lands were owned by the government. There is no problem in this sphere which may delay the project or adversely affect its effectiveness.

With respect to the Internet, most of the users access it via dial-up services. Considering that this service cannot be provided without the base facilities installed under the project, such as the switching facilities and optical transmission cables, the project is considered to have contributed to the spread of Internet use.

⁶ SIER Industrial Estate, which owns an industrial estate in Rungkut in Southern Surabaya. Japanese companies comprise 90% of the companies located there.

2.5 Sustainability

2.5.1 Operations and Maintenance

(1) Organization and staff

The project facilities are operated and maintained by Vivre V, a regional division of the executing agency, TELKOM, serving Eastern Java. Vivre V is charged with not only the operation and maintenance of the facilities, but also facility planning, demand prediction, designing and aspects of construction work, procurement, marketing, customer relations, billing and collection of telephone charges in the area which it is serving. Vivre V has branch offices, among which West Surabaya Office (SBB) and East Surabaya Office (SBT) cover the project area of GKS.

Each branch office comprises a Central Management Department (UPNA), a unit which functions to assist the branch manager and also manages the network in the region, and an Operations and Maintenance Department which performs daily operations and maintenance. Each department has technical staff.

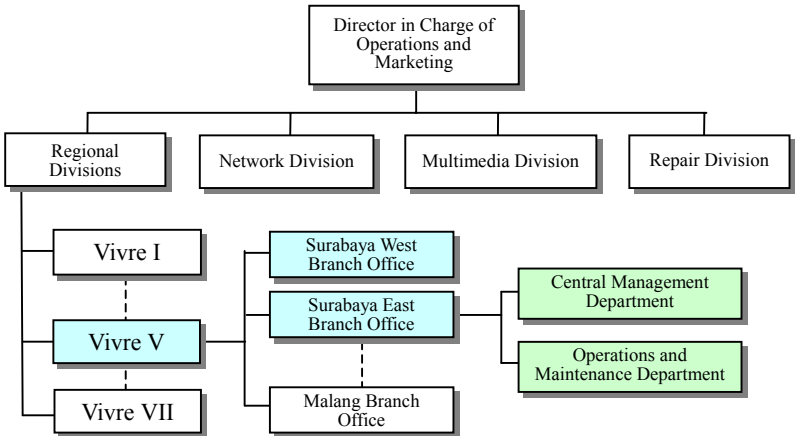


Figure 2: Organization chart of the executing agency (the section involved in the operations and maintenance of the facilities covered by the project)

In addition to the section in charge of operations and marketing, the executing agency has a planning and technology section in charge of planning, expansion, repairs and improvement of communications facilities, and this includes a Development Division, Research and Study Division and Information Technology Division. The division in charge of training of employees is included in the Personnel Resources Development Section.

As of the end of December 2001, the executing agency had about 37,000 employees. Among them, 4,567 employees were working in the area covered by Vivre V, and more than 600 employees were working at the above-mentioned two branch offices. The number of employees of the executing agency has remained almost flat in recent years. While expanding its business by branching out into the mobile phone business and multi-media related business, the executing agency started a voluntary retirement system as part of its effort to reduce employees.

(2) Current state of operations and maintenance

One of the indicators which measures the work efficiency of operations and maintenance activities is the number of employees per 1,000 subscribers. As shown in Table 11, the work efficiency of Vivre V and the executing agency as a whole has improved remarkably. In the case of Vivre V, while the number of subscriber lines has increased eightfold from 1990, the number of employees has decreased from 5,124 by 10%.

Table 11: Changes in the number of employees per 1,000 subscribers

	1990	1997	1998	1999	2000	2001
Vivre V	45.0	6.9	3.7	4.4	3.7	3.5
Total in the executing agency	n.a	7.6	6.8	6.3	5.7	5.2

Source: TELKOM, JICA

In each branch office of each regional division, the Central Management Department (UNPA) engages in operations and management of the network system comprising switching equipment and transmission line systems, and the Operations and Management Department performs installation and maintenance of subscriber lines and outside facilities. Works of each department are carried out in accordance with service quality assurance manuals called SMP (for system maintenance) and SOP (for system operation), for which certification by the International Standardization Organization (ISO) has been granted.

As for system maintenance, the project helped reduce the volume of work. As stated above, when the transmission capacity was increased by the installation of the optical transmission system lines, the transmission system shifted from PDH to SDH, which can offer high-capacity high-speed transmission as a standard, in order to deal with the expected demand increase, and the networks of each switching station were built in a loop structure using the SDH system. According to the executing agency, this route structure reduced the number of cable facilities to be maintained and made it easier to detect damaged points, thus reducing the volume of work required for monitoring and implementation of necessary measures.

The supply management of spare parts is conducted under the responsibility of the Repair Division of the executing agency. As the innovation of technology applicable to communications facilities has been progressing more rapidly than expected, spare parts for a facility which had been decided on only several years ago sometimes became unavailable at times when expansion, renewal or repair was necessary, in some cases because the manufacturer had stopped producing them, and the operation of the facility was hampered. This situation can occur in the project. However, maintenance is adequately performed thanks to the efforts of the executing agency and there have been no problems in the operations of switching equipment and other facilities so far.

2.5.2 Technical Capacity

According to the executing agency, there have been no problems due to lack of capability of the staff involved in the operations and maintenance of communications facilities. The executing agency has a Central Training Center within its Training Department and has set up an annual training plan to enhance the ability of its staff. Each regional division (Vivre) has a training center under the control of the Central Training Center. Thus, it provides both management and technical staff with many opportunities for

training.

In addition to this technical training, the executing agency has a program in which the staff in charge of special technology fields are organized into groups and exchange opinions on a regular basis for the purpose of facilitating technology transfer. These groups are organized in each regional division. Also, meetings to exchange opinions in each technology field are held on a national scale.

Under the project, a training program aimed at enhancing the ability of the staff to operate and maintain the loaned facilities was provided mainly by the suppliers of these facilities. The training included lectures and practical training on 1) design and maintenance of switching equipment and 2) maintenance of the transmission system. The executing agency says that the staff have mastered what they learned in the training and that there has been no problem in the operation of the facilities loaned under the project.

2.5.3 Financial Status

The executing agency, a former national company, was converted to a government-owned stock company in 1991. Following its reorganization in 1995, the present regional divisions (Vivre) were established and a new business system called the KSO Scheme⁷ was launched. Under the new organizational structure, the executing agency has been promoting its business through the expansion of the scope of its services, improvement of customer relations and sound financial management. Judging from its income and expenditure in recent years, the business performance of the executing agency has been satisfactory (see Table 12). As a result, the internal reserve, which provides a source of capital expenditure for the future, has been increasing on a steady basis. A breakdown of income from the fixed telephone business in FY2001 is presented in Table 13.

Table 12: Income and expenditure of the executing agency (Unit: billion Rp.)

	1997	1998	1999	2000	2001
Total income	6,400	7,590	9,386	12,112	16,131
Fixed telephone business	3,206	3,805	4,529	5,178	6,415
Mobile phone business	587	1,092	1,755	2,915	5,053
Dividends from KSO companies	1,646	1,592	1,677	2,267	2,220
Income from interconnections	477	453	733	1,008	1,422
Income from other communications services	484	648	692	744	1,021
Total expenditure	3,591	4,824	5,645	6,434	8,515
Personnel expenses	891	904	1,225	1,610	2,028
Depreciation	1,802	2,468	2,627	2,419	2,829
Operating income	2,449	2,766	3,741	5,678	7,616
Profit before tax	1,646	1,426	3,575	4,789	6,688

Source: TELKOM

⁷ A business scheme to utilize the funds and power of the private sector for rapid expansion of the fixed telephone business by granting the business rights to manage capital investments and business operations to private companies which share the profits with TELKOM (called the Indonesian Version of the BOT (Build-Operate-Transfer) system). The KSO Scheme has been adopted in Sumatra, Western and Central Java, Kalimantan, and Sulawesi. The general view is that the KSO Scheme has failed to expand the telephone service and improve the efficiency of business operations, partly due to the unpredicted impact of the currency crisis. Presently, there is a move to recover granted business rights (repurchase shares in KSO companies).

Table 13: Breakdown of the income from the fixed telephone business (Unit: billion Rp.)

	2000	Ratio
Total income from the fixed telephone business	6,415	100.0 %
Domestic call charge	5,226	81.5 %
Minimum charge	998	15.6 %
Telephone installation fee	98	1.5 %
Others	93	1.4 %

Source: TELKOM

The call charge rate is subject to government approval. The revision rate (increase rate) of call charges is determined every year according to the price cap calculation formula specified by the government. The increase rate is linked to the price index and is calculated after deducting from the price index a certain coefficient determined taking into account 1) the improvement of the business efficiency and 2) the purchasing power of the users. In the process of revising the call charge rate, ensuring transparency is important, while securing the profits of the executing agency is essential.

The telephone installation fee and the minimum charge are set for three categories (business, household, and social services), while the telephone use charge is determined by the distance and calling time based on a specific charge system regardless of the category of the customer. The income sources have been diversifying in recent years. Among them are income from the mobile phone business, income from Internet provider services, and facility lease income. These income sources are contributing to the improvement of the financial situation.

Most of the materials and equipment were purchased using foreign currencies procured by the executing agency. Consequently, foreign exchange risks, whether short-term or long-term, will ultimately be carried by the executing agency. Still, the executing agency has set a positive capital investment plan for the next 5 years, including the utilization of its own funds, and this is well under way.

Facilities are properly operated and maintained, and there is no specific factor which adversely affects business operations and investment activity.

However, the executing agency has named risk factors which might affect its business at any time depending on external conditions and operational handling. Among them, those that are peculiar to the executing agency are listed below.

- Activity by the labor union, which might call for a significant change or suspension of the strategy and plans of the executing agency
- Capital expenditure and market competition brought about by entry into the international telephone business
- Negotiation and agreement on the repurchase of shares in KSO companies (business succession under unfavorable conditions)
- Excessive government regulation and discriminatory favorable treatment of other companies
- Operation of the mobile phone business, in which increasingly intense competition is expected

Under the New Communications Law, which was issued in 1999 and enforced in August 2002, fully-fledged liberalization of the communications industry has started. In the same month, it was decided that

licenses to engage in the domestic local telephone business can be issued to other companies. In future, the executing agency will lose its dominant position and competition will start in the domestic telephone business.

On the other hand, the New Communications Law requires domestic communications companies to fulfill universal service obligations (USO) and social responsibility targets intended to provide communications service to every part of the country including the rural areas, which currently have no access to telephones. Even before the enactment of the New Communications Law, there was a rule stipulating that a portion of the capital expenditure of communication companies must be allocated to capital investment in those areas which do not have access to communications service. However, the executing agency would like to make its final decision on facility expansion toward these areas on the basis of long-term income and expenditure planning.

3. Feedback

3.1 Lessons Learned

Since it became a stock company in 1991 and was transferred most authority to operate as a company, the executing agency has been making efforts to invigorate itself. While raising the awareness of its employees about its business mission, it has properly conducted studies on the expansion of the scope of the project and the coordination required to keep balance with assistance from other donors, and has thus enabled efficient implementation of the project. As a result, the project generated genuine beneficial effects and made a contribution to the positive impact of improvements in telephone density and the elimination of the difference in communication services with the Capital District of Jakarta. This is a good example of the effective results that can be achieved through giving financial support to a highly motivated executing agency.

3.2 Recommendations

In Indonesia, as privatization and competition in the communications sector is being promoted, communications companies are making decisions on capital investment and expansion to underdeveloped areas on the basis of economic feasibility. This situation makes it difficult for them to expand their communications services to nonprofit-making areas as a universal service. Still, the needs of impoverished people and remote areas for receiving and sending information cannot be ignored. In the future, support measures will be needed to prevent the information gap from widening through the utilization of information technology.

Comparison of Original and Actual Scope

Item	Plan	Actual
(I) Project Scope (throughout the 1st and 2nd phases)		
1. Local switching equipment	Number of switching stations:13	Number of switching stations:43
- Surabaya multiexchange area	New installation: 56,000 LU Update: 20,000 LU	New installation and update: 122,500 LU (Subject stations were added and eliminated)
- Areas surrounding Surabaya	New installation: 1,530 LU Update: 470 LU	New installation and update: 99,500 LU (Subject stations were added)
2. Local transmission lines	PDH	SDH
- Optical transmission lines	New construction: 11 sections (15+13 systems) (Constructed length 59.4km)	New construction: 32 sections (47+4 systems) (Constructed length 221.2km) (Subject sections were added)
	Extension of existing lines: 13 sections (20 systems)	Extension of existing lines: 8 sections (8 systems) (Subject sections were added and eliminated)
- Microwave transmission lines	Conversion: 1 section (8Mb/s→34Mb/s)	Conversion: 1 section (8Mb/s→140Mb/s) (Subject section was changed)
3. Long-distance transmission lines		
- Microwave transmission lines	New construction: 4 sections (4+4 systems)	New construction: 4 sections (6+6 systems) (Subject sections were added)
	Extension of existing lines: 1 section (2+1 systems)	Extension of existing lines: 1 section (2+1 systems)
	Conversion: 2 sections (8Mb/s→34Mb/s)	Cancelled
4. Remote areas communications networks	Base stations: 9	Base stations:8 (Subject stations were added and eliminated)
	Relay stations: 5	Relay stations: 5 (Subject stations were added and eliminated)
	Subscriber terminal stations: 59	Subscriber terminal stations: 42 (Subject stations were eliminated)
5. Subscriber cables (OSP)		
- Surabaya multiexchange area	49,000 pairs	27,200 pairs (Subject stations were added and eliminated)
- Areas surrounding Surabaya	2,400 pairs	43,800 pairs (Subject stations were added and eliminated)
- Remote areas communications networks	1,700 pairs	4,372 pairs (Subject stations were added and eliminated)
6. Construction and reconstruction of station buildings	Construction: 3 station buildings Reconstruction: 6 station buildings	Construction: 8 station buildings Reconstruction: 6 station buildings
7. Consulting services	Foreign consultants: 142 M/M Local consultants: 172 M/M	Foreign consultants: 189.52 M/M Local consultants: 254.29 M/M

<p>(2) Implementation Schedule (throughout the 1st and 2nd phases)</p> <p>1. L/A conclusion</p> <p>2. Consultant selection</p> <p>3. Site survey and preparation for tender</p> <p>4. Land acquisition and construction/reconstruction of station buildings</p> <p>5. Tender & contract closing</p> <p>6. Design/manufacture/procurement</p> <p>- Switching equipment</p> <p>- Others</p> <p>7. Installation & set up</p> <p>- Switching equipment</p> <p>- Others</p> <p>8. Acceptance inspection</p> <p>- Switching equipment</p> <p>- Others</p>	<p>Oct. 1992 (Phase I)</p> <p>Nov. 1993 (Phase II)</p> <p>Sep. 1992 - Aug. 1993</p> <p>May 1993 - Oct. 1993</p> <p>Jul. 1993 - Jun. 1994</p> <p>Nov. 1993 - Aug. 1994</p> <p>Sep. 1994 - May 1995</p> <p>Feb. 1994 - Feb. 1996</p> <p>Feb. 1995 - Dec. 1995</p> <p>Mar. 1995 - Sep. 1996</p> <p>Sep. 1995 - Dec. 1995</p> <p>Apr. 1996 - Sep. 1996</p>	<p>Oct. 1992 (Phase I)</p> <p>Nov. 1993 (Phase II)</p> <p>Oct. 1992 - Mar. 1993</p> <p>May 1993 - Nov. 1993</p> <p>May 1993 - Feb. 1999</p> <p>Feb. 1994 - Feb. 1995</p> <p>Mar. 1995 - Dec. 1997</p> <p>Mar. 1995 - Dec. 1997</p> <p>Nov. 1995 - Oct. 2000</p> <p>Nov. 1995 - Mar. 2000</p> <p>Sep. 1997 - Nov. 2000</p> <p>Sep. 1997 - Mar. 2000</p>
<p>(3) Project Cost (Phase I)</p> <p>Foreign currency</p> <p>Local currency</p> <p>Total</p> <p>ODA loan portion</p> <p>Exchange rate</p> <p>(Phase II)</p> <p>Foreign currency</p> <p>Local currency</p> <p>Total</p> <p>ODA loan portion</p> <p>Exchange rate</p>	<p>2,896 million yen</p> <p>564 million yen</p> <p>(8,822 million Rp.)</p> <p>3,460 million yen</p> <p>2,941 million yen</p> <p>Rp.1 = 0.064 yen</p> <p>(as of October 1992)</p> <p>5,794 million yen</p> <p>3,725 million yen</p> <p>(63,128 million Rp.)</p> <p>9,519 million yen</p> <p>8,091 million yen</p> <p>Rp.1 = 0.059 yen</p> <p>(as of November 1993)</p>	<p>2,363 million yen</p> <p>828 million yen</p> <p>(22,391 million Rp.)</p> <p>3,191 million yen</p> <p>2,817 million yen</p> <p>Rp.1 = 0.037 yen</p> <p>(weighted average for 1993-2000)</p> <p>7,079 million yen</p> <p>1,856 million yen</p> <p>(99,146 million Rp.)</p> <p>8,935 million yen</p> <p>7,864 million yen</p> <p>Rp.1 = 0.019 yen</p> <p>(weighted average for 1993-2000)</p>

**Third Party Evaluator's opinion on
Surabaya Metropolitan Area Communication Network Improvement Project**

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Relevance

I agree with the evaluation report that the project is relevant to Indonesia's development objectives for several reasons:

- Indonesia's telecommunication density ratio is relative low.
- Similarly the quality of telecommunication is still behind the international standard.
- Surabaya area is one important industrialized zone in Indonesia. An improvement in telecommunication capacity and quality is important step to boost industrialization process in Indonesia.

However given a relatively high financial rate of return shown in the revised figure this kind of project should not be financed by ODA type loan. In my opinion, PT Telkom as executing agent should be able to raise fund from the market either from loan or obligation. This implies in the future ODA loan can be used for other projects, which have relative low financial rate of return but high economic rate of return investment activities such as social investment.

Impact

Generally speaking and as shown in figure 1 of the evaluation report, the project has been able to improve the telephone density in Surabaya metropolitan area from 1.4 in 1991 increased to 7.7 in 2001. The quantitative figures in Table 2 and 3 have also shown that call completion ratio increased from 25.3 % in 1992 to 74% in 2001, demonstrating a remarkable improvement in the quality of telecommunication in the Surabaya Metropolitan Areas during the last decade. As a result, fault incident per 100 lines per months has dropped from about 4.5 in 1992 – using the East Java figure as a proxy for the GKS – to 0.39 in 2001.

The relative remarkable improvement caused by this project has been also able to reduce the quality gap between Jakarta and Surabaya Metropolitan Area as one of objective of this project.

More importantly the financial rate of return of this project has been also rose – after recalculated – from 13 % in the first and second phases to double at 26 % caused by both a declining in unit cost of project and the utilization rate of telecommunication capacity. This has an important implication for market development which will attract private sector to participate and create a competitive and healthy environment in telecommunication sector in Indonesia. However developing a (conducive) regulatory framework is the most important for telecommunication market creation in Indonesia which is – up to this point – far from satisfactory.

An improvement on the quality of telecommunication services is considered an important and necessary foundation for industrialization together with many important variables like the availability of other infrastructures or investment climate. Quantitative evidences in the evaluation report tend to support the evidence of this project has helped Surabaya Metropolitan Area to maintain its economic and industrial growth. Should this development- in telecommunication sector- be supported by improvements in other areas like electricity supplies and other infrastructure, quality of public services and investment climate as well, one would expect then the outcomes (including the rate of growth in manufacturing sector) would be significantly higher than what actually happened.

(JBIC Comment)

Rate of return is one of the important factors in project selection; however other factors including a national strategy, social fairness and qualitative effect should be taken into account in project selection.