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China - Taiwan - Telecommunications - Report 630

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February 18, 1975

Minister Martin Wong
Embassy of the Republic of China
Washington, D. C.

Dear Mr. Minister:

Re: China Telecommunications Project (Loan 506-CHA)

Please find enclosed a copy of our Project Performance Audit Report on the above project which was finalized and distributed to our Executive Directors on February 14, 1975. We hope that you may find it interesting and useful. Copies have also been forwarded to Mr. Hien-Chee Fang and Mr. Henry Kao at the Ministry of Telecommunications, Taipei, who both sent helpful comments on the draft.

Sincerely yours,

Christopher R. Willoughby
Director
Operations Evaluation Department

Enclosure



February 18, 1975

Mr. Hien-Chee Fang
Director General
Directorate General of
Telecommunications
Ministry of Telecommunications
P.O. Box 84
Taipei, Taiwan
Republic of China

Dear Mr. Fang:

Re: China Telecommunications Project (Loan 506-CHA)

Thank you very much for your letter of November 6, 1974 concerning the Project Performance Audit on the above project and for the kind remarks you made there about the Bank and the small report we had prepared. The report was finalized and distributed to our Executive Directors on February 14, 1975, and we take pleasure in enclosing a copy for your information. Copies are also being forwarded to Mr. Henry Kao, Minister of Telecommunications and Minister Martin Wong at the Embassy in Washington.

Sincerely yours,

Christopher R. Willoughby
Director
Operations Evaluation Department

Enclosure

February 18, 1975

Mr. Henry Kao'
Minister of Telecommunications
Ministry of Telecommunications
P.O. Box 84
Taiepi, Taiwan
Republic of China

Dear Mr. Kao:

Re: China Telecommunications Project (Loan 506-CHA)

Thank you very much for your kind letter of November 4, 1974 commenting on the draft Project Performance Audit on the above project which we had sent to you and telling us about the impressive latest development of your telecommunication system. We very much appreciate too your kind remarks about the Bank. The small Performance Audit report was finalized and distributed to our Executive Directors on February 14, 1975; a copy is enclosed for your information. We are also sending copies to Mr. Hien-Chee Fang, the Director General and Minister Martin Wong at the Embassy in Washington.

Sincerely yours,

Christopher R. Willoughby
Director
Operations Evaluation Department

Enclosure

DOCUMENT OF
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

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SecM75-98

FROM: The Secretary

February 14, 1975

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PROJECT PERFORMANCE AUDIT REPORT
ON CHINA TELECOMMUNICATIONS PROJECT (REPUBLIC OF CHINA)

Attached is a copy of a memorandum from Mr. Shoaib with its accompanying report entitled "Project Performance Audit Report on China Telecommunications Project", dated February 14, 1975 (report No. 630) prepared in the Operations Evaluation Department.

Distribution:

Executive Directors and Alternates
President
Senior Vice President, Operations
Executive Vice President and Vice President, IFC
President's Council
Directors and Department Heads, Bank



INTERNATIONAL BANK FOR
RECONSTRUCTION AND DEVELOPMENT
WASHINGTON, D. C. 20433, U.S.A.

OFFICE OF THE PRESIDENT

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CONFIDENTIAL

February 14, 1975

MEMORANDUM TO THE EXECUTIVE DIRECTORS

SUBJECT: Project Performance Audit Report on China Telecommunications Project

Attached, for information, is a copy of a confidential report entitled "Project Performance Audit Report on China Telecommunications Project" (Loan 506-CHA) produced by the Operations Evaluation Department under the system described in the President's memorandum of April 13, 1973 (SecM73-203). It is another such report to consist of a brief Project Performance Audit Memorandum prepared by the Operations Evaluation Department itself, with the corresponding Project Completion Report, prepared by the responsible Regional Office, included as an attachment.

W. Shorab

Attachment

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Report No. 630

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT PERFORMANCE AUDIT REPORT

ON

CHINA TELECOMMUNICATIONS PROJECT

(LOAN 506-CHA)

February 14, 1975

Operations Evaluation Department

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PROJECT PERFORMANCE AUDIT MEMORANDUM

CHINA TELECOMMUNICATIONS PROJECT - Loan 506-CHA

1. Introduction

This memorandum presents the results of an audit of the project supported with Loan 506-CHA of August 1967, the only telecommunications project in the Republic of China with which the Bank has been associated. It is based on the project's Appraisal Report and the attached Completion Report, complemented with a review of Bank files, progress reports, annual reports, financial statements and audited accounts, and through discussions with relevant Bank officials.

2. The Project and the Loan

Contacts leading to the request for a Bank loan to cover the foreign exchange requirements of China's 1967-1971 telecommunication expansion program began in mid-1965. An appraisal mission visited Taiwan in September 1966 and the appraisal report is dated June 30, 1967. The loan, for US\$ 17 million equivalent, was signed on August 2, 1967. The borrower was the Republic of China's Directorate General of Telecommunications (DGT) and the guarantor was the Government of the Republic of China. The loan became effective on September 29, 1967.

The project which the loan helped finance was part of the DGT's 1967-1971 program to modernize and expand the national telephone services. Its main components were initially i) installation of approximately 118,000 lines of local automatic switching equipment in Taipei, Keelung, Taichung and Kaohsiung, including buildings and associated works; ii) installation of switching equipment for automatic subscriber trunk dialing (STD) in the three primary toll centers at Taipei, Taichung and Kaohsiung; iii) partial replacement and substantial expansion of the local cable networks; iv) expansion of the existing microwave network; v) installation of a telecommunication training center with capacity for 200 students; and vi) assistance of consultants in planning and executing the expansion program.

In September 1969, the Bank approved a change in description of the project, allowing a 75% increase in the purchase of switching equipment for local exchanges (from 118,000 to 207,000 lines) since actual bid prices had proved to be well below appraisal estimates. This substantial increase in plant above the original project was a response to demand growth well in excess of forecasts, probably brought about by the unexpected growth in the Chinese economy. The closing date, originally set for October 31, 1972

was changed to March 31, 1974. In addition, the lower actual costs resulted in a reduction of the loan to US\$ 12.5 million. The loan was completely disbursed by August 1973, and the project completed by December 1973. The total revised project reached a final cost of US\$ 60.8 million equivalent.

Several issues were discussed during appraisal and negotiations. The Bank stated that only international competitive bidding was acceptable and that direct negotiations with suppliers could not be used for Bank financed purchases. In connection with the expansion of the existing microwave system, which China wanted to negotiate directly and be financed by the loan, DGT agreed to go to international bidding in order to include this item in the project. The Bank then suggested that DGT should negotiate directly with the original supplier, in the better interest of standardization, and secure other sources of financing. Finally, DGT dropped the subject (which anyhow amounted to only 6% of the proposed loan and about 2% of the total project) and financed it from its own resources. In the particular case of the China Project, the Bank's position did not damage the project's progress. But situations can arise where strict adherence to international bidding may, in fact, distort substantially an existing telecommunications system and result in increased indirect costs in training and maintenance. The Bank's present position, when it accepts waiving the requirement of full international bidding in well-qualified cases, is welcome.

Also in the early stages of project preparation, China expected to include under Bank financing a first satellite earth station to improve international communication facilities. The Bank rejected the request arguing that China's existing international traffic was small and that it was clearly uneconomic to go to satellite circuits. China dropped the item from the loan request, but apparently pursued it elsewhere, for by 1969 it had its first station in commercial service -- which means that the feasibility studies (nonexistent at the time of the Bank's rejection) and a firm contract for the station must have been completed roughly at the time the loan agreement with the Bank was signed.

Main loan covenants required that a) DGT's fixed payment to the Government should not be increased above the current level of 25% of DGT's net income; b) tariffs should be adjusted to achieve a rate of return of at least 10% on average net fixed assets; c) the purchase contract for the expansion of the existing microwave system should be submitted to the Bank for review and comments before concluding it; d) the high US\$ 350 connection fee for new telephone subscribers should not be reduced during project execution; and e) new long-term debt (mainly for the satellite earth station and a new microwave system) should not be incurred unless net revenues for

any 12 consecutive months out of the 15-month period last preceding such incurrence were at least 2.0 times the maximum debt service requirements (including the new debt) in any succeeding year.

3. Project Implementation

The project's initial estimated total cost was US\$ 50.2 million equivalent, of which the Bank would have financed the whole foreign exchange component of US\$ 17.0 million (34%). The estimates for the revised project (1969) were US\$ 63.1 million equivalent, of which US\$ 16.01 million were in foreign exchange, with the reduced Bank loan covering US\$ 12.5 million. The final cost, as approximately assessed by DGT at the end of 1973, was US\$ 60.8 million equivalent, with a foreign exchange component of US\$ 20.16 million. The difference between the latter figure and the Bank loan was covered by DGT out of currency provided by China's Foreign Trade Board.

A breakdown of the cost figures was as follows: local switching and cable plant US\$ 51.7 m (85%), STD switching US\$ 2.6 m (4.3%), microwave US\$ 1.6 m (2.6%), training US\$ 0.8 m (1.3%) and administration and consultants US\$ 4.1 m (6.8%). The loan contributed to each of these components except the expansion of the microwave network. These figures mean that the original project was expected to cost US\$ 425 per telephone line, whereas the actual cost was only US\$ 292 per line, a 31% reduction in spite of the revaluation of the Japanese yen, which affected the cost of a large part of the imported equipment. The original estimates were based on a unit cost for the switching equipment of US\$ 92 per line, but the first tender yielded a lowest bid of US\$ 65 per line and a re-tender brought about a basic cost of US\$ 52 per line for 118,000 lines and a cost of US\$ 44 per line for the total option (177,000 lines). This is a unit cost only 48% of the initial estimate, and resulted from abnormally low prices that could not have been predicted at appraisal. It is this fact which brought about a 75% increase in project size with only a 21% increase in total cost and a simultaneous 27% reduction in Bank financing. These large differences between estimated and actual unit prices in the switching equipment are explained by the practice, of at least some suppliers, to reduce the prices in the first contract and rely on subsequent negotiated expansions to make up the difference.

If the figure of US\$ 52 per line had been used instead of the original US\$ 92, the total estimated cost of US\$ 50.2 million would have been reduced to US\$ 45.5 million (91%), and the foreign exchange requirements would have dropped from US\$ 17.0 million to only US\$ 12.3 million (72%).

The original schedule of construction was from June 1968 to December 1971, a period of 3½ years. Re-tendering, expansion of the project and building problems shifted the construction to July 1968-December 1973 (5½ years), a two-year delay. DGT did take interim measures to attend demand at the most pressing points; once deliveries finally started, DGT showed competence to proceed with installations at a very rapid pace with a high standard of engineering and labor.

Good coordination was kept between the progress of Bank and non-Bank-financed but related parts of the system. Shortage of trunk circuits, to which we will refer in section 6, brought about the advancement of a new project to construct a new microwave network in addition to the existing one.

A significant difficulty occurred when the bids for the switching equipment (the largest component of the project) were evaluated by DGT and its consultant. Two-stage bid evaluation was proposed by DGT and explicitly accepted by the Bank.^{1/} When the technical and management details of the bid were examined, DGT concluded that three of the four bids submitted were not wholly responsive to the specifications. DGT felt it had to request the bidders to "revise and improve" their presentations without altering the prices (as yet unopened); the Bank agreed to this as well, expressing that it understood it to be in the sense of a clarification and not a change in bids, as required by the Bank's guidelines for procurement.

Yet when the recommendation of award was submitted to the Bank, three qualified staff independently concluded that at least one of the bids had been substantially re-engineered, that considerable amounts of equipment had been added, and that overall the Bank's rule on clarification of bids without substantive change had been overlooked, thus invalidating the tender from the Bank's viewpoint.

During this process, considerable effort had to be devoted by Bank staff to study the situation in great detail, and substantial pressure was exerted by the most affected bidders. Although the Bank had repeatedly expressed in writing the need to limit bid modifications to "clarifications", it had not explained at any greater length the differences with the unacceptable "change" in bids. The Borrower knew the Bank's procurement rules, but it may not have been fully aware that the bid modifications underway were

^{1/} The first stage of this type of bid evaluation deals only with the technical aspects, and the second with price.

going beyond tolerable limits; the Borrower and its consultants expressed some concern about this possibility. In retrospect it appears that the Bank, being aware that problems could arise with this "revision and improvement" of bids, might usefully have gone beyond the rather formal reminders of the rule that it sent. DGT asked for new tenders; by that time the Bank had concluded that two-stage evaluation was not acceptable and the new tender was handled by DGT accordingly and with no further difficulties. Re-tendering resulted in unit prices even lower than would have been paid had the first tender been accepted by the Bank. A delay of 1½ years in initial deliveries of equipment ensued, but building difficulties were being experienced at the same time and thus the overall 2-year delay in project completion must be seen as the combined outcome of project expansion and of procurement and building problems.

4. Impact of the Project

During project implementation, China's telecommunication system grew and improved substantially. The local networks expanded from 113,000 subscribers at the end of 1966 to 487,000 at the end of 1973, a cumulative growth rate of 23% p.a., the highest in Asia; 1973 showed a growth rate of 27%, probably the highest achieved that year in the world for systems of comparable or larger size. This is a remarkable performance, considering that few countries have achieved a sustained growth of more than 15% p.a. With this expansion, the density of telephones (all stations) improved from 1.3 per hundred inhabitants in 1966 to about 4.4 in 1973; the latter level is comparable to those of Colombia, Mexico and Yugoslavia, is about double the density for Asia as a whole (2) but still well below the figures for Israel (20), Japan (32), Australia (34) or Sweden (60).

At the same time, the proportion of telephones connected to automatic local exchanges increased from 75% to 90%, and a new type of telephone set was introduced which improved substantially the quality of communication. The delay in serving new applications, which was of 4 to 6 months in 1966, was reduced to less than one month by 1973 with most areas being served within a fortnight.

The pressure for use of existing plant is still very high: 9.7 calls (local + trunk + international) per telephone (all stations) per day in 1972, well above the rate of other countries which also have more than half their telephones in businesses (Hungary 2.3, Japan 3.7, South Africa 5.4, Switzerland 1.5, Turkey 2.4). This fact presumably comes from the unusually high connection fee (US\$ 350) which depresses connections demand

but does not affect demand for traffic; in fact, the calls per inhabitant per day in China in 1972 were 0.4, well within the range of the other countries with more than 50% business telephones (Hungary 0.2, Japan 1.2, South Africa 0.4, Switzerland 0.8 and Turkey 0.1).

Subscriber trunk dialing became available on several major routes, on which now typically 75% of calls are free from operator intervention (none in 1966). Partly as a result of STD and the unexpected growth of the economy, the number of trunk calls in Taiwan is estimated to have increased by 25% p.a., as compared to the appraised estimate of 15% p.a. This has brought about substantial congestion of the trunk network; its insufficient capacity has prevented STD from becoming extended nationally as fast as expected and a number of local offices with STD possibilities built into them have delayed their cut-over into full automatic trunk operation pending the completion in 1973-1976 of a new microwave network not included in the original project.

The following table summarizes the forecasted and actual growth experienced by the system during 1966-1973.

<u>Item</u>	<u>Forecasted</u>	<u>Actual</u>
No. of telephone subscribers		
- at end of CY73	321,000	487,000
- growth rate 1966/73	16% p.a.	23% (27% in 1973)
No. of trunk telephone calls		
- FY73	67 million	102 million
- growth rate 1966/73	15% p.a.	25% p.a.
No. of national telegrams		
- growth rate in FY73	8%	5.3%
No. of international telephone calls		
- growth rate p.a. 1966/73	15%	32%
No. of international telex paid minutes		
- growth rate p.a. 1966/73	20%	23%
No. of international telegrams		
- growth rate p.a. 1966/73	8%	11%

International services were boosted by the inauguration of a satellite earth station in 1969 and a tropospheric scatter link with the Philippines, adding two important outlets to the existing tropospheric scatter link already connecting China to Hong Kong and the submarine cable network. Some national data services were also initiated in this period.

Thus the quality, quantity and variety of services have all increased, some very substantially, with several of the services growing at a rate well in excess of the original forecast. Some system imbalance, particularly expansion of the capacity of trunk circuits insufficient to match the growth achieved in local plant and associated STD possibilities, resulted from overly pessimistic initial forecasts.

This project had no specific economic justifications or expectations expressed in the appraisal report or in file material. No economic assessment is therefore attempted in this audit.

5. Evaluation of the Borrower's Performance

The performance of the Borrower, DGT, was efficient and satisfactory. Except for the one breach of procurement rules (discussed in para. 3), all loan covenants were adhered to. Annex 2 of the attached PCR shows that all principal financial indicators throughout the period 1967/73 were better than forecasted at appraisal: e.g. the rate of return on net fixed assets varied between 17% and 22%,^{1/} exceeding the forecasted 10-15% range and remaining well above the 10% minimum stated in the loan agreement. Thus, DGT's financial position has been consistently strong and shows a good prospect beyond completion date.

A substantial institutional improvement in this period was the expansion and relocation of DGT's telecommunication training center (now called "Telecommunication Training Institute") which has residential facilities for 200 students and has provided a wide range of technical and management education at levels ranging from unskilled workmen to college graduates, in some years training over 1,000 students. It has essentially freed the DGT from dependence on foreign training and seems to fulfill amply the expectations put forth in this matter at appraisal time. The performance of the trainees in the actual project implementation suggests that the training in this center is of a very good standard.

Another significant indicator is the number of DGT employees per thousand telephones, which has dropped from 39 to 30 (or 26, if only the telephone branch staff are counted). This improvement in labor productivity

^{1/} It has not been possible to establish whether assets have been soundly revalued.

can be expected to continue, since staff growth programmed for 1970/76 is of 11% p.a., and the telephone system is expected to grow at 19% p.a. A figure of 19 telephone staff per thousand telephones can be expected by 1976, well below equivalent figures in most or all other Asian countries and comparable to some European levels.

6. On Forecasting System Growth

The table in section 4 shows that there were wide disparities between some of the actual figures for system growth and those forecasted at appraisal time. The outstanding instances are the growth rates of numbers of subscribers, trunk telephone traffic and of international telephone traffic.

Regarding the figures of numbers of subscribers, there was a margin of more than 50% between actual and forecasted numbers. If only the original project (rather than the 1969 revised version) would have been carried out, there would have been by the end of 1971 a deficit in the order of 100,000 lines, or roughly one-half of the lines in service; this would have represented a dramatic deterioration of the supply situation. That it did not happen seems to have been largely due to the abnormally low prices obtained in the bids for switching equipment, which allowed a 75% increase in local switching and cable plant to be introduced with only a 21% increase in total project costs.

Trunk traffic rose well beyond expectations, leading to an important shortage of trunk circuits. A new microwave network had to be started, where only expansion of the existing one had been envisaged in the project, resulting in an unbalanced system growth and some subutilization of new equipment, as explained earlier.

Some of the factors that may have led, in this project, to underestimate the growth potential are the following.

At the outset of project implementation, China experienced a large growth in manufacturing (23.3% in 1968, against 13.9% in 1961-1964), public utilities (17.3% vs 11.8%), construction (28% vs 9.8%), number of registered motor vehicles (168% vs 18.2%), and rail and road passenger traffic (10.1% vs 5.3%) and freight (11.2% vs 4.8%); these are all sectors moderately to very strongly related to telecommunication needs. At the same time, sectors which are poor contributors to the demand for telecommunication services grew much slower or even decreased their output, e.g.

agriculture (6.1% vs 5.6%) and mining (-0.4% vs 7.1%). In fact, in the late 1960s the contribution of manufacturing to GNP surpassed that of agriculture, industrial activities became quite sophisticated, and overall the economic pattern acquired an unprecedented complexity which brought changes in structure as well as in volume. Structural change, and increased contacts among sectors and across regions, are all factors which can be expected to exert strong pressure on telecommunication services.

Bank staff familiar with the country and the project have indicated that this major change in the economy had not been foreseen and that the forecasts may not have taken them into account. This view is supported by the fact that whereas China's Fourth Four-Year Plan (1965-1968) was based on a real GNP growth target of 7% p.a., the average growth rate actually achieved was 10.5% p.a. and this was not the result of accidentally favorable factors which could not have been expected to recur in the future. In 1966, the Bank's own assessment of the economic prospects of China were based on a figure of 7.5% real growth of GNP over the 1965-1968 period, also well below actual figures, even if that assessment recognized that 1965 had shown a real growth of 10% and that the prospects for 1966 were also similarly good. Real GNP increased by 8.6% in 1966, 10.3% in 1967, 9.3% in 1968, 8.7% in 1969, 11.2% in 1970, 11.5% in 1971, 11.0% in 1972 and 12.3% in 1973.

Other factors which may have been omitted from the forecasts are the possible existence in the early 1960s of a substantial unsatisfied demand for telephone connections which emerged only once the system really got moving, and a sufficient allowance for the large impact on the number of trunk calls brought about by the generalization of direct subscriber local dialing and, more significantly, by the introduction of direct subscriber trunk dialing.

7. The Bank's Performance

As a whole, the project was extremely successful. To a considerable extent this is due to the Borrower's technical and managerial competence and to the effective support found in the small number of consultants it needed. The Bank's participation was adequately matched; excellent relationships and continuous consultation developed between DGT and the Bank, contributing significantly to the operation's success. The Bank does not appear to have given more attention to the project than necessary, yet it did provide firm orientation when required by the Borrower or by events.

However, the Bank could have been clearer on procurement matters and thus have tried harder to avert the one substantial conflict that developed during project implementation. Regarding the need for international bidding, it held a rigid position which by now fortunately has been superseded. The Bank had a vacillating position regarding retroactive financing

of consulting services used in project preparation; in the end, these services were not included in the loan. At the time the Bank rejected China's proposal to include a satellite ground station in the project, the impressive world-wide commercial expansion as is known today was only starting. Since then, ground station capital costs have dropped from some US\$ 6 million to US\$ 3.5 million. Therefore, economic analysis today might show that it would have been preferable for China to delay its satellite station project for a few years in spite of the impressive increase in international telephone calls achieved after the station became operational in 1969 (24% in 1969, 62% in 1970 and 57% in 1973, well above the appraised forecast of 15% p.a.). Yet when the Bank rejected the initial Chinese suggestion, it did this a priori without the benefit of feasibility studies to support its assumption of lack of economic justification. It also did not take into account the extent to which low existing traffic would be affected by the introduction of the new facilities, and it did not foresee imminent, deep and already publicized changes in the engineering and economic practices of international communications. And the Bank did not convey to China any argument based on expecting rapidly decreasing capital costs. Thus, although the Bank's position might in retrospect be shown as good for the Borrower, it was reached without adequate analytical basis and was evidently found unconvincing by the Chinese.

8. Conclusions

Overall the project was a remarkably successful one. This was mainly the outcome of the Borrower's technical and managerial skills.

Large underestimation of telephone connections demand and traffic was coincidental with unusually low prices obtained for some of the major items, in a way which made it possible to expand considerably the number of new connections above initial estimates with only a modest increase in overall cost and a reduction of the Bank's loan. Some system imbalance did occur, though, affecting the capacity of long distance telephone service so that STD has had to progress at a slower pace than expected, while new bearer systems were built to restore balance.

The Bank's performance was well matched to the Borrower's competence, and overall it handled the project adequately and with austerity. However, the Bank could usefully have been clearer on the subject of acceptable bid evaluation procedures, adopted a sustained position on retroactive financing, been less rigid on competitive procurement, taken a more positive and well-founded attitude on technological change and, perhaps, been more critical of the forecasting methods and underlying assumptions used by the Borrower in preparing the project.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT COMPLETION REPORT

China - Loan 506-CHA Directorate General of Telecommunications (DGT)

1. The following completion report is based on a visit to China from November 25 to December 3, 1973.
2. Borrower Directorate General of Telecommunications (DGT)
Beneficiary Ministry of Communications
Republic of China
3. Guarantor The Government of the Republic of China
4. Loan Amount Original: US\$ 17 million
Final : US\$ 12.5 million
5. Date Loan Signed August 2, 1967
6. Effective Date September 29, 1967
7. Closing Date Original: October 31, 1972
Final : March 31, 1974
8. Period of Grace Four years
9. Term of Loan 20 years
10. Interest Rate 6% per annum
11. Commitment Charge 3/8 of 1%
12. Amortization October 15, 1971 - October 15, 1987
13. Exchange Rate Appraisal: US\$ 1 = NT\$ 40.00
December 1973 (final cost estimates):
US\$ 1 = NT\$ 40.10
Present: US\$ 1 = NT\$ 37.90

14. Appraisal Report No. & Date TO-580(a), June 30, 1967
15. Fiscal Year January 1 - December 31 to December 31, 1971
July 1 - June 30 from July 1, 1972
16. Joint Financing (where applicable) None
17. Project Description
- (a) The project which consisted of part of DGT's 1967-1971 development program for the modernization and expansion of the local and long distance telecommunications facilities provided for:
 - (i) Installation of approximately 118,000 lines of automatic exchange telephone switching equipment with necessary buildings, cable networks, telephones and accessory facilities in the cities of Taipei, Keelung, Taichung and Kaohsiung.
 - (ii) Installation of a long-distance dialing system between toll centers with automatic toll switching systems located in the cities of Taipei, Taichung and Kaohsiung.
 - (iii) Establishment of a Telecommunications Training Center with a capacity for 200 trainees.
 - (iv) Assistance of consultants in the planning and execution of the expansion program.

The project was expected to be completed by December 31, 1971. The facilities were expected to be put into operation in successive stages in 1969, 1970 and 1971.

- (b) At the time of bid evaluation for the equipment included in subparas. (a) (i) and (ii) above, DGT found it necessary to request significant equipment changes which made evaluation difficult and controversial. After discussion with the Bank, DGT agreed to go through a retender operation for that equipment; this resulted in a delay of about 18 months in the initiation of the project construction period. However the retendering brought forward extremely low prices and DGT was able to take advantage of the low prices to obtain the additional equipment (89,000 lines) necessary to meet the extra demand caused by the extended construction period. To meet these circumstances on September 12, 1969, the Bank agreed that the equipment in subpara. (a) (i) of the project description above would be increased from 118,000 lines to 207,000 lines. Furthermore, the price advantages were such that on December 3, 1969, the Bank agreed to

cancel US\$ 4.5 million of the US\$ 17.0 million loan. The closing date of the loan was extended from October 31, 1972 to March 31, 1974, and it was agreed that the facilities would be put into operation in successive stages between 1969 and 1974.

18. Objective and Justification

In 1966 the telephone development in Taiwan was 1.3 per hundred of population; this was low when compared to many industrialized nations, for example, Japan with 14, Europe 45 and USA 48. The growth of the economy and improvement in living standards had rendered the facilities inadequate to satisfy the high demand for telephone service. This demand had been high and consistently maintained for over ten years despite a connection fee of about US\$ 350 charged new subscribers. The high demand was further evidenced by the abnormally high calling rate averaging 15.8 calls per day per subscriber's line throughout Taiwan. This was nearly four times the calling rate in the USA. The project was intended to expand and improve the domestic telephone and telegraph services of Taiwan in order to assist the economic development of the country.

19. Construction Schedule

The original and final construction schedules are compared below.

	Original (118,000 lines)	Final (207,000 lines)
Engineering and specifications	Feb. 1966-July 1967	Aug. 1968
Manufacture of equipment	Mar. 1968-Dec. 1970	July 1969-Mar. 1973
Installation of equipment	Jan. 1969-Dec. 1971	July 1970-Dec. 1973

The construction periods, estimated and actual, broken down into main physical components are the following:

Principal Components	Construction Period		
	Estimated initial project (Sept. 30, 1967)	Estimated revised project (Dec. 24, 1969)	Actual (Dec. 31, 1973)
Local exch. equip.	Jan. '69-Dec. '71	Aug. '70-Dec. '73	July '70-Dec. '73
STD exch. equip.	June '69-Dec. '70	Nov. '70-July '71	Nov. '70-Mar. '72
Microwave		Dec. '69-July '70	Dec. '69-Sept. '70
Line plant	June '68-Dec. '73	July '68-Dec. '73	July '68-Dec. '73
Training center	June '68-Dec. '69	June '69-Dec. '70	June '69-Dec. '71

The principal reasons for the delay in the execution of the project was the need to retender for the main equipment and the need for additional time to install the extra equipment included in the revised project (see para. 17b). There was some slippage in the original construction dates for buildings;

however because of the delays in the switching procurement DGT was able to have all the buildings erected in time for the installation of the equipment. Once the initial procurement difficulties were overcome DGT's installation performance was very good; in fact the installations were completed three months earlier than anticipated.

20. Project Cost Estimates

The estimated cost of the Bank financed project as appraised was NT\$ 2.0 billion; subsequently, when the project was changed (see para. 17b), DGT estimated the revised cost to be NT\$ 2.5 billion, of which 75% related to local costs; this revised project cost would represent probably only about 25% of the construction works to be undertaken by DGT during the period 1967 through 1973. Although the cost of the items imported directly for the Bank financed project are easily identifiable, the calculation of accurate final costs for the project is rendered practically impossible because of the need to allocate a large number of local cost items which are common to both the Bank financed project and the remaining part of DGT's program. For this reason the final costs of the project (NT\$ 2.4 billion) as prepared by DGT and shown in Annex 1 can only be considered as an estimate and may be subject to substantial error.

21. Program Achievements

Over the past seven years DGT has maintained a telephone growth which is among the highest in the world. DGT has been able to meet the exceptional demand in most areas without delay and at the same time offer a satisfactory standard of service; current waiting lists are not high. The Bank financed project, which formed part of DGT's large development program, has considerably contributed to this significant achievement. The excellent progress made in each branch of operation is indicated below.

- (a) Local Telephone Service - During the 1966 appraisal it was estimated that DGT's 113,000 telephone subscribers would increase to 321,000 by the end of 1973; annual growth would be about 16%. DGT's actual subscribers at the end of 1973 totalled 486,826, and the annual growth since 1966 had been slightly above 23%. Public telephones which totalled 2,087 in 1966 were increased to 11,000 at the end of 1973; over the same period the percentage of automatic telephones in the network increased from 75% to 90% and telephone density had increased from 1.3 to 4.4 per hundred population. Annual statistics are given below.

End of CY Year	Percentage of Automatic Telephone Stations	Number of Telephone Subscribers		
		Yearly Increase	Total Number	Percentage of Annual Increase
1966	75.0	14,894	113,414	15.1
1967	77.4	21,621	135,035	19.1
1968	79.4	30,949	165,984	22.9
1969	82.2	37,349	203,333	22.5
1970	83.7	46,087	249,420	22.7
1971	87.3	58,053	307,473	23.3
1972	89.7	75,135	382,608	24.4
1973	90.3	104,218	486,826	27.2

(b) Long Distance Services - The number of toll calls, including those dialed directly by subscribers (STD) increased in 1966/1973 by approximately 25% p.a., far above the 15% p.a. forecasted and appraised. In the same period, the number of national telegrams increased by 10% p.a., but in the last year growth fell to 5.3%; those figures compare with 8% forecasted at the end of 1973.

(c) International Services - The annual growth in the number of international telephone calls between 1966 and 1973 was 32%; this was more than double that estimated during the appraisal. During the same period telex paid minutes growth was 23% per year as compared with the 20% forecast during the appraisal. International telegrams increased, during the same period, at a rate of 11% per year as compared with 8% forecasted.

22. Growth Potential

Despite the high connection fee there has been no slackening of telephone connections' demand; for example, the present demand and supply in the large industrial area of Kaohsiung is running at the rate of 27% per year; DGT is presently executing another large development program covering the period to end-1976 which includes switching equipment for a further 350,000 subscribers.

23. Consultants

The consultants, Complan Associates and individual experts, who assisted in the preparation of specifications and evaluating bids, performed their duties satisfactorily.

24. Organization and Management

DGT's organization has operated effectively, management has been and continues to be extremely efficient. At the end of the project, owing

to the rapid growth, it was evident that DGT organizational capacity was burdened. DGT quickly identified the areas which required strengthening and is taking measures to ensure a continuation of efficiency.

25. Financing

The financing plan prepared at appraisal time covered the five-year construction period - January 1, 1967 through December 31, 1971. (The revised Bank-financed project was completed only by end-1973). The under-mentioned table shows (i) DGT's actual financing arrangements for the period 1967-1971 as compared with the appraisal estimates; and (ii) DGT's financing arrangements for the period January 1, 1967 through June 30, 1973, the latest date to which audited accounts are available, and the date when almost all equipment for the project had been installed.

	Appraisal Estimate FY1967-71	Actual	
		FY1967-71	FY1967-73
	-----in millions of NT\$-----		
<u>Requirements</u>			
Construction	4,876	6,087	9,300
Working capital-increase	-	310	1,494
Total requirements	<u>4,876</u>	<u>6,397</u>	<u>10,794</u>
<u>Sources</u>			
Internal cash generation	2,988	4,259	6,838
Less: Debt service	476	366	563
Payments to Government	396	609	900
	<u>2,116</u>	<u>3,284</u>	<u>5,375</u>
Subscribers deposits and connection fees	1,347	2,492	4,198
Borrowings	903	621	1,221
Working capital-decrease	510	-	-
Total sources	<u>4,876</u>	<u>6,397</u>	<u>10,794</u>

26. Summary Financial Results

The relevant indices recording DGT's financial performance from FYs 1967 through 1973 are given below. The corresponding appraisal estimates are shown for FYs 1967 through 1971. Further details are given in Annex 2.

<u>FY</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972^{1/}</u> (six months)	<u>1973</u>
<u>Net operating income - NT\$ million</u>							
Appraisal estimate	278	327	365	405	420	-	-
Actual	329	453	493	633	776	411	1,345
<u>Rate of return - %</u>							
Appraisal estimate	14.5	14.0	13.2	12.3	10.1	-	-
Actual	17.2	22.3	20.9	20.0	18.2	15.6	20.7
<u>Operating ratio - %</u>							
Appraisal estimate	68	67	68	69	72	-	-
Actual	64	59	62	63	58	66	58
<u>Debt/Equity ratio</u>							
Appraisal estimate	12/88	15/85	17/83	17/83	15/85	-	-
Actual	9/91	8/92	10/90	8/92	8/92	7/93	9/91
<u>Current ratio - times covered</u>							
Appraisal estimate	4.5	3.7	2.8	2.6	2.6	-	-
Actual	6.3	4.1	5.1	3.2	4.0	4.2	4.6
<u>Debt service coverage - times</u>							
Appraisal estimate	11	7	6	5	5	-	-
Actual	16	14	14	9	11	14	13

Although there was an 18 to 24 months delay in the execution of the enlarged Bank-financed project, the financial results from DGT's operations throughout the construction period of the project considerably exceeded those forecast at the time of the appraisal; DGT's financial position has remained consistently strong and has exceeded expectations.

27. Insurance

DGT does not carry insurance against major losses on its fixed assets resulting from fire, typhoons, earthquakes or other catastrophes. In side letter no. 6 (dated August 2, 1967) to the Loan Agreement, the Government has agreed to indemnify DGT for losses exceeding NT\$ 1,500,000.

^{1/} FY changed from calendar year to year ending June 30.

28. Auditors

DGT's accounts, by law, are subject to audit by the Ministry of Audit. The procedure has not proved entirely satisfactory and it would have been proposed that DGT employ independent auditors if a further Bank loan had materialized.

29. Other Points and Special Features

The project has been most satisfactorily completed. No further inventory of the project is necessary.

Public Utilities Department

April 22, 1974

CHINADIRECTORATE GENERAL OF TELECOMMUNICATIONS (DGT)Loan 506-CHABank Financed ProjectPROJECT AS APPRAISED - ESTIMATED COST

	Foreign Exchange US\$	Local Cost NT\$	Total NT\$	Cost US\$
	-----expressed in millions-----			
Exchange facilities	13.25	1,192	1,722	43.05
Subscriber toll dialing	1.70	36	104	2.60
Training center	0.15	23	29	0.72
Administration & consultants	0.30	56	68	1.70
Contingencies	1.60	20	84	2.10
	<u>17.00</u>	<u>1,327</u>	<u>2,007</u>	<u>50.17</u>
	----- (US\$ 1 = NT\$ 40.0) -----			

REVISED PROJECT - ESTIMATED AND FINAL COST

	Estimated Costs			Final Costs ^{1/}		
	Foreign Exchange IBRD Loan -----US\$-----	Other -----	Local Cost NT\$	Foreign Exchange IBRD Loan -----US\$-----	Other -----	Local Cost NT\$
	-----expressed in millions-----					
Exchange facilities	10.800	2.30	1,710.5	11.07	3.56	1,485.8
Subscriber toll dialing	1.020	0.06	66.7	1.03	0.06	58.4
Training center	0.288	0.10	18.9	0.26	0.04	20.5
Microwave & carrier facilities	-	1.05	22.2	-	1.00	23.9
Administration & consultants	0.112	-	45.0	0.14	-	160.1
Contingencies	<u>0.280</u>	<u>-</u>	<u>20.0</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total	<u>12.500</u>	<u>3.51</u>	<u>1,883.3</u>	<u>12.50</u>	<u>4.66</u>	<u>1,748.7</u>
Total Cost	(-----US\$ 63.1-----)			(-----US\$ 60.8-----)		
	(-----NT\$ 2,524-----)			(-----NT\$ 2,437-----)		
	(US\$ 1 = NT\$ 40.0)			(US\$ 1 = NT\$ 40.10)		

1/ Owing to the need to allocate local cost items the final costs may be subject to substantial error (see para. 20).

CHINA

DIRECTORATE GENERAL OF TELECOMMUNICATIONS (DGT)

Loan 506-CHA

Financial Statistics - FYs 1967 through 1973
(millions of new Taiwan dollars)

Year ending:	December 31, 1967		December 31, 1968		December 31, 1969		December 31, 1970		December 31, 1971		June 30, 1972*	June 30, 1973
	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Actual	Actual
	Estimate		Estimate		Estimate		Estimate		Estimate		(six months)	
COMPARISON OF ESTIMATED AND ACTUAL STATEMENTS OF INCOME												
Net operating revenues	868	916	1,006	1,116	1,153	1,304	1,323	1,688	1,518	2,131	1,207	3,193
Total operating expenses	590	586	679	663	788	811	918	1,055	1,098	1,355	795	1,847
Net operating income	278	329	327	453	365	493	405	633	420	776	412	1,347
Rate of return	14.5%	17.2%	14.0%	22.3%	13.2%	20.9%	12.3%	20.0%	10.1%	18.2%	15.6%	20.7%
Operating ratio	68%	64%	67%	59%	68%	62%	69%	63%	72%	58%	66%	58%
COMPARISON OF ESTIMATED AND ACTUAL BALANCE SHEETS												
Net plant in service	1,995	1,967	2,683	2,086	2,830	2,615	3,739	3,687	4,619	4,846	5,773	7,230
Net current assets	725	1,133	569	1,255	466	1,299	394	1,117	370	1,524	1,574	2,784
Total assets	3,789	3,874	4,431	4,830	5,160	5,737	5,836	7,019	6,405	8,570	9,288	12,394
Total equity	3,023	3,073	3,445	3,915	3,912	4,773	4,445	5,836	5,043	7,122	7,811	10,005
Total long-term debt	407	337	603	355	792	509	921	480	869	588	609	1,045
Total liabilities	3,789	3,874	4,431	4,830	5,160	5,737	5,836	7,019	6,405	8,570	9,288	12,389
Debt/equity ratio	12/88	9/91	15/85	8/92	17/83	10/90	17/83	8/92	15/85	8/92	7/93	9/91
Times current liabilities covered by current assets	4.5	6.3	3.7	4.1	2.8	5.1	2.6	3.2	2.6	4.0	4.2	4.6
COMPARISON OF ESTIMATED AND ACTUAL CASH FLOW STATEMENTS												
Internal cash generation	459	556	523	715	592	784	670	1,013	744	1,191	640	1,951
Total borrowings	183	134	240	18	240	197	200	76	40	196	60	540
Connection fees and subscribers' deposits	213	250	224	396	252	483	305	602	353	761	421	1,285
Total sources of funds	855	940	987	1,129	1,084	1,464	1,175	1,691	1,137	2,148	1,121	3,776
Construction program	902	476	996	860	1,015	1,168	1,038	1,534	925	2,029	1,018	2,195
Debt service	42	34	74	53	92	56	122	113	146	110	46	151
Payments to Government	66	76	73	96	80	129	87	136	90	172	192	99
Increase (decrease) in working capital	(155)	354	(156)	120	(103)	111	(72)	(112)	(24)	(163)	(135)	1,319
Total application of funds	855	940	987	1,129	1,084	1,464	1,175	1,691	1,137	2,148	1,121	3,764
Times debt service covered by internal cash generation	11	16	7	14	6	14	5	9	5	11	14	13

*FY changed from calendar year to year ending June 30.

OFFICE MEMORANDUM

TO: Mr. M. Shoaib, Vice President

DATE: February 4, 1975

FROM: C. R. Willoughby, OED *CRW*

SUBJECT: Performance Audit Report on China Telecommunications Project

I am attaching for your approval our Performance Audit of the China Telecommunications Project supported by Loan 506-CHA of 1967. The report has been revised in light of useful comments provided by the Central Projects Staff, the East Asia and Pacific Regional Office, and China's Directorate General of Telecommunications.

Attachment

cc: Mr. W. C. Baum
Mr. B. Bell

To

Mr. ~~Knapp~~

Shoaib
5 Feb

OK

[Signature]

To

Mr. Willoughby

Shoaib
6 Feb

FEB 6 1975



DIRECTORATE GENERAL OF TELECOMMUNICATIONS

MINISTRY OF COMMUNICATIONS
REPUBLIC OF CHINA

CABLE ADDRESS: GENTEL TAIPEI
P. O. BOX NO. 84, TAIPEI, TAIWAN, CHINA
TELEX: 21733 TELEPHONE: 330103

Ref. SD-63-397

November 6, 1974

Mr. Christopher R. Willoughby
Director, Operations Evaluation Dept.
International Bank for Reconstruction
and Development
1818 H Street, N. W.
Washington, D. C. 20433
U. S. A.

Dear Sir,

Re: China Telecommunications Project (Loan 506-CHA)

This is to acknowledge receipt of your letter dated October 10, 1974 and the enclosed draft of the Performance Audit of China Telecommunications Project. Your letter to our Minister of Communications H.E. Henry Kao has also been noted and duly replied.

I am pleased to inform you that, after a careful review of the Performance Audit, we find it very well prepared and justified. The content of the report and the figures therein are in conformity with those in our records. It is, therefore, fully agreeable to us.

May I take this opportunity to convey to you on behalf of my Directorate, as a Borrower, my heartfelt thanks and gratitude for what the Bank has done to us in bringing the project to its successful completion. The smooth completion of the project, after having almost doubled its projected capacity increase in the installation of automatic telephones, has contributed greatly to the rapid service growth in the past year.

If there is any additional information you may wish to have in your report to the Bank's Executive Directors in connection with this project, please don't hesitate to contact us. We stand ready to reply at any time.

With best regards,

Sincerely yours,

Hien-chee Fang
Director-General

cc: MOC
MOF
ECO/W

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ECO/M
MOE
CC: MOC

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1974 NOV 11 PM 4:06
INCOMING MAIL UNIT

DIRECTOR-GENERAL
HIGH-SPEED RAIL

Sincerely yours,

With best regards,

reply at any time.
Project, please don't hesitate to contact us. We stand ready to
your report to the Bank's Executive Directors in connection with this
If there is any additional information you may wish to have in

best level.
telephones, has contributed greatly to the rapid service growth in the
country its projected capacity increase in the installation of automatic
completion. The smooth completion of the project, after paying almost
the Bank has done to us in providing the project to its successful
Directorate, as a borrower, my heartfelt thanks and gratitude for what
May I take this opportunity to convey to you on behalf of my

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Performance Audit, we find it very well prepared and justified. The
I am pleased to inform you that, after a careful review of the

H.E. Henry Kao has also been noted and duly replied.
communications project. Your letter to our Minister of Communications
1974 and the enclosed draft of the Performance Audit of China Telecom-
This is to acknowledge receipt of your letter dated October 10,

Re: China Telecommunications Project (Loan 200-CHN)

Dear Sir,

U. S. A.
Washington, D. C. 20533
1818 H Street, N. W.
and Development
International Bank for Reconstruction
Director, Operations Evaluation Dept.
Mr. Christopher B. Middleton

Ref: 2D-03-30A

November 6, 1974

TELEX: 51333 TELEPHONE: 230103
P. O. BOX NO. 84, TAIPEI, TAIWAN, CHINA
CABLE ADDRESS: CENTER TAIPEI

REPUBLIC OF CHINA
MINISTRY OF COMMUNICATIONS

DIRECTORATE GENERAL OF TELECOMMUNICATIONS



ROUTING SLIP		DATE <i>Oct 23 '74</i>	
NAME		ROOM NO.	
<i>Mr Israel</i>			
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<i>② CW</i>			
<i>Mr Israel</i>			
APPROPRIATE DISPOSITION	NOTE AND RETURN		
APPROVAL	NOTE AND SEND ON		
COMMENT	PER OUR CONVERSATION		
FOR ACTION	PER YOUR REQUEST		
INFORMATION	PREPARE REPLY		
INITIAL	RECOMMENDATION		
NOTE AND FILE	SIGNATURE		
REMARKS			
<i>We must discuss how to handle the comments. Send them to Wellenius or may be best to leave the China ones until his return.</i> <i>I think we should send them to him and get his reaction as soon as possible.</i>			
FROM <i>CW</i>		ROOM NO.	EXTENSION

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MINISTRY OF COMMUNICATIONS
REPUBLIC OF CHINA
TAIPEI, TAIWAN, CHINA

TELEPHONE: 23901

CABLE ADDRESS "CHIAOTUNGPU"

November 4, 1974

Mr. Christopher R. Willoughby
Director, Operations Evaluation Dept.
International Bank for Reconstruction
and Development
1818 H Street, N.W.
Washington, D.C. 20433
U. S. A.

Dear Mr. Willoughby,

Re: China Telecommunications Project (Loan 506-CHA)

Thank you for your letter of October 10, 1974 and the enclosed draft of the Performance Audit of our captioned project.

Having gone through your Performance Audit, we find it a fair and just evaluation of our implementation of the project and your Bank's performance of the loan financing. All the figures and accounts in the reports have been checked and are in compliance with those in our own books and records.

I am pleased to mention here that the successful completion of the project has also attracted the special attention of our Government and is lauded as a good example for the implementation of all IBRD loans financed projects in our country.

I wish to take this opportunity to express to you and your associates in the Bank my heartfelt appreciation and thanks for the kind assistance and the warm support you have accorded us in our implementation of the project. Without such assistance and support, the project would not have been so successful. The successful completion of the project has in turn made possible the record breaking growth of our telephone service in 1973, at as high as 27% which claims also the highest in the whole world.

I am also pleased to inform you that with the continued effort of our Directorate General of Telecommunications and the assistance of the Export-Import Bank of the United States, the system growth unbalance as pointed out in the conclusion of your Performance Audit has been greatly improved as a result of our accelerated expansion of long distance telephone facilities and the STD service has been introduced to 21 major dial offices, enabling 88.2% of our telephone subscribers to dial each other through the STD network. If you wish have any

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1203

Mr. Willoughby

- 2 -

November 4, 1974

additional information on the project implementation and the telecommunication services in our country as a whole, please don't hesitate to contact us.

With best regards,

Sincerely yours,



Henry Y. S. Kao
Minister of Communications

CC: Minister Martin Wang,
Embassy of the Republic of China
Washington, D.C.
MOF

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Mr. Willoughby

- 2 -

November 4, 1974

Additional information on the project implementation and the telecommunication services in our country as a whole, please don't hesitate to contact us.

With best regards,

Sincerely yours,



Henry Y. S. Kao
Minister of Communications

MOF
Washington, D.C.
Embassy of the Republic of China
CC: Minister Martin Wang,

RECEIVED
1974 NOV 19 AM 11:37
COMMUNICATIONS
SECTION

OFFICE MEMORANDUM

TO: Mr. Christopher Willoughby

DATE: October 21, 1974

FROM: Warren C. ^{WZ}BaumSUBJECT: Performance Audit of China Telecommunications Project

Please see the comments of Messrs. Armstrong and Dickenson on this Audit. I have gone over the audit in question and tend to agree with them that the criticisms are overstated. I would be glad to discuss this with you if you wish.

I expect to be getting further comments on the audit of the First Malaysia Telecommunications Project later this week.

WCBaum:rma

OFFICE MEMORANDUM

TO: Mr. Herman G. van der Tak

DATE: October 17, 1974

FROM: W. J. Armstrong

SUBJECT: 1. Performance Audit of China Telecommunications Project (Loan 506-CHA)
2. Performance Audit of First Malaysia Telecommunications Project (Loan 560-MA)

1. Reading these two reports together demonstrates the difficulty of maintaining an even prospective and a sense of proportion in the audits. The Malaysians are given low marks on several counts, especially procurement involving contracts of around \$100,000 equivalent. On the other hand, the real problems we had dealing with the Chinese on procurement of multimillion dollar contract is passed over lightly. One aspect was the pressure put on the consultants to agree to procedures and judgments unacceptable to the Bank.

2. In my view, the Malaysia Project was the one with the fewest problems and China with the most.

3. It is true that Malaysia never submitted progress reports. They prepare very elaborate reports which the Bank did not want. We could never convince them to prepare a summary report for us. However, since we knew the information was available and because we were not the major lender, we did not suspend disbursements. I think there are also projects in other sectors where we do not receive reports, where no reports are prepared locally; yet we haven't suspended disbursements in these cases either.

4. I object to phrases relating to gross errors in forecasting (China - page 14) when I don't believe today that we have any better way of estimating unsatisfied or latent demand. The same applies to the use of over estimation of costs. The cost estimate was about half of the actual prices for similar items purchased a short time before. There was no basis to expect that bids would finally come in at half the estimate.

5. I leave comments on further details to the sector department. But my feeling is that both reports should be rewritten and emphasis put in the right places.

WJArmstrong:lp

1138
10/23

OFFICE MEMORANDUM

Messrs. B. Wellenius and C.R. Willoughby
TO: (through Mr. C. P. Vasudevan)
C. R. Dickenson

DATE: October 10, 1974

FROM:

SUBJECT: CHINA - Telecommunications Project Performance Audit

Thank you for the opportunity of seeing the draft project performance audit.

As a general comment on the report, I think that the Bank's position is initially presented rather unfavorably. Although this is in part corrected later in the report where the changes in demand are related to the changes in GNP which could not have reasonably been foreseen at the time of appraisal, it would, I feel, have been fairer to all concerned and more adequately have explained how the increase in local plant provisions could be justified, if right at the outset you had indicated that over the project period there was a major increase in GDP and a change in emphasis from agriculture to manufacturing, etc., with a consequent considerable increase in the demand for the various services.

Turning now to specific points:

Page 2/3 and page 14 - We are still I believe, committed to international bidding (Guidelines, para. 1.1). We have made certain concessions for standardization reasons but these are normally related to the original bids being on an international basis (Sector Working Paper, page 18).

Page 3 - The provision of satellite communications - In addition to the rapid change in demand, one should appreciate that at the time in question major changes in cost were taking place in the provision of satellite facilities. Initially one was facing a cost per station of up to US\$8 million, the initial satellite ground station provided in China cost around US\$6 million, and present day cost is about US\$3.5 million. Also, of course, the space segment costs per circuit have shown a reduction to about 50% of the original figures. In the light of all these circumstances, it may well be that the Bank were correct in dismissing the proposals to put in a ground satellite station at the time the issue was raised.

Page 4 - Switching equipment costs - Here again, in fairness to the staff appraising the project, it should I think be indicated that the estimated cost of switching equipment, including long distance facilities, was realistic as related to the prices being bid at the time in international competition. The prices actually bid were abnormally low and were probably in part accounted for by the special interest of both the Japanese and Americans in China and the development of local production there.

Page 5/6 and page 13/14 - Procurement by and for DGT is handled through the Central Trust of China who have extensive experience in Bank procedures so it would be difficult to accept that the problem might have resulted from ignorance and been avoided if we had been more explicit on the question of clarification. In addition, although we have no written evidence to prove it, we understand that both DGT and their consultants were quite clear that the Bank was opposed to any action going beyond clarification and in fact

Messrs. Wellenius & Willoughby

October 10, 1974

the consultants warned DGT that they doubted whether the Bank, when fully informed, would be prepared to accept what they were doing. DGT, however, on the basis of previous experience under an Exim Bank loan, considered they would be able to get away with the changes which went far beyond clarification, although they took the precaution of requiring all bidders to agree that they accepted the procedures which were followed in the adjustment of bids. In the circumstances I think the criticism of the Bank is not fully justified. Also, on the question of delaying the project, this was not wholly due to procurement and there were major delays partly due to site problems in carrying out the building program, certain of which still existed after the bulk of equipment had been delivered.

Page 8 - Long distance call growth forecast - The comments which have already been made regarding the GNP are pertinent here. The original consultants' growth forecast contained in their report was 12% per annum, which presumably the mission increased to 15% per annum. Further increases under the circumstances existing at the time and in the light of the professional opinion of the consultants, would hardly have been prudent. In any case, it is appropriate for telephone entities to maintain records of traffic growth and from time to time adjust their development plans to meet changed circumstances.

Page 2 - In addition to the tropospheric scatter link with the Philippines, Taiwan's main international outlet was a similar link to Hong Kong. This linked into the submarine cable network and gave first class service to the rest of the world.

Page 13 - The section on Bank performance should be reviewed in the light of the comments which have already been made.

Page 14 - The question of retroactive financing of consultants services was cost wise a very minor factor and our failure to provide this finance had no significant effect on the project. As previously indicated, the references to growth forecasts and rejection of the satellite station are not considered appropriate. The reference to poor quality circuits is also not factual as related to the international facilities and the majority of the long distance network. It would perhaps be appropriate to indicate under "Conclusions" the excellent relationship and continuing consultation which existed between the Borrower and the Bank throughout the period of execution of the project and which in no small way contributed to its success.

Page 15 - The references to the Bank's shortcomings in relation to procurement, technological change and forecasting would seem ill-founded.

cc: Messrs. Rovani, Howell

CRDickenson/ms

ROUTING SLIP		DATE Oct 10 74	
NAME		ROOM NO.	
Mr W. W. W. W.		61050	
The Israel			
APPROPRIATE DISPOSITION		NOTE AND RETURN	
APPROVAL		NOTE AND SEND ON	
COMMENT		PER OUR CONVERSATION	
FOR ACTION		PER YOUR REQUEST	
INFORMATION		PREPARE REPLY	
INITIAL		RECOMMENDATION	
NOTE AND FILE		SIGNATURE	
REMARKS Herein is a memo for Mr CR. Dickenson commenting on the draft of Project Performance audit of loan 506-CHT for China Telecom. These comments were finalized by Mr Dickenson after discussing with me as I agree with these comments. If further elucidation is required I suggest that we may discuss these with Mr Wellenius or your staff.			
FROM		ROOM NO. EXTENSION	
C. P. VASUDEVAN		11	

OFFICE MEMORANDUM

TO: Messrs. B. Wellenius and C.R. Willoughby
(through Mr. C. P. Vasudevan)
FROM: C. R. Dickenson
SUBJECT: CHINA - Telecommunications Project Performance Audit

DATE: October 10, 1974

Thank you for the opportunity of seeing the draft project performance audit.

As a general comment on the report, I think that the Bank's position is initially presented rather unfavorably. Although this is in part corrected later in the report where the changes in demand are related to the changes in GNP which could not have reasonably been foreseen at the time of appraisal, it would, I feel, have been fairer to all concerned and more adequately have explained how the increase in local plant provisions could be justified, if right at the outset you had indicated that over the project period there was a major increase in GDP and a change in emphasis from agriculture to manufacturing, etc., with a consequent considerable increase in the demand for the various services.

Turning now to specific points:

Page 2/3 and page 14 - We are still, I believe, committed to international bidding (Guidelines, para. 1.1). We have made certain concessions for standardization reasons but these are normally related to the original bids being on an international basis (Sector Working Paper, page 18).

Page 3 - The provision of satellite communications - In addition to the rapid change in demand, one should appreciate that at the time in question major changes in cost were taking place in the provision of satellite facilities. Initially one was facing a cost per station of up to US\$8 million, the initial satellite ground station provided in China cost around US\$6 million, and present day cost is about US\$3.5 million. Also, of course, the space segment costs per circuit have shown a reduction to about 50% of the original figure. In the light of all these circumstances, it may well be that the Bank were correct in dismissing the proposals to put in a ground satellite station at the time the issue was raised.

Page 4 - Switching equipment costs - Here again, in fairness to the staff appraising the project, it should I think be indicated that the estimated cost of switching equipment, including long distance facilities, was realistic as related to the prices being bid at the time in international competition. The prices actually bid were abnormally low and were probably in part accounted for by the special interest of both the Japanese and Americans in China and the development of local production there.

Page 5/6 and page 13/14 - Procurement by and for DGT is handled through the Central Trust of China who have extensive experience in Bank procedures so it would be difficult to accept that the problem might have resulted from ignorance and been avoided if we had been more explicit on the question of clarification. In addition, although we have no written evidence to prove it, we understand that both DGT and their consultants were quite clear that the Bank was opposed to any action going beyond clarification and in fact

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OCT 11 1974

Messrs. Wellenius & Willoughby

October 10, 1974

the consultants warned DGT that they doubted whether the Bank, when fully informed, would be prepared to accept what they were doing. DGT, however, on the basis of previous experience under an Exim Bank loan, considered they would be able to get away with the changes which went far beyond clarification, although they took the precaution of requiring all bidders to agree that they accepted the procedures which were followed in the adjustment of bids. In the circumstances I think the criticism of the Bank is not fully justified. Also, on the question of delaying the project, this was not wholly due to procurement and there were major delays partly due to site problems in carrying out the building program, certain of which still existed after the bulk of equipment had been delivered.

Page 8 - Long distance call growth forecast - The comments which have already been made regarding the GNP are pertinent here. The original consultants' growth forecast contained in their report was 12% per annum, which presumably the mission increased to 15% per annum. Further increases under the circumstances existing at the time and in the light of the professional opinion of the consultants, would hardly have been prudent. In any case, it is appropriate for telephone entities to maintain records of traffic growth and from time to time adjust their development plans to meet changed circumstances.

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cc: Messrs. Rovani, Howell

October 10, 1974

Mr. Hien-Chee Fang
Director General
Directorate General of
Telecommunications
Ministry of Telecommunications
P.O. Box 84
Taipei, Taiwan
Republic of China

Dear Mr. Fang:

Re: China Telecommunications Project (Loan 506-CHA)

One year ago our management directed that we prepare "performance audits" shortly after the completion of loan/credit disbursements on all projects assisted by the World Bank and IDA. The purpose of these performance audits is to evaluate the extent to which project objectives, as stated in the appraisal reports, were achieved and to assess the effectiveness of the Bank's role during project preparation and implementation, the main focus being on what the Bank can learn from past experience. Our work in this respect is greatly helped by the systematic preparation, for loans/credits fully disbursed in recent months, of project completion reports by the Bank's Regional Projects Departments.

I attach for your comments a copy of the first draft of the Performance Audit of China Telecommunications Project for which Loan 506-CHA was fully disbursed in August 1973. This performance audit is based on a review of the substance of a project completion report prepared by the Bank's Public Utilities Department in April 1974; the completion report was studied in the light of other relevant reports and important material from the Bank files as well as discussions with some of the Bank staff who had been involved with the project.

We now intend to finalize this performance audit and submit it to the Bank's Executive Directors in mid-December. We would therefore appreciate it if any comments you may have could reach us by November 20. In accordance

Mr. Hien-Chee Fang

- 2 -

October 10, 1974

with standard procedures for this type of study, we do not plan to send a mission to discuss the audit report. However, we are prepared to send one should you so desire.

With best regards.

Sincerely yours,

Christopher R. Willoughby
Director
Operations Evaluation Department

Attachment

cc: Mr. Henry Kao
Minister of Telecommunications
Ministry of Telecommunications
P. O. Box 84
Taipei, Taiwan
Republic of China

Minister Martin Wong
Embassy of the Republic of China
Washington, D. C.

October 10, 1974

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Minister of Telecommunications
Ministry of Telecommunications
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Taipei, Taiwan
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Mr. Henry Kao

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October 10, 1974

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Christopher R. Willoughby
Director
Operations Evaluation Department

Attachment

cc: Minister Martin Wong
Embassy of the Republic of China
Washington, D. C.

Mr. Hien-Chee Fang
Director General
Directorate General of
Telecommunications
Ministry of Telecommunications
P. O. Box 84
Taipei, Taiwan
Republic of China

CRWilloughby:tdj

October 10, 1974

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Embassy of the Republic of China
Washington, D. C.

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October 9, 1974

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With best regards.

Sincerely yours,

Christopher R. Willoughby
Christopher R. Willoughby
Director
Operations Evaluation Department

Attachment

cc: Mr. Henry Kao
Minister of Telecommunications
Ministry of Telecommunications
P.O. Box 84
Taipei, Taiwan
Republic of China

Mr. Hien-Chee Fang
Director General
Directorate General of
Telecommunications
Ministry of Telecommunications
P.O. Box 84
Taipei, Taiwan
Republic of China

OFFICE MEMORANDUM

Copies (1) Mr. Israel
(2) Mr. Morvichi
x file
done
10/10/74
C

TO: Mr. C. R. Willoughby, Director, OED
DATE: October 8, 1974

FROM: F. H. Howell *F.H.H.*

SUBJECT: Project Performance Audit of China Telecommunications Project
(Loan 506-CHA)

I understand you will be receiving some observations on your September 30 draft of this Performance Audit directly from Mr. Dickenson, who has been quite closely associated with the project during its execution. I have not, so I really have little to contribute.

Your report is on the whole quite laudatory of both the "Bank" and the borrower. I therefore hope you will not think I am captious in suggesting that where this and other Performance Audits referred to "the Bank", all of your audience will understand that you mean this to be the whole of the Bank. I say this because the Performance Audit of necessity treats of the relationships between the Bank and the borrower down on the operating level, and it is easy to assume that "the Bank" really means the Project's appraisal or supervisory team, while procurement policy, for example, clearly involves the whole Bank.

In reporting on the contretemps involving the re-bidding for switching equipment (page 5 et seq), your report suggests that Bank staff (not "the Bank") could have gone further in making explicit to the borrower the distinction between clarification and substantive change. I think the Chinese authorities were probably aware of this distinction, as they were used to procurement both under U.S. aid programs and their own fairly rigid government agency, Central Trust of China.

FHHowell:ls

cc: Messrs. Bell
Kirmani
Loos
Rovani/Vasudevan
Sheehan
Dickenson

OCT 9 1974

OFFICE MEMORANDUM

TO: Mr. W. Baum, Vice President, Projects
Mr. B. Bell, Vice President, East Asia and Pacific
DATE: September 30, 1974
FROM: C. R. Willoughby, Director, OED CRW
SUBJECT: Project Performance Audit of China Telecommunications Project
(Loan 506-CHA)

I attach a copy of the draft of a Project Performance Audit of China Telecommunications Project (Loan 506-CHA). This consists of an audit memorandum prepared by our Department to which is attached the corresponding Project Completion Report (excluding the names of authors and any sections that would be inappropriate for circulation outside the Bank). I would appreciate any comments you may have, and we would expect to be able to take them into account in finalization of the report if they are provided before October 30, 1974.

On October 7, we expect to send the draft report to China's Directorate General of Telecommunications for their comments.

Attachment

cc: Messrs. Shoaib
Kirmani
Rovani
Votaw
van der Tak
Vergin
Howell
Sheehan
Loos
Vasudevan
Israel

AI:ch

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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

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WBG ARCHIVES

PROJECT PERFORMANCE AUDIT

OF

CHINA TELECOMMUNICATIONS PROJECT

September 30, 1974

Operations Evaluation Department

PROJECT PERFORMANCE AUDIT MEMORANDUM

CHINA TELECOMMUNICATIONS PROJECT - Loan 506-CHA

1. Introduction

This memorandum presents the results of an audit of the project supported with Loan 506-CHA of August 1967, the only telecommunications project in the Republic of China with which the Bank has been associated. It is based on the project's Appraisal Report and the attached Completion Report, complemented and substantiated by reviewing Bank files, progress reports, annual reports, financial statements and audited accounts, and by discussion with relevant Bank officials.

2. The Project and the Loan

Contacts leading to the request for a Bank loan to cover the foreign exchange requirements of China's 1967-1971 telecommunication expansion program began in mid-1965. An appraisal mission visited Taiwan in September 1966 and the appraisal report is dated June 30, 1967. The loan, for US\$ 17 million equivalent, was signed on August 2, 1967. The borrower was the Republic of China's Directorate General of Telecommunications (DGT) and the guarantor was the Government of the Republic of China. The loan became effective on September 29, 1967.

The project which the loan helped finance was part of the DGT's 1967-1971 program to modernize and expand the national telephone services. Its main components were initially i) installation of approximately 118,000 lines of local automatic switching equipment in Taipei, Keelung, Taichung and Kaohsiung, including buildings and associated works, ii) installation of switching equipment for automatic subscriber trunk dialing (STD) in the three

primary toll centers at Taipei, Taichung and Kaohsiung, iii) partial replacement and substantial expansion of the local cable networks, iv) expansion of the existing microwave network, v) installation of a telecommunication training center with capacity for 200 students, and vi) assistance of consultants in planning and executing the expansion program.

In September 1969 the Bank approved a change in description of the project, allowing a 75% increase in the purchase of switching equipment for local exchanges (from 118,000 to 207,000 lines) since actual bid prices had proved to be well below appraisal estimates. The closing date, originally set for October 31, 1972, was changed to March 31, 1974. In addition, the lower actual costs resulted in a reduction of the loan to US\$ 12.5 million. The loan was completely disbursed by August 1973, and the project completed by December 1973. The total revised project reached a final cost of US\$ 60.8 million equivalent.

Several issues were discussed during appraisal and negotiations. The Bank stated that only international competitive bidding was acceptable and that direct negotiations with suppliers could not be used as a basis for Bank financing. In connection with the expansion of the existing microwave system, which China wanted to negotiate directly and be financed by the loan, DGT agreed to go to international bidding in order to include this item in the project. The Bank suggested that DGT should negotiate directly with the original supplier, in the better interest of standardization, and secure other sources of financing. Finally, DGT dropped the subject (which anyhow amounted to only 6% of the proposed loan and about 2% of the total project) and financed it from its own resources. In the particular case of the China Project, the Bank's position did not damage the project's progress. But situations can arise where strict

adherence to international bidding may, in fact, distort substantially an existing telecommunications system and result in increased indirect costs in training and maintenance. The Bank's present greater flexibility is thought, in this light, to be welcome for telecommunication projects.

Also in the early stages of negotiation, China expected to include under Bank financing a first satellite earth station to improve international communication facilities. The Bank dismissed the subject arguing that China's existing international traffic was small and that it was clearly uneconomic to go to satellite circuits. China dropped the item from the loan request, but apparently pursued it elsewhere, for by 1969 it had its first station in commercial service -- which means that the feasibility studies (nonexistent at the time of the Bank's refusal) and a firm contract for the station must have been completed roughly at the time the loan agreement with the Bank was signed. We will return to this matter in section 7.

Main loan covenants required that a) DGT's fixed payment to the Government should not be increased above the current level of 25% of DGT's net income; b) tariffs should be adjusted to achieve a rate of return of at least 10% on average net fixed assets; c) the purchase contract for the expansion of the existing microwave system should be submitted to the Bank for review and comments before concluding it; d) the high US\$ 350 connection fee for new telephone subscribers should not be reduced, and e) new debts (mainly for the satellite earth station and a new microwave system) should be backed up by a debt coverage ratio of at least 2.0 during the preceding 12 months.

3. Project Implementation

The project's initial estimated total cost was US\$ 50.2 million equivalent, of which the Bank would have financed the whole foreign exchange component of US\$ 17.0 million (34%). The estimates for the revised project (1969) were US\$ 63.1 million equivalent, of which US\$ 16.01 million were in foreign exchange, with the reduced Bank's loan covering US\$ 12.5 million. The final cost, as approximately assessed by DGT at the end of 1973, was US\$ 60.8 million equivalent, with a foreign exchange component of US\$ 20.16 million. The difference between the latter figure and the Bank loan was covered by DGT out of currency provided by China's Foreign Trade Board.

A breakdown of the cost figures was as follows: local switching and cable plant US\$ 51.7 m (85%), STD switching US\$ 2.6 m (4.3%), microwave US\$ 1.6 m (2.6%), training US\$ 0.8 (1.3%) and administration and consultants US\$ 4.1 m (6.8%). The loan contributed to each of these components except the expansion of the microwave network. These figures mean that the original project was expected to cost US\$ 425 per telephone line, whereas the actual cost was only US\$ 292 per line, a 31% reduction in spite of the revaluation of the Japanese yen, which affected the cost of a large part of the imported equipment. The original estimates were based on a unit cost for the switching equipment of US\$ 92 per line, but the first tender yielded a lowest bid of US\$ 65 per line and a re-tender brought about a basic cost of US\$ 52 per line for 118,000 lines and a cost of US\$ 44 per line for the total option (177,000 lines). This is a unit cost only 48% of the initial estimate. It is this fact which brought about a 75% increase in project size with only a 21% increase in total project cost and a simultaneous 27% reduction in Bank financing. These large differences

between estimated and actual unit prices in the switching equipment are explained by the practice, of at least some suppliers, to reduce the prices in the first contract and rely on subsequent negotiated expansions to make up the difference.

If the figure of US\$ 52 per line had been used instead of the original US\$ 92, the total estimated cost of US\$ 50.2 million would have been reduced to US\$ 45.5 million (91%) but the foreign exchange requirements would have dropped from US\$ 17.0 million to only US\$ 12.3 million (72%).

The original schedule of construction was from June 1968 to December 1971, a period of 3-1/2 years. Re-tendering and expansion of the project shifted the construction to July 1968 - December 1973 (5-1/2 years), a two-year delay. DGT did take interim measures to attend demand at the most pressing points; once deliveries finally started, DGT showed competence to proceed with installations at a very rapid pace with a high standard of engineering and labor.

Good coordination was kept between the progress of Bank and non-Bank-financed but related parts of the system. Shortage of trunk circuits, to which we will refer in section 6, brought about the advancement of a new project to construct a new microwave network in addition to the existing one.

A significant difficulty occurred when the bids for the switching equipment (the largest component of the project) were evaluated by DGT and its consultant. Two-stage bid evaluation was proposed by DGT and explicitly accepted by the Bank.^{1/} When the technical and management details of the bids were examined, DGT concluded that three of the four bids submitted were not wholly responsive to the specifications. DGT felt it had to request

^{1/} The first stage of this type of bid evaluation deals only with the technical aspects, and the second with price.

the bidders to "revise and improve" their presentations without altering the prices (as yet unopened); the Bank agreed to this as well, expressing that it understood it to be in the sense of a clarification and not a change in bids, as required by the Bank's guidelines for procurement.

Yet when the recommendation of award was submitted to the Bank, three qualified staff independently concluded that at least one of the bids had been substantially re-engineered, that considerable amounts of equipment had been added, and that overall the Bank's rule on clarification of bids without substantive change had been overlooked, thus invalidating the tender from the Bank's viewpoint.

DGT asked for new tenders, which resulted in even lower prices than would have been paid had the first tender been accepted by the Bank. A delay of 1-1/2 years in initial deliveries of equipment ensued, though, and the expanded project was completed two years later than originally scheduled.

During this process, considerable effort had to be devoted by Bank staff to study the situation in great detail, and substantial pressure was exerted by the most affected bidders. The Bank acted entirely in accordance with its current rules on procurement matters. The Borrower not only knew the terms of procurement it had to adhere to, but the Bank at the proper time brought to its attention what turned out to be the critical aspect -- the clarification of the bids.

Yet in retrospect it appears that Bank staff, apparently aware that problems could arise with this "revision and improvement" of the bids, missed the opportunity to go beyond a formal reminder of the rule. They could have insisted more vigorously on the point and explained with some detail what was actually meant by the distinction between "clarification" and "change"

of a bid. By the time re-tendering procedures were being considered, the Bank had reached the view that two-stage evaluation was not acceptable, and the new tender was handled by DGT accordingly and without further difficulties.

4. Impact of the Project

During project implementation, China's telecommunication system grew and improved substantially. The local networks expanded from 113,000 subscribers at the end of 1966 to 487,000 at the end of 1973, a cumulative growth rate of 23% p.a. with 1973 showing a figure as high as 27%. These are remarkably high growth figures by world standards, considering that few countries have ever sustained a growth of more than 15% p.a. With this expansion, the density of telephones (all stations) improved from 1.3 per hundred inhabitants in 1966 to about 4.4 in 1973; the latter level is comparable to those of Colombia, Mexico and Yugoslavia, is about double the density for Asia as a whole (2) but still well below the figures for Israel (20), Japan (32), Australia (34) or Sweden (60).

At the same time, the proportion of telephones connected to automatic local exchanges increased from 75% to 90%, and a new type of telephone set was introduced which improved substantially the quality of communication. The delay in serving new applications, which was of 4 to 6 months in 1966, was reduced to less than one month by 1973, with most areas being served within a fortnight.

The pressure for use of existing plant is still very high: 9.7 calls (local + trunk + international) per telephone (all stations) per day in 1972, well above the rate of other countries which also have more than half their

telephones in businesses (Hungary 2.3, Japan 3.7, South Africa 5.4, Switzerland 1.5, Turkey 2.4). This fact presumably comes from the unusually high connection fee (US\$ 350) which depresses connections demand but does not affect demand for traffic; in fact, the calls per inhabitant per day in China in 1972 were 0.4, well within the range of the other countries with more than 50% business telephones (Hungary 0.2, Japan 1.2, South Africa 0.4, Switzerland 0.8 and Turkey 0.1).

Subscriber trunk dialing became available on several major routes, on which now typically 75% of calls are free from operator intervention (none in 1966). Partly as a result of STD, the number of trunk calls in Taiwan is estimated to have increased by 25% p.a., as compared to the appraised estimate of 15% p.a. This has brought about substantial congestion of the trunk network; its insufficient capacity has prevented STD from becoming extended nationally as fast as expected and a number of local offices with STD possibilities built into them have delayed their cut-over into full automatic trunk operation pending the completion in 1973-1976 of a new microwave network not included in the original project.

The following table summarizes the forecasted and actual growth experienced by the system during 1966-1973. The issue of forecast is further discussed in section 6.

Item	Forecasted	Actual
No. of telephone subscribers - at end of CY73 - growth rate 1966/73	321,000 16% p.a.	487,000 23% (27% in 1973)
No. of trunk telephone calls - FY73 - growth rate 1966/73	67 million 15% p.a.	102 million 25% p.a.
No. of national telegrams - growth rate in FY73	8%	5.3%
No. of international telephone calls - growth rate p.a. 1966/73	15%	32%
No. of international telex paid minutes - growth rate p.a. 1966/73	20%	23%
No. of international telegrams - growth rate p.a. 1966/73	8%	11%

International services were boosted by the inauguration of a satellite earth station in 1969 and a tropospheric scatter link with the Philippines. Some national data services were also initiated in this period.

Thus the quality, quantity and variety of services have all increased, some very substantially, with several of the services growing at a rate well in excess of the original forecast. But some system imbalance, particularly expansion of the capacity of trunk circuits insufficient to match the growth achieved in local plant and associated STD possibilities, has resulted from overly pessimistic initial forecasts.

This project had no specific economic justifications or expectations expressed in the appraisal report nor in file material. No economic assessment is therefore attempted in this audit.

5. Evaluation of the Borrower's Performance

The performance of the Borrower, DGT, was efficient and satisfactory. All loan covenants were adhered to. Annex 2 of the attached PCR shows that all principal financial indicators throughout the period 1967/73 were better than forecasted at appraisal: e.g. the rate of return on net fixed assets varied between 17% and 22%,^{1/} exceeding the forecasted 10-15% range and remaining well above of the 10% minimum stated in the loan agreement. Thus, DGT's financial position has been consistently strong and shows a good prospect beyond completion date.

A substantial institutional improvement in this period was the expansion and relocation of DGT's telecommunication training center (now called "Telecommunication Training Institute") which has residential facilities for 200 students and has provided a wide range of technical and management education at levels ranging from unskilled workmen to college graduates, in some years training over 1,000 students. It has essentially freed the DGT from dependence on foreign training and seems to fulfill amply the expectations put forth in this matter at appraisal time. The performance of the trainees in the actual project implementation suggests that the training in this center is of a very good standard.

^{1/} It has not been possible to establish whether assets have been soundly revalued.

Another significant indicator is the number of DGT employees per thousand telephones, which has dropped from 39 to 30 (or 26, if only the telephone branch staff are counted). This improvement in labor productivity can be expected to continue, since staff growth programmed for 1970/76 is of 11% p.a., and the telephone system is expected to grow by 19% p.a. A figure of 19 telephone staff per thousand telephones can be expected by 1976, well below equivalent figures in most or all other Asian countries and comparable to some European levels.

6. On Forecasting System Growth

The table in section 4 shows that there were wide disparities between some of the actual figures for system growth and those forecasted at appraisal time. The outstanding instances are the growth rates of numbers of subscribers, trunk telephone traffic and of international telephone traffic.

Regarding the figures of numbers of subscribers, there was a margin of more than 50% between actual and forecasted numbers. If only the original project (rather than the 1969 revised version) would have been carried out, there would have been by the end of 1971 a deficit in the order of 100,000 lines or roughly one-half of the lines in service; this would have represented a dramatic deterioration of the supply situation. That it did not happen seems to have been largely due to the fortunately simultaneous overestimation of costs, which after revision of the project allowed a 75% increase in local switching and cable plant to be introduced with only a 21% increase in total project costs.

Trunk traffic rose well beyond expectations, leading to an important shortage of trunk circuits. A new microwave network had to be started, where only expansion of the existing one had been envisaged in the project, resulting in an unbalanced system growth and some subutilization of new equipment, as explained earlier.

Some of the factors that may have led, in this project, to underestimate the growth potential are the following.

At the outset of project implementation, China experienced a large growth in manufacturing (23.3% in 1968, against 13.9% in 1961-1964), public utilities (17.3% vs 11.8%), construction (28% vs 9.8%), number of registered motor vehicles (168% vs 18.2%), and rail and road passenger traffic (10.1% vs 5.3%) and freight (11.2% vs 4.8%); these are all sectors moderately to very strongly related to telecommunication needs. At the same time, sectors which are poor contributors to the demand for telecommunication services grew much slower or even decreased their output, e.g. agriculture (6.1% vs 5.6%) and mining (-0.4% vs 7.1%). In fact, in the late 1960s the contribution of manufacturing to GNP surpassed that of agriculture, industrial activities became quite sophisticated, and overall the economic pattern acquired an unprecedented complexity which brought changes in structure as well as in volume. Structural change, and increased contacts among sectors and across regions, are all factors which can be expected to exert strong pressure on telecommunication services.

Bank staff familiar with the country and the project have expressed their feeling that this major change in the economy had not been foreseen and that the forecasts may not have taken them into account. This view is

supported by the fact that whereas China's Fourth Four-Year Plan (1965-1968) was based on a real GNP growth target of 7% p.a., the average growth rate actually achieved was 10.5% p.a. and this was not the result of accidentally favorable factors which could not have been expected to recur in the future. In 1966, the Bank's own assessment of the economic prospects of China were based on a figure of 7.5% real growth of GNP over the 1965-1968 period, also well below actual figures, even if that assessment recognized that 1965 had shown a real growth of 10% and that the prospects for 1966 were also similarly good. Real GNP increased by 8.6% in 1966, 10.3% in 1967, 9.3% in 1968, 8.7% in 1969, 11.2% in 1970, 11.5% in 1971, 11.0% in 1972 and 12.3% in 1973.

Other factors which may have been omitted from the forecasts are the possible existence in the early 1960s of a substantial unsatisfied demand for telephone connections which emerged only once the system really got moving, and a sufficient allowance for the large impact on the number of trunk calls brought about by the generalization of direct subscriber local dialing and, more significantly, by the introduction of direct subscriber trunk dialing.

7. The Bank's Performance

As a whole, the project was extremely successful. To a considerable extent this is due to the Borrower's technical and managerial competence and to the effective support found in the small number of consultants it needed. The Bank's participation was adequately matched. It does not appear to have given more attention to the project than necessary, yet did provide firm orientation when required by the Borrower or by events.

However, the Bank could have been more forceful on procurement matters and thus eventually have averted the one substantial conflict that developed

in the whole project. Regarding the need for international bidding, it held an exceedingly rigid position which by now fortunately seems to have been superseded. The Bank had a vacillating position regarding retro-active financing of consulting services used in project preparation; in the end, these services were not included in the loan. It also approved system growth forecasts which, in retrospect, were grossly in error, although it is uncertain whether further investigation by the Bank could have revealed these inadequacies at the right time.

Finally, the a priori rejection of the satellite station idea by the Bank can now be seen as unjustified. There was no feasibility study to support its assumption of lack of economic justification, and the argument of low existing traffic did not take into account the vast extent to which this fact was precisely due to the poor quality of available circuits, and overall it failed to foresee imminent, deep and already publicized changes in the engineering and economic practices of international communications. By 1969, China had already its first station in commercial service. With these improved circuits the number of international telephone calls increased by 24% in 1969, by 62% in 1970 and by 57% in 1973, well above the appraised forecasted growth of 15% p.a.

8. Conclusions

Overall the project was a remarkably successful one. This was mainly the outcome of the Borrower's technical and managerial skills.

Large underestimation of telephone connections demand and traffic was coincidental with a large overestimation of some costs, in a way which made it

possible to expand considerably the number of new connections above initial estimates with only a modest increase in overall cost and a reduction of the Bank's loan. Some **system** unbalance did occur, though, affecting the capacity of long distance telephone service so that STD has had to progress at a slower pace than expected, while new bearer systems are built.

The Bank's performance was well matched to the Borrower's competence, and overall it handled the project adequately and with austerity. There were, however, aspects where the Bank could have done better providing stronger guidance to the Borrower on bid evaluation procedures, adopting a sustained position in retroactive financing, having a less rigid attitude on competitive procurement, taking a more positive and well-founded attitude on technological change and, perhaps, being more critical of the forecasting methods and underlying assumptions used by the Borrower in preparing the project.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT COMPLETION REPORT

China - Loan 506-CHA Directorate General of Telecommunications (DGT)

1. The following completion report is based on a visit to China from November 25 to December 3, 1973.
2. Borrower Directorate General of Telecommunications (DGT)
Beneficiary Ministry of Communications
Republic of China
3. Guarantor The Government of the Republic of China
4. Loan Amount Original: US\$ 17 million
Final : US\$ 12.5 million
5. Date Loan Signed August 2, 1967
6. Effective Date September 29, 1967
7. Closing Date Original: October 31, 1972
Final : March 31, 1974
8. Period of Grace Four years
9. Term of Loan 20 years
10. Interest Rate 6% per annum
11. Commitment Charge 3/8 of 1%
12. Amortization October 15, 1971 - October 15, 1987
13. Exchange Rate Appraisal: US\$ 1 = NT\$ 40.00
December 1973 (final cost estimates):
US\$ 1 = NT\$ 40.10
Present: US\$ 1 = NT\$ 37.90

14. Appraisal Report No. & Date TO-580(a), June 30, 1967
15. Fiscal Year January 1 - December 31 to December 31, 1971
July 1 - June 30 from July 1, 1972
16. Joint Financing (where applicable) None
17. Project Description
- (a) The project which consisted of part of DGT's 1967-1971 development program for the modernization and expansion of the local and long distance telecommunications facilities provided for:
- (i) Installation of approximately 118,000 lines of automatic exchange telephone switching equipment with necessary buildings, cable networks, telephones and accessory facilities in the cities of Taipei, Keelung, Taichung and Kaohsiung.
 - (ii) Installation of a long-distance dialing system between toll centers with automatic toll switching systems located in the cities of Taipei, Taichung and Kaohsiung.
 - (iii) Establishment of a Telecommunications Training Center with a capacity for 200 trainees.
 - (iv) Assistance of consultants in the planning and execution of the expansion program.

The project was expected to be completed by December 31, 1971. The facilities were expected to be put into operation in successive stages in 1969, 1970 and 1971.

- (b) At the time of bid evaluation for the equipment included in subparas. (a) (i) and (ii) above, DGT found it necessary to request significant equipment changes which made evaluation difficult and controversial. After discussion with the Bank, DGT agreed to go through a retender operation for that equipment; this resulted in a delay of about 18 months in the initiation of the project construction period. However the retendering brought forward extremely low prices and DGT was able to take advantage of the low prices to obtain the additional equipment (89,000 lines) necessary to meet the extra demand caused by the extended construction period. To meet these circumstances on September 12, 1969, the Bank agreed that the equipment in subpara. (a) (i) of the project description above would be increased from 118,000 lines to 207,000 lines. Furthermore, the price advantages were such that on December 3, 1969, the Bank agreed to

cancel US\$ 4.5 million of the US\$ 17.0 million loan. The closing date of the loan was extended from October 31, 1972 to March 31, 1974, and it was agreed that the facilities would be put into operation in successive stages between 1969 and 1974.

18. Objective and Justification

In 1966 the telephone development in Taiwan was 1.3 per hundred of population; this was low when compared to many industrialized nations, for example, Japan with 14, Europe 45 and USA 48. The growth of the economy and improvement in living standards had rendered the facilities inadequate to satisfy the high demand for telephone service. This demand had been high and consistently maintained for over ten years despite a connection fee of about US\$ 350 charged new subscribers. The high demand was further evidenced by the abnormally high calling rate averaging 15.8 calls per day per subscriber's line throughout Taiwan. This was nearly four times the calling rate in the USA. The project was intended to expand and improve the domestic telephone and telegraph services of Taiwan in order to assist the economic development of the country.

19. Construction Schedule

The original and final construction schedules are compared below.

	Original (118,000 lines)	Final (207,000 lines)
Engineering and specifications	Feb. 1966-July 1967	Aug. 1968
Manufacture of equipment	Mar. 1968-Dec. 1970	July 1969-Mar. 1973
Installation of equipment	Jan. 1969-Dec. 1971	July 1970-Dec. 1973

The construction periods, estimated and actual, broken down into main physical components are the following:

Principal Components	Construction Period		
	Estimated initial project (Sept. 30, 1967)	Estimated revised project (Dec. 24, 1969)	Actual (Dec. 31, 1973)
Local exch. equip.	Jan. '69-Dec. '71	Aug. '70-Dec. '73	July '70-Dec. '73
STD exch. equip.	June '69-Dec. '70	Nov. '70-July '71	Nov. '70-Mar. '72
Microwave		Dec. '69-July '70	Dec. '69-Sept. '70
Line plant	June '68-Dec. '73	July '68-Dec. '73	July '68-Dec. '73
Training center	June '68-Dec. '69	June '69-Dec. '70	June '69-Dec. '71

The principal reasons for the delay in the execution of the project was the need to retender for the main equipment and the need for additional time to install the extra equipment included in the revised project (see para. 17b). There was some slippage in the original construction dates for buildings;

however because of the delays in the switching procurement DGT was able to have all the buildings erected in time for the installation of the equipment. Once the initial procurement difficulties were overcome DGT's installation performance was very good; in fact the installations were completed three months earlier than anticipated.

20. Project Cost Estimates

The estimated cost of the Bank financed project as appraised was NT\$ 2.0 billion; subsequently, when the project was changed (see para. 17b), DGT estimated the revised cost to be NT\$ 2.5 billion, of which 75% related to local costs; this revised project cost would represent probably only about 25% of the construction works to be undertaken by DGT during the period 1967 through 1973. Although the cost of the items imported directly for the Bank financed project are easily identifiable, the calculation of accurate final costs for the project is rendered practically impossible because of the need to allocate a large number of local cost items which are common to both the Bank financed project and the remaining part of DGT's program. For this reason the final costs of the project (NT\$ 2.4 billion) as prepared by DGT and shown in Annex 1 can only be considered as an estimate and may be subject to substantial error.

21. Program Achievements

Over the past seven years DGT has maintained a telephone growth which is among the highest in the world. DGT has been able to meet the exceptional demand in most areas without delay and at the same time offer a satisfactory standard of service; current waiting lists are not high. The Bank financed project, which formed part of DGT's large development program, has considerably contributed to this significant achievement. The excellent progress made in each branch of operation is indicated below.

- (a) Local Telephone Service - During the 1966 appraisal it was estimated that DGT's 113,000 telephone subscribers would increase to 321,000 by the end of 1973; annual growth would be about 16%. DGT's actual subscribers at the end of 1973 totalled 486,826, and the annual growth since 1966 had been slightly above 23%. Public telephones which totalled 2,087 in 1966 were increased to 11,000 at the end of 1973; over the same period the percentage of automatic telephones in the network increased from 75% to 90% and telephone density had increased from 1.3 to 4.4 per hundred population. Annual statistics are given below.

End of CY Year	Percentage of Automatic Telephone Stations	Number of Telephone Subscribers		
		Yearly Increase	Total Number	Percentage of Annual Increase
1966	75.0	14,894	113,414	15.1
1967	77.4	21,621	135,035	19.1
1968	79.4	30,949	165,984	22.9
1969	82.2	37,349	203,333	22.5
1970	83.7	46,087	249,420	22.7
1971	87.3	58,053	307,473	23.3
1972	89.7	75,135	382,608	24.4
1973	90.3	104,218	486,826	27.2

- (b) Long Distance Services - The number of toll calls, including those dialed directly by subscribers (STD) increased in 1966/1973 by approximately 25% p.a., far above the 15% p.a. forecasted and appraised. In the same period, the number of national telegrams increased by 10% p.a., but in the last year growth fell to 5.3%; those figures compare with 8% forecasted at the end of 1973.
- (c) International Services - The annual growth in the number of international telephone calls between 1966 and 1973 was 32%; this was more than double that estimated during the appraisal. During the same period telex paid minutes growth was 23% per year as compared with the 20% forecast during the appraisal. International telegrams increased, during the same period, at a rate of 11% per year as compared with 8% forecasted.

22. Growth Potential

Despite the high connection fee there has been no slackening of telephone connections' demand; for example, the present demand and supply in the large industrial area of Kaohsiung is running at the rate of 27% per year; DGT is presently executing another large development program covering the period to end-1976 which includes switching equipment for a further 350,000 subscribers.

23. Consultants

The consultants, Complan Associates and individual experts, who assisted in the preparation of specifications and evaluating bids, performed their duties satisfactorily.

24. Organization and Management

DGT's organization has operated effectively, management has been and continues to be extremely efficient. At the end of the project, owing

to the rapid growth, it was evident that DGT organizational capacity was burdened. DGT quickly identified the areas which required strengthening and is taking measures to ensure a continuation of efficiency.

25. Financing

The financing plan prepared at appraisal time covered the five-year construction period - January 1, 1967 through December 31, 1971. (The revised Bank-financed project was completed only by end-1973). The under-mentioned table shows (i) DGT's actual financing arrangements for the period 1967-1971 as compared with the appraisal estimates; and (ii) DGT's financing arrangements for the period January 1, 1967 through June 30, 1973, the latest date to which audited accounts are available, and the date when almost all equipment for the project had been installed.

	Appraisal Estimate	Actual	
	FY1967-71	FY1967-71	FY1967-73
	-----in millions of NT\$-----		
<u>Requirements</u>			
Construction	4,876	6,087	9,300
Working capital-increase	-	310	1,494
Total requirements	<u>4,876</u>	<u>6,397</u>	<u>10,794</u>
<u>Sources</u>			
Internal cash generation	2,988	4,259	6,838
Less: Debt service	476	366	563
Payments to Government	396	609	900
	<u>2,116</u>	<u>3,284</u>	<u>5,375</u>
Subscribers deposits and connection fees	1,347	2,492	4,198
Borrowings	903	621	1,221
Working capital-decrease	510	-	-
Total sources	<u>4,876</u>	<u>6,397</u>	<u>10,794</u>

26. Summary Financial Results

The relevant indices recording DGT's financial performance from FYs 1967 through 1973 are given below. The corresponding appraisal estimates are shown for FYs 1967 through 1971. Further details are given in Annex 2.

<u>FY</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972^{1/}</u> (six months)	<u>1973</u>
<u>Net operating income - NT\$ million</u>							
Appraisal estimate	278	327	365	405	420	-	-
Actual	329	453	493	633	776	411	1,345
<u>Rate of return - %</u>							
Appraisal estimate	14.5	14.0	13.2	12.3	10.1	-	-
Actual	17.2	22.3	20.9	20.0	18.2	15.6	20.7
<u>Operating ratio - %</u>							
Appraisal estimate	68	67	68	69	72	-	-
Actual	64	59	62	63	58	66	58
<u>Debt/Equity ratio</u>							
Appraisal estimate	12/88	15/85	17/83	17/83	15/85	-	-
Actual	9/91	8/92	10/90	8/92	8/92	7/93	9/91
<u>Current ratio - times covered</u>							
Appraisal estimate	4.5	3.7	2.8	2.6	2.6	-	-
Actual	6.3	4.1	5.1	3.2	4.0	4.2	4.6
<u>Debt service coverage - times</u>							
Appraisal estimate	11	7	6	5	5	-	-
Actual	16	14	14	9	11	14	13

Although there was an 18 to 24 months delay in the execution of the enlarged Bank-financed project, the financial results from DGT's operations throughout the construction period of the project considerably exceeded those forecast at the time of the appraisal; DGT's financial position has remained consistently strong and has exceeded expectations.

27. Insurance

DGT does not carry insurance against major losses on its fixed assets resulting from fire, typhoons, earthquakes or other catastrophes. In side letter no. 6 (dated August 2, 1967) to the Loan Agreement, the Government has agreed to indemnify DGT for losses exceeding NT\$ 1,500,000.

^{1/} FY changed from calendar year to year ending June 30.

28. Auditors

DGT's accounts, by law, are subject to audit by the Ministry of Audit. The procedure has not proved entirely satisfactory and it would have been proposed that DGT employ independent auditors if a further Bank loan had materialized.

29. Other Points and Special Features

The project has been most satisfactorily completed. No further inventory of the project is necessary.

Public Utilities Department

April 22, 1974

CHINADIRECTORATE GENERAL OF TELECOMMUNICATIONS (DGT)Loan 506-CHABank Financed ProjectPROJECT AS APPRAISED - ESTIMATED COST

	Foreign Exchange	Local Cost	Total	Cost
	US\$	NT\$	NT\$	US\$
-----expressed in millions-----				
Exchange facilities	13.25	1,192	1,722	43.05
Subscriber toll dialing	1.70	36	104	2.60
Training center	0.15	23	29	0.72
Administration & consultants	0.30	56	68	1.70
Contingencies	1.60	20	84	2.10
	<u>17.00</u>	<u>1,327</u>	<u>2,007</u>	<u>50.17</u>
----- (US\$ 1 = NT\$ 40.0) -----				

REVISED PROJECT - ESTIMATED AND FINAL COST

	Estimated Costs			Final Costs ^{1/}		
	Foreign Exchange		Local	Foreign Exchange		Local
	IBRD Loan	Other	Cost	IBRD Loan	Other	Cost
	US\$		NT\$	US\$		NT\$
-----expressed in millions-----						
Exchange facilities	10.800	2.30	1,710.5	11.07	3.56	1,485.8
Subscriber toll dialing	1.020	0.06	66.7	1.03	0.06	58.4
Training center	0.288	0.10	18.9	0.26	0.04	20.5
Microwave & carrier facilities	-	1.05	22.2	-	1.00	23.9
Administration & consultants	0.112	-	45.0	0.14	-	160.1
Contingencies	0.280	-	20.0	-	-	-
Total	<u>12.500</u>	<u>3.51</u>	<u>1,883.3</u>	<u>12.50</u>	<u>4.66</u>	<u>1,748.7</u>
Total Cost	(-----US\$ 63.1-----)			(-----US\$ 60.8-----)		
	(-----NT\$ 2,524-----)			(-----NT\$ 2,437-----)		
	(US\$ 1 = NT\$ 40.0)			(US\$ 1 = NT\$ 40.10)		

1/ Owing to the need to allocate local cost items the final costs may be subject to substantial error (see para. 20).

CHINA

DIRECTORATE GENERAL OF TELECOMMUNICATIONS (DGT)

Loan 506-CHA

Financial Statistics - FYs 1967 through 1973
(millions of new Taiwan dollars)

Year ending:	December 31, 1967		December 31, 1968		December 31, 1969		December 31, 1970		December 31, 1971		June 30, 1972*	June 30, 1973
	Appraisal		Appraisal		Appraisal		Appraisal		Appraisal		Actual	Actual
	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	(six months)	
COMPARISON OF ESTIMATED AND ACTUAL STATEMENTS OF INCOME												
Net operating revenues	868	916	1,006	1,116	1,153	1,304	1,323	1,688	1,518	2,131	1,207	3,193
Total operating expenses	590	586	679	663	788	811	918	1,055	1,098	1,355	795	1,847
Net operating income	278	329	327	453	365	493	405	633	420	776	412	1,347
Rate of return	14.5%	17.2%	14.0%	22.3%	13.2%	20.9%	12.3%	20.0%	10.1%	18.2%	15.6%	20.7%
Operating ratio	68%	64%	67%	59%	68%	62%	69%	63%	72%	58%	66%	58%
COMPARISON OF ESTIMATED AND ACTUAL BALANCE SHEETS												
Net plant in service	1,995	1,967	2,683	2,086	2,830	2,615	3,739	3,687	4,619	4,846	5,773	7,250
Net current assets	725	1,133	569	1,255	466	1,299	394	1,117	370	1,524	1,574	2,784
Total assets	3,789	3,874	4,431	4,830	5,160	5,737	5,836	7,019	6,405	8,570	9,288	12,394
Total equity	3,023	3,073	3,445	3,915	3,912	4,773	4,445	5,836	5,043	7,122	7,811	10,005
Total long-term debt	407	337	603	355	792	509	921	480	869	588	609	1,045
Total liabilities	3,789	3,874	4,431	4,830	5,160	5,737	5,836	7,019	6,405	8,570	9,288	12,389
Debt/equity ratio	12/88	9/91	15/85	8/92	17/83	10/90	17/83	8/92	15/85	8/92	7/93	9/91
Times current liabilities covered by current assets	4.5	6.3	3.7	4.1	2.8	5.1	2.6	3.2	2.6	4.0	4.2	4.6
COMPARISON OF ESTIMATED AND ACTUAL CASH FLOW STATEMENTS												
Internal cash generation	459	556	523	715	592	784	670	1,013	744	1,191	640	1,951
Total borrowings	183	134	240	18	240	197	200	76	40	196	60	540
Connection fees and subscribers' deposits	213	250	224	396	252	483	305	602	353	761	421	1,285
Total sources of funds	855	940	987	1,129	1,084	1,464	1,175	1,691	1,137	2,148	1,121	3,776
Construction program	902	476	996	860	1,015	1,168	1,038	1,554	925	2,029	1,018	2,195
Debt service	42	34	74	53	92	56	122	113	146	110	46	151
Payments to Government	66	76	73	96	80	129	87	136	90	172	192	99
Increase (decrease) in working capital	(155)	354	(156)	120	(103)	111	(72)	(112)	(24)	(163)	(135)	1,319
Total application of funds	855	940	987	1,129	1,084	1,464	1,175	1,691	1,137	2,148	1,121	3,764
Times debt service covered by internal cash generation	11	16	7	14	6	14	5	9	5	11	14	13

*FY changed from calendar year to year ending June 30.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

OFFICE MEMORANDUM
PROJECT COMPLETION REPORT

TO: ~~Mr. G. P. Vasudevan (Chief, PBPTE)~~ DATE: ~~April 22, 1974~~

FROM: *J. G. Davis*

SUBJECT: CHINA - Loan 506-CHA Directorate General of Telecommunications (DGT)
~~Supervision of a Telecommunications Project~~
~~Completion Report~~

1. *The following ~~is~~ completion report is based on a visit to China from November 25 to December 3, 1973.*
2. In accordance with my terms of reference dated November 16, 1973, I visited China between November 25 and December 3, 1973 to review the progress of the telecommunications project under Loan 506-CHA. The installations having been completed, the following is the completion report for the project.
- | | |
|-----------------------|--|
| 2. Borrower | Directorate General of Telecommunications (DGT) |
| Beneficiary | Ministry of Communications
Republic of China |
| 3. Guarantor | The Government of the Republic of China |
| 4. Loan Amount | Original - US\$17 million
Final - US\$12.5 million |
| 5. Date Loan Signed | August 2, 1967 |
| 6. Effective Date | September 29, 1967 |
| 7. Closing Date | Original - October 31, 1972
Final - March 31, 1974 |
| 8. Period of Grace | Four years |
| 9. Term of Loan | 20 years |
| 10. Interest Rate | 6% per annum |
| 11. Commitment Charge | 3/8 of 1% |
| 12. Amortization | October 15, 1971-October 15, 1987 |
| 13. Exchange Rate | Appraisal : US\$1=NT\$40.00
Present : US\$1=NT\$37.90 |

Dec. 73

*(final int
estimate) : US\$1 = NT\$40.10*

April 22, 1974

14. Appraisal Report No. & Date TO-580(a), June 30, 1967
15. Fiscal Year January 1 - December 31 to December 31, 1971
July 1 - June 30 from January 1, 1972
July
16. Joint Financing (where applicable) None
17. Project Description:

(a) The project which consisted of part of DGT's 1967-1971 development program for the modernization and expansion of the local and long distance telecommunications facilities provided for:

- (i) Installation of approximately 118,000 lines of automatic exchange telephone switching equipment with necessary buildings, cable networks, telephones and accessory facilities in the cities of Taipei, Keelung, Taichung and Kaohsiung.
- (ii) Installation of a long-distance dialling system between toll centers with automatic toll switching systems located in the cities of Taipei, Taichung and Kaohsiung.
- (iii) Establishment of a Telecommunications Training Center with a capacity for 200 trainees.
- (iv) Assistance of consultants in the planning and execution of the expansion program.

The project was expected to be completed by December 31, 1971. The facilities were expected to be put into operation in successive stages in 1969, 1970 and 1971.

- (b) At the time of bid evaluation for the equipment included in sub-
paras. (a) (i) and (ii) above, DGT found it necessary to request
significant equipment changes which made evaluation difficult and
controversial. After discussion with the Bank, DGT agreed to go
through a retender operation for that equipment; ~~the delay re-~~
~~sulted in an extension~~ ^{delay} of about 18 months in the ^{inflation from the} project con-
struction period. However the retendering brought forward extreme-
ly low prices and DGT was able to take advantage of the low prices
to obtain the additional equipment (89,000 lines) necessary to
meet the extra demand caused by the extended construction period.
To meet these circumstances on September 12, 1969 the Bank agreed
that the equipment in sub-para (a) (i) of the project description
above would be increased from 118,000 lines to 207,000 lines.
Furthermore, the price advantages were such that on December 3,
1969 the Bank agreed to cancel US\$4.5 million of the US\$17.0
million loan. The closing date of the loan was extended from
October 31, 1972 to March 31, 1974 and it was agreed that the
facilities would be put into operation in successive stages
between 1969 and 1974.

*Why original
estimates were
so high, then?*

initiation of the

April 22, 1974

18. Objective and Justification

In 1966 the telephone development in Taiwan was 1.3 per hundred of population; this was low when compared to many industrialized nations, for example, Japan with 14, Europe 45 and USA 48. The growth of the economy and improvement in living standards had rendered the facilities inadequate to satisfy the high demand for telephone service. This demand had been high and consistently maintained for over ten years despite a connection fee of about US\$350 charged new subscribers. The high demand was *cells* further evidenced by the abnormally high calling rate averaging 15.8 *calls/day* per day per subscriber's line throughout Taiwan. This was nearly four times the calling rate in the USA. The project was intended to expand and improve the domestic telephone and telegraph services of Taiwan in order to assist the economic development of the country.

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	<u>Original</u> (118,000 lines)	<u>Final</u> (207,000 lines)
Engineering and specifications.	Feb. 1966-July 1967	Aug. 1968
Manufacture of equipment	Mar. 1968-Dec. 1970	July 1969-Mar. 1973
Installation of equipment	Jan. 1969-Dec. 1971	July 1970-Dec. 1973

⊗ The principal reasons for the delay in the execution of the project was the need to retender for the main equipment and the need for additional time to install the extra equipment included in the revised project (see para. 17b). There was some slippage in the original construction dates for buildings; however because of the delays in the switching procurement DGT was able to have all the buildings erected in time for the installation of the equipment. Once the initial procurement difficulties were overcome DGT's installation performance was very good; in fact the installations were completed three months earlier than anticipated.

20. Project Cost Estimates

The estimated cost of the Bank financed project as appraised was NT\$2.0 billion; subsequently, when the project was changed (see para. 17b) DGT estimated the revised cost to be NT\$2.5 billion, of which 75% related to local costs; this revised project cost would represent probably only about 25% of the construction works to be undertaken by DGT during the period 1967 through 1973 ~~(see para. 24)~~. Although the cost of the items imported directly for the Bank financed project are easily identifiable, the calculation of accurate final costs for the project is rendered practically impossible because of the need to allocate a large number of local cost items which are common to both the Bank financed project and the remaining part of DGT's program. For this reason the final costs of the project (NT\$2.4 billion) as prepared by DGT and shown in Annex 1 can only be considered as an estimate and may be subject to substantial error.

⊗ (Add here the following sentence:) The construction periods, estimated and actual, broken down into main physical components are the following: (and put in about 7 p. 3 of memo to Davis)

April 22, 1974

21. Program Achievements

Over the past seven years DGT has maintained a telephone growth which is amongst the highest in the world. DGT has been able to meet the exceptional demand in most areas without delay and at the same time offer a satisfactory standard of service; current waiting lists are not high. The Bank financed project, which formed part of DGT's large development program, has considerably contributed to this significant achievement. The excellent progress made in each branch of operation is indicated below.

- (a) Local Telephone Service - During the 1966 appraisal it was estimated that DGT's 113,000 telephone subscribers would increase to 321,000 by the end of 1973; ~~average~~ annual growth would be about 16%. DGT's actual subscribers at the end of 1973 totalled 486,826; the ~~average~~ annual growth since 1966 had been slightly above 23%. Public telephones which totalled 2,087 in 1966 were increased to 11,000 at the end of 1973; over the same period the percentage of automatic telephones in the network increased from 75% to 90% and telephone density had increased from 1.3 to 4.4 per hundred population. Annual statistics are given below.

End of Year	Percentage of Automatic Telephone Stations	Number of Telephone Subscribers		
		Yearly Increase	Total Number	Percentage of Annual Increase
1966	75.0	14,894	113,414	15.1
1967	77.4	21,621	135,035	19.1
1968	79.4	30,949	165,984	22.9
1969	82.2	37,349	203,333	22.5
1970	83.7	46,087	249,420	22.7
1971	87.3	58,053	307,473	23.3
1972	89.7	75,135	382,608	24.4
1973	90.3	104,218	486,826	27.2

- (b) Long Distance Service - To meet long distance traffic requirements, trunk circuits were increased from 2,100 to 5,300 between 1966 and 1972; this represented an average annual increase of about 16.5%, and compared with an estimate of 15% at appraisal time.

- (c) International Services - The annual growth in international telephone ~~traffic~~ ^{calls} between 1966 and 1973 was ~~about 38%~~ ^{38%}; this was more than double that estimated during the appraisal. During the same period telex ~~traffic~~ ^{paid telex} growth was ~~about 35%~~ ^{23%} per year as compared with the 20% forecast during the appraisal.

International telegrams increased, during the same period, at a rate of 11% per year as compared with 8% forecast.

why estimate
so conservative?

Long distance service - The number of long calls, including those dialed directly by subscribers (STD) increased in 1966/1973 by approximately 25% p.a. para 600. The 15% pa forecast and appraisal. In the same period, the number of national telegrams increased by 10% pa, but in the last year ~~increased~~ ^{rose} by 5.3% p.a. as compared with 8% forecast for the end of 1973.

Telephone Service

Growth potential

TO: Mr. C. P. Vasudevan

- 5 -

April 22, 1974

22. Despite the high connection fee there has been no slackening of telephone demand; for example, the present demand in the large industrial area of Kaohsiung is running at the rate of 27% per year; DGT is presently executing another large development program covering the period to end-1976 which includes switching equipment for a further 350,000 subscribers.

23. Consultants

The consultants, ~~Complan Associates~~, who assisted in the preparation of specifications and evaluating bids, performed their duties satisfactorily.

24. Organization and Management

DGT's organization has operated effectively, management has been and continues to be extremely efficient. At the end of the project, owing to the rapid growth, it was evident that DGT organizational capacity was burdened. DGT quickly identified the areas which required strengthening and is taking measures to ensure a continuation of efficiency.

25. Financing

The financing plan prepared at appraisal time covered the five-year construction period - January 1, 1967 through December 31, 1971. (The revised Bank-financed project was completed only by end-1973). The under-mentioned table shows (i) DGT's actual financing arrangements for the period 1967-1971 as compared with the appraisal estimates; and (ii) DGT's financing arrangements for the period January 1, 1967 through June 30, 1973, the latest date to which audited accounts are available, and the date when almost all equipment for the project had been installed.

	Appraisal Estimate	Actual	
	FY 1967-1971	FY 1967-71	FY 1967-73
	-----in millions of NT\$-----		
<u>Requirements</u>			
Construction	4,876 ✓	6,087 ✓	9,300 ✓
Working capital-increase	-	310 ✓	1,494 ✓
Total requirements	4,876	6,397	10,794
<u>Sources</u>			
Internal cash generation	2,988 ✓	4,259 ✓	6,838 ✓
Less: Debt service	476 ✓	366 ✓	563 ✓
Payments to Government	396 ✓	609 ✓	900 ✓
	2,116	3,284	5,375
Subscribers deposits and connection fees	1,347 ✓	2,492 ✓	4,198 ✓
Borrowings	903 ✓	621 ✓	1,221 ✓
Working capital-decrease	510 ✓	-	-
Total sources	4,876	6,397	10,794

what are these?

what explains the difference?

April 22, 1974

26. Summary Financial Results

The relevant indices recording DGT's financial performance from FYs 1967 through 1973 are given below. The corresponding appraisal estimates are shown for FYs 1967 through 1971. Further details are given in Annex 2.

<u>FY</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u> ^{/1} (six months)	<u>1973</u>
<u>Net operating income - NT\$ million</u>							
Appraisal estimate	278	327	365	405	420	-	-
Actual	329	453	493	633	776	411	1,345
<u>Rate of return - %</u>							
Appraisal estimate	14.5	14.0	13.2	12.3	10.1	-	-
Actual	17.2	22.3	20.9	20.0	18.2	15.6	20.7
<u>Operating ratio - %</u>							
Appraisal estimate	68	67	68	69	72	-	-
Actual	64	59	62	63	58	60	53
<u>Debt/Equity ratio</u>							
Appraisal estimate	12/88	15/85	17/83	17/83	15/85	-	-
Actual	9/91	8/92	10/90	8/92	8/92	7/93	9/91
<u>Current ratio - times covered</u>							
Appraisal estimate	4.5	3.7	2.8	2.6	2.6	-	-
Actual	6.3	4.1	5.1	3.2	4.0	4.2	4.6
<u>Debt service coverage - times</u>							
Appraisal estimate	11	7	6	5	5	-	-
Actual	16	14	14	9	11	14	13

Although there was an 18 to 24 months delay in the execution of the enlarged Bank-financed project, the financial results from DGT's operations throughout the construction period of the project considerably exceeded those forecast at the time of the appraisal; DGT's financial position has remained consistently strong and has exceeded expectations.

27. Covenants to be watched during the life of the loan

- nil -

27. 28. Insurance

DGT does not carry insurance against major losses on its fixed assets resulting from fire, typhoons, earthquakes or other catastrophes.

/1 FY changed from calendar year to year ending June 30.

April 22, 1974

In side letter no. 6 (dated August 2, 1967) to the Loan Agreement the Government has agreed to indemnify DGT for losses exceeding NT\$1,500,000.

28. ~~29.~~ Auditors

DGT's accounts, by law, are subject to audit by the Ministry of Audit. The procedure has not proved entirely satisfactory and it would have been proposed that DGT employ independent auditors if ~~the second~~ Bank loan had materialized. *a further*

29. ~~30.~~ Other Points and Special Features

The project has been most satisfactorily completed. No further inventory of the project is necessary.

31. Revised Reporting Requirements

Apart from its obligations under the Loan Agreement, annual reporting by DGT should be restricted to the submission of annual audited accounts together with an annual report and a resume of significant network statistics.

JGDavis:lpm

cc: Messrs. Rovani, Jennings, Rydell, Armstrong, Lee, Burney, Weiner - Asia,
Loos - Asia (4), Arnold - Asia, Messenger - Asia, Krishna -
Legal, von Buelow - Controller's, J. D. Elliott - Controller's,
Picciotto - Asia, van der Meer - Asia, Street - Asia
Central Files - (2)
Division Files

Public Utilities Department

April 22 1974

CHINADIRECTORATE GENERAL OF TELECOMMUNICATIONS (DGT)Loan 506-CHABank Financed ProjectPROJECT AS APPRAISED - ESTIMATED COST

	Foreign Exchange	Local Cost	Total Cost	
	---US\$---	---NT\$---	NT\$	US\$
	-----expressed in millions-----			
Exchange facilities	13.25	1,192	1,722	43.05
Subscriber toll dialling	1.70	36	104	2.60
Training center	0.15	23	29	0.72
Administration & consultants	0.30	56	68	1.70
Contingencies	1.60	20	84	2.10
	<u>17.00</u>	<u>1,327</u>	<u>2,007</u>	<u>50.17</u>

1055 = NT\$ 40.00 (US\$1 = NT\$ 40.0)

REVISED PROJECT - ESTIMATED AND FINAL COST

	Estimated Costs			Final Costs ^{/1}		
	Foreign Exchange	Local		Foreign Exchange	Local	
	IBRD Loan	Other	Cost	IBRD Loan	Other	Cost
	-----US\$-----		---NT\$---	-----US\$-----		---NT\$---
	-----expressed in millions-----					
Exchange facilities	9.32 10.800	2.30	1,710.5	11.07 ✓	3.56 ✓	1,485.8 ✓
Subscriber toll dialling	1.70 1.020	0.06	66.7	1.03 ✓	0.06 ✓	58.4 ✓
Training center	0.288 1.18	0.10	18.9	0.26 ✓	0.04 ✓	20.5 ✓
Microwave & carrier facilities	-	1.05	22.2	- ✓	1.00 ✓	23.9 ✓
Administration & consultants	0.112 0.30	-	45.0	0.14 ✓	- ✓	160.1 ✓
Contingencies	<u>0.280</u>	-	20.0	-	-	-
Total	<u>12.50</u> ✓	<u>3.51</u>	<u>1,883.3</u>	<u>12.50</u> ✓	<u>4.66</u> ✓	<u>1,748.7</u> ✓
Total Cost	(-----US\$63.1-----)			(-----US\$60.9-----)		
	(-----NT\$2,524-----)			(-----NT\$2,435-----)		
	(US\$1 = NT\$ = 40.0)			(US\$1 = NT\$ = 40.10)		

^{/1} Owing to the need to allocate local cost items the final costs maybe subject to substantial error (see para. 20).

ANNEX 2

CHINA

DIRECTORATE GENERAL OF TELECOMMUNICATIONS (DOT)

Loan 506-CHA

Financial Statistics - FYs 1967 through 1973
(millions of new Taiwan dollars)

Year ending:	Dec. 31, 1967		Dec. 31, 1968		Dec. 31, 1969		Dec. 31, 1970		Dec. 31, 1971		June 30, 1972*	June 30, 1973
	Appraisal		Appraisal		Appraisal		Appraisal		Appraisal		Actual	Actual
	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	(six months)	
COMPARISON OF ESTIMATED AND ACTUAL STATEMENTS OF INCOME												
Net operating revenues	868	916	1,006	1,116	1,153	1,304	1,323	1,688	1,518	2,131	1,207	3,193
Total operating expenses	590	586	679	663	788	811	918	1,055	1,098	1,355	795	1,848
Net operating income	278	329	327	453	365	493	405	633	420	776	412	1,345
Rate of return	14.5%	17.2%	14.0%	22.3%	13.2%	20.9%	12.3%	20.0%	10.1%	18.2%	15.6%	20.7%
Operating ratio	68%	64%	67%	59%	68%	62%	69%	63%	72%	58%	66%	58%
COMPARISON OF ESTIMATED AND ACTUAL BALANCE SHEETS												
Net plant in service	1,995	1,967	2,683	2,086	2,830	2,615	3,739	3,687	4,619	4,846	5,773	7,229
Net current assets	725	1,133	569	1,255	466	1,299	394	1,117	370	1,524	1,574	2,784
Total assets	3,789	3,874	4,431	4,830	5,160	5,737	5,836	7,019	6,405	8,570	9,288	12,386
Total equity	3,023	3,073	3,445	3,915	3,912	4,773	4,445	5,836	5,043	7,122	7,811	9,996
Total long-term debt	407	337	603	355	792	509	921	480	869	588	609	1,045
Total liabilities	3,789	3,874	4,431	4,830	5,160	5,737	5,836	7,019	6,405	8,570	9,288	12,386
Debt/equity ratio	12/88	9/91	15/85	8/92	17/83	10/90	17/83	8/92	15/85	8/92	7/93	9/91
Times current liabilities covered by current assets	4.5	6.3	3.7	4.1	2.8	5.1	2.6	3.2	2.6	4.0	4.2	4.6
COMPARISON OF ESTIMATED AND ACTUAL CASH FLOW STATEMENTS												
Internal cash generation	459	556	523	715	592	784	670	1,013	744	1,191	640	1,235
Total borrowings	183	134	240	18	240	197	200	76	40	196	60	540
Connection fees and subscribers' deposits	213	250	224	396	252	483	305	602	353	761	421	1,285
Total sources of funds	855	940	987	1,129	1,084	1,464	1,175	1,691	1,137	2,148	1,121	3,764
Construction program	902	476	996	860	1,015	1,168	1,038	1,554	925	2,029	1,018	2,195
Debt service	42	34	74	53	92	56	122	113	146	110	46	151
Payments to Government	66	76	73	96	80	129	87	136	90	172	192	99
Increase (decrease) in working capital	(155)	354	(156)	120	(103)	111	(72)	(112)	(24)	(163)	(135)	1,319
Total application of funds	855	940	987	1,129	1,084	1,464	1,175	1,691	1,137	2,148	1,121	3,764
Times debt service covered by internal cash generation	11	16	7	14	6	14	5	9	5	11	14	13

*FY changed from calendar year to year ending June 30.

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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

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JUN 04 2025

APPRAISAL OF THE EXPANSION PROGRAM
OF THE
DIRECTORATE GENERAL OF TELECOMMUNICATIONS
CHINA

WBG ARCHIVES

L 506

June 30, 1967

Projects Department

CURRENCY EQUIVALENTS

US\$1	=	NT\$40
NT\$1	=	US\$0.025
NT\$1 million	=	US\$25,000

WEIGHTS AND MEASURES

1 kilometer (km)	=	0.622 statute miles
------------------	---	---------------------

CHINA
APPRAISAL OF THE EXPANSION PROGRAM
of the
DIRECTORATE GENERAL OF TELECOMMUNICATIONS (DGT)

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This report is based on the findings of an appraisal mission, consisting of Messrs. R.N. Walsh and J.M. Vance, which visited China in September 1966.

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CHINA

APPRAISAL OF THE EXPANSION PROGRAM

of the

DIRECTORATE GENERAL OF TELECOMMUNICATIONS (DGT)

SUMMARY

i. The Government of China has asked the Bank for a US\$17 million loan to finance most of the foreign exchange cost of a project to expand and improve the domestic telephone and telegraph services of Taiwan. The Project would cover certain specific construction works and would be carried out in the period 1967 through 1971, with disbursements commencing in 1968. Total costs of the Project are estimated at US\$50 million equivalent.

ii. The proposed Borrower is the Directorate General of Telecommunications (DGT). This Government enterprise was established under the Ministry of Communications in 1943. Through its agencies, the Taiwan Telecommunications Administration (TTA) and the Chinese Government Radio Administration (CGRA), it operates all Taiwan public telephone and telegraph services, national and international.

iii. The DGT and its agencies have experienced staff. With a small amount of assistance from consultants and continued training of personnel, they should be able to carry out the expansion program satisfactorily.

iv. The proposed program is technically sound and consists of the installation of facilities urgently needed to meet the principal local and domestic long-distance telecommunication requirements of Taiwan. Also, its completion should materially improve the quality of service rendered.

v. Plans and equipment specifications would be prepared with the assistance of competent consulting engineers. All of the equipment to be financed under the proposed Bank loan would be purchased through international competitive bidding.

vi. Financial results in recent years have been satisfactory and are expected to continue so during the foreseeable future. No change in tariffs is required at the present time.

vii. The Project provides a suitable basis for a loan of US\$17 million with a 20-year term including a grace period of 4 years.

CHINA

APPRAISAL OF THE EXPANSION PROGRAM

of the

DIRECTORATE GENERAL OF TELECOMMUNICATIONS (DGT)

1. INTRODUCTION

1.01 The Government of China has a program for the expansion and improvement of the telephone and telegraph facilities of Taiwan for which total construction costs during the period 1967 through 1971 are estimated at NT\$4.9 billion (US\$122 million). Out of this program, certain specific works (the Project) estimated to cost NT\$2 billion (US\$50 million) are proposed for Bank financing. The proposed loan of US\$17 million would cover most of the foreign exchange cost of the Project. The balance of the funds required for the program would be covered by the DGT's operations supplemented by a small amount of suppliers' credits. Disbursements under the proposed loan are scheduled to be made during the years 1968 through 1971. The late commencement of disbursements is because the DGT does not normally make any down payment upon signing an equipment purchase contract and because approximately a year and a half is customarily required for the detailed engineering, ordering and manufacturing of major quantities of telephone equipment.

1.02 The Borrower would be the Directorate General of Telecommunications (DGT) of the Ministry of Communications of the Republic of China. The DGT, through its agencies, operates the national and international public telephone and telegraph services of Taiwan.

1.03 The principal parts of the project are the installation of 118,000 lines of automatic telephone exchange equipment in the areas of Taipei, Keelung, Taichung and Kaohsiung, and the construction of switching centers for subscriber long-distance dialing.

1.04 The report has been based upon a comprehensive feasibility study of June 1966 prepared by the DGT, supplemented by information obtained by a Bank appraisal mission, consisting of Messrs. R.N. Walsh and J.M. Vance, which visited Taiwan in September 1966. DGT subsequently submitted actual operating results for 1966. The negotiation of the loan was delayed because of the time required to complete the legislative action to authorize borrowing from the Bank.

2. THE BORROWER

Organization - General

2.01 The Borrower, the Directorate General of Telecommunications (DGT), is a Government enterprise established under the Ministry of Communications in April 1943 pursuant to the Organization Law for the Directorate General of Telecommunications.

2.02 The DGT operates through the following three agencies:

- (a) The Taiwan Telecommunications Administration (TTA), established in Taiwan in 1949 and operating the domestic telephone and telegraph services;
- (b) The Chinese Government Radio Administration (CGRA), established in Shanghai in 1930 and in Taipei in 1949. It operates international telephone, telegraph, telex and radio photo services;
- (c) The Radio Wave Research Laboratories (RWRL), established in 1951 and engaged in radio propagation observations and research.

The DGT was originally responsible for the supervision of operations of the various provincial telecommunication entities providing service throughout mainland China. When the Government of the Republic of China left the mainland, the headquarters of the DGT was established in Taipei and its operating functions were reduced to the single province of Taiwan. As a consequence of these historical events the DGT staff is now directly involved in the administration of TTA and CGRA. Although there is some overlapping of functions between the DGT staff and that of its agencies, the organization is operating effectively. Separate financial records are kept of TTA, CGRA and DGT. However, as the distribution between entities of part of the revenues is done on an arbitrary basis, the consolidated accounts for the DGT present the best basis for judging the financial results of telecommunication operations in Taiwan.

2.03 Organization charts are shown in Annexes 1 through 4.

Management

2.04 The DGT and its agencies are well qualified to carry out the expansion program and to operate effectively the new facilities. As a result of the low wage levels and the employment of personnel which left the mainland, the organization is overstaffed. It has now 39 employees per thousand telephones. (This is about five times the comparative U.S.A. figure, twice as much as in Venezuela and a third higher than in Argentina.) However, as facilities are added, under the proposed and subsequent construction programs, a gradual improvement in the utilization of personnel should be obtained. Most of the senior staff has over twenty years experience in telecommunications, acquired not only on the island of Taiwan but also on a broader scale on the mainland of China prior to 1949. The average level of education is high, approximately 6% of the employees having a college or university degree. In addition, the U.S. AID-financed program of 41,500 lines of automatic telephone equipment, completed early in 1967, has provided the organization with recent experience in preparing for and carrying out a substantial expansion program.

Training

2.05 Special efforts have been made over many years to train engineering and operating personnel in advanced telecommunications techniques and

practices. During the period 1953-66, 208 employees were sent abroad for specialized training in manufacturers' plants or in operating systems, mainly in Japan, but 48 received training in U.S.A., others in England, Hong Kong, the Netherlands and West Germany. For lower levels of employment, such as equipment installers, cable splicers and linemen, most of the training has been done on the job. It is planned that this training of staff will be continued but that, starting in early 1968, the Telecommunications Training Center now proposed will become the principal place for this work. The qualifications and experience of the existing staff together with the planned training program should assure the successful installation and operation of the additional facilities to be provided by the expansion program.

3. EXISTING FACILITIES

Exchange Telephones

3.01 There were 191,000 telephones in service at the end of 1966. At that time the equipment installed in the telephone exchanges had a capacity for 158,000 subscribers' lines of which 109,000 provide automatic service and 49,000 provide manual service.

3.02 Approximately 69% of the lines are automatic. Most of the automatic telephone equipment is installed in or near the main cities of Taipei, Kaohsiung, Taichung, Tainan, Keelung, Changhua and Hsinchu. Taipei, including its 11 suburban areas, has the greatest concentration of telephones.

3.03 The automatic telephone switching equipment is comprised of Japanese-made step-by-step type of Strowger and Siemens design and 41,500 lines of U.S.A. step-by-step type of Strowger design recently installed by the General Telephone and Electronics Corp. In attached Annex 5 are listed, by exchanges, the number of lines and type of equipment in service or under construction throughout Taiwan as of December 31, 1966.

3.04 Most of the switching equipment is in good condition but of insufficient capacity to meet the present needs for service. The telephone instruments are of a semi-obsolete type. To obtain improvements in transmission and operating efficiency a new high efficiency telephone instrument of modern design is being adopted as the new standard in connection with the expansion program.

3.05 The exchange cable distribution system is largely comprised of locally manufactured lead-covered, paper-insulated underground telephone cables placed in locally manufactured polyvinylchloride tubes encased in concrete. The gradual adoption of plastic-insulated and plastic-sheathed cables is planned when local production facilities have been expanded. Cable pair utilization is about 70% which should be improved with subscriber growth. The condition of the cable system is fair, there being about 0.7 cable troubles per year per kilometer of cable. This is

slightly more than is usual in independent telephone companies in U.S.A., but it is not unreasonable because of the frequent occurrence of typhoons. A program of more extensive pressurization is limited to interoffice and main feeder cables. Telephone poles are generally of reinforced concrete. Service drops are of copperweld conductor insulated with neoprene. Good design and construction practices are employed.

Long-Distance Telephone

3.06 At the end of 1966, the domestic long-distance telephone system had a total extension of 157,000 circuit kilometers. Its total of 2,457 circuits were distributed among the various types of facilities as follows:

	<u>Circuit Capacity</u>	
	<u>Sub-Total</u>	<u>Total</u>
Carrier System		
Underground cable	231	
Open wire	<u>271</u>	502
Microwave System		
Back-bone (West Coast)	348	
Branches	<u>70</u>	418
VHF System		
Back-bone (East Coast)	39	
Branches	<u>15</u>	54
Rural Telephone Lines		<u>199</u>
Short Cable and Open Wire Circuits		<u>1,284</u>
TOTAL CIRCUITS		<u><u>2,457</u></u>

3.07 The long-distance network consists of open wire, cable, carrier on cable, VHF and microwave radio systems. As shown on Map 1, a back-bone, large-capacity microwave system, inaugurated in 1964, links the principal cities of Taipei, Taichung, Tainan and Kaohsiung. This was built along the West Coast by Collins Radio Co. A small capacity VHF radio system links the cities of Ilan, Suao, Hualien and Taitung on the mountainous East Coast. In addition to the microwave and VHF radio systems, there is an underground cable carrier system from Keelung at the northern end of Taiwan to the southern city of Pingtung. This cable carrier system is largely used for medium and short-distance services.

3.08 Considerable improvement has been made in the speed and quality of service rendered during recent years. On more than half the long-distance circuits the operator makes the connection while the calling subscriber waits on the line. Nevertheless, before subscriber long-distance dialing can be introduced on a large scale, a major increase in circuits and switching facilities is essential.

Telegraph

3.09 At the end of 1966, there were a total of 342 telegraph circuits. Most of the operation is by the old type manual key and sounder but some conversion to teletype operation has been made in recent years. In 1966 a total of 1,296,000 messages were dispatched. The average time for delivering a telegram from its sender to its receiver was 45 minutes in that year. This compares favorably with the service rendered in more developed countries.

International

3.10 International telephone, telegraph and telex service is operated by means of high-frequency radio equipment located in Taipei. The principal direct circuits are to Hong Kong, Manila, Oakland and Tokyo. A list of all cities connected by direct international circuits from Taipei is shown in Annex 6.

3.11 The service rendered suffers from the inherent inadequacies of high-frequency radio transmission. To improve the quality of service, other means of overseas communication have been under consideration for some time. The first improvement resulting from these studies and negotiations was the inauguration in June 1967 of a tropospheric scatter system between Taiwan and Hong Kong. This will have an ultimate capacity for 64 circuits but is equipped to provide initially 16 circuits. Preliminary plans have been prepared for the future construction of a ground station for satellite communication. An agreement has recently been reached to construct within two years a tropospheric scatter system between Taiwan and the Philippines.

4. DEMAND FOR SERVICE

Local Telephone Service

4.01 Taiwan has a telephone development of 1.32 telephones per 100 population. While this is higher than many other underdeveloped Asian countries, such as the Philippines with 0.50 and Ceylon with 0.38, it is well below that of industrialized nations, for example, Japan with 14.18 telephones per 100 population.

4.02 As a result of the growth of the national economy and improvement in living standards, the demand for telephone service in Taiwan has been high and consistently maintained for over 10 years. A back-log of unfilled demand continues despite the substantial telephone expansion carried out in recent years. This demand is evidenced by the abnormally high calling rate of 16.1 per day per subscriber's line in Taipei and an average of 15.8 throughout Taiwan. This is nearly four times the calling rate in U.S.A.

How much?

4.03 The number of telephone subscribers in Taiwan has increased from 56,000 at the end of 1960 to 113,000 at the end of 1966 which corresponds to an average annual growth of 12.5 per cent. As a result of the

facilities to be added during the construction program it is estimated that the number of telephone subscribers will increase to 321,000 by the end of 1973, the estimated average rate of growth amounting to 16.0 per cent. Details are given in Annex 7.

4.04 The case for arguing that the demand for telephones is such as to give ample economic justification for the Project is strengthened by the existence of a connection fee of about US\$350 which is charged to new subscribers. This is well above the costs of making a connection. It has existed at its present high level for several years, partly to provide finance for investment and partly to restrain demand. Were a fee more in line with actual costs charged, demand would be even greater than is currently projected. Given the facts that demand is already pressing so hard on facilities and that revenue from the fee will be important for carrying out the Project, this fee should not be reduced before completion of the Project. Forecasts of demand thus assume the continuation of the fee. The forecast and underlying assumptions were reviewed by Mr. John J. Hanselman, a former Assistant Vice-President of the American Telephone and Telegraph Company, who was employed by the DGT as a consultant in the early part of 1966. He found that the records and data available were fully satisfactory and that sound and reasonable procedures had been used in preparing the estimates. To arrive at these estimates, the number of telephone lines in service during past years in each of the major cities was classified by major categories of customers (Residential, Industrial, Commercial, Government and Paystation) and from trends of growth observed in each group, the expected rates of growth were determined for the future. He confirmed that the forecasts of growth could be expected to be attained. It is also the opinion of the appraisal mission that these growth rates are reasonable.

Long-Distance Telephone Service - National

4.05 The demand for domestic long-distance telephone service has been growing at a rate approximating that of the growth in telephones. Improvements made in the facilities and consequently the grade of service rendered have stimulated usage. The introduction of subscriber toll dialing under the Project, providing almost immediate toll connections, will further stimulate growth.

4.06 During the period 1958-66 the number of long-distance telephone calls increased from 12.0 million to 24.3 million per year which corresponds to an average annual growth of 11.0 per cent. In this period the growth was not only restricted by shortage of facilities but also because of tariff increases and the enlarging of the local dial area of Taipei which transformed the toll calls between Taipei and its suburbs into local calls. It is estimated that the annual number of long-distance calls will increase to approximately 67 million by the end of 1973 and that the annual increase will average nearly 15 per cent. Details are given in Annex 7.

4.07 These estimates are based upon the continuance of current tariff levels and compare reasonably with past experience.

Telegraph Service - National

4.08 The average annual rate of growth of national telegraph service has amounted to about 15% for the period 1958 through 1966. Owing to the planned improvement in the quality of telephone service it is expected that the public will more and more use the telephone in preference to telegraph service. For this reason it is estimated that the annual rate of growth of national telegraph business will gradually taper off to about 8% in 1973. This estimate is realistic.

International Service - Telephone, Telegraph and Telex

4.09 In the 1958-66 period, the annual number of international telephone calls has increased from 72,500 to 265,800 and international telegraph messages from 435,000 to 800,000. Telex service, introduced in 1960, has grown rapidly; 430,000 minutes of traffic was handled in 1966. Details of the past growth of international services are given in Annex 7.

4.10 It is estimated that, during the years of the program, international telecommunication traffic will increase at annual rates of 15% for telephone, 8% for telegraph and 20% for telex. These estimates are in general accord with past trends and considered reasonable.

5. THE PROJECT

General

5.01 The DGT has embarked upon a program of expansion and improvement of telecommunication facilities to be brought into service during the period 1966 to 1971. In the early part of 1967 it completed the installation of 41,500 lines of automatic exchange telephone equipment distributed principally among the cities of Taipei, Taichung and Kaohsiung and financed under a US\$4.2 million loan from U.S. AID. During 1967 an additional 13,000 lines of automatic exchange telephone equipment and expansion of certain long-distance routes are to be financed by means of a Japanese credit equivalent to US\$3.9 million. A number of other works, of which the principal ones are a tropospheric scatter radio system to Hong Kong and extensions to the exchange telephone facilities in the smaller cities, would be self-financed. In addition, the program includes the purchase, through suppliers' credit, of additional channeling equipment to increase the capacities of existing microwave radio systems.

5.02 The remaining part of the expansion program is proposed for Bank financing and would be carried out during the 1967-71 period. It would comprise the installation of 118,000 lines of exchange telephone facilities in the cities of Taipei, Keelung, Taichung and Kaohsiung; the establishment of subscriber toll dialing between 11 toll centers with automatic toll switching systems located in Taipei, Taichung and Kaohsiung; and the establishment of a Telecommunications Training Center. Each of these major works, proposed for Bank financing, is described in more detail below.

Exchange Telephone Facilities - 118,000 Lines Automatic Equipment

5.03 Automatic equipment of the Crossbar type would be provided as follows:

	<u>Lines for Growth</u>
Taipei - South exchange	30,000
Taipei - North exchange	30,000
Taipei - East exchange	10,000
Keelung exchange	5,000
Taichung exchange	6,000
Kaohsiung - Center exchange	13,000
" - West exchange	<u>4,000</u>
Lines for Growth	<u>98,000</u>

	<u>Lines for Replacement</u>
Taipei - South No. 2 exchange	10,000
Taichung exchange	<u>10,000</u>
Lines for Replacement	<u>20,000</u>
TOTAL PROJECT LINES	<u>118,000</u>

5.04 The replacement of the Taipei South No. 2 exchange is required because the existing equipment cannot be expanded from five to six-digit numbering nor is there space for the installation of the additional inter-office trunking equipment. About half of the equipment of this exchange is 30 years old and will be scrapped, the balance being recovered for reconditioning and re-use in other offices.

5.05 The 10,000 lines of equipment to be replaced in Taichung consist of a 7,000-line exchange, which completely fills the building, and three 1,000-line mobile exchanges, being installed as a temporary expedient. Under the program a new building will be erected and 16,000 lines of equipment installed in it. The equipment in the old exchange and the mobile units will be recovered for subsequent re-use.

Line Plant

5.06 Coordinated with the expansion of the exchange automatic equipment, necessary extensions and improvements would be made to the exchange cable network. These works involve mainly local currency expenditures as practically all the materials required (cables, terminal boxes, conduits, poles and pole line hardware) are produced in Taiwan. Orders for telephone cables with a substantial total value would be placed with a single local cable manufacturing plant. Although these cables would not be financed by the proposed Bank loan, a confirmation was obtained from DGT that it would maintain a satisfactory procedure to assure that orders for cables would be placed at competitive prices.

Telephones

5.07 In connection with the expansion program, the DGT plans to adopt a modern telephone instrument equivalent to the Western Electric No. 500 type set, standard in U.S.A. The change will result in a substantial transmission improvement over the present No. 4 type which is largely purchased locally. As it is expected to take several years for the local manufacturers to produce enough of the new type telephones to meet requirements, it is planned that approximately 25% of requirements of the Project would be purchased under international competitive bidding and financed by the proposed Bank loan.

Buildings

5.08 Seven buildings would be constructed in the principal cities to house the telephone switching equipment. Only a small portion of the costs would be in foreign currencies for the purchase of air conditioning and emergency power equipment.

Establishment of Subscriber Toll Dialing System

5.09 The Project includes the installation of a subscriber-to-subscriber long-distance dialing system between eleven toll centers with automatic toll switching systems located in Taipei, Taichung and Kaohsiung. This would be a first major step toward providing subscriber toll dialing throughout all Taiwan. It is proposed to use Crossbar type switching equipment at the Taipei, Taichung and Kaohsiung offices in accordance with the recommendations of the consultants (see paragraph 5.14 below). The attached map No. 2 shows the subscriber toll dialing network to be established under the Project.

Telecommunications Training Center

5.10 To meet the needs of trained personnel to operate the increased quantity of facilities and the new types of equipment resulting from the expansion program, a Telecommunications Training Center will be constructed. This would be a permanent training school with room for 200 trainees in

new buildings specifically designed for classroom, shop and laboratory work. The trainees will come from all over the island and, because of lack of available housing and in accordance with common practice in Taiwan, housing as well as teaching facilities are to be provided.

5.11 The training program would provide new employees with technical knowledge regarding telecommunications systems and equipment and also would provide refresher courses to increase the technical competence of telecommunication engineers and technicians.

5.12 The teaching staff would consist of five permanent instructors selected from the DGT staff. This permanent staff would be supplemented with lecturers temporarily recruited from universities, outside business firms and the DGT.

5.13 Most of the construction costs would be in local currency and financed from the DGT's operations. Only those imported items, such as models of working telecommunication equipment, which, because of their nature could be purchased under international competitive bidding procedures, are proposed for financing under the Bank loan.

Engineering and Construction

5.14 The DGT engaged two experts to assist in the planning and the engineering design. Mr. John J. Hanselman, a former Assistant Vice-President of the American Telephone and Telegraph Company, among other observations, confirmed the reasonableness of the growth forecasts. Mr. Roy E. Bradstrum, former Chief Engineer of the Michigan Bell Telephone Company, assisted in the preparation of the basic engineering plans particularly with regard to the long-range development plans for the local and long-distance automatic switching network. Mr. William Rupp, formerly Equipment and Buildings Engineering Director of the American Telephone and Telegraph Company has been engaged to assist in the execution of the automatic equipment program. The program is technically sound and the engineering design is in accord with generally accepted practices.

5.15 Estimates have been drawn up of the additional personnel required to construct the line plant and install the switching equipment included in the expansion program. Recruiting and training of the necessary people commenced in 1967.

5.16 These arrangements for engineering and construction are satisfactory.

Procurement

5.17 All purchases to be financed under the proposed Bank loan are to be made in accordance with international competitive bidding procedures. The contracts will be placed through the Central Trust of China which acts as purchasing agent for the DGT and other organizations of the Government.

Schedule of Construction

5.18 The Bank-financed Project would be implemented as follows:

Engineering and specifications	Feb. 1966 to July 1967
Manufacture of equipment	Mar. 1968 to Dec. 1970
Equipment installation	Jan. 1969 to Dec. 1971

5.19 A bar chart showing by exchanges the schedule of building construction and related equipment installation is given in Annex 8. This chart also shows the installation schedule of the exchange equipment of the interim program now being implemented.

5.20 Installation of the subscriber toll dialing equipment would start at the beginning of 1969 and be completed in March 1970.

5.21 These schedules include reasonable margins for possible delays and may be improved upon during execution.

Cost Estimates

5.22 The cost of the Project proposed for Bank financing is estimated as follows:

	Foreign Exchange		Local Cost	Total Cost	
	US\$	NT\$	NT\$	US\$	NT\$
	(millions)				
Exchange facilities	13.25	530	1,192	43.05	1,722
Subscriber toll dialing	1.70	68	36	2.60	104
Training Center	0.15	6	23	0.72	29
Administration and consultants	0.30	12	56	1.70	68
Contingencies	1.60	64	20	2.10	84
TOTALS	17.00	680	1,327	50.17	2,007

5.23 The cost estimates are reasonable and have been based upon the actual prices charged for recent purchases. The principal item to be imported is exchange automatic equipment for which an estimated price of US\$92 per line has been taken. This price is based on recent tenders obtained for the supply of equivalent equipment. Foreign costs include allowances of 10% for contingencies. Only a nominal amount has been included for local cost contingencies. However, the 1967-71 program includes the equivalent of about US\$72 million for construction works in addition to the Bank-financed Project, and part of these works could be rescheduled if required to offset possible cost increases in the Project proposed for Bank financing.

6. FINANCIAL ASPECTS

Tariffs

6.01 Telecommunication tariffs are established by the DGT but are subject to review and approval of the Ministry of Communications, the Executive Yuan (Cabinet) and the Legislative Yuan (Congress). No regulations establishing a specific tariff policy have been issued by the Government. In recent years tariffs have been approved permitting the DGT to maintain a satisfactory rate of return on net fixed assets in operation of over 10%. In connection with existing loans obtained from U.S. AID a minimum rate of return of 6% was prescribed but calculated on a rate base including allowances for working capital and other items.

6.02 The present tariffs were made effective on September 1, 1965, and were estimated to increase total annual revenues by some 13%. The principal reason for this tariff increase was the introduction of a special payment by the DGT to the Government (see paragraph 6.19). The details of the existing tariffs are given in Annex 9. In general, they are of the same order of magnitude as tariffs charged by Government-owned telecommunication services in Western Europe.

6.03 During loan negotiations assurances were obtained that the DGT would be authorized to charge tariffs to enable it to maintain a minimum rate of return of 10% on average net fixed assets in operation, adjusted to reflect currency revaluations, changes in prices or similar factors, in accordance with a method satisfactory to the Bank.

Accounting and Audit

6.04 The accounting procedures of the DGT have been established in accordance with the "General Instructions for Communications Accounting System" issued in 1956 by the Directorate General of Budgets, Accounts and Statistics, which forms a part of the Executive Yuan. The accounting staff is capable and efficient and the accounting system is modern and follows generally accepted commercial practices. The accounting records are kept on a calendar year basis.

6.05 The DGT's accounts are subject to an annual examination followed by an audit. The examination is carried out jointly by the Ministry of Communications, the Ministry of Finance and the Directorate General of Budget, Accounts and Statistics. Subsequently the Ministry of Audit carries out the audit and its findings are incorporated in a report on all Government enterprises which is submitted to the Legislature.

6.06 In connection with the Bank loan made in 1965 to China to finance railways, a similar auditing procedure was found to be satisfactory and the Bank's normal requirement of independent auditors was therefore waived. This auditing procedure would also be satisfactory with respect to the DGT and agreement was reached during loan negotiations that the unaudited financial statements will be submitted to the Bank within three months after the closing of the fiscal year. The audited accounts and the auditors' reports, together with the certified auditors' statement, will be submitted to the Bank within seven months after the end of the financial year.

Present Financial Position

6.07 Actual Balance Sheets as of December 31 for the years 1961-1966 are shown in Annex 10. The DGT Estimated Balance Sheet as of December 31, 1966, is summarized as follows:

	Millions of NT\$	Millions of US\$
<u>ASSETS</u>		
Plant in Service	2,795	69.8
Less: Depreciation Reserve	<u>945</u>	<u>23.6</u>
Net Plant in Service	<u>1,850</u>	<u>46.2</u>
Plant under Construction	<u>167</u>	<u>4.2</u>
Total Net Fixed Assets	<u>2,017</u>	<u>50.4</u>
Current Assets		
Cash	721	18.0
Receivables	96	2.4
Materials and Supplies	175	4.4
Investments	<u>55</u>	<u>1.4</u>
Total Current Assets	<u>1,047</u>	<u>26.2</u>
Prepayments	90	2.3
Miscellaneous Assets	<u>22</u>	<u>.5</u>
Total Assets	<u>3,176</u>	<u>79.4</u>
<u>LIABILITIES</u>		
Equity		
Government Investment	122	3.1
Capital Surplus	1,497	37.4
Earned Surplus	<u>1,011</u>	<u>25.3</u>
Total Equity	<u>2,630</u>	<u>65.8</u>
Long-Term Debt	248	6.2
Current Liabilities	<u>167</u>	<u>4.2</u>
Subscribers' Deposits	<u>126</u>	<u>3.1</u>
Miscellaneous Liabilities	<u>5</u>	<u>.1</u>
Total Liabilities	<u>3,176</u>	<u>79.4</u>

6.08 As a result of inflation the DGT's fixed assets and the reserve for depreciation were revalued in 1959 and 1961 in accordance with general legislation and to reflect changes in the Wholesale Price Index compiled by the Bureau of Accounting Statistics. There has been no significant fluctuation in the Wholesale Price Index since 1961. Capital Surplus was credited with the two revaluations in the amount of NT\$710 million. The connection fees account for most of the remainder of capital surplus.

6.09 All new subscribers are required to pay in advance a connection fee. This varies from NT\$14,000 (US\$350) for subscribers in Taipei to NT\$4,000 (US\$100) for subscribers connected to manual exchanges. This fee has been in effect for a number of years and was found to be necessary in order to raise funds to finance expansion programs. The connection fees continue to supply a substantial portion of the capital funds needed for telephone expansion. In 1966 they totaled NT\$197 million (US\$4.9 million) or approximately 29% of total internally generated funds. During loan negotiations assurances were obtained that the connection fees would not be lowered before completion of the Project.

6.10 In Metropolitan Taipei only, the connection fee includes a construction allocation of NT\$7,200. In theory two-thirds (NT\$4,800) of this allocation is subject to refund if the telephone subscriber discontinues service within two years after installation and one-third (NT\$2,400) is subject to refund if the subscriber discontinues service within the third year after installation. In practice, however, a refund has never been requested. Taking this into consideration the DGT includes the total paid-in connection fees as capital surplus in the equity portion of its capital account. No interest is paid on the connection fees.

6.11 Each subscriber is required to pay a telephone set deposit of NT\$1,000 (US\$25) which is refundable without interest upon termination of service.

6.12 The DGT's assets have been largely financed from retained earnings and connection fees and to a negligible extent by long-term borrowing and Government investment; the Government has not provided capital funds since 1961. The DGT's total assets at the end of 1966 amounted to NT\$3,176 million while total debt was NT\$546 million or about 17% of total assets.

6.13 As of December 31, 1966, outstanding long-term debt totaled NT\$248 million (US\$6.2 million) representing about 9% of the total capitalization and consisting entirely of U.S. AID loans as follows:

Original Amount	Year Made	Amount Outstanding at 12/31/66	Terms
(in millions of US dollars)			
4.1	1955-58	1.6	15 years at 5%
2.0	1960	1.2	11 years at 3-1/2%
4.2	1962	3.4	11 years at 3-1/2%

6.14 At the end of 1966 the current assets were NT\$1,047 million as compared with current liabilities and subscribers' deposits totaling NT\$293 million. The greatest portion of current assets is in the form of cash amounting to NT\$721 million. It will be utilized over the next few years to meet part of the local currency costs of the planned expansion program. Most of the funds are on deposit in banks in Taiwan earning interest of about 9% per annum.

Past Operations

6.15 Detailed operating statements for the years 1961 through 1966 are shown in Annex 11. The DGT's total operating earnings have consisted of approximately 80% from telephone revenue, 19% from telegraph revenue and 1% from other operating revenue, mainly leased circuit rental.

6.16 During the years 1961-1964 the rate of return on net fixed assets in operation ranged from 10.2% to 11.9% and the operating ratio from 70% to 73%. This ratio compares favorably with the level normally achieved by an efficiently managed telecommunications operation. Principally as a result of abnormally high plant utilization and the tariff adjustment of September 1965, the rate of return for 1965 reached 14.7% and an operating ratio of 66% was achieved.

6.17 During recent years accounts receivable have amounted to approximately 12% of operating revenue. The collection performance is satisfactory.

6.18 Depreciation has been computed on a straight line basis, based on the service life of the various categories of plant in service. Rates vary from 1.7% for buildings to 20% for vehicles resulting in an annual composite rate of about 5%, which is reasonable.

Taxes and Dividends

6.19 Government regulations exempt the DGT from paying income tax, but stipulate that 25% of its annual net income must be paid to the Government. In addition, in connection with the tariff increase authorized on September 1, 1965, the Government introduced a special payment by the DGT to the Government. This payment is calculated on the basis of charges of NT\$34.90 on each subscriber's monthly rental, NT\$1.20 on each toll call and NT\$0.50 on each public telephone call. As a result most of the additional revenue generated by the tariff increase is paid to the Government.

6.20 To assure that DGT has adequate funds to meet the estimated cost of its expansion program, assurances were obtained during loan negotiations that during the 1967-71 construction period, the payment to the Government of 25% of DGT's annual net income would not be increased.

Insurance

6.21 Like most government entities the DGT does not carry insurance against losses on its fixed assets from major risks such as fire, typhoon and earthquake. During loan negotiations assurances were obtained that the Government would indemnify the DGT for any substantial losses from such casualties.

Financial Plan

6.22 A forecast of Sources and Applications of Funds for the period 1967 through 1971 is shown in Annex 12. During this period the DGT's construction costs are estimated at NT\$4,876 million (US\$122 million) including the works currently under way and those to be financed by the proposed Bank loan (see paragraphs 5.01 and 5.02).

6.23 The forecast is summarized as follows:

	1967-1971 (in millions of NT\$)	Per Cent
<u>Requirement of Funds</u>		
Construction		
Proposed IBRD Project	2,007	37.0
Other Projects	2,869	53.0
Payments to Government	396	7.3
Increase in Working Capital other than Cash	148	2.7
Total Requirements	5,420	100.0
<u>Available Funds</u>		
Internal Cash Generation	2,988	55.1
Less: Debt Service	476	8.8
Net Internal Cash Generation	2,512	46.3
Subscribers' Deposits	125	2.3
Connection Fees	1,222	22.6
Decrease in Cash	658	12.1
Borrowings:		
U.S. AID Loan	28	.5
Proposed Japanese Loan	155	2.9
Proposed IBRD Loan	680	12.6
Supplier or Other Credits	40	.7
Total Borrowings	903	16.7
Total Available Funds	5,420	100.0

6.24 The estimated funds available would be sufficient to cover construction costs, debt service requirements, payments to the Government, increase working capital and leave reasonable cash balances. An interest rate of 6% per annum and a term of 20 years including a grace period of four years have been assumed for the proposed Bank loan. Although no Bank funds are scheduled to be drawn down until 1968, it is necessary for budgetary as well as administrative reasons that the DGT has reasonable assurances at an early date that the funds will be available.

6.25 Arrangements are completed for the procurement of equipment from Japanese suppliers to be installed during 1967 and 1968. The cost of this equipment, estimated at US\$3.9 million equivalent, is being financed under a general credit of US\$150 million equivalent extended by Japan to the Republic of China. The funds are being made available to the DGT at an interest rate of 5.75% and a term of 12 years including a grace period of three years.

6.26 It has been assumed that the equipment required to increase the capacity of the existing microwave systems would be purchased directly from the original suppliers and that the cost, totaling about US\$1 million, would be financed by suppliers' credits on reasonable terms. For the purpose of financial forecasts a term of 7 years including a 1-year grace period and an interest rate of 7 per cent have been assumed. In view of the comparatively small amount involved, the terms of financing will not appreciably affect the financial projections. During loan negotiations the DGT confirmed that it expects to conclude satisfactory financing arrangements for this purchase and assurances were obtained that, before it is concluded, the purchase contract would be submitted to the Bank for its review and comments.

6.27 The proposed Bank loan would cover about 34% of the total costs of the works included in the proposed Bank project, and about 13% of total funds required during the 1967-71 period. The balance would be covered by net internal cash generation (46%), connection and subscribers' fees (25%), reduction of cash reserves (12%), the Japanese loan (3%), and U.S. AID loan and possible suppliers' credits (1%).

Estimated Future Operations

6.28 A forecast of earnings for the period 1967 through 1971 is shown in Annex 11. In preparing these estimates the DGT used the following reasonable assumptions based upon past experience:

- (a) Revenues are based upon the continuation of tariffs at existing levels and the growth estimates discussed in paragraphs 4.03-4.10;
- (b) Traffic and commercial expenses would increase at an annual rate of about 15%;
- (c) General and administrative expenses would increase at an annual rate of about 10%;
- (d) Maintenance expense is calculated at 5.2% of fixed assets;
- (e) Provision for depreciation is computed on a straight line basis at a composite rate of approximately 5% of fixed assets.

6.29 The forecast shows that the operating ratio will remain at a satisfactory level of about 70% during the period 1967-1971. The rate of return on average net fixed assets in service ranges from a high of 14.5% in 1967 to a low of 10.1% in 1971. The reduction toward the end of the period results from the substantial assets being added to the

system. These new facilities would provide for a limited time a small margin of spare capacity desirable for the efficient operation of the system.

Future Financial Position

6.30 Estimated balance sheets for the period 1967 through 1971 are shown in Annex 13. They show that the DGT will remain in a satisfactory financial position. The following financial ratios should be viewed in the light of the DGT's unusual capital structure in which a substantial portion of the equity has been built up by connection fees credited to capital surplus (see paragraphs 6.09 and 6.10).

6.31 Net plant in service would increase from NT\$1,850 million at the end of 1966 to NT\$4,619 million at the end of 1971. The long-term debt/equity ratio varies from a low of 12/88 in 1967 to a high of 17/83 in 1969 and 1970 reflecting the comparatively small amount of debt incurred in financing the DGT's expansion program.

6.32 Both debt service and interest are amply covered throughout the program. Debt service coverage by internal cash generation ranges from 10.9 times in 1967 to 5.1 times in 1971. Interest coverage by net income available for fixed charges ranges from 15.7 times in 1967 to 7.7 times in 1971.

Debt Limitation

6.33 During loan negotiations assurances were obtained that the DGT would not incur additional debt unless annual debt service requirements were covered at least twice by annual net revenues. The DGT should have no difficulty in meeting this commitment.

7. CONCLUSIONS

7.01 The program is technically sound and well designed to meet the immediate and most essential needs for the expansion of the DGT's telecommunication services. The DGT is well organized and its operations are efficient.

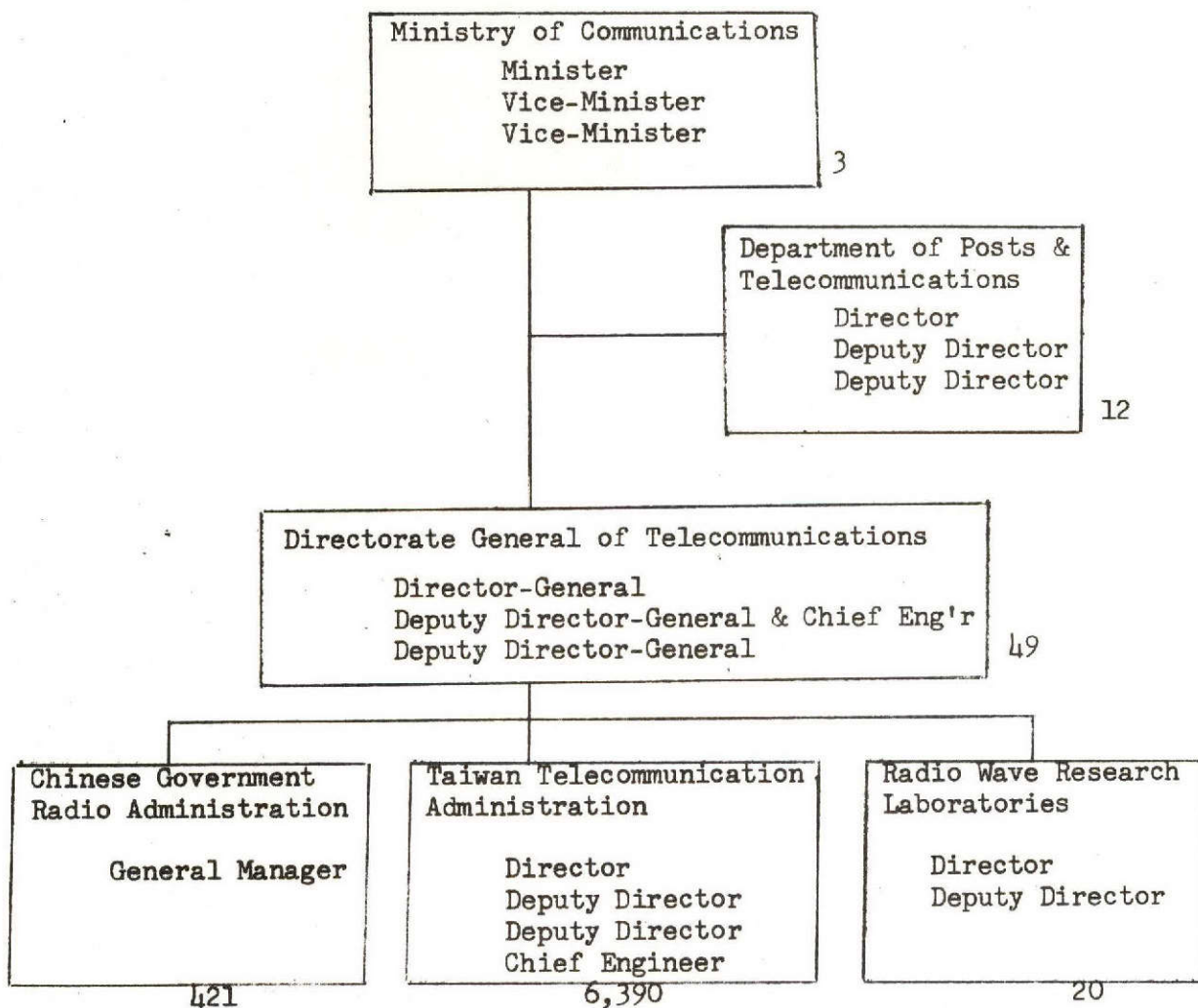
7.02 Estimates of costs are reasonable and financing proposals are satisfactory.

7.03 The DGT's financial position is sound and forecasts show it would remain so throughout the period required for the execution of the proposed program. Construction costs of the program not covered by the proposed Bank loan will largely be met from the DGT's own resources.

7.04 The program is suitable for a Bank loan of US\$17 million with a term of 20 years including a grace period of 4 years.

June 30, 1967

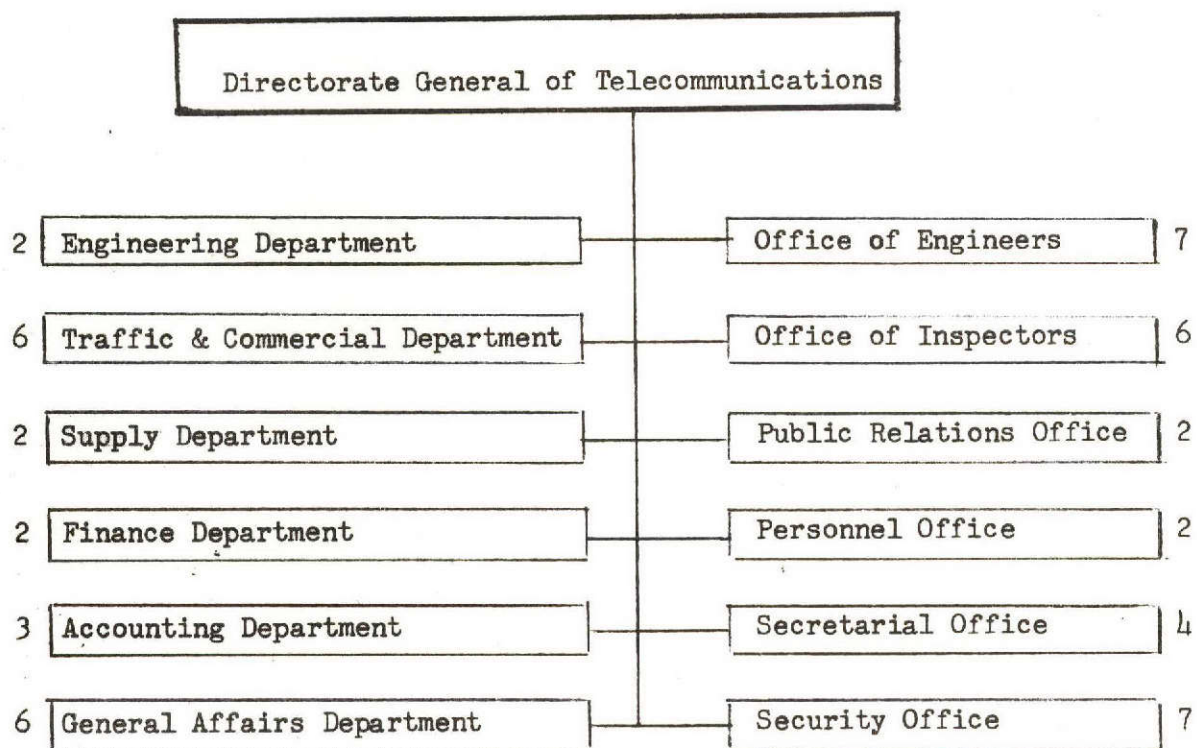
ORGANIZATION CHART OF TELECOMMUNICATION ADMINISTRATIVE SYSTEM
IN THE REPUBLIC OF CHINA



(Numbers show employees at June 30, 1966.)

October, 1966

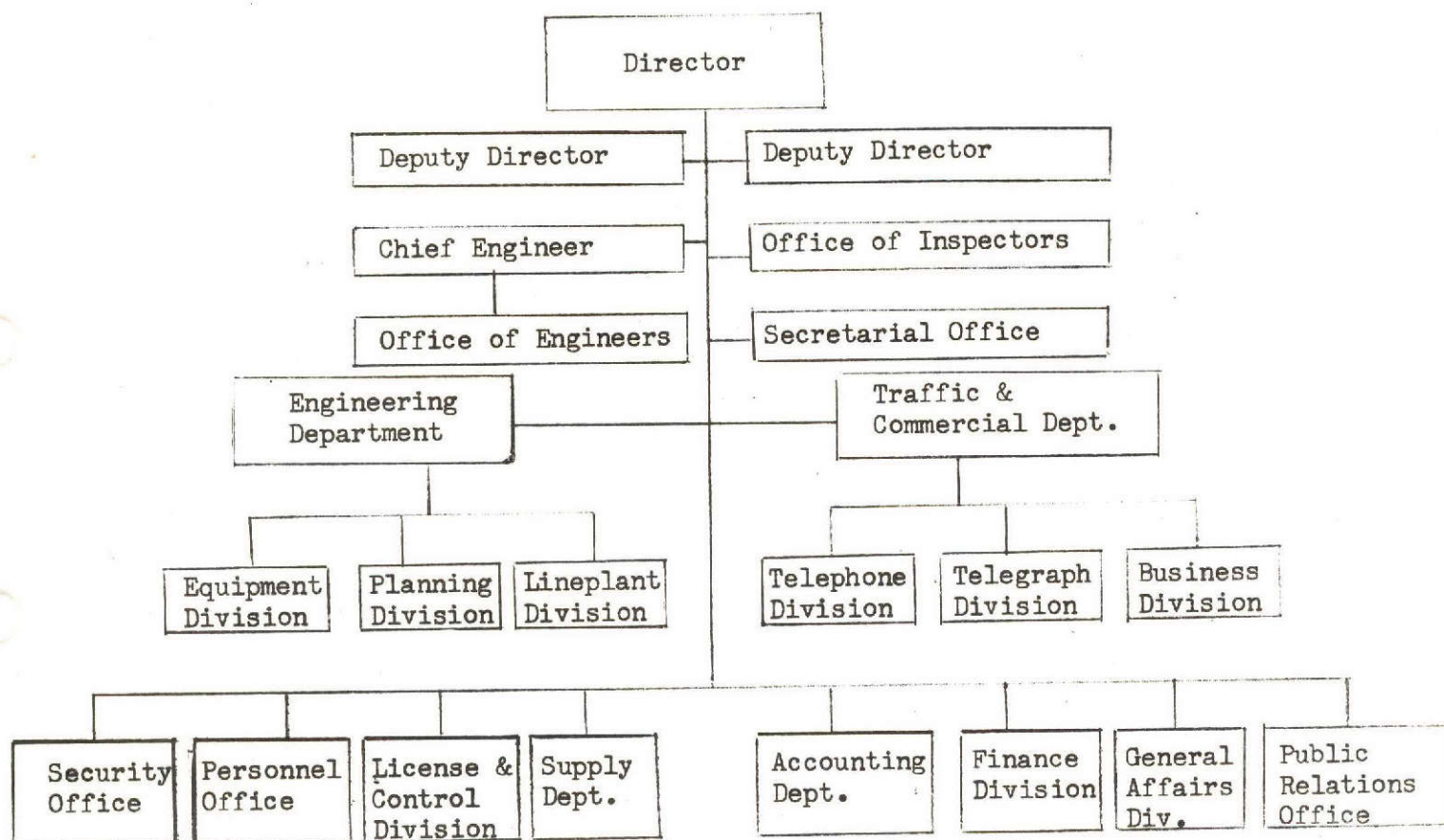
FUNCTIONAL CHART OF THE DIRECTORATE GENERAL OF
TELECOMMUNICATIONS (DGT)



(Numbers show employees at June 30, 1966.)

October, 1966

FUNCTIONAL CHART OF
TAIWAN TELECOMMUNICATION ADMINISTRATION (TTA)

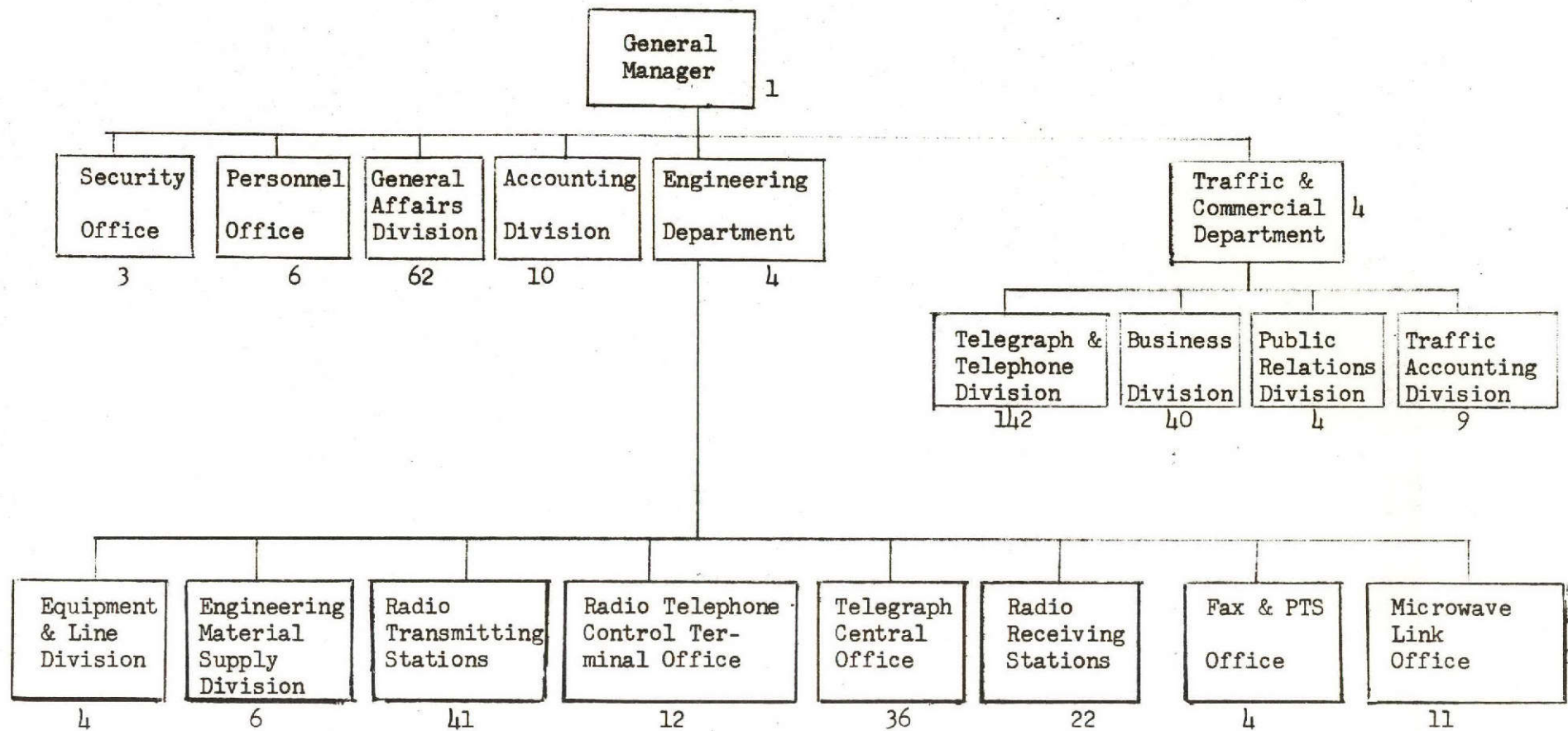


Total number of employees at June 30, 1966: 6,390

January 9, 1967

FUNCTIONAL CHART OF CHINESE GOVERNMENT RADIO ADMINISTRATION (CGRA)

421



(Numbers show employees at June 30, 1966.)

October, 1966

CHINADIRECTORATE GENERAL OF TELECOMMUNICATIONSLocal Telephone Facilities - Northern Taiwan Area

Location	Existing	Capacity (Line) December 31, 1966		Type of Equipment
		Under Construction		
Taipei City	57,000	13,000		SH, ST
Taipei Suburbs:				
Chingmei	1,000			SH
Chungho	1,200			SH
Sanchung	1,900			SH
Peitou	1,600			ST
Paochiao	900			ST
Hsinchuang	400	500		Conversion to ST
Shihlin	700			SH
Shantzehou	400			SH
Tienmu	1,200			SH
Keelung City	5,200			ST
Hsinchu City	3,000			ST
Shihmen	200			ST
Others	<u>15,750</u>			Manual
Sub-total	<u>90,450</u>	<u>13,500</u>		

Central Taiwan Area

Taichung City	7,000		ST
Chunghsing	600		ST
Fengyuan	2,000		ST
Changhua	3,000		ST
Others	<u>13,672</u>		Manual
Sub-total	<u>26,272</u>		

Location	Capacity (Line) December 31, 1966		Type of Equipment
	Existing	Under Construction	

Southern Taiwan Area

Chiayi City	2,700		SH
Tainan City	5,000		ST
Kaohsiung City	12,400		ST
Pingtung City	2,400		ST
Fengshan	800	1,000	Conversion to ST
Others	<u>11,845</u>	<u> </u>	Manual
Sub-total	<u>35,145</u>	<u>1,000</u>	

Eastern Taiwan Area and Penchu

Eastern Area	4,832		Manual
Penghu and Others	<u>1,269</u>		Manual
Sub-total	<u>6,101</u>		
TOTAL	<u>157,968</u>	lines	<u>14,500</u> lines
DIAL	<u>109,400</u>		
MANUAL	<u>48,568</u>		

Notes:

SH - Siemens & Halske equipment.

ST - Strowger equipment.

CHINADirect International Radio Links of theChinese Government Radio AdministrationDecember 31, 1966

<u>From Taipei to</u>	<u>Telegraph</u>	<u>Telex</u>	<u>Telephone</u>	<u>Photo</u>	<u>Program</u>	<u>Leased Telegraph Channels</u>
Bangkok	1		1	1		
Hong Kong	1	2	5	1		3
London	1					
Macau	1					
Manila	1	1	1	1		1
Oakland			4			
Okinawa	1		1			
Osaka	1	5				9
Paris	1				1	
Rome	1					
Saigon	1		1			
San Francisco	2	5		1	1	1
Seoul	1		1	1		
Tokyo			6	1	1	
Total	13	13	20	6	3	14

CHINADIRECTORATE GENERAL OF TELECOMMUNICATIONSTelephone Development in TaiwanGROWTH OF TELEPHONE SUBSCRIBERS

Year End	Number of Tele- phone Subscribers (in thousands)	Per Cent Annual Increase
1960	56	-
1961	65	16.1
1962	73	11.3
1963	80	9.8
1964	88	10.5
1965	99	11.5
1966	113	14.1
Actual Average 1961-1966		12.5
1967	137	21.2
1968	157	14.6
1969	181	15.0
1970	209	15.0
1971	240	15.2
1972	278	15.4
1973	321	15.6
Estimated Average 1967-1973		16.0

GROWTH OF DOMESTIC LONG-DISTANCE CALLS

Year	Number of Long-Distance Tele- phone Calls (3-min. period) (in millions)	Per Cent Annual Increase
1958	12.0	12.7
1959	14.1	17.4
1960	15.2	7.9
1961	16.8	10.4
1962	17.6	4.8
1963	18.4	4.5
1964	22.2	20.6
1965	25.5	14.9
1966	24.3	(4.7)
Actual Average 1958-1966		11.0
1967	30.9	20.7
1968	34.7	12.5
1969	39.2	13.0
1970	44.6	13.5
1971	50.8	14.0
1972	58.1	14.5
1973	66.9	15.0
Estimated Average 1967-73		14.7

GROWTH OF INTERNATIONAL TELECOMMUNICATION SERVICES

	Telephone Calls		Telegraph Messages		Telex	
	(Outgoing and Incoming)		(Outgoing and Incoming)		(Outgoing and Incoming)	
	Number	Per Cent Increase	Number	Per Cent Increase	Minutes	Per Cent Increase
(e x p r e s s e d i n t h o u s a n d s)						
1958	72.5	(3.2)	435.4	0.9		
1959	72.9	0.6	489.3	12.4		
1960	85.3	17.0	562.7	15.0	7.8	
1961	88.3	3.4	496.6	(11.8)	40.8	425.8
1962	87.1	(1.3)	474.8	(4.4)	107.6	163.7
1963	98.8	13.4	539.4	13.6	205.9	91.4
1964	138.4	40.1	621.6	15.2	319.4	55.1
1965	192.3	38.9	681.5	9.6	405.0	36.8
1966	265.8	38.2	799.8	17.3	430.5	6.0
Average Annual Increase		16.3		7.5		-

TAIWAN TELECOMMUNICATIONS ADMINISTRATION

1967-1971 Central Office Building and Exchange Equipment
Installation Schedule

	Lines	1967	1968	1969	1970	1971
<u>Taipei South</u>						
New Building						
IBRD Equipment Project	10,000					
" " "	20,000					
" " "	10,000					
<u>Taipei North</u>						
Interim Equipment Project	10,000					
New Building						
IBRD Equipment Project	10,000					
" " "	10,000					
" " "	10,000					
<u>Taipei East</u>						
Interim Equipment Project	13,000					
New Building						
IBRD Equipment Project	10,000					
<u>Keelung</u>						
Interim Equipment Project	1,000					
New Building						
IBRD Equipment Project	5,000					
<u>Taichung</u>						
Interim Equipment Project	3,000					
New Building						
IBRD Equipment Project	16,000					
<u>Kaohsiung Center</u>						
Interim Equipment Project	3,000					
New Building						
IBRD Equipment Project	6,000					
" " "	7,000					
<u>Kaohsiung West</u>						
New Building						
IBRD Equipment Project	4,000					

x Installed in existing building.

October, 1966

CHINADIRECTORATE GENERAL OF TELECOMMUNICATIONSTariffs
(expressed in NT Dollars)LOCAL MONTHLY TELEPHONE RATES

<u>Group I</u>	<u>Group II</u>	<u>Group III</u>	<u>Group IV</u>
A 51	A 60	A 70	A 80
B 132	B 153	B 173	B 214
C 102	C 119	C 134	C 167
D 143	D 165	D 186	D 237

RATE AREA

- I: Less than 100 subscribers
II: 101 to 500 subscribers
III: 501 to 1000 subscribers
IV: Over 1000 subscribers

CLASS OF SUBSCRIBER

- A: Residence
B: Commercial, Industrial
and other Business
C: Non-profit and Government
Organizations
D: Organizations Catering to
the General Public

Manual service carries a flat rate while automatic service carries a measured rate according to number of calls as follows:

Class A: First 180 calls free; NT\$.70 per call beginning with the 181st call;

Classes B, C and D: First 300 calls free; NT\$.70 per call beginning with the 301st call.

COIN BOX RATE

NT\$1.00 per call.

DOMESTIC TOLL TELEPHONE RATES

<u>Airline Distance</u> <u>(km.)</u>	<u>Advance Preparation</u> <u>Service (3-min.call)</u>	<u>CLR (Non-delay)</u> <u>Service (3-min.call)</u>
Below 5	1.20	2.50
Over 5 up to 20	3.60	8.00
Over 20 up to 40	7.20	10.00
Over 40 up to 60	10.80	18.00
Over 60 up to 80	14.40	20.00
Over 80 up to 110	18.00	28.00
Over 110 up to 140	21.60	30.00
Over 140 up to 180	25.20	32.00
Over 180 up to 220	28.80	40.00
Over 220 up to 260	32.40	42.00
Over 260	36.00	50.00

Advance Preparation Service: Rates are for ordinary station to station calls; the rates are increased by 50% for person to person calls; rates for urgent calls are doubled.

CLR (Non-delay) Service: Rates are for station to station calls; the rates are increased by 33% for person to person calls.

Night-time Reduced Rates: The rates are reduced by 30% for calls booked between the hours of 2200-0600.

DOMESTIC TELEGRAPH RATES

Ordinary messages are charged at the rate of NT\$0.50 per character with a minimum of 7 characters per message.

Letter messages are charged at the rate of NT\$0.25 per character with a minimum of 22 characters per letter.

Urgent rate is double the ordinary rate and the Government rate is one-half the ordinary rate.

CHINA

DIRECTORATE GENERAL OF TELECOMMUNICATIONS

Actual Balance Sheets December 31, 1961-1966

(Expressed in Millions of New Taiwan Dollars)

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>
<u>ASSETS</u>						
<u>Fixed Assets</u>						
Plant in Service	1,532	1,697	1,875	2,183	2,287	2,795
Less: Depreciation Reserve	457	520	593	699	811	945
Net Plant in Service	<u>1,075</u>	<u>1,177</u>	<u>1,282</u>	<u>1,484</u>	<u>1,476</u>	<u>1,850</u>
Plant Under Construction	325	265	291	112	353	167
Total Net Fixed Assets	<u>1,400</u>	<u>1,442</u>	<u>1,573</u>	<u>1,596</u>	<u>1,829</u>	<u>2,017</u>
<u>Current Assets</u>						
Cash	147	206	278	437	489	721
Receivables	66	67	62	77	86	96
Materials and Supplies	87	97	107	114	129	175
Investments	7	7	7	1	52	55
Total Current Assets	<u>307</u>	<u>377</u>	<u>454</u>	<u>629</u>	<u>756</u>	<u>1,047</u>
<u>Deferred Charges</u>	<u>5</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>-</u>	<u>-</u>
<u>Prepayments</u>	<u>43</u>	<u>52</u>	<u>53</u>	<u>56</u>	<u>86</u>	<u>90</u>
<u>Miscellaneous Assets</u>	<u>10</u>	<u>13</u>	<u>21</u>	<u>21</u>	<u>22</u>	<u>22</u>
Total Assets	<u>1,765</u>	<u>1,886</u>	<u>2,104</u>	<u>2,303</u>	<u>2,693</u>	<u>3,176</u>
<u>LIABILITIES</u>						
<u>Equity</u>						
Government Investment	122	122	122	122	122	122
Capital Surplus	1,014	1,050	1,130	1,210	1,333	1,497
Earned Surplus	316	406	487	609	786	1,011
Total Equity	<u>1,452</u>	<u>1,578</u>	<u>1,739</u>	<u>1,941</u>	<u>2,241</u>	<u>2,630</u>
<u>Long Term Debt</u>						
U.S. AID Loans	156	121	175	162	217	248
Suppliers' Credit	24	26	25	8	-	-
Total Long Term Debt	<u>180</u>	<u>147</u>	<u>200</u>	<u>170</u>	<u>217</u>	<u>248</u>
<u>Current Liabilities</u>	<u>65</u>	<u>84</u>	<u>78</u>	<u>94</u>	<u>123</u>	<u>167</u>
<u>Subscribers' Deposits</u>	<u>62</u>	<u>72</u>	<u>82</u>	<u>93</u>	<u>107</u>	<u>126</u>
<u>Miscellaneous Liabilities</u>	<u>6</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>
Total Liabilities	<u>1,765</u>	<u>1,886</u>	<u>2,104</u>	<u>2,303</u>	<u>2,693</u>	<u>3,176</u>
Ratio: Long Term Debt/Equity	11/89	9/91	10/90	8/92	9/91	9/91

June 7, 1967

CHINA

DIRECTORATE GENERAL OF TELECOMMUNICATIONS

Actual and Forecast Operating Statements

(Expressed in Millions of New Taiwan Dollars)

As at December 31	ACTUAL						FORECAST				
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
<u>Operating Revenues</u>											
Local Service Revenues	169	202	207	231	288	386	475	559	642	738	848
Toll Service Revenues	139	138	153	196	244	293	336	387	450	523	609
Telegraph Revenues	79	86	96	115	132	152	158	174	189	205	222
Miscellaneous Operating Revenues	6	3	3	4	7	8	8	12	16	21	26
Total Operating Revenues	393	429	459	546	671	839	977	1,132	1,297	1,487	1,705
Less: Telephone Tax ^{1/}					27	87	109	126	144	164	187
Net Operating Revenues	393	429	459	546	644	752	868	1,006	1,153	1,323	1,518
<u>Operating Expenses</u>											
Costs of Operation	207	228	247	277	301	331	414	479	556	648	769
Depreciation	68	77	86	118	125	155	176	200	232	270	329
Total Operating Expenses	275	305	333	395	426	486	590	679	788	918	1,098
Net Operating Income	118	124	126	151	218	266	278	327	365	405	420
<u>Miscellaneous Income (Loss)</u>	(3)	3	11	20	25	40	5	(4)	(5)	(5)	(5)
Net Income Available for Fixed Charges	115	127	137	171	243	306	283	323	360	400	415
<u>Fixed Charges</u>											
Interest	11	7	7	9	8	6	18	30	41	51	54
Net Income	104	120	130	162	235	300	265	293	319	349	361
<u>Payments to Government</u>	26	30	33	40	59	75	66	73	80	87	90
Net Income Transferred to Surplus	78	90	97	122	176	225	199	220	239	262	271
Rate of Return ^{2/}	11.9%	11.0%	10.2%	10.9%	14.7%	16.0%	14.5%	14.0%	13.2%	12.3%	10.1%
Operating Ratio ^{3/}	70%	71%	73%	72%	66%	65%	68%	67%	68%	69%	72%

^{1/} Tax Collected and Paid Directly to Government^{2/} Ratio of Net Operating Income to Average Net Plant in Service^{3/} Ratio of Total Operating Expenses to Net Operating Revenues

June 7, 1967

CHINA

DIRECTORATE GENERAL OF TELECOMMUNICATIONS

Forecast of Sources and Applications of Funds 1967-1971

(Expressed in Millions of New Taiwan Dollars)

SOURCES OF FUNDS	1967	1968	1969	1970	1971	Total
<u>Internal Cash Generation</u>						
Net Income Available for Fixed Charges	283	323	360	400	415	1,781
Depreciation	176	200	232	270	329	1,207
Total Internal Cash Generation	<u>459</u>	<u>523</u>	<u>592</u>	<u>670</u>	<u>744</u>	<u>2,988</u>
<u>Borrowings</u>						
U.S. AID Loan	28	-	-	-	-	28
Proposed Japanese Loan	155	-	-	-	-	155
Proposed IBRD Loan	-	200	240	200	40	680
Supplier or Other Credit	-	40	-	-	-	40
Total Borrowings	<u>183</u>	<u>240</u>	<u>240</u>	<u>200</u>	<u>40</u>	<u>903</u>
<u>Subscribers' Deposits</u>	<u>19</u>	<u>22</u>	<u>24</u>	<u>28</u>	<u>32</u>	<u>125</u>
<u>Connection Fees</u>	<u>194</u>	<u>202</u>	<u>228</u>	<u>277</u>	<u>321</u>	<u>1,222</u>
Total Sources of Funds	<u>855</u>	<u>987</u>	<u>1,084</u>	<u>1,175</u>	<u>1,137</u>	<u>5,238</u>
<u>APPLICATIONS OF FUNDS</u>						
<u>Construction Program</u>	<u>902</u>	<u>996</u>	<u>1,015</u>	<u>1,038</u>	<u>925</u>	<u>4,876</u>
<u>Debt Service</u>						
Interest						
U.S. AID Loans	11	10	8	6	4	39
Proposed Japanese Loan	7	9	9	9	8	42
Proposed IBRD Loan	-	8	21	33	40	102
Supplier or Other Credit	-	3	3	3	2	11
Total Interest	<u>18</u>	<u>30</u>	<u>41</u>	<u>51</u>	<u>54</u>	<u>194</u>
Amortization						
U.S. AID Loans	24	44	46	48	42	204
Proposed Japanese Loan	-	-	-	17	17	34
Proposed IBRD Loan	-	-	-	-	27	27
Supplier or Other Credit	-	-	5	6	6	17
Total Amortization	<u>24</u>	<u>44</u>	<u>51</u>	<u>71</u>	<u>92</u>	<u>282</u>
Total Debt Service	<u>42</u>	<u>74</u>	<u>92</u>	<u>122</u>	<u>146</u>	<u>476</u>
<u>Increase in Working Capital Other Than Cash</u>	<u>(32)</u>	<u>39</u>	<u>(25)</u>	<u>79</u>	<u>87</u>	<u>148</u>
<u>Payments to Government</u>	<u>66</u>	<u>73</u>	<u>80</u>	<u>87</u>	<u>90</u>	<u>396</u>
Total Applications of Funds	<u>978</u>	<u>1,182</u>	<u>1,162</u>	<u>1,326</u>	<u>1,248</u>	<u>5,896</u>
Cash Surplus (Deficit)	(123)	(195)	(78)	(151)	(111)	(658)
Cash at Beginning of Year	721	598	403	325	174	721
Cash at End of Year	598	403	325	174	63	63
Debt Service Coverage by Internal Cash Generation	10.9	7.1	6.4	5.5	5.1	
Interest Coverage by Net Income Available for Fixed Charges	15.7	10.8	8.8	7.8	7.7	

me 7, 1967

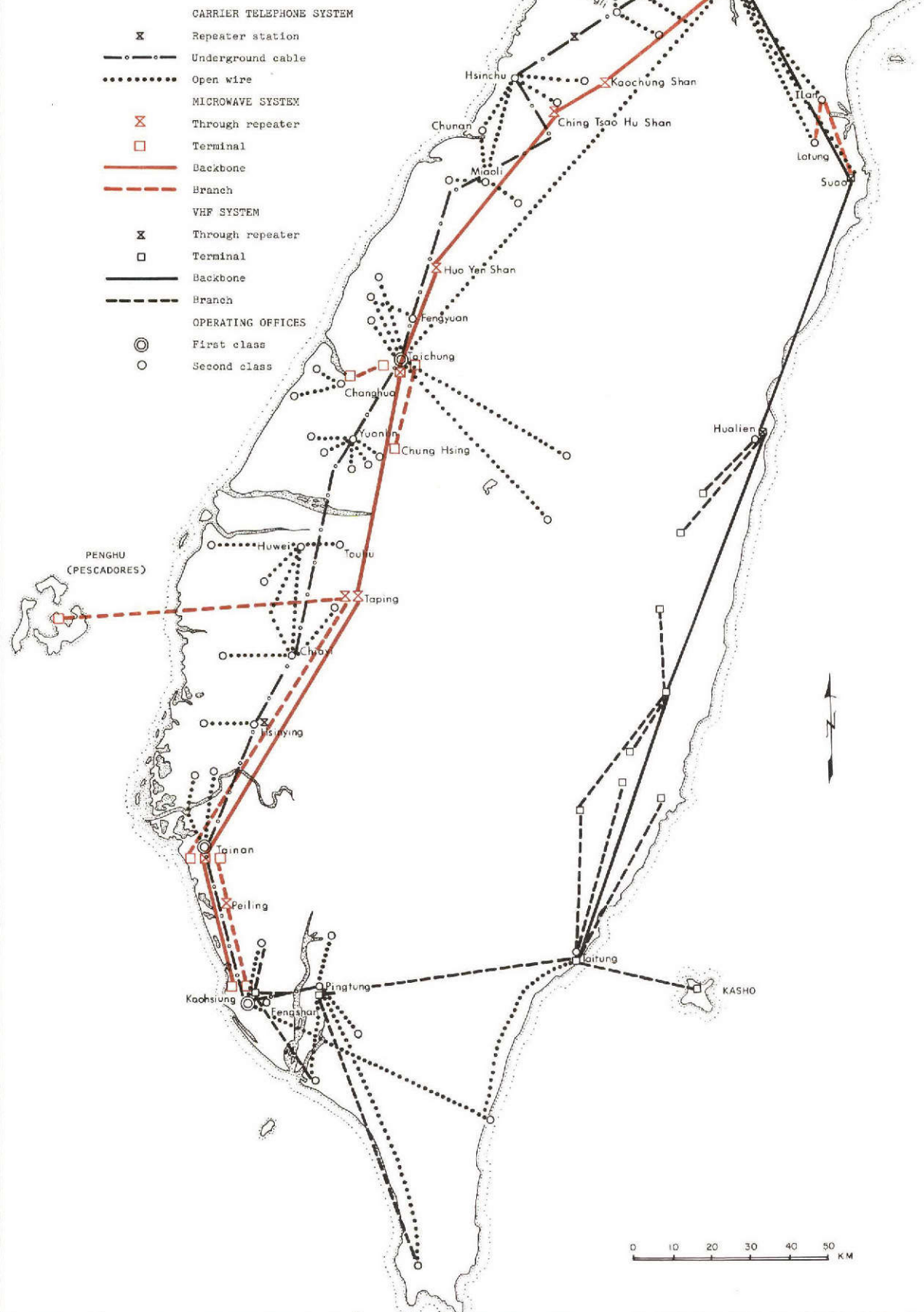
CHINADIRECTORATE GENERAL OF TELECOMMUNICATIONS

Forecast Balance Sheets December 31, 1967-1971
(Expressed in Millions of New Taiwan Dollars)

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
<u>ASSETS</u>					
<u>Fixed Assets</u>					
Plant in Service	3,116	4,004	4,383	5,562	6,771
Less: Depreciation Reserve	1,121	1,321	1,553	1,823	2,152
Net Plant in Service	<u>1,995</u>	<u>2,683</u>	<u>2,830</u>	<u>3,739</u>	<u>4,619</u>
Plant Under Construction	748	856	1,492	1,351	1,067
Total Net Fixed Assets	<u>2,743</u>	<u>3,539</u>	<u>4,322</u>	<u>5,090</u>	<u>5,686</u>
<u>Current Assets</u>					
Cash	598	403	325	174	63
Receivables	110	126	142	161	183
Materials and Supplies	196	221	254	294	356
Investments	30	30	5	5	5
Total Current Assets	<u>934</u>	<u>780</u>	<u>726</u>	<u>634</u>	<u>607</u>
<u>Prepayments</u>	90	90	90	90	90
<u>Miscellaneous Assets</u>	22	22	22	22	22
Total Assets	<u>3,789</u>	<u>4,431</u>	<u>5,160</u>	<u>5,836</u>	<u>6,405</u>
<u>LIABILITIES</u>					
<u>Equity</u>					
Government Investment	122	122	122	122	122
Capital Surplus	1,691	1,893	2,121	2,398	2,719
Earned Surplus	1,210	1,430	1,669	1,931	2,202
Total Equity	<u>3,023</u>	<u>3,445</u>	<u>3,912</u>	<u>4,451</u>	<u>5,043</u>
<u>Long Term Debt</u>					
U.S. AID Loans	252	208	162	114	72
Proposed Japanese Loan	155	155	155	138	121
Proposed IBRD Loan	-	200	440	640	653
Supplier or Other Credit	-	40	35	29	23
Total Long Term Debt	<u>407</u>	<u>603</u>	<u>792</u>	<u>921</u>	<u>869</u>
<u>Current Liabilities</u>	209	211	260	240	237
<u>Subscribers' Deposits</u>	145	167	191	219	251
<u>Miscellaneous Liabilities</u>	5	5	5	5	5
Total Liabilities	<u>3,789</u>	<u>4,431</u>	<u>5,160</u>	<u>5,836</u>	<u>6,405</u>
Ratio: Long Term Debt/Equity	12/88	15/85	17/83	17/83	15/85

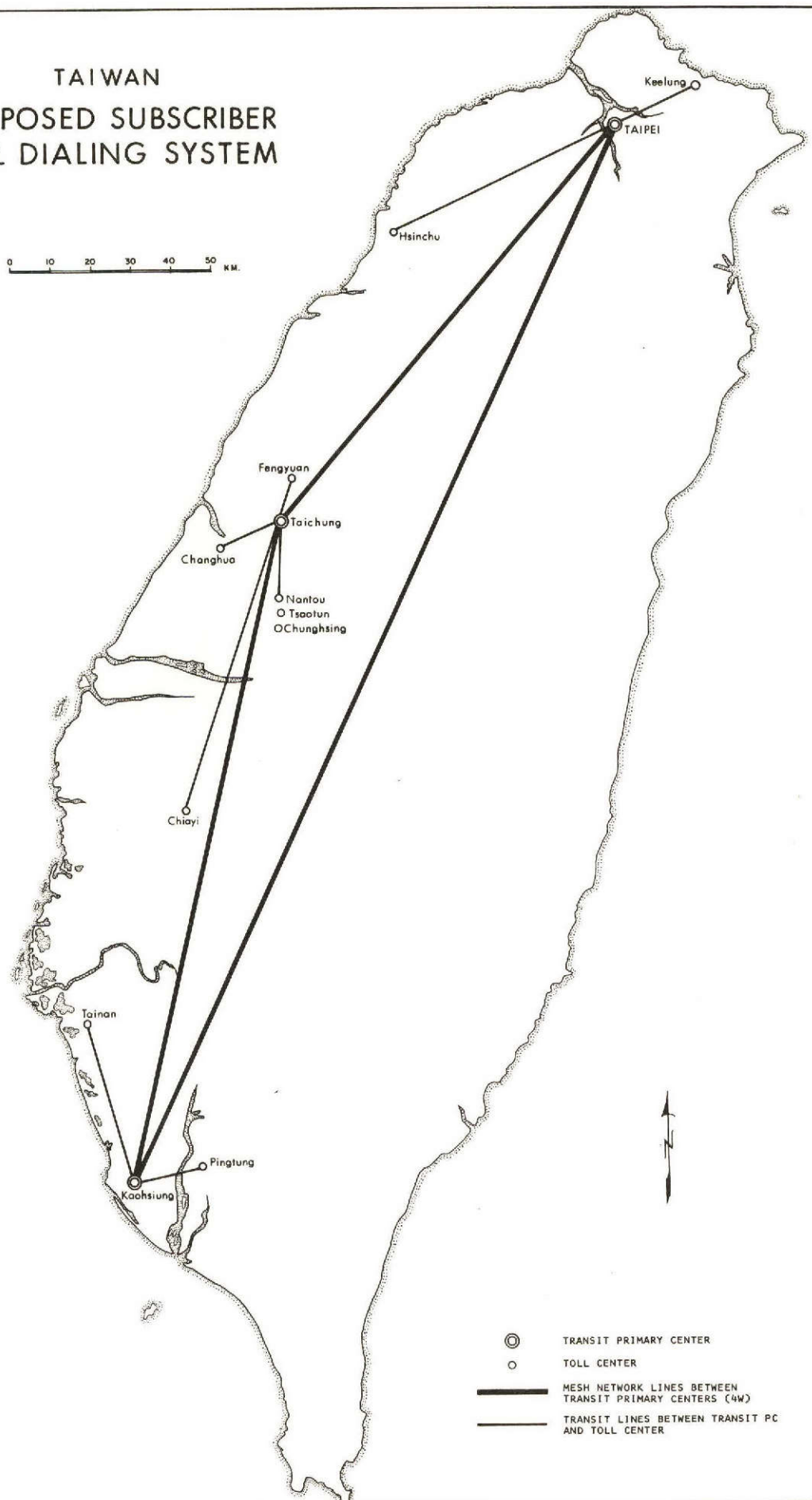
June 7, 1967

TAIWAN TELECOMMUNICATIONS



TAIWAN PROPOSED SUBSCRIBER TOLL DIALING SYSTEM

0 10 20 30 40 50 KM.



- ⊙ TRANSIT PRIMARY CENTER
- TOLL CENTER
- MESH NETWORK LINES BETWEEN TRANSIT PRIMARY CENTERS (4W)
- TRANSIT LINES BETWEEN TRANSIT PC AND TOLL CENTER

