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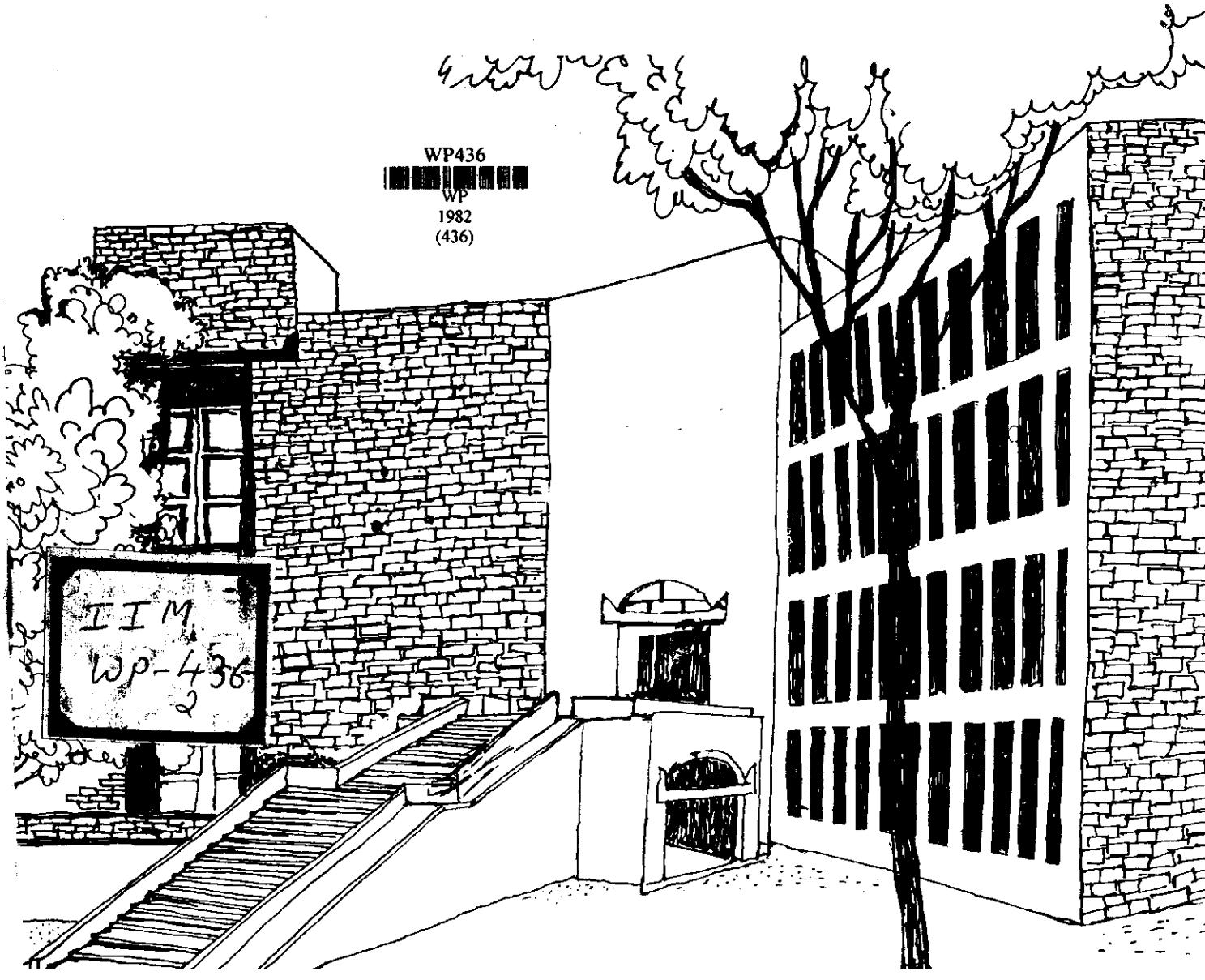

PERFORMANCE DETERMINANTS OF PUBLIC ENTERPRISES

by

Pradip N Khandwalla

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by

Pradip N. Khandwalla
Professor
Indian Institute of Management
Ahmedabad 380015

CONTENTS

Page No.

(B) TABLES AND FIGURES

PERFORMANCE DETERMINANTS OF PUBLIC ENTERPRISES

Pradip N. Khandwalla*

ABSTRACT

The paper is a summary of a report submitted to the World Bank on the performance determinants of Indian Public enterprises. The study was based on intensive case studies of four engineering enterprises, all attached to the Government of India's Department of Heavy Industry. The paper describes the operating context of the four PEs, the hypotheses that were formulated before the field work began, the research methodology, and the findings of the study. The supported hypotheses are listed, and effective models of turnaround of PE's management of its operating and regulating environments, its management of growth and diversification, the regulating authority's management of its interface with PE, and the government's appraisal of PE investment proposals are delineated. The paper outlines some implications of the study.

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* Professor of Organizational Behaviour,
Indian Institute of Management,
Ahmedabad.

Introduction

The public enterprise is an institution of global significance. It is a prime instrument of the state's economic action in the socialist economies (Granick, 1975) and though it plays a much less dominant role in the Western market economies, it is of significance in the spheres of utilities, transportation, and communication (Pryor, 1976). In many LDCs, a variety of factors have combined to make it a vital institution. Their national aspirations for rapid industrialisation, involving especially the development of "basic" industries with low profitability, high risk, long gestation periods, or vast capital outlays beyond the capacity of the private sector, is one reason for the emergence of PEs. The urge to break the economic strangehold of "alien" minorities through nationalisation, as in some East African countries, is another stimulus. Ideological reasons, such as the state securing commanding heights in the economy, as during the Bhutto regime in Pakistan, is a third reason. Augmenting of the state's revenues, breaking of private sector monopoly power, control of natural monopolies, taking over of sick private units with a view to maintain employment, import substitution, penetration of foreign markets, and the natural growth and diversification of established PEs, are other major reasons for the emerging dominance of PEs in the developing world.

There has been rapid growth in the number and economic importance of PEs in many LDCs. In Philippines, for instance, the assets of PEs increased three-fold between 1966 and 1974, and their number from 13 in 1951 to 69 in the mid-seventies (Sadique, 1976, p.497) while in Malaysia, their number grew from 10 in 1957 to 82 in 1974 (Sadique, 1976, p.365). Despite major differences in their economic growth strategies, both India and Pakistan have come to have very large public sectors, with PEs accounting for half or more of the

industrial production of each country (Fernandes, 1976; Syed, 1980). A number of other developing countries alsoboast sizeable public sectors, such as land (Yongkittikul, Kanchanadul et al), Tanzania (El-Namaki, 1979), Zambia, Botswana, Lesotho, and Swasiland (Commonwealth Secretariat, 1978).

Given the vast resources locked up in PEs, there has been world-wide interest in their performance (Syed, 1980; Yongkittikul, Kanchandul et al; Commonwealth Secretariat, 1978; Choksi, 1979; PPFD, 1978; Liaquat Ahmed, 1978; Basu, 1979; U.N., 1973). By and large, their financial performance, both in the developed and the developing countries, has been unsatisfactory (Choksi, 1979). For instance, net income after depreciation as percent of activity was - 16% for PE industries in Europe, Latin America, Africa, and Asia, the deficits being largest in Europe and Latin America (Choksi, 1979, pp 14-16). In India, which has one of the largest and most diversified public sectors among the LDCs, the financial performance of PEs has tended to be distinctly poorer than that of private enterprises in the same industry (Sri Ram et al., 1976, pp 40-41 and pp. 71-74). Many reasons have been adduced for this poor financial performance, including price control (eg. Nath, 1979); multiple and conflicting objectives (Sadique, 1976, p.529; Choksi, 1979 p.8); political unacceptability of high profits in a democratic society (Monsen and Walters, 1979), inappropriate regulation (PPFD, 1978); and the poor quality of their management (Maheshwari, 1978).

A functional review of the materials on PEs contained in World Bank reports indicated some significant problems faced by PEs, especially in the LDCs, and the operating wisdom at the Bank as to how to tackle these problems (see Liaqut Ahmed, 1978, especially pp.45-49). These problems and solutions are summarised below:

Problems Faced by PEs	Bank's Suggested Solutions
1. Proliferation of social objectives, particularly with regard to pricing and employment, that dissipates savings and masks managerial inefficiency	Government should give explicit subsidies for these social objectives to ensure awareness of their costs. Different organization could be set up to pursue different goals.
2. An over-centralized process of taking decisions due to inadequate information flows and ill defined authority relations	Improvement of auditing practices and financial accounts of PEs. Decision making should be decentralized more. The Government should limit its freedom of action vis-a-avis PEs.
3. Lack of well defined standards or targets for judging PE performance, resulting in over use of financial measures for assessing PE performance	Cost and productivity growth should supplement financial assessment
4. Insufficient motivation on the part of managers to improve PE performance	Compensation should be based on performance and PE management should have greater autonomy over investment of PE surpluses
5. A lack of external discipline on PE, leading to allocative inefficiency in pricing and investment and also managerial inefficiency	There should be better and more independent screening of investment proposals. Pricing should be geared to world prices.

Empirical studies of the managerial and administrative determinants of the performance of PEs are, however, rather infrequent. The study summarised in this paper was undertaken to develop insights into these.

This paper summarises a study of the determinants of the performance of four Indian engineering public enterprises (PEs) attached to the Department of Heavy Industry of the Ministry of Industry (Khandwella 1981b).* The four enterprises are Richardson and Cruddas (1972) Ltd. (R & C), Bharat Pumps and Compressors Ltd. (BPCL), Bharat Heavy Plate and Vessels Ltd. (BHPV), and HMT Ltd. (HMT). In the main all four are equipment manufacturers, although HMT also is a major producer of watches, tractors, and lamps.

The study was an exploratory one, and was undertaken more to refine and extend some hypotheses than to test them. The study was initiated in mid-1978. The field work was begun in early 1979 and completed a year later. The explanations for the performance of the PEs studied were sought primarily in the nature of the interface with their regulatory environments, the character of their business environments, their modes of management, and the strategic and structural responses of their managements to the problems, constraints, and opportunities confronting the PEs.

Broadly speaking, it was expected that a supportive and yet demanding regulatory environment, and a competitive market environment, would aid PE performance. More importantly, perhaps, a dynamic and professional management response to the complexity of the operating environment of equipment manufacturing enterprises would positively aid performance, while a conservative, mechanistic, authoritarian, and non-professional response would inhibit performance.

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* Professors Dholakia, Murthy, Mohan and Pandya as well as Dr. V.V. Bhatt, Dr. Khalil-Jadeh Shirazi, and Dr. Gobind Nankani made significant contributions to the study. The study was greatly facilitated by Mr. V. Krishnamurthy, Mr. Sharangapani, Mr. Puri, Mr. Mansukhani, and Mr. Ramachandra.

The study was part of a World Bank sponsored multi-national study of the determinants of the performance of PEs. Its hoped for result was a somewhat enlarged understanding of the dynamics that shape the performance of PEs. Such an enhanced understanding may not only provide funding agencies with better bases for advicing their clients, but may also shape public policy towards PEs, and in addition, may help the management of PEs to do a better job. A study like this one could be a stepping stone to answers to some important questions, such as, what kind of a regulatory environment could improve the performance of PEs; what kind of a business environment (e.g. extent of competition) would be "optimal" for PEs; and what kind of management response (styles of management, business strategy, organizational structure, administrative strategy, management systems, etc.) to the operating and regulatory environments of PEs would facilitate high performance.

Being part of an international study imposed two major constraints on the study. As with other participating countries, there were to be only four case studies, and these had to be engineering enterprises. In addition, another constraint for this study was that the enterprises selected for the study had to be attached to the Ministry of Industry, and preferably to the Department of Heavy Industry. The choice of the enterprises was arrived at through a process of negotiation between the Secretary, Department of Heavy Industry, World Bank officials, and the author. Of the 17 enterprises attached to the Department, 13 were eliminated for a variety of reasons, such as financial sickness, or their managements not favouring the study, or political conditions not favouring their study, etc. Even so, as Table 1 shows, the four enterprises selected are fascinatingly complex, and variegated enough, to yield useful insights.

SALIENT CHARACTERISTICS OF THE SELECTED PEs

	R & C	B H P V	B P C L	H M T
Major product lines	Structurals; chemical, rubber, sugar and other mechineries and equipments; railway points and crossing; hand pumps, etc.	Heat exhcnagers and pressure vessels; cryogenic equipment; equipment for the paper industry	Pumps and compressors; gas cylinders.	Machine tools; watches; tractors; lamps; printing presses; horological equipment, etc.
Brief history	Founded by Britishers in the 19th century. Passed to Indian hands after Independence. Mismanaged. Taken over by Court. Govt. ownership in 1972. Main product structurals, but its share is rapidly declining. Entered sophisticated technology area in mid-seventies. Became a loss making unit in 1977-78 but turned the corner in 1979-80 under a new management. Planning diversification in sophisticated engineering products.	Formed in 1966 by Government of India with Czech collaboration to produce equipment for chemical and fertilizer units; later diversified into cryogenic and paper converting equipment; loss making unit that has just turned the corner under a new management. Planning diversification into industrial boilers.	Formed in 1970 by Govt. to produce equipment for the extractive industries, especially oil and gas. Later diversified into non-home gas cyclinders. Has grown rapidly and become more profitable under a new management. Planning diversification into "base load" industries.	Formed by Govt. in 1953 to produce machine tools, Diversified into watches, tractors, lamps, etc. in the sixties and formed an international subsidiary in mid seventies to promote product and project exports. Believed to be one of the best managed of Indian PEs.
Size in 1980				
(a) Annual sales (rupees in millions)	200	260	170	1760
(b) No. of employees	4000	3800	1400	25000

		R & C	BHPV	BPCL	HMT
4.	Age	100	14	10	27
5.	Technology	Low to Medium	High	Medium to high	Medium to high
6.	Value added per employee (in rupees)	19000	34000	48000	35000
7.	Net operating profit to sales:				
	(a) Lowest during past 5 years	-4%	-7%	2%	11%
	(b) Highest during past 5 years	8%	12%	14%	18%
8.	Net operating profit to capital employment:				
	(a) Lowest during past 5 years	-5%	-3%	1%	11%
	(b) Highest during past 5 years	9%	9%	7%	18%
9.	Annual growth rate in sales during past 5 years	13%	5%	34%	22%

Some limitations of the study may be noted. The limited size of the sample (only 4 out of over 175 central government PEs in India) rules out extensive generalisability of the findings. Secondly, all of the PEs studied are attached to a single ministry and to a single department within this ministry. Thus, the potential variation in ministry - enterprise interface, which may be an important determinant of enterprise performance, has been sharply curtailed by the research design. Three of the four PEs studied are either monopolies or dominent firms in their major product lines. This makes it difficult to identify industry norms for evaluating their performance. The four PEs studied have practically no overlap in their products. This makes comparison across these four PEs difficult. All four of the PEs are diversified manufacturers of custom-built equipment. This makes it difficult to identify their market structures, or to make sense of the implications of their market structures. Also, given the extent of product differentiation, price control by their controlling ministry is much less feasible than, say for steel, and it is likely that these four enterprises therefore enjoy a significantly higher autonomy than PEs with standardised or homogeneous products. Given these limitations of the study, it seemed to make sense to concentrate attention on significant changes in the performance of the PEs, and to seek explanations for these variations in changes, if any, in their business and regulatory environments and the management of the PEs. This was supplemented by comparisons with the performance of comparable public or private sector units.

The Operating Context of the Four PEs: The Indian Public Sector

The four PEs are part of a massive and rapidly growing and diversifying Indian public sector. The central public sector boasts nearly 180 enterprises attached to various ministries of the Government of India, producing an extremely wide variety of products and services, employing nearly two millions persons, and annually producing goods and services

worth 200 billion rupees (about 22 billion dollars). These enterprises are regulated not only by their boards and parent ministries, but their investment proposals are also scrutinized by the Bureau of Public Enterprises, the Planning Commission, the Ministry of Finance, and the Public Investment Board. Their performance is scrutinized by the Parliament. Besides being subjected to the scrutiny of government audit, they are also subject to the scrutiny of statutory auditors under the provisions of the Indian Companies Act. Interference by politicians in the working of PEs has often been alleged, although no significant interference of this kind was reported by any of the four PEs.

The need for public accountability of the enterprises and also simultaneously for their functioning autonomy seem to pose a significant policy dilemma. (Dimock, 1949; Robson, 1970; Amarchand, 1978). The first argues for detailed control by organs of the Government; the second for substantial operating decentralisation. As a consequence, there appears to have been a potent struggle between a secretariat or bureaucratic mode of running organisations epitomized by a procedural and mechanistic orientation, and a business or managerial mode of running organisations characterised by professional management, flexibility, improvisation, quick action, and results orientation. The secular tendency seems to be towards a more flexible and discriminating, strategic rather than administrative, and results oriented rather than procedural, regulation of public enterprises (Murthy, 1980). As a former insider put it: "What was formerly described as "administrative control" over the companies by ministries is now giving place to managerial, professional and pdicy control of companies" (Fernandes, 1976, p.145).

Historical necessity, as much or more than socialist ideology may have favoured the growth of the public sector in India. India emerged into independence industrially a grossly underdeveloped economy, with an unhappy history of colonial exploitation by a leading western nation. Rapid industrialisation was an obvios economic and political necessity. The indigenous private sector was not seen as capable of entering into high technology areas in which gestation periods were long, markets uncertain, risks high, and capital requirements very large. A possible alternative was having western multinationals invest in such industries. But the colonial experience probably ruled out reliance on this source of capital and enterprise in industries the Government considered vital to the nation's long term growth. Another option was joint ownership and professional management, that is, substantial equity participation by both the Government

and the public, with management appointed by the Board of Directors rather than by organs of the Government. This, however, has not been seriously considered, perhaps because public enterprises are not merely commercial undertakings but also - probably more so - instruments of public policy, and joint ownership may lead to a dilution of this role of public enterprises. There is, however, tendency for state governments in India to resort increasingly to joint ventures with private enterprise.

Besides generating surpluses, as instruments of state policy, public enterprises are expected to strive to secure the objectives of the Government, such as removal of poverty, attainment of self-reliance, a more egalitarian distribution of income, expansion of employment, balanced regional development, acceleration of the rate of national production, prevention of concentration of economic power, and technological self-sufficiency (BPE and BHEL, 1976, p. xiii).

The performance of the Indian public sector indicates the following characteristics:

a. The profitability of the public sector as a whole has been dismal. The profit before taxation, as a percentage of employed capital ranged from about - 1% to 3% between 1959-60 and 1974-75 (both years inclusive) and averaged about 1/2%. By contrast, this percentage for large public limited companies in the private sector varied from about 7% to 12% and averaged about 9% (Sri Ram et. al., 1976, pp.26-27). Even when public sector companies are compared with private sector companies in the same industry (but not necessarily the same product line), the picture is not much brighter. Out of eleven industries, only in trading, and to a much lesser extent in shipping, was the advantage with the public sector (Sri Ram et. al., 1976 pp. 40-41; see also pp. 71-74). The profit performance has been poor despite certain advantages enjoyed by the public sector, such as preferential purchasing from it by the Government, interest rates for loan capital substantially

below market rates, considerable monopoly power, and preferential treatment with respect to foreign exchange allocations. Against this are disadvantages stemming from long gestation periods, high charges on account of depreciation, expenditure on townships, lower remuneration for managerial personnel, multiple sources of regulation, etc. (Sri Ram et. al., 1976, Ch. III).

b. The major causes of low profitability have been identified as idle capacity, managerial and other inefficiency, low prices due to competition, subsidisation of the consumer by the Government through low prices, initially wrong investment decisions that resulted in the production of the wrong product mix, etc. (Ramanadham, 1974). Work identifying the relative weights of these causes appears to be embryonic (Ramaswamy, 1972, ch. 2).

c. In recent years there has been fluctuating profitability. From 1971-72 to 1978-79 the percentage of gross return on capital employed of running enterprises has averaged 7% and fluctuated from 4.1% in 1971 to 9.4% in 1976-77.

d. There are substantial inter-industry variations in public sector profitability. For example, during the three years of 1972-73 to 1974-75, the percentage of gross profits (before tax and interest charges) to capital employed averaged 18.6% for the public sector petroleum industry, 17.6% for consultancy services, and 11.2% for medium and light engineering, by contrast, it averaged - 3.3% for public sector minerals and metals, -1.2% for consumer goods, and 2.0% for steel (Sri Ram et. al, 1976, p. 34).

e. There are substantial intra-industry variations in public sector enterprises. In the steel industry during 1974-75, the profit making units reported a net profit of Rs. 432 million while the loss making units reported a net loss of Rs. 116 millions; in the public sector heavy engineering industry during 1972-73, the profit making units reported a net profit of Rs. 150 millions while the

loss making units reported a net loss of Rs.168 millions (Sri Ram et. al 1976, pp. 36-37). As another example of intra-industry variations in efficiency, the tonnes of steel produced per employee in 1969-70 varied from 45 at the Government's Durgapur Steel Plant to 79 in its Bhilai Steel Plant (Sri Ram et al, 1976, p.77, p. 135.)

f. There is very great inter-unit variation in the rate of increase in efficiency in the public sector. Between 1967-68 and 1972-73 the net value added per employee (unadjusted for inflation) rose 98% in Hindustan Steel, 260% in Bharat Heavy Electricals, 329% in Heavy Electricals (India), 89% in Hindustan Machine Tools, and 103% in Indian Oil, while it rose by only 22% in NEPA and by 23% in FACT and declined in Hindustan Antibiotics.

g. There are substantial inter-ministry differences in the performance of public enterprises belonging to the same industry. For example, light and medium engineering enterprises attached to the Department of Heavy Industry increased their turnover by 39% in 1978-79 over 1977-78, while other light and medium engineering public enterprises not attached to the Department increased their sales by only 11%.

h. There are great variations in the profitability of enterprises attached to the same ministry. For example, both BHEL and HEC are large heavy equipment manufacturing units attached to the Department of Heavy Industry. In 1977-78 their respective gross profit to capital employed ratios were 19.5% and -9.3% and in 1978-79 these were 16.3% and -5.5%.

i. Productivity in the public sector has been rising rapidly at over 4% a year, although it is still below private sector standards (Dholakia, 1978).

j. The export performance of PEs is rather modest. Despite the sophistication and range of their products, and excess capacity situation in many of them, exports are barely 2% of sales. In their aversion to an international orientation, Indian PEs have much in common with their European counterparts (Mazzolini, 1979, p.377).

The sharp differences in public and private sector profita bility (point a above) suggests that the form of ownership or the relations between owners (or their agents) and management, may significantly affect corporate performance in the public sector. Inter-industry variations in public sector profitability (point d) suggests that market structure, possibly in combination with constraints imposed by owners, may significantly affect corporate performance in the public sector. Intra-industry variations in the profitability of public enterprises (point e) suggests that organizational structures and the process of management may also significantly influence corporate performance in the public sector.

The many causes of low performance (point b) and the uneven rate of improvement in efficiency (point f) suggest that changes in management structure and processes may significantly improve corporate performance in the public sector. The large inter-ministry variations in performance (point g) suggests that the character of the interface between a ministry and the enterprises attached to it may be a significant predictor of public enterprise performance, although variations in management quality and business environment may be equally important predictors of performance (point h). Finally the rapid improvement in productivity (point i) suggests that the public sector as a whole, particularly its newer, high technology units, is on the high slope of the learning curve.

Operating Context : The Department of Heavy Industry

The four PEs are all attached to the Department of Heavy Industry, which is part of the Ministry of Industry. During the study period, the Department was headed by Mr. V. Krishnamurthy, formerly the chief executive of Bharat Heavy Electricals Limited (BHEL). In 1980 the Department oversaw 17 PEs with a total output of 10 billion rupees and a staff of 1,60,000 persons.

During the study period, the published strategic objectives of the Department of Heavy Industry were the promotion of the rapid growth of Indian industry through the very rapid growth of the Indian equipment industry, the opening up of markets for Indian equipment in the

newly opulent developing countries of Asia and Africa where economic and social conditions give a comparative advantage to Indian products and know-how, the upgrading of Indian technology through R & D and selective imports of technology, the management and organizational development of enterprises under its wing, the development of capability for exporting high value added products and taking on of turnkey projects abroad, greater range of technological capability, and the collective exposure of Indian equipment industry to global competition to create greater cost, market, and quality consciousness (Ministry of Industry 1978-9). High profitabilityof the public enterprises did not, it may be noted, figure in the strategic objectives of the Department.

An implication of the above strategic objectives seemed to be that public enterprises attached to the Department were cued off to be strongly committed to growth, diversification, upgrading of technology, exports, manpower management and organizational development. The enterprises that responded appropriately, that is, conformed to the strategic objectives of the Department, were likely to attract greater attention, importance, and resources from the Department-merely high profitability probably could not.

Interviews with the officials of the Department led to the following impressions of its work culture :

a) There seemed to be a genuine respect for the operating autonomy of PEs. But also simultaneously there was a fairly comprehensive monitoring of their performance monthly and quarterly, at meetings attended by their chief executives and chaired by the Secretary. Liaison with the ministry was provided by a n officer of the Department who was also a member of the PE board. The monitoring of PE investment proposals tended to be weak.

b) There was a fairly strong commitment to the well-being of PEs, and an attitude of helpfulness rather then hostility or indifference.

c) There was a strong growth and results orientation, particularly with respect to growth in output and acquisition of sophisticated

technology. Concern for profitability or productivity appeared to be modest.

d) There was a commitment to professional management encompassing the institutionalisation of sound planning, financial control, and personnel systems in the PEs.

e) Given the level of sophistication in the technologies and products of the PEs monitored by the Department, it did not seem to have a sufficiently strong expertise orientation. The officials did not, by and large, seem to have either the managerial know-how or the technical know-how to be able to analyse in depth the problems faced by the PEs and the strategies for solving them. Nor it seemed, did they have the time for a really good monitoring job. The strength of the officials seemed to lie in being helpful in fire fighting and crisis management, not in providing expert assessment or counsels.

f) Within the Department there seemed to be two cultures: the generalist bureaucratic culture of IAS officers, and the managerial/technical culture represented by the Secretary andhis "boys" and the technical departments within the Ministry. No sharp operating conflicts, however, were detected. Though there seemed to be a general commitment to the public sector among officials, there were sharp differences as to how to safeguard it. A major difference seemed to be whether to maintain or extend the domain of the public sector or to restrict it to its area of comparative advantage.

Operating Context : The Public Sector Engineering Industry

The Indian engineering industry, consisting of both public and private sector units, is a relatively high growth industry but also one which is subject to violent fluctuations because it is tied strongly to the volume of governmental investment. In the machinery manufacturing part of the

engineering industry, the products are highly differentiated, and sales precede design to customers' specifications and production. There are long delivery schedules, onerous after sales service terms in the contracts, and frequent re-designing of products. Because of its high priority, various incentives are available for newcomers, and competition tends to get stiffer over time due to low barriers to entry. It is an industry in which large units often encounter stiff competition from tiny units, especially for the lower priced, less sophisticated products.

In this study, the major concern was with enterprises in the light, medium, and heavy engineering public sector industry, that is, with the industrial products part of the Indian public sector engineering industry that encompasses manufacture of tools, machinery, equipment, structurals, fabrications, etc. Its distinctive features are:

a. By and large, the technology is fairly to highly sophisticated since the prime reason for setting up public sector units in this industry has been national self-reliance in strategic industries which the private sector was not seen as capable of achieving. BHEL, Heavy Engineering Corporation, BHPV, HMT and BPCL are some of the corporations with sophisticated technologies and products that were created in pursuance of this strategy. An implication of sophisticated technology is the professionalisation of both the work force and management. Highly skilled workers and supervisors need to be hired and their skills need to be updated by training. Similarly, managers need to have the skills needed to make complex investment, technology acquisition, make or buy, bidding, production planning, etc. decisions. They need, for the most part, to have not only good technical skills but also good commercial, planning, coordinating, and leadership skills. In 1978-79, while just about a quarter of all central public sector employees were categorised as managerial, supervisory, and skilled personnel, the percentage was nearly 40% in the light and medium engineering public sector and over 60% in the heavy engineering public sector (See Table 2).

Table - 2

PUBLIC SECTOR ENGINEERING INDUSTRY

	Light and Medium Engineering.	Heavy Engineering	Public Sector As a whole
1. Turnover (rupees in billions) in 1978-79	6	9	111*
2. Capital employed[1] (rupees in billions) in 1978-79	5	8	72
3. Number employed (1978-79)(in '000)	98	135	1871
4. Growth in sales in 1978-79 over 1977-78	17%	25%	11%*
5. Inventories in number of days of output in 1978-79	232	342	104
6. Gross profits[2] to sales ratio, 1978-79	11%	6%	6%*
7. Gross profits[2] to capital employed ratio 1978-79	14%	6%	9%*
8. Managerial, supervisory, and skilled personnel as % of total personnel (1978-79)	38%	61%	26%
9. Labour cost as % of cost of production (1978-79)	24%	19%	12%
10. Value added per employee (1978-79) (in rupees)	18000	33000	13000*
11. Total emoluments per employee (in Rs.) (1978-79)	13000	12600	11000*
12. Exports as percentage of turnover (1978-79)	5%	9%	2%*

* Manufacturing public enterprises only.

1 Net block plus working capital

2 Profit after depreciation but before interest and taxes

Source: Public Enterprises Survey 1978-79, Vol. I Bureau of Public Enterprises, Ministry of Finance, New Delhi.

b. Sophisticated technology, in combination with custom technology, often implies dependence on imports for some critical materials, components, etc. For instance, 75% of the inputs purchased by BHPV need to be imported, and a high per centage of BPCL's inputs also need to be imported. When orders are one of a kind, it is hard to find domestic manufacturers who can produce a small quantity of a part or a component needed just for that order at an acceptable price. But given the chronic foreign exchange shortage of India, and the lengthy import procedures this has given rise to, it means that the engineering public sector would have to live with long delivery schedules for its imports. The latter (a) make it difficult for the engineering public sector to compete with foreign suppliers both in India and abroad and (b) exposes the public sector units to cost escalations due to efflux of time. Despite drastic improvement in BHPV's delivery schedules, it still found itself 3 or 4 months behind the Japanese delivery quotations because of the high import content of BHPV products.

c. Another implication of being a custom manufacturer of sophisticated products is the need to stockpile inventories of frequently needed inputs. The precise quantitites of inputs needed, say a year ahead, cannot be easily estimated because of the varying input requirements of the various orders. At the same time supplies of inputs are erratic in India, and therefore, to maintain the tempo of work on the various orders without stoppages due to stock-out situations, engineering enterprises tend to over-stock on general inputs. In 1978-79, the value of inventories in the central public sector as a whole was equivalent to just over 100 days of production. The figure was over twice this level in the light and medium engineering public sector and nearly three and a half times in the heavy engineering public sector (see Table 2). Clearly, the management of inventories and the management of the production planning function are of major importance in the public sector engineering industry.

d. The demand for the products of the engineering public sector is largely what may be called derived demand. Its principal customers are mostly other public sector organizations such as steel plants, fertilizer and petrochemical complexes, electricity generating stations, defence industries, railways etc. that are either expanding their capacity or replacing their obsolete plant. This has several implications. The more specialised the engineering public sector unit, the more volatile its order book position will tend to be thanks to uneven investment expenditures of its customers. There will, therefore, be strong pressures on the enterprise either to seek foreign markets to offset domestic slackening of demand, or to seek diversification into contra-cyclical products or into base load industries. For their size many of the engineering public sector units are, as a result, carrying wide product lines. Richardson and Cruddas, for example, despite an annual turnover of only about Rs.200 million, produces not only structurals, but also rubber, chemical, and sugar machineries, rural hand pumps, railway points and crossings, refrigeration equipment, and so forth. BHPV, which was designed to produce sophisticated equipment for the fertilizer and chemical industries, has diversified into the making of oxygen plants and paper industry equipment, and will shortly take up the production of industrial boilers under licence from BHEL. The management of diversification, and the management of the units that come into being as a result of diversification, is a major problem for public sector engineering units.

e. Another problem that engineering public sector units face by virtue of their main customers being other public sector units is the problem of inter-ministry coordination. While the engineering public sector has partly at least come into being to service the equipment needs of the rest of the public sector, the customers are inclined to shop nationally and globally for the best terms.

This is reinforced when their expansion etc. is funded by international lending agencies like the World Bank. The problem is compounded by complaints of cost and delivery overruns, defective equipment etc. by the customers of the engineering public sector, especially during the gestation and settling period of the engineering units. Despite having on paper great market power (being monopolies or dominant firms in many of their product lines) the public sector engineering units tend to be on the defensive, and tend under pressure from customer public enterprises in other ministries, to take "uneconomical" orders to stave off excess capacity situations. Their profitability is continually under pressure, although poor management may be equally responsible for low profitability.

f. The capacities of the engineering PEs are often designed bearing in mind not current demand but future demand. The Planning Commission habitually comes out with optimistic forecasts of future demand. These forecasts are taken seriously by the engineering PEs, who accordingly plan large expansions in the expectation that the targets set by the Planning Commission will be fulfilled. The actual national achievements almost always fall behind, often far behind, targets, and the PEs that have carried through their expansions find themselves saddled with huge excess capacities. BHPV is a glaring example of the foregoing. On the basis of official forecasts of demand made in the mix-sixties, BHPV was set up with a capacity to produce 23000 tons of equipment. The maximum it has yet been able to sell in any year is just about half of this capacity. Despite gross under utilisation of capacity, there was a proposal in the early seventies to expand BHPV's capacity by a third, again on the basis of Planning Commission targets. A similar mismatch of capacity and demand is to be found at BPCL with respect to its pumps and compressors business. Being part of the formal planning structure of the Government gives PEs many advantages

in terms of relative priority in inputs, capital, imports, etc. But the drawback tends to be unrealistic capacity planning which may lead to huge excess capacity, low profitability, large borrowings, high interest charges, and in turn to lower profitability, a demoralised management, pressure for diversification to escape from a "stagnant" industry, once again reliance on official forecasts for the purpose of finding "growth" industries, and the repetition of the vicious cycle.

g. The engineering PEs are faced with enormous management problems. Producing to customers specifications implies almost continuous interaction between groups of specialists in commercial, design, manufacturing, quality control, materials, maintenance, stores and myriad other departments. Operating in highly turbulent markets and servicing customers that have a lot of political clout adds to the complexity of management decision making. Added to these are the problems of managing often very wide spreads of product lines, excess capacities, poor financial resources, growing competition, and restive personnel (due to inter-union rivalries in large plants). Only with very able management of the enterprises may these adverse factors be overcome.

h. The close monitoring of engineering PEs by the Government is quite a task. It is difficult to compare their performance with each other or with units in the private sector because of many reasons. Typically each such PE is a single or dominant producer. It carries a fairly broad product line. Its products are not standardised. Its technology is quite complex. And it could lose money for many reasons beyond its control, such as customer holds, or non-supply of agreed upon materials by customers, or cancellation of orders, or delays in receiving imported materials, etc. The management of the interface between the regulating Ministry and the enterprise must very carefully blend monitoring and control with motivating the management of the enterprise, extending it support in its hour of crisis or demoralisation, and

Institutionalising the monitoring function largely within the PE itself through such devices as picking top executives who are not only highly competent professional managers but also share the strategic objectives of the Ministry.

Issues in the Management of Indian Public Enterprises

There is a substantial literature on the various management and regulatory dilemmas faced by Indian PEs (e.g. Gupta, 1978; Nigam, 1980). Much, however, of this literature is speculative and/or hortatory. More substantial, perhaps, is the growing volume of empirical work. A survey of emperical studies of the management of PEs suggests the following inferences:

a. There are conflicting findings about the political interface of public sector units. In Sinha's study (1973) there was much complaint about political and governmental interference. Kumar (1976), on the other hand, found that governmental interference was the least potent inhibitor of job motivation of public sector managers. It is likely, therefore, that the political interface of PEs varies substantially from unit to unit and may be a significant predictor of unit performance.

b. There is some evidence to support the widespread belief that PEs have lower autonomy than private sector enterprises (Krishna Kumar, 1980). However, the extent of autonomy of an enterprise may depend more on a variety of factors than merely on whether an enterprise is in the public or the private sector (Krishna Kumar 1980). Thus, eventhough in general PEs may have lower autonomy than private sector enterprises, particular PEs may, under certain circumstances, have greater autonomy than particular private enterprises. There is also evidence that PEs accord greater priority to meeting national priorities than private sector enterprises (Krishna Kumar, 1980). Superimposed upon the enterprise goals of profitability, growth, etc., emphasis on meeting national priorities would tend to make decision making and resource allocation more complex in PEs than in the private sector.

c. The effectiveness of decision making may not be as high in the public sector as compared to the private sector (Maheshwari, 1978), and PE management may put a greater premium on growth of output. A consequence of high growth orientation and ineffective decision-making may be faster growth but lower profitability of PEs as compared to private sector enterprises (Maheshwari, 1978). A strong growth orientation and a mechanistic or bureaucratic management do not go well together (Khandwalla, 1977 a). The lower efficiency or profitability of PEs may be due to just this combination (Krishna Kumar, 1980).

d. The style of management may be a significant predictor of PE performance (Maheshwari, 1978). In particular, the combination of a dynamic entrepreneurial management and a decentralisation and participative decision making orientation may lead to higher enterprise performance. At the same time, a favourable business and regulatory environment may also be a factor influencing performance (Maheswari, 1978). Both mechanistic and organic managerial cultures, the first stressing bureaucratic practices, passivity, friendship cliques, and authoritarianism, and the second stressing task achievement, application of expertise in decision making, and commitment of the managers to system goals, may be found in the same enterprise (Habibullah and Sinha, 1980).

e. Profitability and efficiency are perhaps not as highly valued by the management of the Indian public sector as control and accountability (Roy, 1974; Sinha, 1973; Agarwal, 1973; Upadhyay KM 1977). This may be a cause of the relatively poor profit performance of the corporate public sector in India (Sri Ram et al, 1976).

f. Managers in the public sector tend to be ambivalent towards the practice of participative management (Dhingra, 1972, Elhance and Agarwal, 1975). Most tend simultaneously to harbour participative and authoritarian beliefs. While public sector units may be rife with democratic structures like committees, the conduct of their managers may minimise two-way communication with subordinates and cue subordinates to conceal negative feedback (Prasad, 1976). Given sophisticated technologies (and therefore, a fairly highly educated workforce), multiple business and social objectives, and rapid organizational growth, excellent collaboration of personnel and a high degree of internal agreement on organizational goals and activities are likely to be crucial. Participative management offers a potent integrative device (Khandwalla, 1973 a). Limited evidence (Moitra, 1977, Premraj and Venkatesan, 1976; Sharma et al, 1978; Arya, 1980) indicates that where in the public sector it has been tried honestly and with some persistence, it has yielded good results. There is also evidence that participative decision making is seen by PE managers as a major instrument for improving the decision making process and the organizational effectiveness of PEs (Maheswari, 1978).

g. Studies indicates that PE managers, at least as compared to private sector managers, stress sense of duty and morality more than success in getting tasks accomplished (Ganesh and Malhotra, 1975). They seem to want to accomplish their tasks within an ethical framework (Chattopadhyay and Agarwal, 1977).

h. The attitudes of public sector managers towards the public sector are not very flattering to the public sector (Sinha, 1973; Narain, 1972). Without positive job attitudes there may not be the reservoir of commitment necessary to overcome the challenges posed by headlong growth, long gestation periods, a cramping political environment, and so forth.

i. Risk aversion, including the fear of criticism, may be a notable characteristic of public sector managers. The studies of Sinha (1973), Agarwal (1973), Elhance and Agarwal (1975), Prasad(1976) and Krishna Kumar (1980), all attest to this, and the consequences seem to be red tapism, poor organizational performance, and poor upward communication, especially of negative feedback. In addition, there may also be widespread aversion to ambiguity (Kumar 1976). Ambiguity about tasks and relationships, it may be noted, is characteristic of growing or changing organizations (Burns and Stalker, 1961). Given the entrepreneurial role and rapid growth of public sector units in India, this high risk aversion and intolerance for ambiguity among their executives may be counterproductive. In addition, the relatively low level of pragmatism (relative to the levels in the entrepreneurial cultures of US, Korea, and Japan, Dhingra, 1972), may also handicap enterprise entrepreneurship.

j. Except at low levels of public sector management, extrinsic motivators such as good working conditions, pay, or job security may not be strong motivators. Rather, the prospects for personal growth and development and for worthwhile accomplishment may be (Kumar, 1976; Ganesh and Malhotra, 1975; Chattopadhyay and Agrawal, 1977). This has large implications for the design of the incentive systems in public sector units. Also, in conjunction with the possibly high risk aversion noted in point (i) above, it is likely that the typical manager in the public sector is a bit schizoid: he wants personal growth and challenge in his job, but is unwilling to take risks to secure it (Chattopadhyay and Agrawal, 1977; Agarwal et al, 1976). Some strengthening of growth orientation and weakening of risk aversiveness through achievement and power motivation training (McClelland, 1961, 1975), sensitivity training (Rush, 1969), creativity training (Khandwalla, 1978) may be in order, as also selection and promotion procedures that increase the proportion of high growth orientation-low risk aversive managerial personnel.

k. Motivation and morale may be major problems of PE managers (Chattopadhyay and Agrawal, 1977, Krishna Kumar 1980). Evidence suggests that lower level managers may be a lot more dissatisfied as compared to senior level managers (Sharma, 1979), and even at senior levels there may be dissatisfaction due to lower remuneration than in the private sector (Vathsala and Krishna Kumar, 1979). What is more, the effort-reward nexus may be weak (Krishna,Kumar, 1980), and given the lower managerial job satisfaction in the public sector as compared to the private sector (Krishna Kumar, 1980), it may be quite difficult to attract (or retain) top class managerial talent to the public sector. Amongst the causes of lower satisfaction in the public sector may be inconsistent top management actions (Maheshwari, 1978), arising partly from the frequent changes in the top management of PEs. There may also be a serious mismatch between what PE managers want and the need satisfaction offered by the system. In particular, there may be too great an emphasis by PEs on meeting the security needs of the managers, but not enough on meeting their needs for growth, challenge, advancement, recognition, etc. (Chattopadhyay and Agrawal, 1977).

l. There may be very large areas of improvement in the management of PEs. Maheswari's research (1978) indicates that managers of Indian enterprises, including those of PEs, believe that more participative/consultative decision making, greater role clarity, better planning, control, and information systems, greater managerial competence, better personnel policies and practices, a more collaborative and open organizational climate, and better goal setting would improve decision making and organizational effectiveness.

Hypotheses

The World Bank proposal for the research on the organizational and managerial determinants of public enterprises contained a number of hypotheses (PPFD, 1978). By and large these argued that such aspects of the regulatory structure - PE interface as the clarity of PE objectives, the clarity of direction from the centre, clear definitions of social objectives, absence of imposition of conflicting objectives on the PE, absence of political considerations in the appointment of PE managers, sufficient autonomy for the PE, PE control over hiring, dismissal, and promotion of staff, financial performance - linked incentives for the top management of the PE, systematic reporting and monitoring of the PE's performance, etc. promote PE performance whilethe absence of these factors depresses PE performance.

Before commencing field work, further hypotheses were developed by the author by drawing upon the literature of contingency and strategic choice organization theory (Child, 1972, 1975; 1977; Lawrence and Lorsch, 1967; Thompson, 1967; Khandwalla, 1973, 1977a, 1977b, 1981a; Galbraith, 1970, 1971; Van de Ven and Delbecq, 1974) and the literature on the Indian public sector and management studies of the Indian public sector. The thrust of these hypotheses was that PE performance is far more crucially determined by the response of PE management tothe various situations encountered by PEs (such as low autonomy, conflicting objectives, turbulent market environment, etc.) than by these situations. Thus, whether competition orgreater autonomy improve PE performance or not would depend less on the intensity of competition or the extent of autonomy granted to the PE and more on the kind of management response made to competition or greater autonomy. Certain synergistic responses might improve performance; others might depress it. In other words, depending upon the quality of management response, the same operating context could produce vastly different performance results. Figures 1 and 2 illustrate the alternative but complementary models underlying these hypotheses. Both sets of hypotheses are reproduced in Appendix A to this paper. While any rigorous test of these hypotheses was not possible given a sample of four, it was hoped that the hypotheses

FIGURE 1

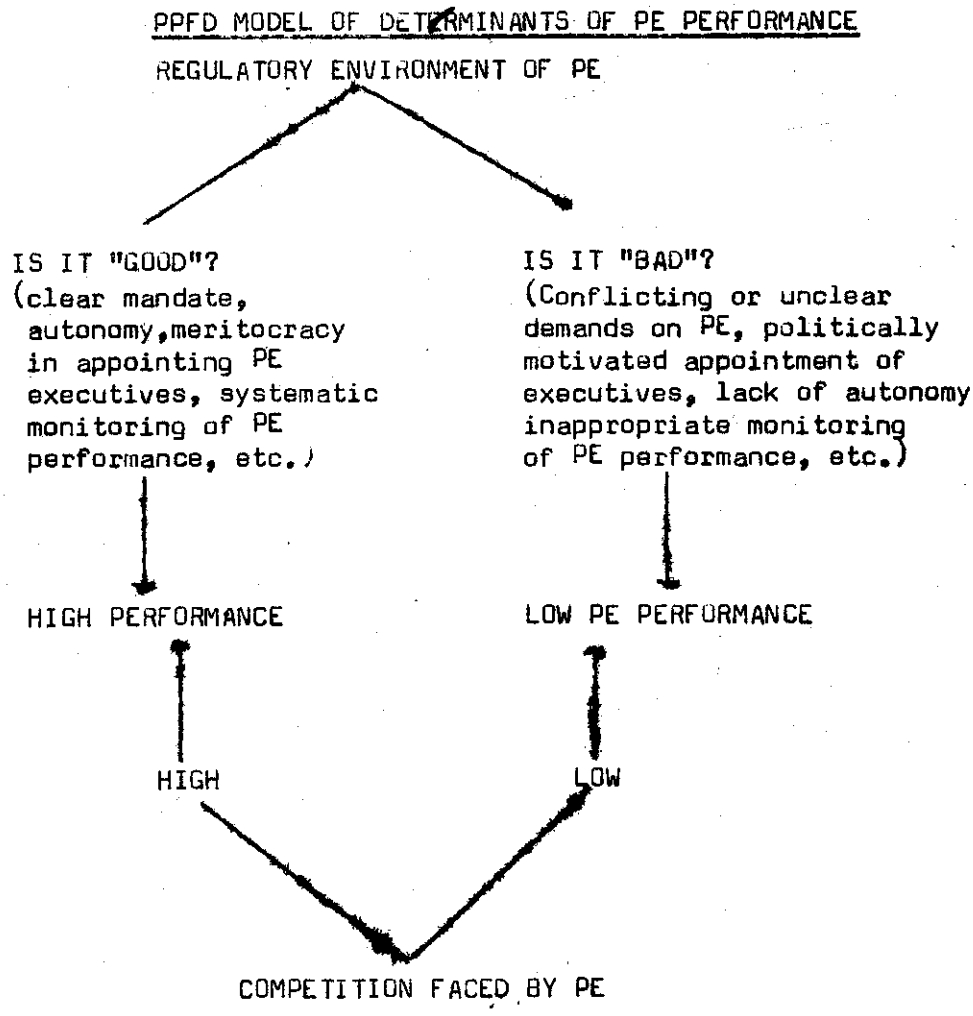
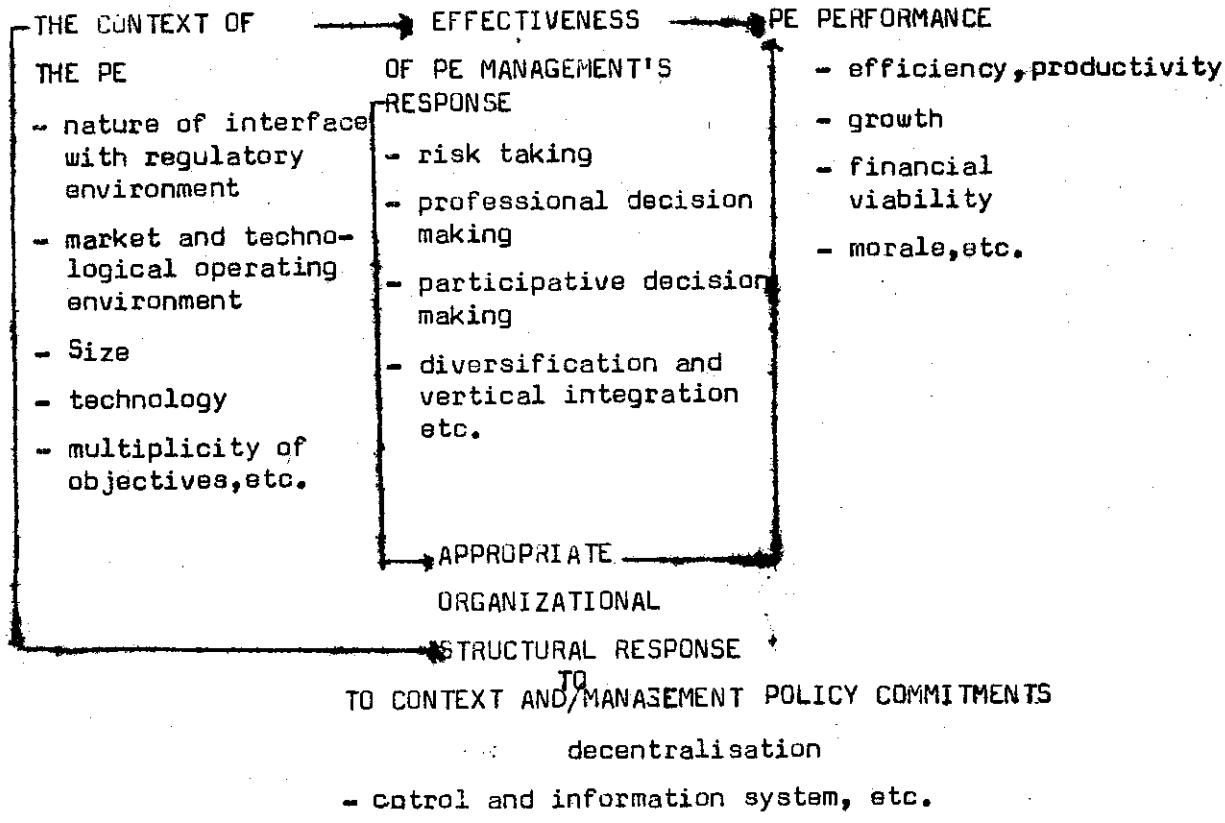

PPFD MODEL OF DETERMINANTS OF PE PERFORMANCE
REGULATORY ENVIRONMENT OF PE
IS IT "GOOD"?
(clear mandate, autonomy, meritocracy in appointing PE executives, systematic monitoring of PE performance, etc.)
IS IT "BAD"?
(Conflicting or unclear demands on PE, politically motivated appointment of executives, lack of autonomy inappropriate monitoring of PE performance, etc.)
HIGH PERFORMANCE
LOW PE PERFORMANCE
HIGH
LOW
COMPETITION FACED BY PE

FIGURE 2

SYNERGY MODEL OF DETERMINANTS OF PE PERFORMANCE



formulation exercise prior to empirical work would ensure attention, during emprical work, to crucial variables. The expectations were that the empirical work would lead to a refinement of these hypotheses, and also possibly to further models and hypotheses, expectations that were not belied.

Research Strategy for the Case Studies

The primary determinants of performance were postulated to be (a) PE - Ministry interface variables; (b) market environment variables; (c) management variables. Broadly, therefore, the research strategy was aimed at identifying and measuring/assessing these sets of variables. These variables could be measured/assessed through a number of methods, namely, through scanning documents like annual financial reports and other publications and internal records and documents; interviewing decision makers in the Government and the enterprises; and having structured questionnaires completed by executives of the enterprises. Obviously each of these three methods has its advantages and limitations, but it was hoped that the use of all three methods would provide a kind of triangulation, and through cross checks, would lead to more reliable findings. Appendix B describes in some detail the use of these methods in the research reported in this paper.

Besides the field work described in Appendix B, an economic study of the four enterprises was also carried out by Professor Dholakia (see Khandwalla, 1981b, Appendix). The attempt here was to use the factor productivity approach to estimate changes over the years in the productivity of labour, capital, and management (Dholakia, 1978). The findings from this study were broadly consistent with the findings from the field work.

Findings of the Study Pertinent to Performance

The principal focus of the study was the identification of the determinants of the performance of Indian public enterprises. It should be borne in mind that while the four enterprises studied are fairly typical of the equipment manufacturing part of the engineering industry, they are not typical of the bulk of Indian public enterprises, many of which, such as the steel enterprises, produce standard goods and market them under administered prices. Because of the customised nature of the equipment manufacturing industry, the four enterprises studied have had considerable flexibility with respect to pricing, and also with respect to manufacturing and marketing arrangements. In other words, the operating autonomy enjoyed by such enterprises as these in the public sector equipment manufacturing industry may not be typical of the Indian public sector. Subject to this important caveat, which restricts the generalisability of the conclusions of the study, the major determinants of the performance of the four public enterprises studied are indicated in the following sections.

Table 3 summaries the long term and recent (up to 1980) performance of the four enterprises studied. The determinants of their performance are briefly indicated below.

R and C: R and C's profit performance from 1973-4 to 1979-80 was poor. At best it had broken even. At worst it had incurred large losses. R and C had grown fast, however, in terms of production and sales, even in real terms. Its capacity utilisation, too, had been quite good, certainly in relation to the average capacity utilisation in the structurals industry. Its growth of productivity had been negligible, and its export performance spotty. Industrial relations, good until the mid-seventies, later tended to deteriorate, indicating a morale problem. Overall, therefore, R and C's performance was quite mediocre.

RECENT & LONG TERM PERFORMANCE OF R AND C, BHPV, BPCL AND HMT

	Profitability[a]	Real Growth Rate[b]	Real Productivity[c]
			Rs.
R and C			
1973-4 to 1979-80	5.5%[d]	10.7%[e]	8340[f]
1975-6	8.4%	26.9%	8142
1976-7	8.2%	15.2%	7478
1977-8	2.0%	5.3%	7192
1978-9	-4.3%	6.2	7664
1979-80	7.8%	10.6%	8663
BHPV			
1973-4 to 1979-80	7.7%[d]	15.6%[e]	14082[f]
1975-6	2.7%	54.3%	15373
1976-7	8.7%	52.2%	16643
1977-8	10.3%	-14.7%	16711
1978-9	-6.8%	-29.1%	11929
1979-80	12.4%	48.2%	14940
BPCL			
1975-6 to 1979-80	7.4%	28.5%	16070[f]
1975-6	5.6%	100.0%	13531
1976-7	2.4%	10.9%	12360
1977-8	3.7%	81.9%	13189
1978-9	11.7%	34.1%	20401
1979-80	13.8%	-1.6%	20860

	Profitability[a]	Real Growth Rate[b]	Real Productivity[c]
H M T			Rs.
1960-1 to 1979-80	16.6%[d]	12.2%[e]	10647[f]
1975-6	18.0%	32.2%	13460
1976-7	16.2%	8.3%	13451
1977-8	11.3%	26.6%	13124
1978-9	12.6%	43.8%	17261
1979-80	18.2%	-10.1%	16441

Note: R and C data not available prior to 1973-4; BHPV and BPCL, being young companies their long term growth rate, profitability and productivity have been estimated only from the time they overcome teething troubles.

a. Net operating profit (before interest) to sales
b. Growth rate in sales deflated by appropriate price index
c. Value added per employee deflated by appropriate price index.
d. Average for the period
e. Estimated exponential annual growth rate for the period
f. Average for the period.

Source: Tables in chapter five of the case studies of R and C, BHPV, BPCL and HMT - See Khandwalla, 1981b.

It is not possible to state with any great confidence the reasons for this mediocre performance except to say that public ownership may not be one of the reasons. In fact, public ownership after 1972 led to a large scale infusion of funds into the company and extensive modernisation, diversification, and growth. Nor was there any evidence of an unfavourable relationship of R and C with its parent ministry. Certainly the highly competitive nature of the structurals industry and the fairly competitive structure of the industrial machinery industries in which R and C operates might have been factors contributing to R and C's mediocre performance. However, Testeels, a private sector unit also operating in the highly competitive structurals industry, displayed a vastly superior profitability, so that the management response to a competitive business environment rather than competition itself may have been the major reason for R and C's overall poor to mediocre performance. There was at R and C evidence of sloppy investment planning, practically non-existent market research and marketing (as distinct from selling), poor cost control, poor personnel management, and seat-of-the-pants production planning and scheduling. Poorly developed management systems may have been a major reason for R and C's mediocre overall, long term performance.

An examination of the relatively recent troughs and peaks of R and C's performance yielded more reliable determinants of R and C's performance. The major trough was the period 1977 to 1979 when profitability as well as productivity sharply declined. Two overt causes uncovered were the mismanagement of the newly acquired Mulund plant and disturbed industrial relations. The Mulund plant gave R and C the capacity to produce and market suphisticated chemical and other equipment. Perhaps because of unfamiliarity with the new products and perhaps out of anxiety to take orders, Mulund appears to have taken highly unremunerative jobs in 1976 and 1977, resulting in very sizeable losses in 1977 and 1978 and stretching into 1979. This was a management failure, in particular the failure to manage effectively a diversification into sophisticated technology products. On the industrial relations front R and C was

apparently a victim of the post-Emergency rash of industrial disputes aggravated by unscrupulous inter-union revalry. But here again as later management seemed to demonstrate, a more vigorous management could have contained the damage to the company's performance.

If the performance troughs etch in fairly sharp detail the reasons for poor performance, the recovery in 1979-80 discloses additional determinants of performance. The major reason for the recovery seems to have been a vigorous, risk taking, results oriented style of a new top management that rallied the morale of managers, gave a clear sense of direction, and led to vigorous search for profit raising opportunities including diversification, cost control, sales of scrap, freeze on total employment in the face of a fast increase in output and sales, push for greater productivity, change in the structurals product mix towards higher valued, sophisticated items, and so forth.

In sum, the R and C experience suggests that while adverse business factors (such as recession or greater competition) may reduce performance, there still is a very large range of performance that is very substantially a function of management systems and the style of top management. If the management systems are weak and/or the top management style inappropriate, there may be a precipitate decline in performance. Equally, if the management systems are strong and/or the top management style is appropriate to the enterprise's situation, the fall in performance can be small and there can be a quick recovery.

As far as R and C is concerned, while the top management style in 1980 seemed appropriate to recovery, the management systems, though better than in the past, remained weak. Also, mobilisation and rallying of managers and employees as in a crisis was not any longer the critical requirement of top management. That job had been done well. But the new job was that of building up management systems and institutionalising a highly professional and participative mode of decision making

and operating the enterprise. That job substantially remained to be done. Without that job being done, while no profit-no loss might be readily attainable in the future, a healthy profitability might not be.

BHPV: Like R and C, BHPV's performance during the past decade has been mediocre or worse. It has been a loss making unit; its growth of sales has been low; its capacity utilisation has been poor; its productivity growth has been poor; its diversification has been modest; its export performance is virtually non-existent; and the morale of its work force has seldom been high.

Like R and C, BHPV's poor long term performance can not be explained with any substantial degree of confidence, although a number of factors appear to have contributed to it. Its capacity was badly planned (5000 tons, or nearly 25% of its capacity was "found" to be inoperative after it was installed), saddling it with a higher capital cost than was necessary. It had to change its product mix substantially from what it was initially planned to be because of a faulty appraisal of the market for its products. In the early seventies the oil crisis appears to have depressed the demand for BHPV's products. This was a dual blow, for BHPV appears to have hired nearly a thousand hands on a permanent basis to meet an expected expansion of demand. These surplus employees have been carried by the company for all these years. The company has had frequent change of chief executives, and this appears to have been responsible for policy discontinuities. Like R and C, BHPV, too, appears to have had weak management systems. Its commercial tactics and its market intelligence have been weak; the deficiencies in its cost control system with respect to contracts undertaken by the company are only lately being remedied; in 1980 it was only just introducing an incentive system; despite the enormous complexity of its manufacturing operations, production scheduling until recently was done on an intuitive basis; for a company operating so sophisticated a technology in so turbulent a market, there had not been any strong effort at management training and development; and so on.

Competition could not be said to be a significant factor keeping BHPV profit performance at a low level. In fact BHPV has had considerable monopoly power in the equipments it manufactures (pressure vessels, heat exchangers, cryogenic equipment, etc.). The ministry-enterprise relations have been a mixed bag. In the mid-seventies the Ministry was unsympathetic to BHPV because of BHPV's tardy commissioning of contracts that affected the Ministry's relations with other ministries. The Ministry's volte faces on labour wage contracts had also contributed to BHPV's difficulties. On the other hand the Ministry had been liberal with funds to cover BHPV's losses. Perhaps a major disservice to the company for which the Ministry could be partially responsible was the frequent change of chief executives, and until recently the failure to find a chief executive well versed in professional management.

In sum, a somewhat careless Ministry, and more than that, a discontinuous and often incompetent top management that was not energetic enough to fire redundant workers, open up export possibilities, seek alternative domestic markets, and build up strong management systems, may have been the primary factors compounding the difficulties of faulty capacity planning in producing a poor performance during the past decade.

As in the case of R and C, drammatic recent changes in performance afforded an excellent opportunity for identifying with some certainty the determinants of BHPV performance. In 1978-9 BHPV experienced a precipitous decline in profitability, growth, productivity, and capacity utilisation. In 1979-80 there was an equally remarkable recovery, and BHPV turned profitable for the first time in its history.

No evidence was uncovered that either the business environment had suddenly and catastrophically deteriorated in 1978-9 or miraculously improved in 1979-80. On the contrary, 1979-80 was industrially a distinctly worse year for the nation than 1978-79 (stagnation in industrial production versus a growth rate of about 8% in 1978-9).

Since 1977-8 the gross public sector investment in process industries (the prime markets for BHPV products) had been rising. So there is little reason to believe that the business environment sharply deteriorated in 1978-9.

Nor was any evidence uncovered that the relations with the Department of Industry had badly soured in 1978-9 and became far more congenial in 1979-80. On the other hand, the major difference between 1978-9 and 1979-80 appears to be that the company was without a chief executive for several months in 1978-9, an exigency not faced in 1979-80. Clearly, the absence of top level control, coordination, guidance, and inspiration for several months was a major factor in explaining the devastating failure of performance in 1978-9.

For an explanation of the 1979-80 recovery, the major reason appears to be the style of top management. The new chief executive went on a highly successful order hunt, introduced an incentive system, strengthened the marketing organization, introduced budgetary control over contracts, decentralised certain aspects of decision making, encouraged a more scientific mode of production planning and scheduling, started a monthly performance review meeting, cut down on overtime and quick promotions unrelated to performance, sought diversification, raised R and D activity, started the process of divisionalisation, and so on. As a result, the financial indicators of performance dramatically improved. Managerial morale may, however, have suffered somewhat, especially at the middle and lower levels of management, thanks largely due to a reversal of the easy promotion policy and the inevitable stress of having to adjust one's ways to the rapid changes wrought by top management.

In sum, the BHPV case suggests that while mistakes in capacity planning, employment planning, etc. in the initial years of an enterprise constrain later performance, there is a very large range of performance below some

upper limit imposed by initial mistakes, that is very largely a function of management systems, top management continuity, and the style of top management. If the management systems are weak and/or top management is inappropriate to the enterprise's situation, there may be a large decline in performance. Equally, if the management systems are strong and/or there is continuity of competent top management and/or the top management style is appropriate to the enterprise's situation, the recovery can be drammatic.

As far as BHPV is concerned, the recovery in 1979-80 appears to be due to a restoration of competent top management and a vigorous strengthening of management systems (with the exception of personnel management). The style of the new top management was risk taking, professional, and participative, appropriate to BHPV's situation, but also somewhat bureaucratic or procedure bound, inappropriate to its situation. While BHPV had turned the corner, making it a reasonably profitable enterprise would require very substantial strengthening of the personnel and organizational development functions, a stronger marketing organization, top management continuity, and an organic, results oriented culture.

BPCL: BPCL began manufacturing in a substantial way only after 1975. During the period 1975-6 to 1979-80, BPCL's profitability was moderate but rising, growth was very fast, capacity utilisation was modest but rising, and productivity also moderate but rising. Overall, during the five year period, BPCL's performance has been moderate but improving fast.

One significant reason for the on-the-average mediocre performance may be poor planning of capacity. BPCL was set up with a capacity for pumps and compressors, and for industrial gas cylinders, far in excess of the country's absorptive capacity. Ten years after coming into existence, the company still was faced with a large excess capacity. Profitability, especially net profits, have taken a beating because of this. But even in mid-seventies it should have been obvious to management that the

company was in for a long period of excess capacity. It could have responded then by seeking "base load" products, such as industrial boilers, that absorbed fluctuations in the demand for pumps and compressors.

This it sought much later. It also failed to develop export markets. Nor had it, by 1980, mounted a really strong export drive. Both these largely seem to be management failures, possibly compounded by the indifference of the Ministry, and the frequent changes of chief executives at BPCL.

BPCL has very large market shares in most of its products. Hence competition can not be held responsible for its mediocre performance. But its large excess capacity makes BPCL vulnerable even to modest competition. An examination of BPCL's performance during 1975-6 to 1979-80 indicates two very distinct phases: quite mediocre profitability, capacity utilisation, and productivity until 1977-8, and thereafter a very strongly rising trend in all three. Part of the strong improvement after 1977-8 may be due to the strong pick up of investment in the public sector process industries in 1978-9, these being major customers of BPCL's pumps and compressors. Partly, perhaps mainly, the improvement may have been due to the style of the new chief executive, who took over in late 1977. By 1980, return on sales had increased three fold despite an 80% increase in sales, productivity had doubled, and capacity utilisation had gone up. Morale seemed to be excellent, at least at the management level, there had been no industrial disputes despite disturbed industrial relations in the area, and the company had vigorously embarked on a search for base load products. These gains are particularly impressive in the face of the country's negative rate of industrial growth in 1979-80, the elimination by the Government of the 10% price preference to public sector units, and world-wide competition faced by BPCL in World Bank funded projects.

The style of management of the new chief executive was characterised by a strong results orientation, emphasis on professional management and the development of management systems, participative decision making, and paternalistic human relations. It is this style of management, practiced in a company whose lower level employees come largely from semi-rural, feudalistic backgrounds, that seems to have welded the company into a highly cohesive unit with a strong potential.

The BPCL experience suggests the enormous contribution that the right style of management can make to the morale of an enterprise's performance.

Another lesson of the BPCL experience is that ministry-enterprise relations are not a constraint to be borne with patience by the enterprise, but a decision variable. The BPCL chief executive demonstrated that an indifferent ministry could be made far more responsive to the needs of the enterprise by an appropriate nurturing not only of the Secretary in charge of the Ministry but also its lower officials. Similarly, the business environment of a public enterprise is not a given as far as the PE is concerned. The BPCL management demonstrated that one could not only seek indigenous sources of imported inputs but also develop them, induce competition among them, and get better terms for the enterprise. The BPCL experience dispels the myth of the constraints-chained Indian public enterprise that has by virtue of being a PE, too little room to manoeuvre. It points instead to the many opportunities that can be seized by in fact being a PE, such as quite sympathetic attention from the Government, the adroit use of monopoly power not to gouge customers but to develop indigenous input supply capa bilities, the possibility of arousing in the employees a sense of participating in a strategic mission, profitable tie-ups with other public sector units, the ability to draw on the resources of other public sector units, and so forth.

By 1980 BPCL had come up miles but it still had miles to go. Its management systems, particularly personnel and financial and cost control, needed strengthening. It had yet to push divisionalisation to its logical limits. Its R and D was still much too unfocussed. It still had to develop a large export capability. It still was far too vulnerable to changes in chief executives - it did not yet possess a sufficiently large core of professional managers that could assure competent management despite dislocations caused by relatively frequent changes of chief executives. Continued improvement in performance would be contingent heavily on BPCL being able to institutionalise professional, participative, results oriented but humane, management.

HMT: HMT's performance has clearly been outstanding. Over the 1960-79 twenty year period, it has grown at a compound real annual rate of 12% per annum, nearly thrice the rate of growth of Indian industrial production, and about twice the rate of growth of the Indian engineering industry, whether in the public or in the private sector. It has averaged a return of about 15% on sales (NOP to sales ratio). Its productivity (real value added per employee) has grown at an annual compound rate of 3.6% per annum. It has become a significant exporter not only of machine tools but also of projects. It has actively encouraged the development of ancillaries. It has diversified successfully. Above all, it has mastered a wide spread of engineering technologies which provide it with a limitless potential for growth.

This performance has not, of course, been even Profitability and growth were unusually high in the early sixties and unusually low in the second half of the sixties. They stabilised in the first half of the seventies during the time HMT diversified into tractors, printing presses, horological machinery, etc. They have been on the rise during the past five years. Compared to the sixties, the profitability and growth rates have been lower in the seventies, but far more stable. Several determinants of HMT's performance were uncovered:

1. Unlike BHPV and BPCL, HMT began with a relatively tiny production capacity (in relation to national demand). It priced its machine tools at below the landed cost (including customs duty), and consequently, was able to expand its capacity, production, and sales rapidly. It was not until mid-sixties that import substitution approached the saturation point. It was after this period that growth in machine tool sales of HMT slackened off permanently, and began to coincide much more with the growth in national demand for machine tools. Thus, when the machine tool industry faced a recession during 1966-69, HMT's machine tool sales also stagnated. When there was a sharp pick up in the demand for machine tools after 1977 due to capacity expansion in the automobile industry, HMT's growth in machine tool sales also picked up.

HMT has repeated its strategy of beginning small (in relation to national demand) and growing fast in its watch, tractor, and lamp diversifications. In watches, from the early sixties HMT had a dominant share of indigenous production. But the total indigenous production was a small fraction of total demand for watches, which was met only partially by smuggled watches. Thus, HMT has been in a sellers market in watches until very recently. In tractors, HMT began with hardly 10% of market share, which it is trying to raise rapidly. The same holds true also for lamps. Thus, the strong growth performance of HMT in the past is due to (a) taking up the production of those products in which national demand far outstripped Indian indigenous production capacity; (b) beginning modestly in these industries (in relation to national demand) and growing fast; and (c) by offsetting the maturation phase of a major product line by diversification into an unrelated high growth potential product line.

2. HMT's management capability has kept pace with its expansions and diversifications. By beginning modestly in each of its major product lines and then growing fast, HMT ensured that its management mastered the technology and the marketing aspects of a product before taking on large expansions. This has been a major factor in HMT being able to make its expansions and diversifications successful.

Besides its management mastering the management aspects of each of its diversifications, HMT's management systems have become more and more sophisticated over time, and this has been a major factor in keeping HMT integrated and efficient. One consequence of this professionalisation of management has been greater performance stability even in those of HMT's businesses (such as machine tools) that face a relatively volatile market. While profit margins in machine tools plummetted during the recession years of 1966-1969, they were higher and more stable during the recession years in the seventies.

3. Management continuity, strong identification with the company, and the institutionalisation of a work and efficiency ethic have been a major factor in HMT's success. Mr. Mathulla, who was the chief executive until the mid-sixties, groomed Dr. Patil, who was the chief executive until the late seventies, and Mr. Ramchandra, the CMD in 1980, had been with the company for over 25 years. Thus, HMT's management has not suffered from the policy and management style discontinuities that have retarded the performance of many other PEs, such as BHPV and BPCL. The work ethic was reportedly installed into HMT junior managers during the fifties by Oerlikon, HMT's then Swiss collaborator. These then junior managers rose rapidly with the rapid growth of the company, and have occupied senior and top management positions since the early sixties.

These managers have built HMT and have developed a strong identification with the company. Management continuity, identification of senior managers with the company, and the institutionalisation of a work ethic at managerial levels have been major integrating forces that have substantially offset the stresses and strains of unrelated diversifications.

4. HMT's unrelated diversifications have greatly stabilised its performance. Its watch business lost money in the early sixties but that was more than made up by the profits in machine tool operations. The tables were turned after 1966. The indifferent and erratic profitability of machine tools was more than compensated by the profits of the watch business, which has also offset the losses of the tractor business in recent years. HMT's profitability (NOP to sales)has, as a consequence, been far more stable in the seventies as compared to the sixties. Besides this, these diversifications have also provided HMT with a large repertoire of engineering technologies with virtually unlimited potential applications.

5. The recession of 1966-1969 was a beneficial shock to HMT. It made HMT much more export oriented, marketing oriented, profit oriented; it led to the installation of sophisticated personnel, industrial relations, and financial control systems; it made its management much more futurist in its orientation; it got HMT involved much more vigorously into R & D. The cohesive management at HMT enabled it to absorb the shock of recession and execute an intelligent recovery and growth strategy.

6 Even though HMT's export orientation has led to only modest successes on the export front, it has given HMT access to global developments in manufacturing and marketing technologies, and the global competition it has had to face has offset the lethargy induced by sheltered domestic markets. This has been reinforced by growing competition even in HMT's domestic markets, as these approach their maturity phases. For instance, HMT is finding it increasingly tough to sell watches as domestic capacity catches up with demand and other competitors enter the market in a big way. In machine tools, the indigenous production accounts for about 80% of demand, and HMT's market share is only about 40%. In tractors and lamps HMT has relatively small market shares. HMT has not been allowed to remain complacent, thanks to domestic and international competition.

7. The Government has certainly influenced HMT's performance. It set up HMT to substitute imports of machine tools. It forced HMT to take up watch production. It suggested diversifications into tractors and lamps. Equally, it blocked for a long time HMT's diversification into electronic watches. But having noted the foregoing, it becomes difficult to assess the contribution of such aspects of Ministry - HMT interface as the extent of autonomy granted to HMT, the supportiveness of the Ministry, the pressure for performance on HMT, and so forth. As far as it could be ascertained, HMT has apparently always enjoyed a good deal of operating autonomy; but so apparently have BPCL, BHPC, and R&C. Thus, the autonomy enjoyed by HMT does not seem to be a significant factor in explaining the relatively superior performance of HMT as compared to these three sister enterprises. There were indications that Ministry supportiveness was not very high during the early seventies, but was at a high level during the latter half of the seventies. This may be a factor explaining the somewhat better financial and growth performance of HMT during the second

half of the seventies as compared to the first half, but it does not appear to be a major one. Little evidence was uncovered for any very great Ministry pressure for performance. There was indication that prduction and profits have been stressed in recent years, but, understandably, a well performing enterprise like HMT seems to be treated to only a modest pressure. But here again, despite the much poorer performance of R&C, BPCL, and BHPV, the pressure for performance on them does not appear to have been much stronger. Thus, pressure for performance on HMT may not only not have been significant, it may not be a significant factor explaining HMT's performance. In sum, while Government decisions and policies have certainly affected HMT's performance (as they may have virtually every public and private sector corporation in the country), the HMT-Ministry interface may not be a significant explanatory factor in the case of a well-functioning enterprise like HMT.

Supported Hypotheses

One of the principal objectives of studying the four PEs was to evaluate the hypotheses that were developed before the field work began (see Appendix A). The assessment was judgemental because the limited sample size ruled out multivariate statistical tests. A hypothesis was deemed to be supported if the data indicated that (a) the causal situation was operative at a PE; (b) the response (to the causal situation) hypothesised to be instrumental in improving PE performance was made; and (c) the performance of the PE was high and so warranted the supposition that the PE response was an effective one. Support for a hypothesis was also construed if the data suggested that (a) the causal situation existed at the PE, or the situation at the PE had changed towards the causal situation; (b) the PE's response had changed towards a hypothesised effective response; and (c) the performance of the PE had improved during the time the response was being made. Conversely, support for a hypothesis was assumed if the PE made a response to a causal situation opposite to the one hypothesised as effective, and the performance of the PE was low or had declined. As illustrations of the foregoing, professional and participative management was hypothesised to be an effective response to a complex industry environment (H1B.3 in Table 2 of Appendix A). HMT's industry environment was assessed as being complex and its management in recent years was judged to be professional and participative. Given the relatively high performance of HMT during recent years, the hypothesis was deemed to have support. Another hypothesis (H2A.1) was that given a risk taking corporate management, its organic (i.e. non-bureaucratic) and results orientation would raise PE performance. It was judged that at R and C the extent of risk taking had gone up in recent years after the new chief executive took over, and the management had also become more organic and results oriented, and since the performance of R and C had improved, there was support for this hypothesis. Another hypothesis was that if there was strong pressure for performance from the controlling ministry, a risk taking and organic management with a strong information, planning, and control system would raise PE performance (H1A.4). At BHPV there apparently was, on the earlier management, strong pressure for performance from the parent ministry. But the then top management was conservative rather than risk taking and bureaucratic rather than organic. Nor did BHPV have a strong management information, control, and planning system. Since BHPV's performance was poor during its regime,

indirect support for H1A.4 was construed.

Most of the hypotheses contained in the original World Bank proposal (PPFD, 1978), and reproduced in Table 1 Appendix A, could not be assessed because the causal conditions were not encountered in the study. One hypothesis (3 in Table 1, Appendix A) seemed to have support, namely that well-defined objectives, systematic reporting of key performance indicators to centre, high degree of monitoring and feedback, and willingness to change objectives and management, improves PE performance. Another hypothesis that received some support was: Initially, basic purpose and initial design of the project affects PE performance. Subsequently, if management exercises the option to diversify and expand, this importantly determines performance (hypothesis 5, Table 1, Appendix A). Hypothesis 6, namely that the stronger the competitive environment the greater the probability of improvements in decision making in both the centre and the PE, received mixed support. Hypothesis 2c, that weak incentive performance links for top management leads to poor enterprise performance was controverted.

The basic premise of the hypotheses developed by the author (see Table 2 in Appendix A) was that the performance of a PE is determined far more by the PE's response to a choice initiating situation than by the situation itself. As an example, it is the PE's response to, say, competition, or ministry pressure for performance, that may more significantly determine the PE's performance than competition or ministry pressure for performance per se. The more appropriate the PE response to a choice evoking situation, the better is likely to be its performance. Table 4 lists those hypotheses in Table 2, Appendix A that received at least some support from the study.

The PEs studied seemed to be under fairly strong pressure for performance from the Ministry, at least with respect to production, sales,

and profit targets; they seemed to operate in a turbulent, complex, and fairly competitive business environment; as organizations go they were large, although not necessarily large by public sector standards; most of them were characterised by at least some unrelated diversification; they mostly operated sophisticated capital intensive technologies and produced customised products; their management seemed to be pursuing multiple, partially conflicting goals; and their managerial personnel were mostly specialists, and were characterised for the most part by strong growth needs, at least moderately strong defence or security needs, and fair amount of aversion to ambiguity. The supported hypotheses indicate that effective PE responses to this contextual picture are: (1) a top management committed to professional, participative, risk taking, organic (flexible) and results oriented styles of management (as opposed to intuitive, authoritarian, conservative, mechanistic and procedurally oriented styles of management); (2) a bureaucratic structure (in Weber's (1949) sense) to take care of routine activities, characterised by much specialisation of managerial functions, standardisation of procedures, and formalisation of roles, reporting relationships, and information communication; (3) strong, sophisticated intelligence gathering, planning and forecasting, control, coordination, selection, and motivational management systems, that utilise both formal and informal sources of intelligence, involve periodic reporting and monitoring of performance, and intelligently respond to a wide band of employee needs and abilities; (4) decentralisation of decision making authority and a divisionalised structure based on the profit centre concept; and (5) a performance based reward system for managerial personnel, job rotation, movement of managers over time to increasingly less structured jobs, a fairly participatory decision making structure at middle and lower levels of management, and task oriented but fatherly, nurturant supervision of junior managers.

The foregoing may be considered an effective management and organizational "ideal type" for sizeable equipment manufacturing PEs.

Table 4

EFFECTIVE RESPONSE HYPOTHESES SUPPORTED BROADLY ACROSS THE FOUR PEs

	Choice Evoking Situation	Response Hypothesised to be Effective
1.	Strong pressure for performance from the ministry	Risk taking and organic top management with strong intelligence, planning, and control systems.
2.	Turbulent industry environment	Risk taking and organic top management
3.	Complex industry environment	Professional and participative top management.
4.	Multi-faceted competitive pressure on PE	Decentralised authority structure, sophisticated intelligence, planning, and control systems.
5.	Large size of PE	Bureaucratic structure (in Weber's sense) characterised by high levels of managerial specialisation, procedural standardisation, and formalisation of roles, relationships, and communication.
6.	Sophisticated capital intensive technology	Sophisticated selection and reward system.
7.	Conglomerate diversification	Divisionalised organizational structure (divisionalisation based on the profit centre concept)
8.	A number of strongly held partially conflicting goals for the enterprise	Professional and participative top management; a sophisticated intelligence, planning, coordination, and control system; a sophisticated reward system (that responds in a sophisticated manner to a broad range of human needs).
9.	Specialist managers, strong defence as well as growth needs in them, and intolerance of ambiguity in them	Performance based reward system for managers, job rotation, movement over time through increasingly less structured managerial jobs, participatory decision making structure, and task oriented but nurturant, fatherly supervision.
10.	Professional top management orientation	Participative top management orientation.

Other Hypotheses and Models Emerging from the Study

(1) Effective Turnaround Model: By a fortuitous coincidence, all the four PEs had a change of chief executives between November 1977 and August 1978. Three of the PEs were more or less sick at about the time the new chief executive took over, namely R & C, BHPV, and BPCL. By 1979-80 R & C and BHPV had broken even, and BPCL had very substantially raised its profitability. Table 3 earlier shows the drammatic changes in financial performance. The steps taken to turnaround these three PEs provide an interesting model for quickly turning around sick PEs. This model may have wide applicability to the Indian public sector. Table 5 lists steps taken by the new chief executives of the three PEs that seem to have contributed to the turnaround. Table 5 also shows the turnaround steps by the new chairman at Hindustan Photo Films (HPF), another formerly sick PE attached to the Ministry of Industry (see Prahlad and Thomas, 1977). Table 5 suggests the following elements of a successful turnaround of a PE.

A. Credibility building by a powerful change agent: Turnarounds seem to be initiated by powerful individuals, and by individuals who are dissatisfied with the status quo, want to change it, and see it as their mission to bring up the enterprise. Usually these individuals are newcomers, and so are detached enough to see what concrete steps can be taken to remedy the situation, and optimistic enough, untouched by the prevailing ethos of "nothing can work" that is commonly found in sick organizations.

Even when these individuals are top level executives, to be effective as change agents they need to have credibility. Building up credibility becomes a major first task of chief executives seeking a turnaround for their organizations. Accomplishing the implausible, or facing up successfully and drammatically to a crisis, seem to be common ways of earning credibility from the sceptical rank-and file.

TURNAROUND ACTS OF NEW CHIEF EXECUTIVES

R & C (August 1978 to end 1979)	BPCL (November 1978 to Jan. 1980)	BHPV August 1978 to March 1980	HPF (July 1972 to 1976)
Faced a strike of white collar workers. Broke it. But gave humane treatment to strikers.	1. Faced a situation of likely shortfall in the year's production target. Insisted that the target be met. Succeeded.	1. Faced labour unrest situation. Negotiated a new labour contract.	1. The New Chairman evolved a strategy of making most of what the company had. He also visualised the company as the nucleus of the photography industry in India. Primacy given to improving quality and capacity utilisation.
Told managers they would not be promoted unless they provided him with names of two successors	2. Instituted daily meetings of managers. Instituted periodic dinners for managers and their family. Sought to build up a cohesive management team.	2. Went on an order hunt. Netted the largest volume of orders in company's history.	2. Decision to make no compromise on quality. All defective stocks were withdrawn. Vigorous statistical quality control was instituted.
Instituted a monthly performance review meeting for all unit heads and senior managers; chaired by chief executive	3. Personally greeted workers on their birthdays. Quickly negotiated a new labour contract.	3. Got done an ABC analysis of contracts and decided not to take any more low valued unprofitable contracts.	3. Programme for doubling capacity utilisation was developed.
Instituted a freeze on new recruitment especially at the level of operatives	4. Developed cordial relations with junior as well as senior officials of the Ministry.	4. Instituted a budgetary control system for large contracts. Assigned project coordinators for large contracts.	4. Distribution was strengthened by appointing new distributors. Targets were fixed for the distributors.
Obtained approval from the Ministry for a substantial modernisation and rehabilitation programme	5. Sought diversification into "base load" products to off-set cyclical fluctuations in demand for main products.	5. Initiated the divisionalisation of the company by setting up the cryogenics division.	5. Cost reduction programme was formulated revolving around reduction of scrap and recovery of silver and solvents from waste materials.

			HPF
Reversed the previous management's strategy of expansion in the loss making structurals part of the business. Instituted a vigorous drive to get out of low valued, unprofitable structurals andinto more profitable products.	6. Got the employees involved in local flood relief work, got students, local officials etc. interested in the mission of the company by having them visit the company	6. Against managerial opposition, instituted in incentive system for blue as well as white collar operators. Cut down on overtime.	6. Periodic management conferences were organized to discuss HPF problems and action.
Doubled scrap sales	7. Sought the institutionalisation of professional management systems in the company	7. Increased the R&D budget.	7. Decision to add capacity for X-ray film and to convert (rather than manufacture) colour film. Jumbo film coversion taken up in a big way to assure delivery to film industry.
Mounted an export drive	8. Strongly emphasised the strategic mission of the company to employees and outsiders.	8. Strengthened the Marketing network.	8. Long term R &D policy was evolved.
Sought R &D funds from the Government	9. Strong emphasis on getting results and meeting targets	9. Pressed the Government hard for interest relief on government loans.	9. Report on the revival strategy was sent to the Ministry. Ministry kept informed on what HPF needed from it and what results HPF would deliver.
Pressurised governmental bodies to give contracts.	10. Strong emphasis on raising profitability	10. Introduced a monthly performance review meeting of managers.	10. New Strategy communicated to public via a press conference.
Sought to capitalise on Indian aid to other countries	-	11. Reversed the quick promotion policy of the previous management	11. Company's problems and strategy discussed with distributors at conference

(R & C)	BPCL	BHPV	HPF
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Decentralised decision making and turned branches into fullfledged profit center divisions.

Strongly emphasised getting results, facing upto problems, takingon challenges, and managers directly solving their problems.
Strongly emphasised quantification of tasks and holding managers to tasks undertaken by them.

Strongly emphasised improved financial results and breaking even in two years. Succeeded.

12. Started serious corporate planning exercises and more formal EDP.based production planning and scheduling.

13. Sought diversification in a "base load" product.

14. Actively sought prestigeous international quality recognition

15. Utilised Ministry pressure to obtain large contracts from public and private sector units.

12. Chairman outlined HPF's strategy to improve quality, delivery and price to its customers and sought their co-operation.

13. Unions informed of the revival strategy.

14. Problem areas in manufacturing were isolated.

15. Performance evaluation system changed from confidential reports to performance appraisal and personal development format. Merit based promotion system supported by trade tests replaced seniority system on the shopfloor. Extensive training introduced at all levels.

16. Breaking even and then having stable profitability were adopted as goals. Sales target of Rs. 1 crore a month adopted to break even. Profit centre concept extended to lower levels of the organization.

R & C	BPCL	BHPV	HPF
			17. Cost reduction problem aimed at making HPF costs comparable to inter-national giants.
			18. Various task forces of managers set up to investigate such areas as inventory control, cost cutting, process improvement, and new product developments.
			19. Shopfloor councils established at all departmental and sub-departmental levels to discuss production, quality, and working condition problems.
			20. Every section made aware of its achievements for the week in terms of its contribution to the company's profitability.
			21. Help, guidance and commitment of employees in understanding and implementing decisions was solicited.
			22. An open, participatory culture was emphasised.
			23. Public and Ministry were kept informed of success through advertising.
			24. In manufacturing operations cleanliness was enforced. Ad hoc changes in parameters of production were banned.

R & C	BPCL	BHPV	HPF
			25. Du Pont technicians used to develop emulsions and coating techniques to improve quality of X-ray film.
			26. A consultant's assistance in personnel and labour relations was sought. An equitable wage settlement was negotiated with the union. He helped develop training programmes for operators, supervisors and managers. Another consultancy was sought in statistical quality control.

urces: The third chapters of the case studies of R&C, BHPV, and BPCL in Khandwalla, 1981b, and Prahlad and Thomas, "Turnaround Strategy: Lessons from HPF's experience", Vikalpa, April 1977.

In R & C the chief executive faced a white collar strike within days of his arrival in a city where unionism is militant. He broke it, and demonstrated that firmness pays. In BPCL production was lagging far behind target when the new chief executive arrived, and the expectation was that the year's target would be missed by a large margin. The new chief executive insisted that the target would be achieved, and in fact it was exceeded. In BHPV the new chief executive worked day and night to reach a wage settlement with the unions, and went on a highly successful order hunt for his orders-starved company. In HPF the chairman insisted that the company would market only high quality products, recalled sub-standard stocks with distributors, and instituted a rigorous quality control that assured only high quality despatches. This was a sharp and successful departure from the early habit of dumping shoddy products on customers.

Thus, a powerful and credible chief executive (or other change agent) committed to a turnaround may be an essential first step in a turnaround.

8. Mobilisation: A turnaround may be initiated by an individual but obviously it cannot be accomplished by an individual. It is necessary to mobilise a large number of people for the changes that have to be made. Mobilisation means getting people to focus on the mission of the organization and the removable obstacles to it. When an organization is sick, employees feel insecure and think first of their own security and comfort and tend to ignore the health and well-being of the organization. Indeed, thisself-centredness and sense of insecurity may be strong reinforcers of sickness. How, then, is the rank-and-file to be mobilised? A number of mechanisms seem to have been used by the chief executives:

(a) Sharing with the managerial rank-and-file factual information about what is happening to the organization. Information about the declining trend in profitability, growth, productivity, market share may be shared. Difficulties in obtaining credit may be shared. Extent of returns or rejects may be shared. The point is to replace rumours by facts, and needless anxieties and alarms by a more realistic appraisal of the problems besetting the organization. A device for sharing this information appears to have been management conferences or meetings attended by most senior and middle level managers. The chief executives of R & C, BPCL, BHPV and HPF started such meetings. Besides disseminating factual information, these forums also served as places where information and problems could be shared.

(b) The restatement by the chief executive of the exalted mission of the organization. In HPF, for example, the new chairman articulated the vision of HPF becoming the dominant element of a great photographic industry in India. In BPCL the change agent took pains to "sell" the strategic role of the company in the Indian economy not only to managers but also to employees and members of the local community.

(c) The articulation by the chief executive of highly concrete and highly visible goals, like doubling capacity utilisation as in the case of HPF, breaking even as in the case of R & C, meeting the year's production target as in the case of BPCL. These concrete goals became the focus of rational end-means analysis throughout the organization, and were highly visible benchmarks against which progress could be measured. Essentially, the articulation of visible concrete goals was a way of providing a sense of challenge to the managerial rank-and-file and even lower level staff.

(d) Identification of solvable problem areas and creation of task forces to tackle these problem areas. In BHPV task forces were set up to liquidate overdue accounts, set up an incentive system, and a budgetary control system for large contracts undertaken by the company. In HPF, task forces were set up to investigate such areas as inventory control, cost cutting, process improvement, and new product development. This was another mechanism for involving a substantial number of managers in challenging tasks.

To sum up, the main elements of a mobilisation strategy appear to be dissemination to the rank-and-file and other stake-holders of factual information about the problems of the organization, creation of forums for information and problem sharing, articulation of visible, concrete, and challenging tasks for the organization, and involving personnel in creative problem solving by assigning challenging tasks to them.

C Success experience: A demoralised organisation needs success to keep the momentum of mobilisation going. Otherwise disillusionment can come fast. Success need not be spectacular. Even small successes build confidence and restore morale. This means that the chief executive must identify tasks where with proper planning and a concentrated effort, quick success is highly probable. In the case of HPF, quality improvement, greater capacity utilisation, and converting jumbo film were tasks that were eminently doable and showed quick results. In the case of R and C reducing the share of low valued structurals, increasing scrap sales, and raising sales of points and crossings to the railways were quick return tasks that paid good dividends. In the case of BHPV the company bagged a major morale boosting order for paper converting machinery in the face of global competition, and so did BPCL with respect to supplying a public sector enterprise with pumps and compressors. Grand long term strategies may not be as useful during the early part of the turnaround as well publicised piecemeal successful actions that build confidence and counteract scepticism.

D. Insulation from environment: A turnaround is a time when organisational energies need to be highly focussed on specific tasks. The more of external interferences and exigencies are kept at bay, the swifter is the turnaround likely to be. In India thorny industrial relations is a major imponderable. Neutralising this nuisance was a major early preoccupation of the chief executives of R and C, BPCL, and BHPV. In the case of BPCL the chief executive took special pains to build up cordial relations with lower level officials of the Ministry because of their power to hold up matters of vital interest to BPCL. Thus, during a turnaround it may be very useful to buy time with respect to critical external uncertainties such as with respect to industrial relations, supplies of crucial inputs, and relationship with the owners or external controllers of the organization.

E. Exploitation of opportunities in the environment: Large financial, manpower, and material resources are needed to turnaround a sick or poorly performing PE. It is not enough to use optimally the organization's internal resources. The external environment also needs to be tapped. R & C sought to capitalise on India's aid to other nations by seeking orders from these nations. It also sought R & D funds from the Government even though it had not yet thought through any coherent R & D strategy. BPCL and BHPV sought to subcontract from BHEL the production of some base load items previously produced by BHEL. They also sought to reduce their interest burden by converting some of their debt into equity. HPF got emulsion technology practically free of cost from Du Pont.

F. Accountability for performance: In sick PEs one commonly finds the buck passing tendency. Fixing of accountability for performance of every manager appears to be an important action in a turnaround. This means targets or objectives pursued by each manager are quantified or clearly specified and he/she is held responsible for achieving them by due dates. It no longer is a valid defence for a manager to argue that

he followed the procedures he was supposed to follow, and that a target was not achieved because somebody else did something or failed to do something. The manager now is expected to pursue whatever tactics are necessary to get the job done. In the turnaround cases studied, accountability for performance was commonly sought to be ensured by the chief executive insisting that managers make clear quantitative commitments and periodically report their performance in a performance review meeting attended by other managers. This procedure seemed to have the added advantage of subjecting managers to peer group pressure for excellence in performance.

G. Motivational strategy: Motivation is often a problem in PEs because of their bureaucratic structures. There are many ways of motivating personnel. The ones that appear to have been most consciously utilised in the turnaround cases were not money or promotion or fear but greater challenge in job and peer group pressure for excellence. In HPF not only did the chief executive define a challenging mission for HPF - catching up with multinationals in the photographic field - and gave managers challenging assignments, but the contribution they were making to the company's financial improvement was also publicised. In R & C the chief executive persistently exhorted his subordinates to take on challenging assignments and report their progress in monthly performance review meetings. Providing a sense of participation in a turnaround through participatively taken decisions as at BPCL and involving personnel in various task forces - as at BHPV and HPF - was also a motivator. Not to be belittled was the personal example for fairness, integrity, courage, boldness, and effectiveness set by the new chief executives of the four enterprises. Greater operating autonomy, coupled with with management support for initiative and simultaneously a hard nosed accounting for performance was another motivator. It was evidenced by adoption or extension of the profit centre concept at R & C, BHPV, BPCL, and HPF. Lastly, nurturance of personnel through good human relations

was also a motivator, especially at BPCL. In a dependency prone culture, as at BPCL, a nurturant father figure can be a powerful motivator. At R and C, the chief executive also projected a paternal image, but of a stern but fair benefactor rather than a loving elder, and reported success in weaning staff away from outside union leaders.

H. Coordination strategy: Poor inter-personal and inter-departmental coordination and collaboration are a principal weakness of a sizeable PE that is sick. There are many alternatives for improving coordination, and these range from structural devices like putting interdependent departments under one boss or creating a coordinating committee of the representatives of inter-facing departments, to organization development exercises aimed at removing the emotional blocks to collaboration and at development of inter-personal competence and team management. But the coordination strategy that appears to have been most effectively utilised in the turnarounds was the one of creating a forum for sharing information and problems and airing disagreements, and simultaneously an insistence by the chief executive that as far as possible conflicts be solved directly without recourse to a boss. In other words, managers were exhorted to engage themselves in direct face-to-face negotiation of their conflicts and bring only intractable conflicts to the chief executive or to a forum of managers. This strategy was much in evidence in R and C and BPCL, and encouraged in BHPV. The effect of this strategy was to create a culture where managers levelled with one another and shook off their dependency on boss figures for solving their conflicts. In addition, the performance review meetings instituted by several of the turnaround PEs also resulted in much better coordination because organization-wide problems and information were shared in these forums.

I. Systems building strategy: Because of the diversity and complexity of its operations, a sizeable PE needs a fairly high order of professional management. One cause of sickness of large PEs may be the failure to institutionalise professional management systems, covering such functions

as corporate and production planning, budgetary and cost control, marketing, investment appraisal, personnel appraisal, manpower planning, formal training, etc. While post haste and comprehensive professionalisation of management may be far too costly in a cash loss situation and unnerving to the existing staff, large benefits may accrue from identifying areas of crucial weakness in management and selectively strengthening management systems. The strategy during turnaround is one of plugging the largest holes. Serious corporate planning exercises were initiated during turnaround at BPCL and BHPV. Professional performance appraisal and formal training were given a big impetus at HPF. Marketing was strengthened at BPCL, BHPV and HPF. Several of the organizations initiated a periodic performance reporting system that forced their unit or division or branch heads to tone up their accounting system. BHPV instituted an incentive system. Thus selective systems building and consolidation is a significant element of turnaround.

3. Management Style: In a crisis situation even small acts of the chief executive have large symbolic significance for the staff. His powerfully influence the style of management. Is he dogmatic or receptive, fair or unfair, bold or timid, participative or authoritarian, systematic or haphazard? While initial centralisation of power and the emergence of a charismatic focal personality may often be necessary to initiate a turnaround, if the chief executive, through his actions, creates a culture of openness, confrontation of issues, risk taking, achievement ethic, innovation and adaptation, as at the four enterprises, power need not remain centralised, and the organization could well become highly decentralised, participative, and enterprisingly managed, as appears to have happened to some extent at BPCL and R & C. Building up of management systems should also lead to more professional management. If these are institutionalised, say by a longer run organization development effort, then the large PE need not fear sickness that stems from its large size or bureaucratic structure.

The various elements of the model forsuccessfully turning around sick or poorly performing PEs are shown in Figure 3

The fact that four public sector units could be turned around relatively fast despite all the alleged restrictions and difficulties of being in the public sector has vast implications for the more effective management of public sector enterprises . The crucial choices appear to be those of the chief executive and the relationship between the enterprise and the controlling ministry. If the chief executive is a results oriented missionary with a knack for spotting managerial talent, seizing opportunities for improvement and getting staff's participation in turnaround, and if the ministry is supportive and provides a lot of autonomy to the enterprise, the turnaround of a public enterprise that has become sick may be reasonably assured. A competitive environment may be helpful, as in the case of R & C, BPCL, and BHPV, if the PE has access to competent management. Despite the widespread sickness in the public sector, the problem of getting rid of it may be quite manageable.

As far as engineering enterprises are concerned, the turnaround experience at R & C, BPCL, and BHPV suggests the following hypothesis:

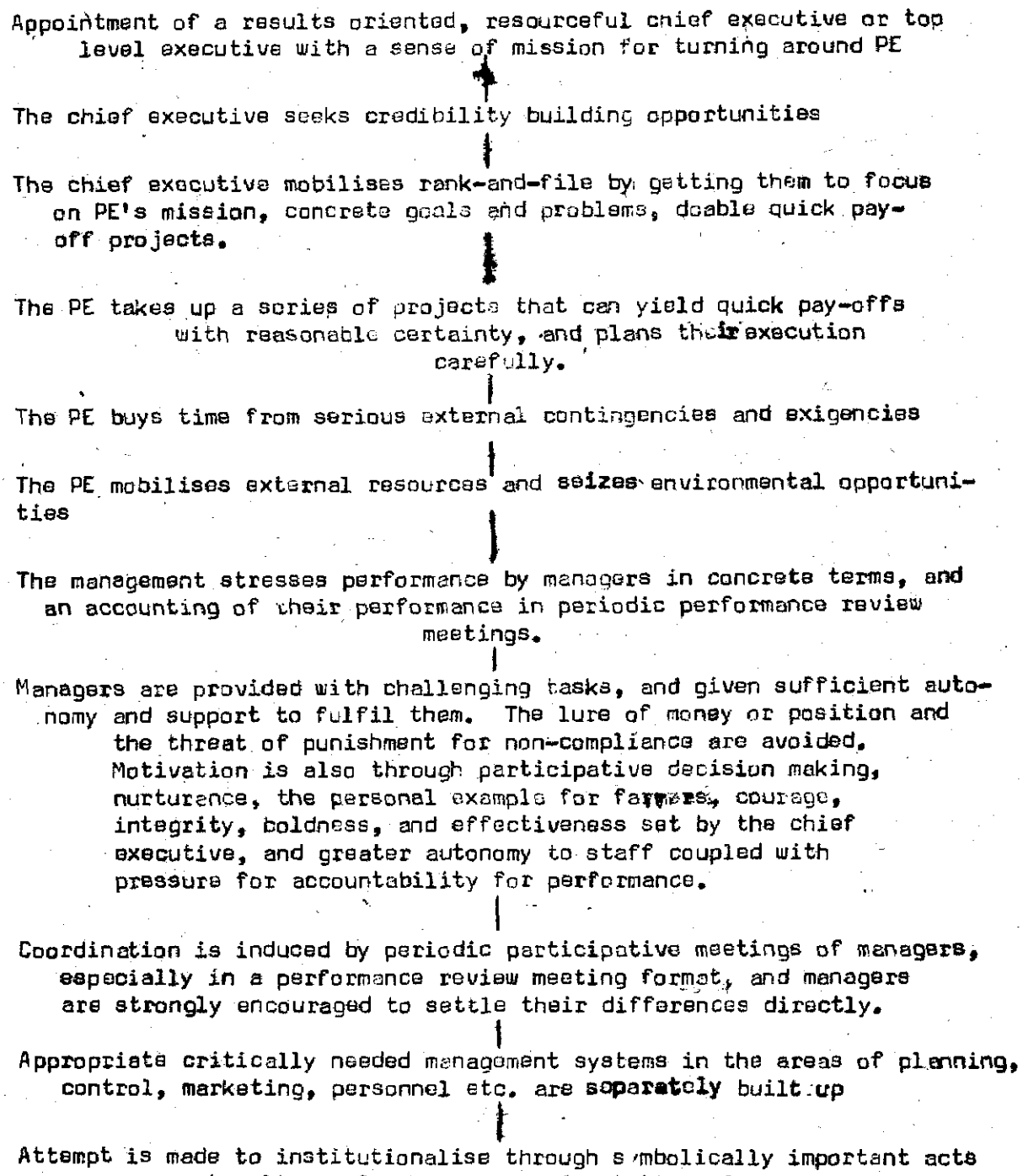
1. If the PE is a sick high technology, custom production, engineering enterprise, the combination of anew results oriented, resourceful and missionary chief executive committed to turning around a sick PE, substantial operating autonomy granted to the enterprise by the ministry, a fairly demanding and competitive environment, and a supportive or nurturant ministry that, however, exerts at least moderate pressure for improving performance on critical goals (production, profits), may significantly raise PE performance.

(2) Management of Operating and Regulatory Environments

Besides contending with competition, fluctuations in demand, erratic supply of inputs, and other aspects of the business environment, an Indian PE has to deal with its regulatory environment. It is generally

Figure - 3

STEPS FOR AN EFFECTIVE TURNAROUND OF SICK PEs



Note: The sequence of steps is not of any great importance.

highly dependant on the ministry to which it is attached for investment funds, and quite often also for working capital. The support of the ministry is vital in getting its investment proposals accepted by the various assessing organs of the Government such as the BPE, the Planning Commission, the Public Investment Board, etc. The case studies provided interesting evidence that PE performance may depend partly on how well the PE is able to manage aspects of its business and regulatory environments. If the PE passively responds to its business and regulatory environments its performance is likely to be significantly worse than if it actively and intelligently manipulates both of its environments.

One major problem area for PEs, particularly the ones established with import substitution in mind, is getting acceptable quality inputs from indigenous sources. BPCL had considerable difficulty getting indigenously the castings it needed. HMT Tractor unit had to suffer a disastrous loss of production because it had failed to develop an indigenous source for a component it had been importing from a foreign sour ce that dried up. BHPV, too, has been struggling to find indigenous sources of inputs. But BPCL management demonstrated, as did HMT and BHPV managements, that it is possible not only to develop indigenous sources of supply, but by developing multiple sources of supply with the help of finance, know-how etc., competition can be induced between the suppliers and this can lead to better quality and lower input prices for the PE.

The Indian public sector is vast and diversified. It affords enormous opportunities to a PE to find technical collaborators, joint venture partners, input suppliers, and so forth. Both BPCL and BHPV have teamed up with BHEL to take on the production of certain types of boilers that BHEL no longer finds it worth its while to produce. This has provided a "base load" to BPCL and BHPV and made them less vulnerable to erratic fluctuations in the demand for their main products. A resourceful PE can get chronically scarce inputs like steel by shopping around among

other PEs because, as the chief executive of R & C put it, there would be fewer questions in the Parliament if a PE got steel from another PE rather than from outside the regulated channels. It can tap, as BHPV is attempting to do, the financial control, personnel, and other management systems of professionally managed PEs like HMT, since these are likely to be more relevant to it than textbook management systems.

The Government is very much a resource for a resourceful PE, rather than, as widely considered by PE managements, a source of frustrations and constraints. Good performance is relatively scarce in the public sector. PEs that do well, such as HMT, acquire enough credibility to be able to get their proposals speeded through the labyrinths of the Government. HMT was able to get an overseas joint venture approved in barely a week. But besides good performance, cultivation of the officials manning the regulatory structure seems to pay off well. This does not imply greasing their palms, but it means meeting them frequently, keeping them posted about the PE's needs and achievements, seeking their help and guidance in solving the PE's problems, being cordial to them, doing a favour or two to them once in a while, and so forth. BPCL demonstrates the benefits to be reaped from this sort of cultivation of officials of the regulatory structure. Besides establishing good communications with officials, PEs can exploit another advantage not easily available to private sector enterprises. As part of the public sector, and hence of the Government, they can, if they so desire, have access to top level officials, and therefore, to crucial intelligence and political power. Through its ministry or otherwise, a PE can pressurise another ministry for settling outstandings from other PEs, getting orders from them, preventing competitive imports, etc., as BHP& was able to do. Its high level contacts can tip it off to impending developments, such as the tip HMT received about capacity expansion in the automobile industry, or the information about Indian aid to Nepal that R & C utilised to try to get a transmission line tower contract in Nepal. A resourceful PE that establishes effective communications with

officials in the regulatory structure, and knows how to use the levers of power, cannot get all it wants; but it can get many more of its needs met than a PE that suffers from resource myopia vis-a-vis the regulatory structure:

The foregoing suggests the following hypothesis:

2. PE managements that view their business and regulatory environments as sources of opportunities rather than as sources of constraints, that aggressively scan their environments for resources and opportunities, that develop alternative suppliers in their input markets with know-how, finance, and other facilities, that establish resource and information exchange linkages with other PEs, that cultivate officials of the regulatory structure, and learn to access and manipulate levers of power in the Government, tend to show a better performance than passive PE managements that view their business and regulatory environments as unalternable by them.

8. Management of Growth:

Indian PEs have been rapidly diversifying (Chaudhuri, Vathsala et al; 1982). The management of their growth and diversification has assumed considerable importance. The four PE cases exhibit several alternative models of growth. BPCL and BHPV exhibit the strategy of installing a large capacity well in excess of national demand and thereafter a struggle to utilise capacity more fully, culminating into a diversification into otherwise unrelated "base load" and other products that can, however, be produced from the same plant. HMT exemplifies the strategy of gradual but successful expansion, and the use of surpluses from profitable ventures to diversify into other unrelated or related profitable products, repeating again the strategy of gradual expansion. R & C exhibits a still another strategy of growth and diversification. In this type of growth, the enterprise attempts to escape from its primary industry not so much because it has been saddled with a large excess capacity but because the industry the enterprise is in is highly competitive. Inability to compete effectively leads to losses or low profits, and to improve profitability the enterprise seeks diversification into other industries. But here, too, without an effective management it falters. Its profit

expectations go awry and the enterprise once again seeks greener pastures. But until or unless the enterprise develops much more effective management, the cycle of diversification into relatively unfamiliar industries on the basis of overly optimistic projections, failure to manage diversification successfully, poor financial return from diversification, and the search again for greener pastures continues. Over a period of time the enterprise may find itself in a large number of product markets, straining further the enterprise's thin management resources.

It seems reasonably clear that the HMT-type growth strategy is the desirable one for PEs. It offers several advantages. Since expansion is gradual it provides time for mastering the production and marketing technologies relevant to the product. Thus, expansions tend to be more realistic and well managed. The enterprise generates its own surpluses, is less dependent on the parent ministry, and acquires higher credibility in its regulatory environment, all of which facilitate diversification. The enterprise tends to go from success to success and strength to strength. Its management also undergoes changes as in the case of HMT. From a dynamic, risk taking, organic and intuitive management, it tends to move towards professionalisation and participative management, as expansion and diversification make decision making at the top more complex. Diversification also creates the needs for organization wide financial control, planning, and personnel systems. Unlike the R & C type of growth and diversification, where management development fails to materialise (unless accidently the PE gets a highly competent chief executive), in the HMT-type of growth and diversification management development does take place, and indeed is as much a stimulus to further growth and development as a response to it.

A second factor in the successful management of growth appears to be management continuity and an institutionalised concern for growth,

efficiency, and the well being of the enterprise. Here, too, the contrast between the management continuity at HMT and the management discontinuity at BHPV and BPCL seems to be a factor explaining the poorer performance of BHPV and BPCL. There was comparable management continuity at R & C, but not an institutionalisation of management concern for growth, efficiency, and the well being of the enterprise comparable to the one at HMT. Thus, management continuity may give good results if there is an institutionalised concern for growth, efficiency, and the well being of the enterprise in the management personnel. If such a concern is not there, it may be desirable to discontinue the old management and bring in, as at BHPV, a new management that has such a commitment. The ministry can play a vital role in institutionalising the concern for growth, efficiency, and PE well being, firstly by ensuring for the PE top executives with such a concern and secondly by prodding the PE at the periodic review meetings to grow and be efficient.

The foregoing suggests the following hypotheses:

3a If the PE follows a strategy of gradual expansion, further diversification and expansion out of the surpluses it generates, and of concomitant management development, it is likely to show a better performance than were it to start with a technically optimal but greatly excessive capacity for its intended market followed by distress diversification into base load products, or were it to seek escape from a competitive industry through diversification without professionalising its decision making processes and its financial control, planning, marketing, manufacturing, and personnel management systems.

3b If there is management continuity, succession planning, and management concern for growth, efficiency and the well being of the enterprise institutionalised through enterprise monitoring by the ministry and appropriate management training at the PE, the PE is likely to show a better performance than if either or both management continuity and institutionalised concern for growth, efficiency, and the well being of the enterprise is/are absent.

(4) Ministry's Management of Ministry - PE Interface

How should the ministry behave in order to maximise the likelihood of high PE performance on the strategic goals of the ministry for the PE? The improved performance of all four PEs, in part due to the character of their interface with the Ministry, suggests the following model of desirable ministry behaviour, at least vis-a-vis equipment manufacturing PEs.

1. A crucial service that the ministry can render a PE is in the selection of the PE's top managers, especially the chief executive. The single greatest factor in the remarkable turn-arounds at BHPV, BPCL, and R & C appears to be the types of new chief executives they got - a dynamic systems oriented man at BHPV, a dynamic "people" and human relations oriented man at BPCL, and a dynamic confrontationist at R & C. It is essential that the ministry help the PE get a dynamic professional manager, who may be systems oriented or human relations oriented or confrontationist depending upon what the particular PE especially urgently needs. In helping the PE get the right top management the ministry should also strive to make sure that the top management fully understands, and accepts, the strategic goals of the ministry for the PE.

2. There should be fairly frequent and fairly detailed performance review of the PE by the ministry. Periodically reporting the performance to the ministry in quantitative terms, explaining variations from targets and describing the concrete remedial action is a good discipline for the PE. It institutionalises fairly sophisticated budgetary control and performance mobitoring systems at the PE itself. Besides formal reviews, there should be other early warning mechanisms, such as ministry officials on the PE's board of directors.

3. The ministry should exert pressure on the PE for performance on goals that both have agreed upon are priority goals for the PE. What goals have priority would depend heavily upon the PE's situation - whether it is in a growth situation, or a turnaround situation, or a maturity situation. The pressure for performance should be tempered by a nurturant, supportive, collaborative attitude on the part of the ministry. It is this combination of a strong performance orientation combined with a willingness to help out the PE that is likely to institutionalise in the PE a healthy performance orientation.

4. The ministry should grant to the PE a good deal of operating autonomy, holding it accountable not for its procedures and practices, but for its results vis-a-vis critically important goals. This autonomy should be particularly extensive if points 1, 2 and 3 above have been taken care of.

5. The monitoring official(s) at the ministry should have industrial experience. Without a reasonably detailed understanding of the complexities of industrial management, it is doubtful how a monitor at the ministry would be able to evaluate the reasonableness or appropriateness of the PE's explanations for its performance shortfalls, or its plans for improving its performance. It might not be a bad idea if top executives of PEs are promoted into the ministry in monitoring roles (an example being that of Mr. Krishnamurthy, formerly chief executive of BHEL, later appointed as Secretary of the Department of Heavy Industry).

6. The tendency to change chief executives, or allow them to leave after just 2 or 3 years at a PE, must be resisted. It takes atleast ayear or two for an outsider chief executive to get familiarised with the PE's myriad operations and its operating culture. If chief executives remain only for short

durations, there is a grave danger of their window dressing their performance, and of their avoiding taking the hard decisions necessary for long term growth that may, however, depress current performance. Equally essential is the quick filling of top management vacancies. Even a short absence of a chief executive, as at BHPV, can have disastrous consequences. Only in exceptional circumstances should a chief executive be allowed to go before completing 5 years at a PE, and only in exceptional circumstances should there be a top management vacancy for more than a month. The ministry must push hard for succession planning. The new R & C chief executive's strategy may be usefully employed: no top or senior level executive of a PE should be allowed to leave or be promoted until he has identified and groomed at least two potential successors.

The foregoing suggests the following hypothesis:

4 If the ministry appoints dynamic, highly competent top level executives to the PE who share the ministry's strategic goals for the PE, conducts fairly frequent and detailed performance reviews of the PE with the participation of PE management, ensures continuous liaison with the PE through ministry officials being on the PE board, exerts strong pressure on the PE for performance on mutually agreed upon goals and targets that, however, are coupled with a supportive, nurturent attitude, provides considerable operating autonomy to the PE with the PE being held accountable for results rather than for practices, ensures that the monitoring officials at the ministry have industrial experience, and ensures top management continuity at the PE, the performance of the PE is likely to be better than without these ministry practices.

(5) Government Appraisal of PE Investment Proposals

As was noted earlier, PE investment proposals are subjected to a prolonged multi-agency scrutiny. A sizeable investment proposal must not only be approved by the PE's board of directors, it must be

approved by the ministry and the finance cell in the ministry, get past BPE, PAD in the Planning Commission, the Public Investment Board (PIB), and the Union Cabinet. Not only is the process time consuming, each appraising agency has its own axe to grind. The PE board may be motivated by enterprise-level considerations (profitability, rapid growth of PE), the ministry by strategic ministry considerations(eg. import substitution, growth of exports), the finance cell by economic and financial viability considerations, the BPE by jurisdictional and technical considerations, the PAD by considerations of economic costs and benefits to the nation and relevance to national priorities, the PIB by national strategic as well as administrative considerations, and the Union Cabinet by among others, regional political considerations. Subjected to so many diverse pulls, the proposal is likely to be appropriately window dressed to get it past the hosts of appraisers. Besides that, the proposal is likely to get bogged down somewhere or the other in this process, with consequent cost escalations and so forth. The scrutiny by the various appraising agencies (with the exception of PAD) reportedly is superficial given the large volume of investment proposals and the shortage of appraising competence. Finally, the basic data, such as the financial viability of the project, seem to be appraised by practically every agency. In other words, there is usually a lot of redundancy in the different appraisals.

Clearly investment proposals of PEs, using as they do public funds in a planned economy in which national priorities are determined by a democratic political process, must be appraised by the Government. But the present appraisal process appears to be elaborate and time consuming without being thorough. The following appraisal model may improve the situation:

1. All projects below Rs. 100 millions should be appraised only by the PE's board, the ministry, and the finance cell (in lieu of the present Rs. 10 millions). This would substantially relieve the appraisal machinery in the BPE, Planning Commission, PIB, the Cabinet etc. from having to attend to a large number of relatively small projects, and thus enable them to concentrate attention on the large ones. Further, this Rs. 100 millions figure should be suitably indexed, so that it moves up with inflation. Concommitantly an effort should be made to strengthen the appraisal process at the PEs and the ministries, with the criteria used by the finance cells in these ministries being internalised by the PEs and the ministries. The BPE should conduct a suitable training programme for the finance officers of the PEs and the monitoring officials in the ministries.

2. For large projects above (real) Rs. 100 millions, initial clearance should be sought not from PIB but from the Union Cabinet. It makes little sense to go through an elaborate and time consuming appraisal process and then have a project stuck at the Cabinet level because of political or other reasons. A sub-committee of the Cabinet, assisted by a suitable official from the Ministry of Finance, and one from the sponsoring ministry, should scrutinise each proposal and accord it suitable administrative priority.

3. Once a large proposal is cleared by the Cabinet, a team of appraisers consisting of a representative each from the PE, the ministry, Finance BPE, and PAD, and chaired by the PAD representative, should be formed to appraise the project. This team should examine the feasibility report and the DPR, get whatever technical and other assistance it needs from within or outside the Government, and finalise the project. No further approvals should be necessary for implementation to begin.

4. The PIB should be turned into a monitoring agency from its current status as an appraisal agency. A quarterly report on the progress of implementation of each large project should be forwarded to it for high level administrative monitoring and follow up. The PIB in turn should brief a Cabinet sub-committee on the progress of the really large projects(say, real Rs. 500 millions and over).

Implications of the Study

Even the limited effort of studying just four engineering PEs, all attached to the Department of Heavy Industry in the Ministry of Industry, has thrown up significant models of (a) effective organizational design for equipment manufacturing PEs; (b) effective turnaround strategy for sick PEs; (c) effective management of PE growth and diversification; (d) effective environment management by PE; (e) effective monitoring of PE by the ministry; (f) effective appraisal of PE investment proposals. Some implications of the study are outlined below:

1. Clearly a lot more research needs to be done to refine these models and extend their applicability to a wider range of PEs, especially those that produce standardised products and sell them under government administered prices, such as steel, fertiliser, and coal producing PEs. These differ very substantially from equipment manufacturing PEs. It would, therefore, be erroneous to apply these models to such PEs without a good deal of careful research. It also should be useful to study enterprises whose ministry interfaces differ sharply from those of the enterprises studied for this report, in order to highlight more sharply the role of PE-ministry

interface as a determinant of PE performance. Equally interesting would be to study the forces that shape the culture of a ministry, the forces that make one ministry strongly committed to growth and efficiency and another much less so.

2. The study does indicate that each of competition, fairly tight (but nurturant) monitoring of performance by the ministry, and professional PE management, contribute to high performance, but not in isolation. Competition may raise the need for more effective PE management to maintain performance, but unless the regulatory system makes sure that the PE gets the resourceful, professional management it needs, competition may not lead to better management and greater efficiency.

Thus, a policy of exposing PEs to greater competition should be balanced by a policy of facilitating the flow to the PEs of the best management talent available in the country. This is equally true of a policy of exerting strong pressure for performance on the PEs. Such a pressure should be balanced by giving the PEs access to the best management talent in the country. This has large implications for modifying the present modes of recruiting top and senior level executives for PEs. The salary ceilings for the public sector are lower than those for the private sector, thus constraining the flow of management talent to the public sector. In addition, the recruitment to top and senior level PE posts is through the Public Enterprises Selection Board. Reportedly the PESB, staffed mostly by senior officials, is open to political influence, and reportedly its scrutiny is amateurish and superficial. One possibility is to leave the initial search and short listing of candidates to a professional personnel agency. The PESB would then make its

choice only out of the candidates short listed by the agency. Another possibility is of letting the PE board and the ministry, rather than the PESB, select top and senior executives from amongst those short listed by the professional agency, for those PEs that are relatively small and less strategic like the sick units taken over by the Government and also for the well established, professionally managed PEs like HMT and BHEL.

Besides the measures listed above, succession planning may ensure that vacancies are filled quickly. One of the banes of the public sector is the failure to fill top level vacancies quickly, resulting in great damage to the PE, as in the case of BHPV in 1978-9. An attempt should be made to survey all the senior managers in the public sector, test them appropriately, and identify good general management talent that can be quickly drawn upon to fill up vacancies anywhere in the public sector. Much greater formal management training may also substantially increase the supply of competent generalist managers.

3. In selecting top level executives for the PEs, especially chief executives, it is crucial to bear in mind the requirement of the situation. In growth situations, turnaround situations, and turbulent business environments, entrepreneurial types of chief executives are needed; in the maturity phase and in a complex industry environment, systems and professional management oriented executives are needed. Equally, the role of the chief executive for the enterprise-whether it is of the strategic planner, the controller, or the supervisor (Murthy, 1982) needs to be borne in mind in choosing the chief executive.

4. Management strategy for a PE, as well as the interface between the ministry and the PE, may need to differ sharply depending upon the phase the PE is in. What is good management practice in a turnaround situation (emphasis on mobilisation, on the short term, on quick results projects, etc) may not be good

management practice in a meturity phase, in which long term considerations and systems development may need to have far higher priority. Similarly, the ministry-PE interface may also need to differ considerably-much more supportive and nurturant ministry behaviour during a turnaround; much more hard nosed pressure for performance on key goals once the organization has stabilised.

5. PEs should be assessed on performance criteria that make sense given the phase the PEs are in. If a PE is assessed on two many criteria (See Basu, 1979, for such a proposal) there would be much confused fire fighting in the PE to meet the variegated ministry demands. A young PE may be reasonably assessed with regards to its progress in incurring capital expenditure and capacity creation according to plan. Similarly, a PE ih a turnaround situation needs to be assessed on its improvement in profitability. It would be pointless to assess young or sick PEs on a multitude of criteria ranging from profitability, growth, and productivity to export performance, employment of persons from disadvantaged communities, development of ancillaries, etc. This does not mean that information vis-a-vis these criteria should not be gathered from PEs; only that the management of a PE should be evaluated only in terms of criteria that make sense for the kind of situation the PE is in, and are previously agreed upon as relevant by the management of the PE.

6. Diversification without a concomitant strengthening of management needs to be avoided. Excessive focus on techno-economic feasibility of projects without enough attention to the quality of management needed to implement the diversification successfully, is an invitation to disaster. Hard nosed planning for management raquirements - both in terms of numbers of managers and style of decision making - must be a part of every investment proposal.

7. The attempt by the Government to impose uniform policies and practices on PEs, through "guidelines" issued through the Bureau of Public Enterprises, should be tightly reined. Such uniform guidelines to all PEs make little sense given the enormous diversity of Indian PEs. Besides, they reduce the BPE's credibility with the PEs. Instead it might be a better idea if the BPE turned into a consultancy, training, and research centre for the public sector.

8. Those monitoring the PEs must themselves have industrial management experience and a good deal of familiarity with professional management concepts and tools. Otherwise, what credible advice can they give to beleauguered PE management, and how may they be able to evaluate the explanations for poor performance advanced by PE management? Four to six month crash course in industrial management for the IAS officers monitoring PEs may be highly desirable.

9. It is essential that a results oriented, pragmatic, innovation and professional management oriented industrial culture, rather than a procedurally oriented bureaucratic culture, pervade the so-called economic ministries (industry, steel, petroleum, energy, etc.) that account for the bulk of Indian PEs. Besides training IAS officers in industrial management, it may be useful to elect some of the top officers (secretaries and joint secretaries) from the ranks of the more successful top executives of the PEs attached to these ministries.

APPENDIX A ON HYPOTHESES ON PE PERFORMANCE DETERMINANTS

The World Bank's research proposal on managerial structures and practices of public manufacturing enterprises contains a number of hypothese on the determinants of PE performance (PPFD, 1978, pp 14-18). They are reproduced in an abbrevated fashion in Table 1 with minor modifications of language and form.

TABLE 1

HYPOTHESES CONTAINED IN ORIGINAL WORLDBANK RESEARCH PROPOSAL

Independent Variables	Moderating Variables	Hypothesised Effect
1. Unclear objectives Unclear direction from center	Good top management and clarity of its goals.	Lower performance subject to moderating variables.
1a Unclear objectives		Poor performance, masking of poor performance, management excuses for poor performance.
1b.(i) Multiple and conflicting objectives imposed on PE		Management excuses for poor performance.
(ii) Clear definitions of social objectives.		Low potential conflict with efficiency
(iii) Clear measurement of costs of social objectives		Greater pressure for efficiency and greater accountability.
2. Political appointment of PE managers, with short and uncertain tenure, with limited autonomy and constrained functions, and weak performance reward nexus.		Managers tend to minimise visible mistaker rather than pursue efficiency and growth.
2a. Low enterprise autonomy (high governmental control)	Center exercises top management functions.	Stifles managerial initiative, lowers PE performance subject to moderating variable.
2b. Low enterprise autonomy weak public administrative structure		Ineffective and inefficient decision making process

2c.	Weak incentive performance links for top management	Poor enterprise performance.
2d.	Lack of PE control over hiring, dismissal, and promotion of workers.	Lowers PE performance.
3	Well- defined objectives, systematic reporting of key performance indicators to center, high degree of monitoring and feedback, and willingness to change objectives and management	Improves PE performance
4	Management participation in initial investment decision and subsequent joint participation with the center in formulating PE's plans and targets in the context of broad government policies.	Improves PE performance
5	Investment decisions without management participation, and plans and targets dictated by center	Lowers top management's sense of commitment to the enterprise and its sense of responsibility for success.
5.	Initially, basic purpose and initial design of the project	Affects PE performance
	Subsequently, if management exercises the option to diversify and expand	Importantly determines performance
6	The stronger the competitive environment	The greater the probability of improvements in decision making in both the center and the PE.

The table indicates that the major determinants of performance are hypothesized to be the degree of clarity of PE objectives; clarity of directives from the center; conflict among objectives imposed on the PE by the center; measurement of the costs of social objectives; professionalisation in the appointment of PE managers; the performance-reward nexus; enterprise autonomy, especially with respect to the personnel function; the system for reporting PE performance to the center and the center's response to performance information; management participation in investment decision concerning the PE and in the formulation of its plans and targets; the phase of the PE's growth and development; and the extent of competition faced by the PE.

The hypotheses usefully draw attention to some important facets of PE - center relationship. But there is a neglect of organizational and management variables like the organizational structure of PE, its management's style or mode of managing it, its business and marketing strategies, its management systems, its administrative strategies, etc., that may well be highly important determinants of performance. There is also insufficient attention to facets of the business environment of PEs other than competition, such as growth, turbulence, technological change, cyclicity, etc. The hypotheses are intuitively derived rather than based on explicit theory or emprirical research. Except for hypotheses 1 and 2a, no attempt has been made to identify moderating effects to the hypothesised relationships between independent variables and PE performance. Finally, it is not clear what some of the hypothesised determinants of performance mean, such as "good top management" and "weak public administrative structure". Management research does not indicate any one universally acknowledged mode of good management, so that unless defined carefully, "good management" or "weak administrative structure" become meaningless terms.

An additional set of hypotheses was derived by the author that drew heavily on the organization theory literature and the empirical work on organizational performance. These hypotheses were based on a particular model of enterprise effectiveness. Its principle argument is that situations (such as some of those listed in Table 1) may be less potent determinants of performance than the responses that the enterprise makes to these situations. As an example, competition itself may not improve performance at all unless the enterprise responds to competition in specific ways.

A Model of Enterprise Effectiveness

Market structure - conduct - performance literature (for a fine summary see Scherer, 1970) considers market structure as a major determinant (through market conduct) of industry performance (Scherer, 1970, p.5). However, it does not shed much light on the performance determinants of individual enterprises, especially enterprises that are more or less monopolies (as Indian public enterprises commonly are). Organisation theory does indicate what these determinants may be (Khandwalla, 1977b, ch. 7 and 15). It especially postulates that enterprise performance is a function of the congruence or fit between a number of variables. The major classes of these variables are: situational variables (the type of organization's industry, its size, control by external agency, the nature of the business environment, etc.); strategic variables (the style and goals of the top management of the enterprise, the latter's business strategy), structural variables (degree of decentralization, form of departmentalization, planning, control, and information system, reward system, coordinative system, etc.) and behavirooural variables (the dominant motives and attitudes of personnel). While individual variables may marginally affect enterprise performance, they are likely to affect it much more strongly in certain effective combinations or congruences (Lawrence and Lorsch, 1967; Khandwalla, 1973; Child, 1975; Khandwalla, 1976, 1977a, and 1977b).

The underlying idea is that a number of organizational responses are possible in any situation. If the organization picks a response that is particularly appropriate to the given situation (organization theory indicates the responses that are especially likely to be effective), then the probability of high performance appreciably increases, just as an inappropriate response may significantly lower it.

The model of enterprise performance is shown in Figure 1. It indicates that effective combinations or congruences between situational and strategic variables creates a potential for high organizational performance as do congruences between situational and structural variables, among strategic variables, between situational and strutaral vaiables, among structural variables, and between strudural and behavioural variables.

FIGURE 1

A Model of Performance Determinants of Public Enterprises

1. Degree of congruence between situational and strategic variables	High – Potentially high organizational performance Low – Potentially lower organizational performance
2. Degree of congruence between strategic variables	High – Potentially high organizational performance Low – Potentially lower organizational performance
3. Degree of congruence between situational and structural variables	High – Potentially high organizational performance Low – Potentially lower organizational performance
4. Degree of congruence between strategic and structual variables.	High – Potentially high organizational performance Low – Potentially lower organizational performance.
5. Degree of congruence between strudural variables	High – Potentially high organizational performance Low – Potentially lower organizational performance
6. Degree of congruence between structual and behavioural variables	High – Potentially high organizational performance Low – Potentially lower organizational performance

Enterprise Performance = A + B 1 Congruence No. 1 + B 2 Congruence No. 2 + B 3 Congruence No. 3 + B 4 Congruence No. 4 + B 5 Congruence No. 5 + B 6 Congruence No. 6.

The model also indicates that incompatibilities or low congruences between situational and strategic variables potentially lower organizational performance as do incompatibilities between situational and structural variables, among strategic variables, among structural variables, between situational and structual variables, and between structural and behavioural variables. The net effect of these congruences and incompatibilities is a predictor of enterprise performance.

Organizational theory recognises the interactions between all classes of variables (Leavitt, 1965). Ideally, therefore compatibility or incompatibility between and among all classes of variables should be treated as determinants of enterprise effectiveness. Neither organizational research nor organization theory have evolved to the point where such a comprehensive model can be meaningfully utilised to generate testable hypotheses. The more limited model of Figure 1 has been expounded, keeping in mind current knowledge, to generate a number of testable hypotheses on public enterprise performance.

Figure 1 embodies a particular model of organizational functioning. It is assumed that what at any time gets defined as "given" by decision makers profoundly affects the structure and functioning of organizations. That is to say, organizational change decisions involve adaptations to these perceived constraints (Cyert and March, 1963). The latter initially are likely to be the nature of the enterprise's industry, the organization's scale of operations, business conditions, etc. Business strategy and the style of management get evolved in the light of these initial "givens". Once business strategy and the style of top management are crystallised, the structure of the organization begins to be adjusted to them. The structure is also influenced by the motives, attitudes, and expectations of the personnel (and vice versa).

In this sequence of choices and adjustments, those that are synergetic tend to yield desirable results in terms of enterprise performance while those that are maladaptive tend to yield undesirable results.

Table 2 lists a number of hypotheses of synergetic combinations. Their common thread is that faced with a complex or challenging situation, it is the response of management that importantly affects the performance outcome. The hypotheses in Table 2 are meant to supplement rather than supplant those given in Table 1. The rationales for these hypotheses are provided in the report submitted to the World Bank (Khandwalla, 1981 b.).

TABLE 2

A SUMMARY OF HYPOTHESES CONCERNING PUBLIC ENTERPRISE PERFORMANCE

Hypothesis No.	Choice Initiating Parameter	Responses Hypothesized to Raise Performance Potential
H1A.1	Low autonomy from controlling authority	Professional (or technocratic) and participative top management orientation.
H1A.2	Unsupportive controlling authority	Risk taking and organic(or results oriented) top management and/or professional and participative top management orientation.
H1A.3	Conflicting demands imposed by controlling authority on enterprise	Professional and participative top management orientation.
H1A.4	Strong pressure for performance from controlling authority.	Risk taking and organic top management orientation with strong intelligence, planning, and control systems.
H1B.1	Turbulent industry environment	Risk taking and organic top management orientation.
H1B.2	Stable industry environment and conservative top management.	Mechanistic or bureaucratic and noncoercive top management orientation.
H1B.3	Complex industry environment	Professional and participative top management orientation.

H1B.4	Noncomplex industry environment	Risk taking, intuitive and non-participative top management orientation.
H2A.1	Risk taking top management orientation	Organic top management orientation.
H2A.2	Professional top management orientation	Participative top management orientation.
H2A.3	Conservative top management orientation	Mechanistic and non-coercive top management orientation.
H2B.1	A number of strongly held partially conflicting goals for the enterprise	Professional and participative top management orientation.
H3.1	Large size of the enterprise	Bureaucratic structure in the Weberian sense, that is, high levels of specialisation, standardisation, and formalisation.
H3.2	Multi-faceted competitive pressure on the enterprise	Decentralized authority structure, sophisticated intelligence, planning, and control systems
H4.1	Conglomerate diversification	Divisionalised organizational structure
H4.2	Marketing of customised sophisticated outputs	Matrix organizational structure
H4.3	Marketing of standardized and interdependent products	Functional departmental structure, advance planning of operations, inter functional coordinating committees.
H.4.4	Marketing of standardised mass produced products	Vertical integration, decentralisation, sophisticated planning and control system
H.4.5	Sophisticated capital intensive technology	Sophisticated selection and reward system.
H4.6	Strongly held multiple, partially conflicting management goals	A sophisticated intelligence, planning, coordination and control system and sophisticated reward system
H5.1	Highly differentiated products or technologies.	High intraorganizational variation in operating culture, leadership styles, planning sophistication, and degree of technocracy.

H5.2	Highly differentiated products or technologies, and high intra-organizational differentiation	Special coordinative and collaborative mechanisms.
H5.3	Interdependence between important organizational units with (a) low differences in their operating cultures (b) large differences in their operating cultures	(a) Reliance on structural coordinative mechanisms (b) Reliance on structural as well as behavioural coordinative mechanisms.
H6.1	Specialised training, strong defence needs as well as growth needs and intolerance of ambiguity in managerial personnel	Performance based reward system, job rotation, movement over time through increasingly less structured jobs, participatory decision making structure, and task oriented but nurturant supervisory behaviour during subordinates' apprenticeship phase.

Note: For rationales of above hypotheses, see Khandwalla (1981b) Part A Appendix to ch. 1.

Relevance of Hypotheses to Equipment Manufacturing PEs

Since the study centres around four equipment manufacturing engineering PEs attached to the Department of Heavy Industry, certain hypotheses are likely to be more relevant than others. In particular, equipment manufacturing enterprises are likely to face a turbulent and complex industry environment (hypotheses HIBI and HIB 3 of Table 5); they market customised, sophisticated outputs (hypotheses H4.2); they employ a sophisticated, capital intensive technology (H4.5); and produce highly differentiated products or possess highly differentiated technologies (H5.1). Accordingly, the expectation is that high performance equipment manufacturing units will tend to exhibit most of the following attributes: risk taking, organic, professional, and participative top management orientation; a matrix organizational structure; a sophisticated personnel selection and reward system; and a highly differentiated organizational structure and culture. By implication, low performance equipment producing units, or successful units in stable, noncomplex environments producing standardised engineering products with relatively labour intensive technologies, will tend to exhibit most of the following attributes: relatively a more conservative, mechanistic or bureaucratic, intuitive, and authoritarian top management; an organizational structure marked by functional departmentalisation, an unsophisticated, seat-of-the-pants personnel selection and reward system; and a fairly uniform organizational structure and culture.

To the extent that the choice initiating parameters in HIA.1. HIA.2, HIA,3, and HIA.4 (low autonomy, unsupportive ministry, imposition of conflicting goals, and high performance pressure) are operative, risk taking, organic or results orientation, professional and participative orientations will tend to be more strongly evidenced in high performance units, and by implication, conservative, bureaucratic, seat-of-the-pants and authoritatian orientations will tend to be more strongly evidenced in low performance units, or in high performance units having high autonomy, supportive controlling authority, low goal conflict or low performance pressure from the Ministry.

Successful large units will tend to have more of specialisation of functions, standardisation, and formalisation in their routine activities than poorely performing large units or successful smaller units (H3.1), while successful enterprises operating in strongly competitive environments will tend to be more decentralised and have a more sophisticated intelligence, planning, and control systems, than poorly performing enterprises operating in such environments, or successful enterprises operating in monopolistic environments (H3.2). Similarly, successful conglomerates will tend to have a more divisionalised organizational structure than poorly performing conglomerates, or successful units that cannot be called conglomerates (because their diversification, if any, is in related areas).

A review of the Indian empirical literature on the management of PEs indicated that PE managers tend to have both strong defence and growth needs and intolerance of ambiguity. Since the enterprises chosen for study produce fairly to highly sophisticated engineering products, their managers are likely to have specialised training (most of them are likely to be engineers). Thus, the choice initating parameter in H6. 1 is likely to be active in these four enterprises. Consequently, the expectation is that the more successful ones among these four will have a more strongly performance based reward system, practice job rotation more systematically, have a more formalised participative decision making structure at middle levels of management, and supervision of apprentice executives will be more task oriented and nuturant, than in the less successful units.

While the implications of the hypotheses contained in Table 2 have been sketched out in terms of comparisons between succesful and less successful units, they are also relevant for examining the behaviour of the same enterprise over a period of time during which a choice initiating parameter has become salient. For example, if competition has increased, then the implication of H3.2 is that to perform well, the enterprise must get decentralised and instal a more sophisticated intelligence, planning,

and control system. Similarly if autonomy was high earlier but has currently greatly declined, it would be necessary for top management to acquire a professional and participative orientation for the PE to perform at a satisfactory level.

To summarise : The hypotheses potentially explain why enterprises may differ in their performance despite being in similar situations. They also potentially explain why enterprises may show similar performances despite being in very different situations. And finally, they potentiall explain why the performance of an enterprise deteriorates or does not deteriorate given a change in its operating situation.

Clearly, the hypotheses listed in Tables 1 and 2 cannot be tested with a sample size of four. The intensive case studies of the four equipment manufacturing enterprises are intended to sharpen the hypotheses. At the same time, the development of the hypotheses before beginning the field work has enabled a sharper focus on key variables and relationshipsduring the field work.

APPENDIX-B

A BRIEF DESCRIPTION OF THE RESEARCH METHODS USED IN THIS STUDY

While a fuller discussion of research methodology is available in Khandwalla (1981 b), a brief description is provided below of the kind of data and the manner of their gathering. Information was secured primarily through scanning various documents, by intervie wing executives in the PEs, in the Department of Heavy Industry and other organs of the Government of India, and by administering anonymous questionnaires to selected samples of top management, functional management, and middle management executives in the PEs.

Information from Documents

For the four enterprises, by far the richest source of information of this type are their annual financial reports. Besides containing the balance sheet and the profit and loss account, the annual report contains the report of the board of directors, occassionally supplemented by a statement by the chairman of the company. The directors' report is a rich information source for strategic actions of management and explanations for the performance of the company. The annual report also contains the auditors report, and in the case of PEs, also a review of their accounts by the Indian Audit and Accounts Department. In addition, by law a PE (or any public limited company) is required to give in its annual report such information as particulars of employees receiving a remuneration of Rs. 36,000/- or more a year; quantity and value of various raw materials consumed; value ofimports calculated on CIF basis and broken down by categories such as raw materials, components, spare parts , capital goods, etc.; expenditure in foreign currency on account of royalty, know-how, professional consultation fee,interest, etc.; value and percentage of imported versus indigenous consumption of raw materials, components, stores and spare parts; earnings in foreign exchange through exports, interest, other income, etc.; particulars in respect of quantity and value of sales of the

various products of the company; particulars of licensed capacity, installed capacity, actual production, opening and closing physical stocks of each product produced by the company; expenditure on maintenance of school and educational facilities; provision of medical facilities, subsidised transport, other subsidies for social and cultural activities, etc. Although time series based on the above information cannot go very far back (due to changes in disclosure laws), certainly some interesting trends, such as in capacity utilisation, foreign exchange earnings, average price realisation, etc. can be identified for atleast recent years.

In addition to the annual report, subsidiary sources of information on the enterprise are the monthly letter and quarterly brief on the enterprise sent to the Ministry, minutes of periodic performance review meetings conducted by the chief executive of the company, internal corporate planning documents, and production and other records and documents, such as theDetailed Project Report for setting up the company.

Market share, capacity utilisation, national production information for products and so on, pertinent to assessing the market environment of an enterprise, is, with luck, available in the annual reports of the Directorate General of Trade and Development. Another source is industry publications, if any. A subsidiary source is the annual report of the Ministry of Industry. The latter contains valuable information on theDepartment of Heavy Industry's activities and priorities, of use in assessing the policy environment of the PEs.

For assessing the relative performance of a PE, recourse was had to the Reserve Bank of India Bulletin, which provides profitability, etc. information for various industries, including large equipment manufacturing companies in the private sector. Public Enterprises Survey brought out by the Bureau of Public Enterprises contains a wealth of performance and other informationon Indian Public Enterprises, and makes possible interesting comparisons of the PEs

studied with comparable public sector enterprises. The annual reports of private or public sector competitors of the PEs studied are another source of comparative performance information.

Information from Interviews

Each of the enterprises studied has a large number of managers. The smallest, Bharat Pumps and Compressors, has about 70; the largest, Hindustan Machine Tools, more than ten times that number. Given the limited time for interviews, it was decided to restrict interviewing to all or most of the top level executives, a representative cross section of senior managers in charge of major functions and divisions, and a few select middle or even junior level managers in charge of, or well informed about, some critical functions like purchases or management development.

The interviews were only loosely structured, varied in length from half an hour to several hours, and averaged over an hour per interview. There were differences in the information elicited from theinterviewees, depending both on their level and their role in the organization. For example most top level executives were probed for (a) the strengths and weaknesses of the enterprise; (b) goals of management; (c) the style of management; (d) the interface with the Government; (e) the long term business and organizational development strategy; (f) the operating environment of the company. In addition, each top level executive was questioned relating to strategic issues in his area of work specialisation. The interviews with top level executives were typically fairly long, and some, such as the chief executive, were interviewed more than once (the first time to elicit information and the additional time or times to tie up loose ends, pursue some points further, and get one's overall impressions confirmed). The senior and lower level executives were probed primarily for information related to their areas of specialisation but secondarily also with respect to such matters as the strengths and weaknesses of the enterprise, the styleof management, and the company culture. The total number of executives

interviewed varied from about a dozen each in the three relatively small PEs (R and C, BPCL and BHPV) to over 30 in HMT.

By and large the style of interviewing followed was that of sympathetic listener rather that of an evaluator or aggressive interrogator. An attempt was made to establish a comfortable relationship with the interviewee, and by and large this yielded much good and confidential information. An attempt was made to cross check some of the sensitive information by unobtrusively probing several interviewees about it.

In addition to interviewing executives of the four PEs, officials of the Department of Heavy Industry monitoring thefour PEs were interviewed about their perception of the strengths, weaknesses, and problems of the enterprise, the kind of help given to the PE, the extent of autonomy granted to it, etc. Top officials of the Department were also interviewed to understand better the policy environment of the enterprises. A limited effort was also made to interview top executives of private sector competitors of the PEs, to gain a better understanding of the dynamics of the industry, constraints and problems faced by it, etc.

Information from Questionnaires

Given the limited time available for interviews, the vast range of information sought, and the need for somewhat quantifiable information that could facilitate comparisons across time for a PE and between the PEs, several structured questionnaires were deployed. These had been developed earlier for a study of indegenous Indian management, but were substantially modified for use in PEs. In particular, several questions on the interface between PE and Ministry were added. These questionnaires were anonymously filled out by management personnel of the PEs. The questionnaires were pre-tested at the first PE taken up for study, namely, Richardson and Cruddas. Modified versions were administered in the three remaining PEs.

Broadly speaking, information was sought from three distinct types of personnel. Information on corporate policies, management goals, interface with Ministry, constraints faced by the PE, the PE's business environment, etc. was sought from questionnaires completed by top level executives (chief executive and/or his immediate subordinates) of the PEs. Variations were developed for divisions/product groups that were autonomous profit centers. Information solicited from these top management questionnaires pertained to the present time and the situation 3 years earlier, in order to get an idea of the direction of change of management policies and goals, interface with Ministry, business environment, performance relative to leading rivals, etc. These questionnaires, therefore, were given only to those top level executives who had been with the company or division (as the case may be) for at least 3 years. Depending upon circumstances, two to four respondents were sought, and their responses were averaged for greater reliability.

Information on corporate/divisional practices pertaining to major management functions, namely, financial control, manufacturing, marketing, and personnel was sought from a senior experienced executive in each of these areas. These questionnaires, too, were completed anonymously. After each question, the respondent was requested to indicate the changes, if any, that had taken place in the past 3 years in company practice. In each questionnaire there were a few questions on the respondent's perception of the style of top management, and the work ethic of managers involved in the management function probed by the questionnaire.

Finally, information on the middle level manager's priorities, job satisfaction, his perception of the work culture of his group, his perception of the company management, etc. was secured from middle level managers (usually of the rank of deputy manager and manager, but not senior manager). All such responses from the company were averaged for greater reliability.

Many cross checks were built into these questionnaires. For example, a crucial variable in this study was the style of management, for a good deal of management research indicates it to be a significant predictor of corporate performance (Burns and Stalker, 1961; Khandwalla 1976, 1977 b, 1981 a; Likert, 1961). The style of management was abstracted from the information on corporate policies yielded by the top management questionnaires. There was a question on the top management's style in each of the four functional management questionnaires. There also was a question on company management in the questionnaire for middle managers. Thus, the style of top management as indicated by top level executives themselves could be compared with the style of top management as perceived by senior functional executives and by middle level managers. Similarly, conflict resolution and motivational mechanisms preferred by top management could be compared with these as seen by senior functional executives to be preferred by top management, and autonomy given by Ministry and helpfulness of Ministry as seen by top management could be compared with the perception by functional executives of the company's autonomy, albeit with respect to items pertinent to their areas.

Of all these questionnaires, perhaps themost important were the top management questionnaires, for they incorporated most of the hypothesised determinants of PE performance. Their reliability and validity was , therefore, important. One indicator of reliability was degree of agreement between several respondents on questionnaire items. If the agreement was reasonably. good, the instrument was likely to be reliable. As oneindicator of reliability, in the study of Bharat Heavy Plate and Vessels Ltd. (BHPV) , of the 228 scale items in this questionnaires, there was significant disagreement between the three top level respo ndents in only 48 items (21%). Disagreements about BHPV's business and administrative strategies were on the high side, but this may well reflect some uncertainty in BHPV's actual policies following the ingress of a new chief executive only about a year before the date the questionnaires were administered, who initiated many changes in BHPV's policies and management. By way of comparison, in BPCL the new chief executive

had arrived 2 years before the questionnaires were administered, had also initiated many changes, but the policies appear to have been stabilised by the time the questionnaires were administered, for significant disagreement between the three top level executives who filled out the questionnaires were in only 7% of the business strategy scales and 16% of the administrative strategy scales.

There was also generally reasonably good agreement between data from different types of questionnaires. As indicated earlier, the style of top management was measured through top management questionnaires, functional management questionnaires, and middle management questionnaires. The scores were allocated to one of the five possible categories : very low, low, moderate, high, and very high. Despite major differences in the way the top management style was measured in the three types of questionnaires, there was reasonably good agreement about it across the three levels of management in the units. The maximum variation in categories was only once more than one category difference (in the case of HMT Machine Tool Group's top management's professional managementorientation). In all the 24 other cases, it was zero or one. One could, therefore, say with some confidence that, for example, R and C management was not conservative, but HMTWatch Group might be, and that BPCL management was less mechanistic than BHPV management.

The data also attest (see Table 1) to what may be called the discriminant validity of the three types of questionnaires, that is, the capacity of the instrument to pick up actual variations in the phenomenon being measured. Since the enterprises studied are public sector, regulated enterprises, all attached to a Ministry that emphasises professional management, the variation in professional management orientation across the units is likely to be modest, and the data so indicate, regardless of whether these orientations are measured through top management questionnaires, functional management questionnaires, or middle management questionnaires. Greater freedom of choice is, however, likely, in whether a top

management elects to be conservative or risk taking, organic or bureaucratic, participative or authoritarian, and idealistic or pragmatic. With the exception of participative management orientation, the other three orientations did show a substantial variation across the units. What is more, the variation across units generally accorded with the impression gained through interviewing executives of these units. For instance, interviews indicated that the Machine Tool Group of HMT was distinctly more professionally managed than the Watch Group, and commitment to ideals and an organic, results orientation was distinctly greater at BPCL as compared to BHPV. Table 1 indicates a picture broadly congruent with these impressions.

There were many other examples of congruence between interview impressions and questionnaire findings. For example, interviews both at the Department of Heavy Industry and with the top executives of the four enterprises indicated that (a) the enterprises were given a lot of operating autonomy; (b) the Ministry was generally supportive and helpful; and (c) vis-a-vis different indicators of PE performance, the pressure from the Ministry with respect to the enterprise meeting the monetary target of production was particularly high, generally it was as high ar higher than that for theenterprise meeting its physical production or profit or cost targets.

Table 2 indicates the overall operating autonomy of the enterprise, the overall helpfulness of the Ministry, pressure for meeting the production target (in monetary and physical terms) and for meeting the profit and cost targets, as measured through top management questionnaires. The informations yielded by questionnaires accords well with the impressions formed through interviews.

To sum up : The questionnaires used in the study have yielded a wide range of fairly reliable data.

PERCEPTION OF TOP MANAGEMENT STYLE AS SEEN BY TOP LEVEL EXECUTIVES, FUNCTIONAL MANAGERS, AND MIDDLE LEVEL EXECUTIVES

	R and C	BHPV	BPCL	HMT Machine Tool Group	HMT Watch Group
Entrepreneurial Orientation of Top Management					
As rated by top level executives	High	High	Moderate	Moderate	Moderate
As rated by functional executives	Moderate	Moderate	High	Moderate	Low
As rated by middle level executives	Moderate	Moderate	High	Moderate	Low
Professional Management Orientation of Top Management					
As rated by top level executives	High	High	High	Very High	High
As rated by functional executives	Moderate	Moderate	Moderate	Moderate	Moderate
As rated by middle level managers	High	Moderate	High	High	Moderage
Organic Management Orientation of Top Management					
As rated by top level executives	Moderate	Moderate	High	Moderate	Low
As rated by functional executives	High	Moderate	High	Moderate	Moderate
As rated by middle level executives	Moderate	Low	High	Moderate	Low
Participative Management Orientation ofTop Management					
As rated by top level executives	High	High	High	High	Moderate
As rated by functional executives	High	Very High	Very High	High	High
As rated by middle level executives	High	High	High	High	High
Idealistic Orientation of Top Management					
As rated by top level executives	Moderate	Moderate	Moderate	High	Moderage
As rated by functional executives	Moderate	Moderate	High	High	Moderate
As rated by middle level executives	High	Low	High	Moderate	Moderate

Note : - Scoring categories range from very low, low, moderate, high, to very high.

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