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Infrastructure in Philippine Development

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Abstract

Studies linking infrastructure and development support the idea that there are large returns to infrastructure investments. This paper examines the conceptual bases for infrastructure's role and their implementation in the Philippines. Regressions show that capital stock investments have yielded insignificant effects on Philippine output from 1955-2001. A survey of different sectors suggests that poor government management has severely limited the effectiveness of resource mobilization and reduced the rate of return on infrastructure investments in the country. Recent experience indicates that allowing greater private sector involvement may address pressing issues regarding efficiency in provision and funding capabilities until the government develops the ability for effective resource mobilization. It is recommended that the government focus on strengthening future financing capacity to meet expected increases in demand for infrastructure services. Caution, however, must be exercised in the overly liberal provision of performance guarantees as this may lead to significant government expenditure increases in the future.

INFRASTRUCTURE IN PHILIPPINE DEVELOPMENT

by

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I. Background

The importance of infrastructure for development was recognized early in the emergence of development economics. Paul Rosenstein-Rodan, Ragnar Nurkse, and Albert Hirschmann, among others, pointed out the importance of large and lumpy investments in increasing productivity as well as the support provided by basic infrastructure. This was reinforced when Rostow (1960) listed infrastructure provision as one of the “pre-conditions for take-off”. More recently, David Aschauer’s articles (1989) have rekindled interest in infrastructure’s role in development. Since then, there has been a flurry of interest in its importance, its contribution to economic growth, and reasons for success or failure of infrastructure projects. In this preliminary study, we review the conceptual bases for infrastructure’s role and their implementation in the case of the Philippines.

II. Infrastructure and economic growth

One of the most important questions in economic growth is the contribution of the different factors of production to aggregate output. The task then is to bring about an increase in these factors in order to increase output in the shortest time. Where resources are limited, the strategy may include focusing on those with the highest impact on output.

Direct evidence of this contribution is indicated by the returns to the factors. In a perfectly competitive economy, the market will automatically channel resources to activities to those with the highest returns. Unfortunately, factor inputs sometimes generate spillovers or externalities that cannot be captured through the market mechanism. Other forms of market failure such as the absence of markets may also prevent the market from allocating resources efficiently. In this situation, potential market revenue of these factors diverges from their marginal social benefit. As a result, the market is unable to provide the correct amount of some commodities and services for the economy.

For the foregoing reasons, the construction of infrastructure has traditionally had a large public sector component, at least in the last 75 years. In the absence of market mechanisms, public sector projects have often been evaluated by the methods of cost-benefit analysis. Recent studies indicate large returns to infrastructure investment. Using broad regional data, Aschauer (1989) shows that the elasticities of non-military public capital to output per unit of capital are in the 0.25 - 0.40% range. Succeeding studies (e.g. Gramlich, 1994) have reduced the implied rates of return but have nevertheless supported differences in growth rates that can be indirectly attributed to infrastructure investments.

III. Infrastructure in Developing Countries

Public resources in less-developed countries (LDC's), especially those for financing basic infrastructure services, are often scarce. This can be traced to the overall fiscal weakness of most LDC governments. This in turn is often caused by the difficulty of collecting taxes and other forms of government revenues. In the Philippines, for example, the ratio of government revenues to gross domestic product (GDP) has typically been less than 20% (right now just slightly more than 10%). One explanation for this rather discouraging state of affairs is that underdevelopment, in fact, refers to a lack of institutions needed to support an economy that operates at a level that results in higher income per person.

Fiscal difficulties have led to several innovations in modes of financing infrastructure services in developing countries. Governments have resorted to, among other methods, built-operate-transfer (BOT), build-transfer-operate (BTO), and build-own-operate (BOO) arrangements. The last method is, of course, merely the application of the traditional franchising mode of public utilities to more areas such as toll roads and ports. The Philippines passed what has become known as the BOT law (that includes the other arrangements) in 1991, subsequently re-encoded to simplify more provisions.

These arrangements are discussed in more detail, where appropriate, below.

IV. Contribution to Philippine economic growth

Post-war Philippines saw a slow accumulation of capital stock to what it is today. Table 1 shows estimate of the capital stock for the Philippines using the perpetual inventory method. From 1956 to the 1969 net capital stock grew at a fairly stable annual average of 6.6 percent (Sanchez, 1980; my estimates -- using her method -- for 1970 onwards). From 1970 to the early part of the 1980s, a massive effort by President Ferdinand Marcos to industrialize the economy saw large increases in the nation's capital stock. Philippine capital stock is estimated to have grown by an average of 20 percent during this period. In the early 1980's political events induced a crisis in confidence that had debilitating effects on investment. As confidence in the country waned, private investment ground to a halt.

Table 1
Philippine Capital Stock and Growth Rates

	Capital Stock (constant 1985 prices)	Percent Increase
1955	92,810.6	
1960	124,272.6	33.9
1965	207,828.7	67.2
1970	443,298.7	113.3
1975	735,626.1	65.9
1980	2,445,634.8	232.5
1985	6,367,752.5	160.4
1990	8,982,288.6	41.1
1995	23,622,470.3	163.0
1996	27,261,402.1	15.4
1997	31,224,435.9	14.5
1998	33,128,251.9	6.1
1999	37,704,515.8	13.8
2000	42,842,243.2	13.6
2001	44,577,205.7	4.0

Source: IDEA, Inc. (using NSCB data)

After the ouster of the Marcos government, private investments slowly started to flow back into the country. The early years of rehabilitation were bedeviled by various attempts of a military takeover that undermined confidence one again, culminating in the largest attempt in December 1989. Six months after the takeover attempt, private investments went down to practically zero. However, investments eventually recovered and capital formation has grown by an annual average of 6.5 percent since 1986, with investments in durable equipment growing the fastest, at a 7 percent average annual rate. As a result, capital stock has been accumulating at an average of 13.5 percent annually since 1986.

Despite the robust growth in capital stock in the Philippines, it has failed to produce the much-needed increases in output. Increases in output per worker over the post-World War II period are not overly impressive, to say the least. For indications on the impact of investments on Philippine economic growth, preliminary estimates using the aggregate production function over the whole economy were made. These estimates, using different functional forms, have yielded largely similar results indicating an insignificant effect of capital stock on national output.

Table 2
Summary of Regression Results

Dependent Variable: Real GDP	1	2	3	4	5
	Linear	Cobb-Douglas	Cobb-Douglas (Restricted)	Translog	Tranlog with AR Corrections
Constant	1.19 (0.93)	0.79 (0.02)	0.32 (0.00)	-66.63 (0.69)	-127.83 (0.21)
Labor supply	1.37 (0.00)				
Capital stock	-0.02 (0.68)				
log(Labor supply)		0.71 (0.00)	1.03 (0.00)	-2.67 (0.79)	-6.48 (0.27)
log(Capital stock)		0.07 (0.32)	-0.03 (0.01)	19.5 (0.69)	38.08 (0.20)
log(Labor supply) ²				-0.15 (0.61)	-0.25 (0.15)
log(Capital stock) ²				-2.68 (0.71)	-5.46 (0.21)
Interaction Term				0.51 (0.73)	1.06 (0.22)
Adjusted R square	0.9604	0.9624		0.984	0.9485
Root Mean Square Error					0.00897

Note: 1. Numbers in parenthesis are p-values

Source: IDEA, Inc.

Table 2 shows different functional forms that were used to estimate the effect of capital stock on output. The simple linear estimate shows that only labor has a significant effect on Real GDP. A simple Cobb-Douglas production function also shows that capital stock has no significant effect on production and that labor has a significantly large share in output generation as compared to capital. If the same Cobb-Douglas form is estimated with restrictions, capital stock coefficient becomes significant but its share to output is negative. The coefficient for labor increases beyond one and is significant, signifying the disproportionately large share of labor in generating Philippine output.

The estimates for the translog functions reverse signs of the coefficients relative to those in the linear and Cobb-Douglas forms. This merely reflects the underlying phenomenon of the postwar period, i.e. where per worker productivity essentially remained constant, implying no change in technology. The instability of the coefficient estimates resulting from the collinearity of the variables show up in the estimates for the translog form of the production function. This nearly fixed coefficient behavior of labor and capital is consistent with a constant incremental capital-output ratio, implying in turn no significant technological change over the period.

These results are consistent with studies made by Cororaton and Cuenca (2001) that show a pattern of negative factor productivity in the Philippines in the last twenty years. Most capital investments in the Philippines have been in construction and in the services sector, both of which are considered non-tradable. Furthermore, in the sectors with high rates of capital formation (i.e. Construction, Transportation and Communication, Trade, Finance and Dwellings and Other Services), total factor productivity has been negative over the past two decades. Very little effort has been done to increase Research and Development (R&D) expenditure, and whatever funds that have been allocated to R&D are inefficiently distributed. Productivity inducing capital has yet to be efficiently adapted in the Philippine setting, resulting in a situation of stunted output growth.

The disproportional share of capital accumulation in construction stock also proves to be problematic since output increases due to construction stock are more significant over longer periods of time. From 1946 to 1982, it is estimated that construction stock accounted for 58.3 percent of total capital stock. It has only been in the periods from 1991 to 1994 and 1996 to 2001 that durable equipment stock exceeded the levels of construction stock. From 1996 to 2000 the share of construction stock to total capital stock decreased to 42 percent, as durable equipment formation increased significantly.

Regressions show that labor has an inelastic effect towards output. Still, it is more productive than capital in terms of output generation. Philippine labor productivity is still very low, especially in the rural areas, the country being a labor surplus one. However, most of the output-generating activities are still labor-intensive, although this trend is slowly starting to change.

V. Philippine Infrastructure Sectors

There are two types of competitive infrastructure: hard and soft. The former refers to infrastructure in the form of roads, ports, telecommunications and shipping. Soft infrastructure includes peace and order, governance and human infrastructure in the form of skilled and educated labor force. This type of infrastructure has been receiving increasing attention in recent years. In this paper, the hard infrastructure, specifically power, water, transport, communication and education will be tackled in detail.

A. Power

Sector structure

The key players are the National Power Corporation (NPC), independent power producers (IPPs), electric power distributors and retailers, and regulatory agencies.

NPC, until the issuance of Executive Order 215 that opened the generation sector to private investors, monopolizes electric generation. At present, a number of IPPs generate and sell electricity to NPC and other customers. NPC is, however, still a monopoly in bulk power transmission. NPC sources power from at least four types of plants: oil-based, hydro, geothermal, and coal.

IPPs were created in response to the 1991-1993 power crisis. The completion of six fast-track projects by IPPs ended the power crisis. To date, an increasing number of IPPs generate power through arrangements with NPC.

Electric power distributors and retailers include private electric utilities, rural electric cooperatives, directly served industries, and local governments, which avail of electricity generated by NPC through its transmission lines. The biggest customer of NPC is Meralco.

The Department of Energy (DOE) is the policymaking body of the energy sector while the Energy Regulatory Board (ERB), now the Energy Regulatory Commission (ERC), regulates the prices of electricity and petroleum products. The National Electrification Administration (NEA) handles rural electrification.

Supply and demand

Until recently, oil remained the main source of power in the country. Supply from oil-based plants has been continually decreasing since 1995. By the end of 2003, power supply from coal-fired plants (26 percent) exceeded that from oil-based plants (24 percent). Other sources of power are hydro plants (19 percent), geothermal plants (13 percent), and non-conventional natural gas (18 percent). The IPP's are more dependent on oil, accounting for 90 percent of their capacity mix.

Table 3
Installed Generating Capacity by Plant Type
in MW

	Oil-based	Hydro	Geothermal	Coal	Total	Growth Rate
1991	3,341	2,155	888	405	6,789	
1992	3,399	2,257	888	405	6,949	2.4
1993	4,296	2,259	963	441	8,014	15.3
1994	5,335	2,254	1,074	550	9,212	14.9
1995	5,425	2,303	1,154	850	9,732	5.6
1996	5,844	2,303	1,446	1,600	11,193	15.0
1997	5,973	2,303	1,886	1,600	11,762	5.1
1998	5,568	2,304	1,856	2,200	11,931	1.4
1999	4,839	2,304	1,931	3,355	12,431	4.2
2000	4,987	2,301	1,931	3,963	13,185	6.1
2001	3,905	2,518	1,931	3,963	13,380	1.5
2002	3,527	2,518	1,931	3,963	14,702	9.9
2003	3,604	2,867	1,932	3,958	15,124	2.9

Note: Differences between total and sum of the components are accounted for by non-conventional energy sources

Source: DOE

Electric power consumption by all sectors (residential, commercial, industrial, and other sectors) has been growing by an annual average of 6 percent for the last twelve years. In 2003, residential consumption accounts for 29 percent of the total. This matches industrial consumption for the same year. While the portion of electric power used by households is constantly on the up trend (24 percent in 1991 to 29 percent in 2003), the share of industrial consumption is constantly going down (36 percent in 1991 to 29 percent in 2003).

Table 4
Power Consumption
in GWh

	Consumption by all sectors	Utilities own use	Power losses	Total
1991	21,387	1,086	3,176	25,649
1992	20,645	1,154	4,071	25,870
1993	21,209	1,132	4,238	26,579
1994	24,593	1,132	4,734	30,459
1995	26,593	1,226	5,735	33,554
1996	29,240	1,340	6,128	36,708
1997	32,289	1,471	6,037	39,797
1998	34,138	1,590	5,849	41,577
1999	34,142	1,536	5,754	41,432
2000	36,555	2,390	6,345	45,290
2001	39,140	2,196	5,713	47,049
2002	38,624	1,928	7,915	48,467
2003	42,642	3,410	6,810	52,862

Source: DOE

Of the 52,863 GWh consumed in 2003, 74 percent was generated by NPC. This is 16 percent lower than in 2000, a year before the passage of Electric Power Reform Act (EPIRA) which aims to create a competitive environment in the power industry in terms of production and delivery of electricity.

Table 5
Power Generation by Utility
in GWh

	NPC	Meralco IPPs	NEA RECs	Private utilities*	Total
1991	25,451	-	35	163	25,649
1992	25,538	-	43	289	25,870
1993	26,421	-	40	118	26,579
1994	25,092	-	32	5,335	30,459
1995	22,138	-	73	11,344	33,555
1996	23,816	-	93	12,799	36,708
1997	38,702	916	97	82	39,797
1998	39,684	857	242	795	41,578
1999	39,257	832	123	1,220	41,432
2000	40,978	3,213	73	1,026	45,290
2001	42,302	3,712	67	967	47,048
2002	38,269	9,046	78	1,075	48,468
2003	39,385	11,354	55	2,069	52,863

*Includes power generated by other IPPs

Source: DOE

Between 2003 and 2013, DOE forecasts an average of 3.7 percent growth on final energy demand. DOE, under the Electric Power Reform Act of 2001 (EPIRA) Power Generation Extension Plan, estimated an investment requirement of PhP462 Billion to finance capacity expansion projects that would meet projected demand. One important consideration is the archipelagic character of the country. Unless properly distributed, power surpluses for the total economy may still mean power shortages in some areas of the country. This feature implies an equal importance of the national transmission grid.

Key factors behind the demand-supply gap

Lack of economies of scale in smaller islands. NPC can only make profits from power generation in major islands.

True cost of power not reflected in tariffs and cross-subsidies. IMF evaluation states that NPC's financial problems are due to its: a) high leverage, with debt constituting 80% of paid-up capital; b) very high capital expenditures to make up for inadequate investments in the past; and c) purchase of power from IPPs at commercial rates.

Luzon grid customers subsidize NPC customers in the Visayas and Mindanao. Cross subsidization across customers within a grid and across customer classes within a utility is also being practiced. The current practice of charging industries higher power rates to subsidize the low-volume residential consumers leads to non-competitiveness of the Philippine industries. The table below shows that the Philippines has the highest average revenue per kilowatt hour as compared to other Asian countries.

Table 6A
Average Revenue per kWh, 1994, Current Prices
(in US cents/kWh)

Country	Utility	Average	Commercial	Industrial	Residential
China	ECEPA	3.60	3.02	3.83	3.02
Hong Kong	CLPC	8.64	-	-	-
Indonesia	PLN	7.14	11.82	6.38	6.78
Korea	KEPCO	7.48	10.73	5.87	10.55
Malaysia	TNB	7.07	8.19	5.82	7.51
	NPC	6.81	-	-	-
Philippines	MECO	11.36	11.70	10.79	11.78
	NEA	11.73	-	-	-
Singapore	PUB	7.46	-	-	-
Thailand	EGAT	7.08	-	-	-
	MEA	7.16	7.56	6.36	7.96

Source: Electric Utilities Data Book, ADB

Table 6B
Average Revenue in Constant 1995 Prices, 1989-1994
(in US cents/kWh)

Country	Utility	FY1989	FY1990	FY1991	FY1992	FY1993	FY1994	% growth p.a.
China	Overall	6.22	5.42	5.16	5.27	5.86	3.59	-8.75
Hong Kong	CLPC	11.92	11.07	10.09	9.40	8.65	9.40	-3.88
Indonesia	PLN	7.53	6.78	7.36	7.44	7.95	7.65	0.26
Korea	KEPCO	10.48	9.20	8.59	8.71	8.41	8.09	-4.22
Malaysia	TNB	8.99	8.72	8.36	7.98	8.14	7.84	-2.26
	NPC	6.55	7.01	7.52	7.89	7.33	7.57	2.44
Philippines	MECO	11.14	11.73	12.57	12.72	12.60	12.61	2.09
	NEA	12.37	12.75	13.97	13.81	13.75	13.03	0.87
Singapore	PUB	9.94	10.41	10.06	9.08	8.14	7.90	-3.76
Thailand	EGAT	9.11	8.65	8.30	8.01	7.77	7.56	-3.06
	MEA	9.76	9.16	8.69	8.38	8.08	7.64	-4.00

Source: Electric Utilities Data Book, ADB

Long gestation period of power projects including delays and costly requirements. The process for the approval of power projects takes a long time leading to a disruption of targets. Moreover, the Department of Energy has reported that electricity tariffs in the Philippines are among the highest in the

Asian region. As of 1998, the percentage of barangays with electricity was estimated to be 76 percent.

Weak government electrification arm. There is continued deterioration of the rural electricity distribution as evidenced by low reliability of service and high distribution losses. As of end-92 NPC took over operation of 50 plants with aggregate capacity of 96 MW.

Mothballing of the Bataan Nuclear Power Plant (BNPP). The 1991 - 1993 power crisis has been directly linked to the closure of the BNPP, which has a capacity of 620 MW, enough to sustain 20% of Luzon's energy requirements.

Power Sector Problems. The lack of power supply coming from a combination of planning and implementation miscues and the economic recovery led to the explicit recognition of the private sector as a partner in the provision of energy – a significant retreat from the nationalization thrust of the 1970's during martial law. The supply gap, together with the exuberance of the early 1990's, when the Philippines benefited from the inflow of global funds, led to an overstatement of demand projections. Among others, the National Power Corporation projected GDP growth at 8% over the next decade, a significant break from the growth record of the previous two decades. It also used an energy-income elasticity of 1.5, an assumption that apparently ran counter to the labor absorption program of the government and the large unemployment and underemployment situation in the country.

In the hurry to increase power generation based on the rosy forecasts, the government went into BOT-type contracts with domestic and international firms, while investing in large operation plants. From 1993 to 1998, the government signed more than 100 contracts with independent power producers (IPP's). Unfortunately, these contracts invariably included performance guarantees given by the government. These implied a minimum level of revenue for the IPP's even if demand sagged. As a result, the country is now saddled with a huge surplus of power generating capacity that has to be financed continuously. One study made in 2000 estimated the government losses from these projects to be a minimum of 250 billion pesos (\$2 billion).

B. Water

Sector structure

Until 1995, the supply and distribution of water in Metro Manila and neighboring areas was a monopoly of the Manila Water and Sewerage System (MWSS). However, the fast growing population and the age of the water system (which is oldest in Asia) have called for the need to improve the system, thus the National Water Crisis Act in 1995 was enacted. Under this bill, the operational

and investment functions of MWSS in water and sewerage services have been privatized through an international bidding.

Two water and sanitation concessions were created, each with exclusive rights to treat, transport, and distribute water to their respective territory - Manila Water Company (MWC) in the East Zone and Maynilad Water Services, Inc. (MWSI) in the West Zone. The MWSS, at present, is mandated, among others, to monitor and enforce the Concession Agreement (CA). The 25-year concession agreement began in August 1997.

Outside Metro Manila, the provision of piped water to individual households under a waterworks system is found only in more densely populated towns and cities. Government assists the formation of water districts in such towns and municipalities through the Local Water Utilities Administration (LWUA). As of 2003, there are 558 active water districts in the Philippines.

Water resources regulation and coordination is the charge of the National Water Resources Board (NWRB). The NWRB regulates, coordinates and formulates medium- and long-term policy related to the water sector. It also reviews and approves the appropriate water rates that are to be charged by waterworks operators. By law, operators of public utilities are allowed a rate of return not exceeding 12%. The present Water Code also requires groundwater users to secure permits from NWRB with the exception of users of shallow wells for domestic purposes.

There is no significant integrated sewerage service to speak of. Most area-wide sewerage services are found in a few private subdivisions, which finance these as part of consolidated subdivision services. Human wastes in other areas are disposed into septic tanks.

Supply and demand

In the Philippines, there are 3 defined levels of water supply service provided as follows:

- Level III - Fully reticulated system with individual house connections and is considered adequate if a household member uses more than 100 liters per day.
- Level II - Piped system with communal or public faucets usually serving four to six households within 25 meters.
- Level I - Point source where users directly obtain water at a considerable distance away from any piped distribution system and serving an average of 15 households within 250 meters.

As of end 2000, around 79 percent of the total population had access to public water supply systems. In areas outside Metro Manila, 70 percent of the total urban households have safe drinking water through Level III systems provided by LWUA, LGUs, and the private sector. In rural areas, 87 percent of the total population have access to safe drinking water through Levels I and II systems.

The after-privatization figures (Table 7) show an improvement in the delivery of water service in Metro Manila. Among others, the increase in the total number of connections and the higher incidence of 24-hour water supply show that current operations are more efficient. However, it can be seen that the non-revenue water (NRW) is still high. NRW commonly results from pilferage, leakage, defective water meters, and inefficient water system operations.

Table 7

Water Service Performance Information				
Indicators	Jul-97	MWC	MWSI	Total
		(as of December 2001)		
Service Area	1940 sq.km.	1400 sq.km	540 sq.km	1940 sq.km.
Service Population	11.0M	5.0M	6.60M	11.60M
Population Served	7.15M	4.0M	5.50M	9.50M
Billed Services	837,000	417,935	590,480	1,008,415
Percent Coverage				
Water	65%	80%	83%	82%
Sewer	7%	3%	10%	
Water Distributed	3000 MLD	1600 MLD	2450 MLD	4050 MLD
Length of Pipelines	4500 km	2500 km	3710 km	6210
Total No. of Connections	825,000	351,315	653,551	1,004,866
Non-revenue water	60%	47%	64.80%	56%
Average water rate	P8.78/cu.m	P4.22/cu.m	P10.79/cu.m	
Personnel	5,266	1,500	2,400	
24 hours water supply availability	38%	55%	56%	

Source: MWSS

MWSS's, through MWC and MWSI, main water supply comes from surface water sourced from the Angat river. This supplies 97 percent of the needs of MWSS users while the remaining 3 percent come from ground water.

JICA estimates show that by the year 2025, the demand for water services in highly urbanized areas will be three times as much as the demand in 1995.

Table 8
Projected Water Demand in Water-Critical Urbanized Areas

	Water Demand (MCM/Year)	
	1995	2025
Metro Manila	1,068	2,883
Metro Cebu	59	342
Davao City	50	153
Bagiuo City	12	87
Angeles City	11	31
Bacolod City	37	111
Iloilo City	9	47
Cagayan de Oro City	29	98
Zamboanga City	28	203
TOTAL	1,303	3,955

Source: JICA/NWRB 1998 [adopted from Rola, et al (2004)]

Historically, the demand for water in MWSS serviced areas has always been greater than the available supply. MWSS estimates show that among the 10.6M population under MWSS service area in 1995, only 7.5M or 71 percent have access to water. Although this has increased after the privatization of MWSS, almost 20 percent of the population is still not able to avail the services of either MWC or MWSI.

Table 9
Population with Access to MWSS Water

Year	Population under MWSS (in millions)	Population with		Population with water (A+B) (in millions)
		House Conn (A) (in %)	Public Faucet (B) (in %)	
1984	7.724	36.7	5.9	3.288
1985	7.968	41.2	5.7	3.737
1986	8.223	46.3	5.7	4.271
1987	8.491	49.4	5.8	4.690
1988	8.774	50.8	6.2	5.004
1989	9.383	53.3	6.6	5.437
1990	9.070	55.9	6.9	5.892
1991	9.616	58.0	7.0	6.257
1992	9.854	59.8	7.2	6.601
1993	10.099	61.5	7.3	6.948
1994	10.350	62.8	7.4	7.266
1995*	10.607	53.0	7.4	7.465

Source: MWSS

* Jan-Jun 1995

Table 10
Water Consumption
(volume sold in million tons)

	Household	Commercial	Industrial	Total
1984	168.55	106.40	14.95	289.90
1985	183.55	104.84	14.45	302.84
1986	195.47	100.79	14.52	310.78
1987	218.48	101.76	16.27	336.51
1988	225.85	112.71	20.90	359.46
1989	235.74	114.76	25.28	375.78
1990	245.01	113.85	25.80	384.66
1991	253.32	107.94	25.23	386.49
1992	256.04	102.63	24.32	382.99
1993	266.98	105.77	24.50	397.25
1994	281.10	111.78	26.06	418.94
1995*	143.66	53.50	12.47	209.63

Source: MWSS

* Jan-Jun 1995

Outside Metro Manila, water service can be one of three levels: point source system (which is a protected well or a developed spring with an outlet but without a distribution system); communal faucet system; or a waterworks system with individual house connections.

Since water districts outside the MWSS area rely heavily on groundwater for their water supply, there is a real danger of depletion of ground sources of water as a result of increasing demand for water. Sourcing of potable water such as rivers and lakes is still not feasible due to the high cost of infrastructure requirements and the instability of the client base from which tariffs will be collected to recover costs. Addressing the gap between the demand for and supply of water require huge investments and capital outlays.

Key factors behind the demand-supply gap

Heavy dependence on only one water source. In Metro Manila, there is a heavy dependence on the Angat watershed. Angat watershed not only provides water for home and industrial use but also water for irrigating farmlands and hydropower plants. MWSS withdraws only a third of the total inflow of the Angat dam.

There is also difficulty in finding groundwater sources to supply the needs of industrial communities and other consumers in the rest of the country.

Inefficiencies. More than half of MWSS water is lost through leaks and water theft. Non-revenue water (NRW) is high while many areas still experience water shortages. If non-revenue water is controlled at acceptable rates, water coming from Angat and Ipo dams will suffice for the 10 million people dependent

on MWSS water. Non-revenue water in areas outside Metro is mostly caused by pipe leaks.

Table 11
Cost of Water for Domestic Use, 1990
(in US dollars per month)

	10 m3	30 m3	50 m3	Installation	Industry/Residential*
Manila	1.05	3.87	8.07	74.92	2-3
Cebu	2.4	8.19	25.35	82.41	1
Jakarta	1.72	7.38	15.76	9.86	1-2
Kuala Lumpur	1.66	6.36	13.1	79.24	2-3
Singapore	3.26	11.13	22.5	214.99	1-2
Bangkok	1.57	4.71	8.15	157.29	1-2
Seoul	0.89	3.23	8.05	635.08	2-3
Beijing	0.22	0.66	1.1	72.93	2-3
Shanghai	0.22	0.66	1.1	72.93	1
Hong Kong	2.66	18.01	36.51	87.88	1-2

Source: ADB

* Note: The ratio is for a consumption level of 30 m3/month

Provincial urban centers under the water districts (WDs) likewise experience water shortages. In many cases, water supply schemes are characterized by small, non-integrated facilities that have been planned and implemented in a piecemeal fashion. In rural areas, this approach has created gaps in the availability of services. Many of the rural areas are within the jurisdiction of WDs and because of the Government policy that LWUA (Local Water Utilities Administration) should support only viable projects, many areas remain unserved.

MWSS is also plagued with project delays and inefficiencies in project management. It usually takes years for a project to move from planning, to fund sourcing, to technical feasibility study stage, and to the actual construction.

In areas outside Metro Manila, most water districts are losing propositions or are just breaking even. There is much to be desired in terms of efficiency. Of 538 water utilities in the country, 166 are defunct and 362 are active. Of the 372, there are cases where LWUA has taken over the management of certain water districts.

Lack of funding. Infrastructure problems need an estimated P37 billion to increase the population coverage to 90 percent. However, there are constraints in project funding as the government can only finance so much of water projects without straining the national budget.

The approximately 1,000 water supply systems which are being operated by the local government units (LGUs) are also often inadequately funded, poorly maintained, and too small to be made viable, making a strong case for clustering and privatization / corporatization or restructuring into corporations.

Scarcity value of water not reflected in water tariffs. MWSS charges different water tariff schedules based on the type of customer: residential A, residential B, commercial or industrial. The agency also applies price discrimination by volume of consumption, which is actually a cross-subsidy to low-income consumers. This also promotes water conservation by charging higher prices per cubic meter on higher volume of consumption. Manila is in the upper range among Asian cities where industrial users pay 2-3 times more than the residential consumers. Tariffs should be rationalized so that direct consumers will have to pay for actual consumption and will thus be forced to save water.

Environmental issues. Although MWSS is tasked not only to deliver water but also to collect wastewater, less attention is given to the latter. The country's sewerage system is still in a nascent stage. It is only in Metro Manila and Baguio City where sewerage treatment plants are in place.

In Metro Manila, 85 percent of domestic wastewater is discharged directly into Metro Manila's water bodies (Pasig, San Juan, Tullahan-Tenejeros, Paranaque-Zapote). Had this not been the case, these rivers could have been tapped as possible water sources.

Water resources are also affected by the degradation of watersheds through urban encroachment, logging, slash and burn agriculture, and other forms of unsustainable cultivation, indiscriminate groundwater extraction, particularly in rapidly urbanizing areas and pollution from untreated municipal and industrial wastewater discharges.

Moreover, among the Southeast Asian countries, the Philippines has the highest total withdrawals in 1990. The 2025 projections of International Water Management Institute (IWMI) presented Table 12 show that it will still have the highest withdrawal as percentage of annual water resources.

Table 12
Southeast Asia: Water Supply and Demand

	Total AWR	Total DWR			
	1990 <i>cubic km</i>	1990 DWR % of AWR <i>cubic km</i>		2025 (<i>projected</i>) DWR % of AWR <i>cubic km</i>	
Cambodia	498	1	0	1	0
Indonesia	2,530	18	1	24	1
Malaysia	456	14	3	19	4
Myanmar	1,082	4	0	5	0
Pilippines	323	42	13	50	15
Vietnam	376	28	7	31	8

AWR - Annual Water Resources

DWR - Withdrawals

Adopted from Rola, et al (2004)

Institutional developments. In 1998, the government privatized the operations of MWSS by bidding out the management of the two halves of the service area. The three bidders were consortia of domestic business groups in joint ventures with internationally known foreign water companies to meet constitutionally-mandated citizenship requirements for public utility ownership. The resulting concessionaires, Manila Water Corporation and Maynilad Water Services, Inc., have taken over the east and west portions of the MWSS franchise area for 25 years.

As a result of the privatization, the provision of water has become more reliable, from a little more than 50 percent to close to 90 percent reliability in most areas of the franchise. Most of the service-enhancement has come from the rehabilitation and improvement of maintenance. However, two issues have come up: first, the future increase in water supply to Metro Manila depends on the completion of a large aqueduct that has however been much delayed; second, large investments, especially undertaking an integrated sewerage system, depends on raising water tariffs. However, questions of political feasibility have greatly reduced the ability of the concessionaires to raise required funds for further large investments. This has threatened the financial viability of major improvements in the water and sewerage service in Metro Manila. Privatization may improve the efficiency and reliability of water services but it does not guarantee the ease of raising the funds for further improvements of what are perceived as public services.

C. Transportation

Sector structure

There are three modes of transport in the Philippines: land, air and water. Road transport is the predominant mode of transportation but the bulk of inter-island cargo traffic moves by sea. The inter-linking of major islands by ferryboat services further boosts land travel. Air transport has also been an ideal transport mode for the Philippines because it is comparatively more comfortable, more convenient, and faster than both sea and land transport.

The construction and maintenance of roads, bridges and other transport infrastructure is a mandate of the Department of Public Works and Highways (DPWH). It contracts out most of the construction and repair-work to private construction firms.

Supply and demand

Land transport

Road infrastructure. The great majority of passenger and freight transporters use the road system, and this is where strategy must center. The country's road network handles about 90 percent of the total passenger movement and about 50 percent of freight movement.

As of date, the current road network is classified broadly into national and local roads stretching 202,000 kilometers. National roads account for 15, while provincial and municipal roads account for a total of 24 percent. The remaining 60 percent are *barangay* roads that are mostly dirt road.

As of 2002, national roads have been extended to 30,030 kilometers, of which, 34 percent is overlaid with gravel and 61 percent paved with asphalt or concrete. On the average, road paving (whether with asphalt or concrete) is extending about 4 percent annually. With this pace, it would take the government about 20 years to extend paved road to 80 percent.

Table 13
National Roads by Surface Type
(in kilometers)

	All Types	Earth	Gravel	Asphalt	Concrete
1994	26,658.8	214.0	12,622.7	6,374.7	7,447.3
1995	26,720.3	128.5	12,622.9	6,394.7	7,574.2
1996	27,369.4	352.8	11,861.9	6,806.0	8,348.7
1997	27,649.9	380.7	11,575.3	6,893.7	8,800.3
1998	27,893.2	379.8	11,486.5	6,732.9	9,294.0
1999	28,522.7	386.9	11,512.4	6,882.3	9,741.0
2000	29,055.8	611.9	11,424.0	6,683.8	10,336.1
2001	29,878.0	684.0	11,050.0	6,815.0	11,329.0
2002	30,030.0	736.0	10,335.0	7,048.0	11,911.0

Source: DPWH

Road carriers. Being the most popular mode of travel, the demand for road transportation continues to increase since the early 1960s when the car industry was liberalized.

As of 2003, the country has a total of 4.3 million registered motor vehicles, most of these vehicles are found in highly urbanized areas such as Metro Manila and its environs.

Table 14
Motor Vehicles Registered

	Number of Vehicles	Percent Increase
1990	1,620,242	
1991	1,715,366	5.9
1992	1,879,563	9.6
1993	2,125,115	13.1
1994	2,341,469	10.2
1995	2,581,354	10.2
1996	2,904,487	12.5
1997	3,193,549	10.0
1998	3,316,817	3.9
1999	3,533,732	6.5
2000	3,701,173	4.7
2001	3,865,862	4.4
2002	4,187,673	8.3
2003	4,292,272	2.5

Source: DOTC

The oversupply of land vehicles relative to available roads has become a problem in urban centers. In Metro Manila, a system of road rationing is in place where vehicles are prevented from using major thoroughfares for one day a week.

Rail systems. The Philippine National Railways (PNR), a government-owned corporation, operates a 438 km rail system between Metro Manila and Polangui, Albay in Southern Luzon. The PNR also operates a commuter train in Metro Manila. There are no other rail systems in the other islands of the Philippines. However, the PNR has long been on a decline. Investments in the failing operation failed to give any substantial returns. Thus, the need for a rail backbone outside of Manila is unnecessary since there is no high-density corridor where traffic flows enough to merit investments in rails.

Table 15
PNR Operations
(in thousands)

	Passengers	MMRC	Freight (tons)	Express (tons)
1990	928.0	5,560.8	32.2	16.8
1991	654.9	4,508.5	11.6	10.3
1992	466.8	2,302.9	4.9	8.6
1993	401.7	4,639.4	17.5	7.3
1994	426.0	2,844.9	12.3	7.2
1995	589.0	4,054.6	14.1	6.2
1996	299.5	3,007.0	-	1.7
1997	613.5	3,077.0	-	3.8
1998	578.1	4,702.1	-	3.5
1999	540.9	5,015.0	-	2.8
2000	374.3	3,504.0	-	1.9
2001	318.7	4,787.0	-	1.7
2002	264.6	4,092.5	-	1.8
2003	240.4	3,660.0	-	1.9

Source: NSO

Passenger patronage of the Manila-Albay rail system is decreasing every year due to the poor quality of coaches and track maintenance. Another factor is the improved road network towards that region and the presence of more efficient bus services of private firms engaged in ferrying people.

The deteriorating service also resulted in the decline of freight transport. While total volume increase between 1993 and 1993, the increase is very low compared to freight capacity.

Meanwhile, a 15-km light rail transit (LRT) system powered by electricity has been in existence since 1984 in Metro Manila. The LRT enjoys a huge patronage because of the absence of other alternative and efficient mass transport systems in the city. The LRT is operated by the Light Rail Transit Authority (LRTA), a government-owned corporation.

Table 16A
LRT Operations
(in millions)

	No. of Passengers	Average per day	Revenue per day
1990	127.55	0.35	429.02
1991	120.13	0.33	516.77
1992	120.29	0.33	659.69
1993	123.20	0.34	673.08
1994	145.83	0.40	791.28
1995	135.84	0.37	735.00
1996	143.20	0.39	740.43
1997	134.39	0.37	1,238.55
1998	127.86	0.35	1,175.06
1999	129.27	0.35	1,191.69
2000	102.39	0.28	1,256.50
2001	109.94	0.30	1,141.98
2002	107.00	0.29	1,215.92
2003	107.24	0.29	1,225.56

Source: NSCB

In 2001, the Metro Rail Transit (MRT) started its commuter rail service along EDSA, the main thoroughfare of Metro Manila's motorists and commuters. It is operated by a consortium of private corporations. The demand for light rail service is expected to increase in the next few years. More light rail transit lines are to be constructed in Metro Manila in the medium term.

Table 16B
MRT Operations
(in millions)

	No. of Passengers	Average per day	Revenue per day
2001	90.3	0.25	1,116.78
2002	102.4	0.28	1,251.55
2003	112.7	0.31	1,381.27

Source: NSCB

Water transport

The Philippines, being an archipelago of more than 7,000 islands, has some 414 operational ports all over the country bridging the distance between production and consumption centers. The Philippine Ports Authority (PPA) manages 19 ports of entry and 59 sub-ports of entry. The PPA also leases out

the Manila International Container Terminal to the International Container Terminal Services.

Demand for water transport, either for cargo or passenger, is high because it is the most practical mode of inter-island transportation. However, the total volume of cargo throughput decreased in 2003, which could be accounted for by the four million metric ton drop of imported cargo. Passenger traffic, on the other hand, has increased.

Table 17
Shipping Operations

	Domestic Shipcalls	Foreign Shipcalls	Gross Registered Tonnage	Cargo Throughput (metric tons)	Passenger Traffic
1999	276,989	9,662	288,786,656	142,914,473	43,228,478
2000	292,505	10,056	297,922,583	149,836,156	44,371,866
2001	268,818	9,567	286,367,222	147,850,999	43,656,418
2002	276,223	9,735	292,218,155	149,457,449	49,116,643
2003	291,914	9,816	298,608,230	146,655,903	51,718,640

Source: PPA

The introduction of fast craft vessels has improved shipping in recent years. But the problem lies in the reliance of the Philippine Ports Authority (PPA) on the private sector for expansion. The PPA regulates the tariffs charged in private ports and thus unfairly penalizing the private sector.

Air transport

There are 163 registered airports in the Philippines; of which, 85 are national airports and the rest are private airports. Three of the government's airports are regular international airports, these are in Manila, Cebu, and Davao. Twelve trunkline airports connect the key cities of the country.

Table 18
Number of Airports

	National	Private
1998	92	75
1999	85	87
2000	85	87
2001	87	70
2002	87	87
2003	85	78

Source: DOTC

The number of passengers for air transport is expected to grow at an average annual rate of 3.9 percent while cargo will grow by 4.2 percent. Aircraft movements will reach 269,239 with a growth rate of 3.4 percent. With the expected increase in air traffic, the construction and expansion of international and domestic facilities are very crucial.

However, the Philippine Airlines (PAL) is still, by far, the largest supplier despite the recent deregulation of the industry. PAL operates domestically in 11 of 16 regions and is sole carrier of the Philippine flag. Moreover, it holds the most number of passenger and cargo flights. The second leader in the airline industry is Cebu Pacific. There are also at least 10 small players in the industry.

Table 19
Air Transportation Operations

	Cargo (kilograms)	No. of Passengers
1998	172,660,900	12,257,634
1999	144,488,263	11,639,950
2000	164,405,339	11,052,859
2001	535,266,751	19,422,660
2002	547,807,740	20,207,426
2003	480,297,472	18,311,512

Source: NSCB

Key factors behind the supply-demand gap

Investment constraints. The government is the foremost financier and proponent of transportation infrastructure projects. But it has been constrained by insufficient financial and technical resources. In the period 1993-1998, government programmed investment for the transportation sector amounted to P159.4 billion. This underinvestment manifests the relatively poor financial standing of the government and weak commitment in carrying out its program.

Natural calamities. The Philippines lies in the rim of fire and unprotected from Pacific storms. This makes the country prone to disasters that bring an element of instability and unpredictability to capital investment requirements. Limited government resources are channeled toward the rehabilitation and reconstruction of damaged infrastructure and away from the maintenance of existing facilities and the construction of new ones.

Implementation delays. Delays in the implementation of projects have been, more often than not, linked to scarce financial resources. This results in a level of available infrastructure that is below than what has been originally planned.

Further, the present portfolio of projects is facing problems that delay implementation by as much as seven years. Such delays affect the overall capability of the government to implement other development programs and projects.

Right of way acquisition. Some projects continue to be impaired or threatened by right of way and relocation problems. To address such issues, a presidential task force on right of way acquisition was created in 1993.

Cost overruns. This is an offshoot of the delays in implementation. In a review conducted by the NEDA in 1994, 50 projects were identified as incurring cost overruns of more than 10 percent.

Other implementation issues. Delays in the bidding and awarding of contracts, difficulties in securing environmental compliance certificate requirements, court cases filed by losing contractors, and weak coordination among implementing agencies and units are among the factors that cause a drag on project implementation.

Urban concentration. The tendency of the population to move into urban centers due to better access to basic services and perceived economic opportunities results in congestion and traffic related problems.

Inadequate funding. The most viable option to sustainably finance the sector is through tolls and tariffs that users pay. This would mean that users pay for the services that they use. This will thus lead to more efficient provision of the service and a better quality of the infrastructure.

Poor management by the government and lack of transport policy. In the road transport sector, the problem is that the Department of Public Works and Highways (DPWH) is not as proactive in the maintenance and improvement of the road system in the Philippines. Planning is often ineffective and implementation is poor. This is attributed to the massive encroachment of politics in the system. Politics intrudes too much in the transportation policy with little concern for economic efficiency. Further, the government institutions are ill-equipped to handle the task ahead.

There was no transport policy owned by the government and attention has been focused on projects and not on institutions or policies. Nonetheless, an effective transport policy is vital for a country's sustainable development. Successful implementation of transport schemes promotes efficiency and, on the other hand, botched plans create massive bottlenecks. Any effective transport policy should consider sustainability, as long-term goals of a society must be addressed. Also, it is vital that markets must dictate the policy in order to address the needs of consumers and producers.

D. Telecommunications

Sector structure

The telecommunications sector in the Philippines was liberalized in 1993. Prior to liberalization, there were more than 70 telephone companies operating in the entire country, most of them operating on a very limited scale. The only big player at that time was the Philippine Long Distance and Telephone Company (PLDT), which held a virtual monopoly of the sector.

As a result of liberalization, big players were able to gain entry into the industry, thus leveling the sector's playing field. The policy of liberalization has also transformed the telecommunications sector due to competition, mergers, strategies and counter-strategies that the key players are foisting against each other. In fact, the telecommunications industry can be considered as one of the most dynamic in the region with at least two local exchange operators per area and a number of cellular operators competing to provide telecommunications access to households and businesses.

Table 20A
Telephone Distribution by Operator, 2001-2003

	Installed Telephone Lines		Number of Subscribers	
	2001	2003	2001	2003
PLDT	2,324,862	2,933,555	1,605,760	2,098,493
DIGITEL	611,999	633,190	384,476	391,605
BAYANTEL	465,365	443,910	218,883	227,057
EPTI	69,350	-	11,862	-
GLOBE TELECOM	786,292	-	143,471	-
ISLACOM	693,541	-	73,367	-
PHILCOM	181,249	-	44,661	-
PILTEL	455,255	236,561	59,098	48,186
PT&T	190,456	125,912	63,493	36,751
SMART	725,695	-	118,182	*
Other Operators	478,589	391,277	249,929	218,137
TOTAL	6,982,653	4,764,405	2,973,182	3,020,229

Source: NSCB

*SMART data is incorporated in PLDT figures

PLDT remains the dominant telephone company in the country. It has a virtual monopoly in overseas calls which can be made only through PLDT's gateway. It owns and operates the country's backbone or the public switch telecommunications network (PSTN) which the other companies hook into.

The telecommunications sector provides the following services: local telephone service, long distance telephone service, international gateway facility, public calling offices, record carrier services, public mobile telephone and radio services, paging services, and operation of very small aperture terminals (VSAT).

A telecommunications franchise is needed in order to operate a telecommunications facility in the Philippines. A franchise can only be granted by the Philippine legislature which makes it difficult to acquire such franchise. As a result, companies just buy into shares of existing telecommunications companies than go through the process of acquiring a franchise.

Telecommunication firms are under the jurisdiction of the National Telecommunications Commission (NTC), a government quasi-judicial body that exercises authority over the sector. Under the liberalized regime, NTC's main task is to set parameters for negotiations between key players. These issues include access charges and interconnection. The NTC also adjudicates between telecommunication companies that cannot reach an agreement to resolve differences.

Supply and demand

In 2003, there were 8.09 telephone lines for every 100 people in the country but only 4 out of 100 are subscribed. The Philippines is counted as one of the 5 countries in Asia with less than 10 main telephone lines per 100 inhabitants. The telephone density is higher in urbanized areas such as National Capital Region (15.07), where half of the total telephone lines are. In other provinces, there is at least one telephone line per one hundred people and telephone density ranges between 1 to 8 telephone per 100 population.

Public calling offices set up through the municipal telephone program reached 757 in 1994. Seventy two percent or 1,604 municipalities had access to telephone services in 1994.

Table 20B
Regional Telephone Distribution, 2003

	Population (‘000)	Installed Lines	Subscribed Lines	Density (Installed)	Density (Subscribed)
NCR	10,936	2,818,358	1,647,671	25.77	15.07
CAR	1,492	93,567	33,527	6.27	2.25
Ilocos	4,345	195,088	108,888	4.49	2.51
Cagayan Valley	2,977	30,326	29,000	1.02	0.97
Central Luzon	8,130	431,626	260,328	5.31	3.20
Southern Ragalog	12,206	1,064,590	564,370	8.72	4.62
Bicol	5,001	124,957	72,656	2.50	1.45
Western Visayas	6,660	412,984	117,154	6.20	1.76
Central Visayas	5,856	458,637	185,620	7.83	3.17
Eastern Visayas	3,977	127,264	16,339	3.20	0.41
Western Mindanao	3,374	33,849	31,949	1.00	0.95
Northern Mindanao	3,054	147,518	50,412	4.83	1.65
Southern Mindanao	5,646	381,295	104,730	6.75	1.85
Central Mindanao	2,847	82,349	31,291	2.89	1.10
CARAGA	2,223	125,116	37,264	5.63	1.68
ARMM	2,328	29,969	8,162	1.29	0.35
TOTAL	81,052	6,557,493	3,299,361	8.09	4.07

Source: NSCB

More and more local exchanges are now interconnected to PLDT’s public switch telephone network. In 1992, 17 local exchanges were not connected to PSTN in 1992. In 1994, this was reduced to four.

The number of telephone connections has grown at an average 4.6 percent annually. However, unmet demand for telephone services is still numbering hundreds of thousands. In 1992, the country had 800,000 unserved applications for telephone lines, 600,000 in Metro Manila alone.

Table 21
Cellular Mobile Telephone Services

Operator	2000	2001	2002	2003
EXTELCOM	194,452	194,452	29,896	29,896
GLOBE	2,563,000	5,405,415	6,572,185	8,800,000
ISLACOM	181,614	181,614	181,614	**
PILTEL	656,814	1,483,838	1,773,620	2,867,085
SMART	2,858,479	4,893,844	6,825,686	10,080,112
DIGITEL	--	--	--	732,467
TOTAL	6,454,359	12,159,163	15,383,001	22,509,560
CMTS DENSITY	8.46	15.61	19.36	27.77
POPULATION (‘000)	76,320	77,898	79,476	81,054

Source: DOTC

**included in Globe

--not operational

Due to the shortage of fixed telephone lines, the demand for mobile cellular telephones has gone up, from 6 million units in 2000 to 22 million units in 2003, making every one in four Filipinos using a mobile phone.

Facsimiles, on the other hand, had been gaining popularity in business. Annual average growth of facsimile traffic volume from 1987 to 1991 was 60.7 percent. Meanwhile, telegraph and telex continue to be in demand in the provinces because of insufficient and unreliable telephone services.

As of 1994, there were ten paging operators in the country, eight trunk public radio repeater system operators and three small aperture terminal operators.

The liberalization of the telecommunications sector has brought in more foreign investments and therefore, increased the sector's capacity to meet the increasing demand for telecommunication services.

The government's goal in the medium term is to increase telephone density to 10 telephones per 100 inhabitants from the current 1.7 telephones to 100 inhabitants. To achieve this, the government espouses an open market structure that encourages cross-subsidies for less lucrative services such as local exchanges. Under this scheme, government allots the more unprofitable service areas to telecommunications companies in exchange for operating the profitable cellular and international gateway facilities.

To realize the teledensity target of 10 telephones for every 100 inhabitants by 2010, the National Telecommunications Development Plan (NTDP) projects an investment requirement of \$12.7B from 1999-2010. The NTC forecasts telephone demand at about 8.8 million lines by 2010.

Table 22
Projected Demand for Telecommunication Services
(as of 1992)

	1998	2004	2010
Target telephone density <i>per 100 inhabitants</i>	3.8	6.3	10
Target telephone subscribers <i>in millions</i>	2.7	5.04	8.77
Cellular <i>in thousands</i>	183	557	1520
Radio Paging <i>in thousands</i>	363.1	650.9	1097.6

Source: JICA/DOTC

Key factors behind the demand-supply gap

Barriers to entry. Since the Philippine legislature is the only body that can grant telecommunication franchises, entry into the industry will require a certain amount of political muscle. Further, the sector is capital intensive with slow rates of return on investment. Uneven population densities and low incomes of target consumers in the regions make it difficult for investors to recoup their investment. The high foreign exchange requirement for the purchase of imported equipment is another barrier.

Philippine capital market limitation. Despite the liberalization of the telecommunications sector, the financial requirements of capital-intensive infrastructure projects may not even be met by the private sector. A 1991 estimate pegs the market capitalization of the Philippine stock market at only P170 billion. Investment in the telecommunications sector will crowd out available investment in other sectors.

PLDT's residual monopoly power is still in place. Despite the liberalization, PLDT has the monopoly of the main backbone and gateway facilities of the country, thus, maintains the upper hand in interconnection negotiations with new players. An alternative backbone is in the offing by a consortium of eight carriers (ICC, PT&T, Capwire, Islacom, Globe Telecom, Smart, Eastern, Extelcom and Piltel). However, the project is experiencing delays due to conflicts of interest among companies particularly on the routing system. Moreover, the regulatory environment has proved to be ill prepared to cope with the demands of competition leading to problems, particularly on the issue of interconnection.

At present, local operators still rely on their access to PLDT's lines including a revenue-sharing arrangement from calls. The results of these arrangements have been to keep international access at a higher price (40 cents/minute) relative to more developed countries in the world (48 cents/minute).

Problems in universal access policy. Executive Order 109 requires all cellular mobile telephone service (CMTS) providers to put up at least 400,000 telephone lines in both urban and rural areas in five years while international gateway facilities will have to install 300,000 telephone lines in three years. To operationalize the universal access policy, NTC has divided the entire country into 11 service areas to be awarded to each player depending on the franchise, financial strength, application for local exchange, and technical capability. The inherent problem in this concept is that firms will have all the incentive to channel all their resources to the urbanized areas since profits will be realized in urban areas than in rural areas and, huge investments are needed to realize their quota in more unprofitable provinces.

Recent technological developments may have, however, mitigated the fears of universal access. In the last few years, reductions in the price of cell phones and the cost per call have continued with much increased country coverage by mobile phone cell sites to provide very wide access to this mode of service.

Infrastructure funding problems. Because of the heavy investment requirement, some carriers have difficulty in building their networks in the rural areas as stipulated in the service area concept.

Unprofitability of telephone operations in remote provinces leading to unmet demand in provincial areas. International long distance is the most profitable segment of telecommunications while local telephony is the least rewarding due to rate regulation. While bigger players can recoup losses in local telephone operation through international long distance, local telephone service companies may be in the red in the face of bigger competition.

E. Education

Sector Structure

The Philippine education sector can be broadly divided into the Primary and Secondary area, the Middle-level Skills Development area and the Tertiary education area. In the grassroots, schools are run by government or by private groups.

Supervision of academic and administrative operations of the Primary and Secondary level is done by the Philippine Department of Education (DepEd). The Technical Education and Skills Development Authority (TESDA) is the prime mover in Middle-level skills education, while the Commission on Higher Education (CHED) is the lead agency for tertiary level educational development.

Supply and Demand

As of the 2001-2002 School Year (SY), there were a total of 40,763 elementary schools in the Philippines, around 89 percent of which are public schools. These institutions serve a total of 12.8 million students in the country. Recent government policy measures to increase access to education prompted a steady rise in the elementary school participation rate to 97 percent in SY2001-2002, from the 96.4 percent in the previous year. However, the cohort survival rate for primary education has been falling since SY 1998-1999, to 67.1 percent in SY 2001-2002, a sign that more children are not able to finish elementary education. Furthermore, there is still no noticeable increase in the overall quality of education based on the scores on the national aptitude tests.

There were a total of 7,683 high schools in the country catering to 5.8 million students in the country. Public schools comprised 58 percent of total high schools in the Philippines, indicating a more active role of the private sector in secondary education. Although participation rate for secondary education is lower than that of elementary education, it has been noticeably increasing in the last two school years. Completion rates, based on the first year of high school, are higher than that of elementary education. Most recent data tabulated until SY 2000-2001 also show a marked improvement in aptitude test scores from an average of 46.8 points in 1996-1999 to an average of 53.9 points in 1999-2001. Further studies need to be done to determine if an actual improvement in the quality of secondary education did indeed occur.

According to the Commission on Higher Education, there are 1,452 tertiary education institutions that cater to 2.6 million students. Most of the Higher Education Institutions (HEI) are private and non-sectarian (66 percent), only 170 HEIs are run by the government. Business related fields are the most enrolled in, followed by Education, Engineering and Information Technology.

Key factors behind the demand-supply gap

Inadequate facilities that cannot accommodate growing student population. The public school system is starved for funding to finance construction of new school buildings and purchase of educational materials.

Inappropriate incentive structures for teachers. The student-teacher ratio is on a steady deterioration as a lack of teachers due to the low wage structure in schools has forced educators to more profitable professions. Recent moves to increase take-home pay of teachers may only prove to insufficient.

Relatively low participation rate of the private sector in providing elementary education. Most private entities are more involved in secondary or tertiary education.

High costs of completing education. Financing schooling until graduation is a problem that is reflected in the relatively low completion and survival rates of students.

Education system does not address the needs of the labor market. An over-emphasis on producing college graduates creates a situation of unemployment or underemployment of people

VI. Alternative Approaches to Infrastructure Development in the Philippines

Traditional approaches to infrastructure provision have been unable to deliver the infrastructure requirement to improve competitiveness, especially those in the countryside. Public monopolies have led to limited access and poor quality of formal services has been delivered. Subsidized services have been mostly consumed by higher-income households.

Furthermore, after the Asian financial crisis, prospects of increased infrastructure investment diminished as the financial capacity of the public sector deteriorated while the appetite of the private sector decreased due to lower demand prospects and reduced project profitability. Thus, there is an urgent need to address major investors' concerns such as weak regulatory policies, inadequate legal standards, among others. Notwithstanding, the Medium Term Philippine Development Plan (MTPDP) 1999-2004, which aims to pursue further industry reforms to encourage greater private sector participation, has provisions for the strengthening of concerned agencies' supervisory capabilities to safeguard public interest and uphold the integrity of project-related transactions.

The promise of private involvement. Due to constraints, many governments have realized that private sector resources and expertise may be more efficient and effective in addressing infrastructure needs of a country. In the Philippines, significant steps, at both macroeconomic and microeconomic levels, have been undertaken to encourage private participation in building infrastructure. At the macroeconomic level, fundamentals have been put in place with inflation and interest rates kept low. Meanwhile, at the microeconomic level, the creation of the Committee on Privatization and the Asset Privatization Thrust has indicated the shift towards a more private sector-led infrastructure program. Republic Act (RA) 6957 or the Build-Operate-Transfer (BOT) Law, which was enacted in 1990 and amended in 1994 through RA 7718 and deemed as the first in Asia, has also provided for the creation of a new infrastructure policy environment that encourages private investments in infrastructure. These efforts have led to increases in private sector investments in various infrastructure projects.

The Build-Operate-Transfer (BOT) Scheme through the BOT Law, according to the World Bank (2000), has become a landmark event. It has expanded private sector participation in infrastructure development to sectors other than power to include telecommunications, ports, toll roads, airports, and water. It has also relaxed the 60 percent Philippine ownership requirement for operating infrastructure projects and winning construction contracts. It has also prevented the use of explicit government guarantees and limited the use of public funds – i.e., less than 50 percent of total project cost come from public finance.

As of March 2002, total BOT projects amounted to US\$ 441.32 million in the water sector; US\$3.3 billion in the power sector; US\$ 3.3 billion in the transport; and US\$ 207.7 million in communications.

Although funding cost to BOT proponents are higher than if financed through direct government borrowing, implementation through the private sector has been deemed faster and more responsive to the implementation needs of various infrastructure projects.

However, there have been a number of unsolicited BOT projects that need greater attention. This can be traced to the lack of good feasibility studies on a given project due to the lack of expertise of the implementing agencies and the funding constraints for the preparation of these studies. Another issue is the lack of coordination among agencies that may be involved in a given BOT project. In addition, the transition from public to private provision of infrastructure has not come without tremendous costs to the Philippine government. Government guarantees have generated huge contingent liabilities, which warrants better management.

Notwithstanding the drawbacks of greater private sector involvement in infrastructure development, several benefits have been achieved. There has been greater access to more capital and management expertise. Increased competition has led to more innovations/technologies, reduced costs and enhanced consumer effectiveness. Access to services has been expanded and labor productivity has increased.

With the shift in government's role from being a major provider of infrastructure to an agent responsible for creating the policy and regulatory environment for private sector participation, comes the need to develop and strengthen government capacity to identify, evaluate, plan and manage projects. In short, regulatory governance – with regulatory bodies that are independent and accountable - has become more critical. In addition, the capital market infrastructure has to be developed, following the parallel shift in the source of finance for infrastructure. The paradigm shift opens the avenue for bringing private sector expertise and capital to bear on the task of financing infrastructure.

Financing Infrastructure

The government should pay attention to various issues to address future financing requirements. These include:

- credible stock market that responds to the needs of infrastructure markets and projects;
- deep and liquid long-term bond markets;
- increased participation of sources of long-term capital, such as pension funds and insurance companies;
- mechanisms for pricing long-term debt;

- opportunities offered by asset-backed securitization;
- deep and liquid markets for mitigating currency and maturity risks;
- efficient credit rating agencies, helped by responsible information disclosure systems;
- legal and regulatory systems geared towards ensuring fairness and transparency in infrastructure markets. (Llanto, 2000)

The structure of infrastructure projects has moved away from structures where key risks are assumed by the Philippine government into one in which risks are more equitably shared with the private sector. Consequently, domestic financing mechanisms will have to help the private sector to mitigate these risks. Aside from strengthening the domestic bond and equity markets and the domestic banking sector, the structure of the projects will have to be strengthened as well. In this respect, both the government and the private sector face major challenges to achieve optimal project structures, albeit reforms in policy and capacity strengthening are presently moving towards this direction. (Reside, 2000)

VII. Concluding remarks

The low rate of return to physical and human capital investments implied by macroeconomic measurements of growth contributions presents a disappointing puzzle for the Philippines. The country had one of the lowest rates of national saving and investment in its immediate region over the period under review. It would be natural to expect that the rate of return to its investments be relatively higher than the average. Instead, we observe virtually zero, and even negative, rates of return over the period. Aside from the individual and sectoral observations gleaned from the various studies listed in the references, broad lessons are indicated by the overall national experience.

The broad impression given by the sectoral reviews is a general failure in governance (understood as the ability to mobilize resources for maximum effectiveness). This failure happened in three broad ways. First, there is a rather strong impression that maintenance of physical capital was neglected. This is particularly evident in the case of the transportation and water sectors. Fixed infrastructure was allowed to deteriorate over time. Assets that could have lasted for decades were degraded over just a few years. The rate of return on investments was substantially reduced as useful life was shortened.

Second, while overall plans for various service infrastructures were probably present --- e.g. public investment plans and a national transportation plan are available --- the implementation was subjected to political and financial pressures. As a result, groups of infrastructure services planned as clusters or networks often took years to finish, sometimes the last pieces came in after earlier investments had already deteriorated. As a result, the full benefit of

service clusters or networks would never be fully realized, sometimes grossly under-realized. Further, the former failure mentioned above seriously worsened this second failure. This is, perhaps, most palpable in transportation. But deficiencies in education and health may also be cited.

Third, inadequate governance in peripheral areas also adversely impinged on the benefits of physical investments. An example of this is in the provision of roads and water and sewerage services. The government's inability to manage the migration of population from the rural to urban areas, for example, meant that people moved haphazardly into areas even before the necessary public services were put in. When these infrastructures were finally put in, the cost would have already escalated as appropriation values had escalated or "work-arounds" had to be resorted to. The resulting escalation in investment costs further reduced the rate of return on projects.

A short summary lesson from the inferences above seems to point to the importance, not only of planning, but also of effective and timely implementation.

Another broad lesson can be gleaned in the financing of infrastructure. The Philippine experience shows that we need some caution in implementing innovative modes of financing. The various modes allowing the private sector to participate in the provision of these services has several advantages. The first, of course, is the increase in available funds to finance these services, especially during the early period of development when resources for the public sector may be wanting. At this stage, there is less ability of the population to save, all other things being equal. Perhaps even more important, the most governments at this stage of development also have less ability to mobilize resources by taxation or other means. Involving the private sector in the provision of public services allows governments to bypass this bottleneck until it develops the ability for effective resource mobilization.

Beyond resource mobilization, are the advantages of efficiency offered by the liberation from, oftentimes, elaborate and cumbersome government procedures. As a result, decision-making and implementation are faster and more flexible. All of these advantages result in lower cost of service provision, which has same effect as having more funds.

However, the advantages above come with a price. The same features of the private sector also allow them to bargain effectively with governments that have diffused decision-making and broad consensus-building apparatuses. The private sector will understandably try to maximize its take from government contracts and pass on the risks to government. Unless the government is careful in its decision-making and accurate in its estimates and assumptions, its commitments could take on substantial contingency liabilities.

This is an important lesson from the Philippine experience. Some contracts written by the government in the power and transportation sectors are examples of this danger. Thus, while the government for various reasons such as technology and intrinsic service features may be interested in allowing the private sector to participate in the provision of public services, care and caution should be taken. Over the long run, governments are best served if they also invest in gaining the ability to mobilize resources through the usual methods such as taxation.

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