Table Ⅲ-1-8 Projected Balance Sheet of MTB
-Total Investment
(At Current Prices)

Unit: Rs. Lakh

Items	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Materials	1,178	1,386	1,641	2,113	2,430	2,636	3,050	3,701
Matl-in-Transit	400	400	400	400	400	400	400	400
Work-in-Progress	945	945	945	945	945	945	945	945
Stock-in-Trade	708	708	708	708	708	708	708	708
Total Inventories	3,231	3,439	3,694	4,166	4,483	4,689	5,103	5,754
Debtors	707	832	985	1,268	1,458	1,581	1,830	2,221
Loans & Advances	1,021	1,202	1,422	1,831	2,106	2,284	2,643	3,208
Other Current Assets	314	370	438	563	648	703	813	987
Cash & Bank Balance	75	75	75	75	75	75	75	75
Inter-Unit Accounts	1,021	1,202	1,422	1,831	2,106	2,284	2,643	3,208
Total Current Assets	6,370	7,119	8,035	9,733	10,878	11,617	13,107	15,452
Creditors	393	462	547	704	810	879	1,017	1,234
Advances Received	471	555	656	845	972	1,054	1,220	1,480
Other Current Liab.	393	462	547	704	810	879	1,017	1,234
Provisions	236	277	328	423	486	527	610	740
Inter-Unit Accounts	628	739	875	1,127	1,296	1,406	1,626	1,974
Total Current Liabilities	2,121	2,496	2,954	3,803	4,375	4,744	5,489	6,662
Working Capital	4,249	4,624	5,082	5,931	6,503	6,872	7,617	8,790
Fixed Asset (Net)	2,398	3,598	4,359	4,288	4,472	4,455	8,304	12,186
Deferred Expenditures	6	464	965	765	818	828	788	804
Deposit	0	0	0	0	263	1,407	1,657	3,424
Total Capital Employed	6,652	8,686	10,406	10,984	12,055	13,562	18,367	25,204
Sources								
H.O. Account	4,394	4,394	4,394	4,394	4,394	4,131	2,834	2,834
Profit	-1,108	-1,069	-1,048	108	1,304	2,804	4,775	7,448
Sub./Cap. Res.	61	61	61	61	61	61	61	61
Def./Buyers Cr.								
Cash Credit	1,603	1,647	1,600	734	-0	-0	-0	-0
Term Loan (Foreign)	383	1,563	2,815	2,918	3,252	3,403	6,470	7,527
Term Loan (Domestic)	687	1,458	1,951	2,138	2,413	2,532	3,595	6,704
Others-Pkg. Cr.	589	589	589	589	589	589	589	589
Veh. Loan Adv.	43	43	43	43	43	43	43	43
Total	6,652	8,686	10,406	10,985	12,056	13,563	18,367	25,205

prices, respectively, when the strategic investment project and the total investment plan are implemented.

A summary of projected financial data is shown in Table III-1-9 and key financial ratios are as shown in Table III-1-10. Two cases, that the total investment plan would be implemented and that only the strategic investment project would be implemented, have been compared. The difference between the two cases would naturally emerge after 1998/99, when the Step 3 investment is to be started.

As a result of the strategic investment project, the operating profits (profits before interest and tax) would increase approximately 6 times from 1992/93 to 1999/2000. MTB, however, would continue to be very low until 1994/95 on an after-interest basis. The necessity to finance the existing borrowings is a considerable burden to the finances of MTB for several years after the start of the project.

The strategic investment project would significantly improve the profitability of operation at MTB. The ratio of operating profits to sales would be improved from 8% in 1992/93 to 17% in 1999/2000. Operating profits as a percentage of total assets would also rise from 5% in 1992/93 to 14% in 1999/2000.

The current ratio stays stable until 1995/96 and then turns to a increasing trend. It decreases from 2.53 in 1992/93 to 3.01 in 1996/97 and increases to 3.59 in 1999/2000.

The strategic investment project would bring about a tight debt burden to the unit during early operations. The debt service coverage ratio would be over 2.0 after 1995/96 for only long-term loans.

Table III-1-9 Summary of Projected Financial Data of MTB
(at Current Price Basis)

Unit: Rs. Lakh

Total Investment Plan (Step 1 to Step 3)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Sales Revenue	7,875	9,263	10,960	14,104	16,223	17,592	20,351	24,695
Profit Before Interest and Tax	625	971	1,128	2,313	2,307	2,541	3,134	4,275
Profit Before Tax	-25	-38	22	1,156	1,196	1,499	1,972	2,672
Total Assets	12,004	14,621	17,054	18,953	20,914	22,995	28,959	37,621

Strategic Investment Project (Step 1 to Step 2)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Sales Revenue	7,875	9,263	10,960	14,104	16,223	17,592	19,101	22,040
Profit Before Interest and Tax	625	971	1,128	2,313	2,307	2,541	2,770	3,852
Profit Before Tax	-25	38	22	1,156	1,196	1,499	1,971	3,359
Total Assets	12,004	14,621	17,054	18,953	20,914	22,995	23,738	27,642

Table III-1-10 Key Financial Ratios of MTB
(At Current Price Basis)

Total Investment Plan (Step 1 to Step 3)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Operating Profit/ Sales	7.9%	10.5%	10.3%	16.4%	14.2%	14.4%	15.4%	17.3%
Operating Profit/ Total Assets Ratio	5.2%	6.6%	6.6%	12.2%	11.0%	11.1%	10.8%	11.4%
Current Ratio	2.53	2.58	2.55	2.57	3.01	3.49	3.57	3.43
Debt Service Coverage Ratio (Long-term Loan)	2.98	1.85	1.83	3.00	2.35	2.26	2.31	2.19
Debt Service Coverage Ratio (Total Borrowing)	0.37	0.50	0.59	1.04	1.38	1.80	1.32	2.19

Strategic Investment Project (Step 1 to Step 2)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Operating Profit/ Sales	7.9%	10.5%	10.3%	16.4%	14.2%	14.4%	14.5%	17.5%
Operating Profit/ Total Assets Ratio	5.2%	6.6%	6.6%	12.2%	11.0%	11.1%	11.7%	13.9%
Current Ratio	2.53	2.58	2.55	2.57	3.01	3.49	3.64	3.59
Debt Service Coverage Ratio (Long-term Loan)	2.98	1.85	1.83	3.00	2.35	2.26	2.63	3.30
Debt Service Coverage Ratio (Total Borrowing)	0.37	0.50	0.59	1.04	1.38	1.80	1.36	3.30

2. Financial Internal Rates of Return

The incremental pre-tax financial internal rates of return (FIRR), which result from accounting for the incremental investment, sales and operating costs on a constant price basis, have been calculated for the strategic investment project. Cost and benefit streams are presented in Table III-1-11. The FIRR of the project is 25.11%.

A sensitivity analysis has been undertaken to evaluate the effects of changes in basic assumptions. Results of the sensitivity analysis are shown in Table III-1-12.

Table III-1-12 Sensitivity Test on FIRR for the Strategic Investment Project

At 1992/93 Constant Prices

	I R R
1. Base Case	25.1%
2. Sales Prices	
Up 5%	28.1%
Down 5%	21.3%
3. Production Costs	
Up 5%	22.5%
Down 5%	27.7%
4. Capital Costs	
Up 10%	23.0%
Down 10%	27.6%

The FIRR of the project, 25.11%, is considered a favorable rate as an industrial project from the viewpoint of the world standard.

The interest rates in nominal terms in India are currently around 20%. When the prevailing inflation rate is considered, the FIRR at constant prices is far above the cut-off rate in real terms. It may be said to be attractive.

For reference, the FIRR on a current price basis is 29.4% for the base case.

Table Ⅲ-1-11 Cash Flow Table of MTB
-Strategic Investment Project (At Constant Prices)

Unit: Rs. Lakh

FIRR	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Project Capital Cost	1,054	2,088	1,884	878	1,027	710	77	302	0	0	0	0	0	0	0
Plant Capital Cost	1,054	1,883	1,630	344	779	639	0	0	0	0	0	0	0	0	0
Working Capital Increase	0	183	254	534	248	71	77	302	0	0	0	0	0	0	0
Production Cost (Increase from Project)	0	344	1,046	1,977	3,019	3,187	3,369	4,128	4,128	4,128	4,128	4,128	4,128	4,128	4,128
Without Project	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030
With Project	7,030	7,374	8,075	9,007	10,048	10,197	10,399	11,158	11,158	11,158	11,158	11,158	11,158	11,158	11,158
Sales Revenue (Increase from Project)	0	880	1,621	3,800	4,519	4,781	5,085	6,185	6,185	6,185	6,185	6,185	6,185	6,185	6,185
Without Project	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875
With Project	7,875	8,555	9,496	11,475	12,394	12,656	12,940	14,060	14,060	14,060	14,060	14,060	14,060	14,060	14,060
Net Benefit	-1,054	-1,731	-1,309	745	474	904	1,619	1,758	2,058	2,058	2,058	2,058	2,058	2,058	2,058

FIRR= 25.11%

2007/08	2008/09	2009/10	2010/11	2011/12
0	0	0	0	-1,697
0	0	0	0	0
0	0	0	0	-1,697
4,128	4,128	4,128	4,128	4,128
7,030	7,030	7,030	7,030	7,030
11,158	11,158	11,158	11,158	11,158
6,185	6,185	6,185	6,185	6,185
7,875	7,875	7,875	7,875	7,875
14,060	14,060	14,060	14,060	14,060
2,058	2,058	2,058	2,058	3,755

Salvage Value	
Building	0
Machinery & Equ	27
Working Capital	1,870
Total	1,897

Unit: Rs. Lakh

EIRR	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Project Capital Cost	754	1,572	1,479	737	846	568	69	271	0	0	0	0	0	0	0
Plant Capital Cost	754	1,407	1,251	258	624	525	0	0	0						
Working Capital Increase	0	164	228	479	222	63	69	271	0	0	0	0	0	0	0
Production Cost (Increase from Project)	0	184	803	1,160	1,880	1,977	2,213	2,786	2,786	2,786	2,786	2,786	2,786	2,786	2,786
Without Project	5,598	5,598	5,598	5,598	5,598	5,598	5,598	5,598	5,598	5,598	5,598	5,598	5,598	5,598	5,598
With Project	5,598	5,782	6,201	6,779	7,478	7,575	7,811	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384
Sales Revenue (Increase from Project)	0	612	1,459	3,240	4,087	4,303	4,559	5,586	5,586	5,586	5,586	5,586	5,586	5,586	5,586
Without Project	7,060	7,060	7,060	7,060	7,060	7,060	7,060	7,060	7,060	7,060	7,060	7,060	7,060	7,060	7,060
With Project	7,060	7,671	8,518	10,300	11,127	11,362	11,618	12,626	12,626	12,626	12,626	12,626	12,626	12,626	12,626
Net Benefit	-754	-1,144	-823	1,323	1,341	1,738	2,277	2,530	2,801	2,801	2,801	2,801	2,801	2,801	2,801

IRR= 45.90%

2007/08	2008/09	2009/10	2010/11	2011/12
0	0	0	0	-1,826
0	0	0	0	-1,826
2,786	2,786	2,786	2,786	2,786
5,598	5,598	5,598	5,598	5,598
8,384	8,384	8,384	8,384	8,384
5,586	5,586	5,586	5,586	5,586
7,060	7,060	7,060	7,060	7,060
12,626	12,626	12,626	12,626	26
2,801	2,801	2,801	2,801	27

Salvage Value	
Building	0
Machinery & Equipment	27
Working Capital	1,799
Total	1,826

B. Economic Analysis and Economic Internal Rate of Return

Incremental economic cost and benefit streams for the strategic investment project shown in Table III-1-11.

The economic internal rate of return (EIRR) for the strategic investment project is 45.9%. This is significantly higher than the FIRR. This is largely because high import tariffs are levied on materials as well as on capital goods.

The sensitivity of the base-case EIRR to changes in base-case assumptions have been tested. The results of the sensitivity analysis are shown in Tale III-1-13. The EIRR ranges from 42% to 50%.

Table III-1-13 Sensitivity Test on EIRR

At 1992/93 Constant Prices

	I R R
1. Base Case	45.8%
2. Sales Prices	
Up 5%	49.9%
Down 5%	41.5%
3. Production Costs	
Up 5%	43.6%
Down 5%	47.9%
4. Capital Costs	
Up 10%	42.1%
Down 10%	50.2%

C. Assessment of Technological Viability

The level of technologies both in product development and production which MTB presently possesses are rather outdated although their technologies concerning general purpose machines have reached the competitive level.

Two major problems which confront MTB in the area of technology are (1) the acquisition of product design technologies which enable the restructuring of the product-mix; and (2) the modernization of production technology.

As seen in the Action Program, CNC technology has brought innovation in machine tools throughout the world. The concept and function of machine tools today is quite different from those of general purpose machines. The market has been shifting to CNC machines from conventional machines.

For MTB, it is an urgent task to upgrade the product design technology in CNC machines and place updated machines on the market. This is considered essential for MTB's survival in the machine tool business.

At the same time, the upgrading of production systems, including the modernization of production facilities, is critical for the realization of competitiveness in the market.

Under this context, the investment plan has been proposed for MTB as a part of the Restructuring Plan of HMT.

In the Action Program the necessity of technical collaboration has been stressed and the necessary technologies have been identified. For these technologies, MTB's existing technology absorption capability can be said to be sufficient for technological collaboration when their experience in technical collaboration and the technological level of existing products are considered.

The product-mix would gradually shift to new products during the 1990s. The CNC ratio would gradually be lifted to the current level of advancing countries by 2000 by replacing outdated GPMs with proposed CNC machines.

For the production facility modernization, a phasing approach, starting from the reshuffle of plant layout and replacement of machinery and advancing to the higher production technology FMC, is proposed. It would allow engineers and operators of MTB sufficient time to adapt to the new production technology. The present technological level of production at other HMT machine tool factories exhibits the opportunity of MTB to acquire the proposed production technology.

D. Impact of the Project on Other Aspects

1. Impact on Foreign Exchange

Net foreign exchange savings have been calculated on a constant price basis and the results are shown in Table III-1-14. For import savings, the effects of the high-technology CNC machines and FMC to be newly developed through the strategic investment project are considered.

The net foreign exchange inflow is US$35.91 million at constant 1992/93 prices over the life of the project.

The increase in material imports due to the production of high-technology machines would continue to have a re verse effect on foreign exchange flow. The increasing use of domestic parts and components should be a major goal.

2. Impact on Employment

The flow of the number of workers is shown in Table II-1-11.

The number of workers to be recruited is far less than the number of retiring workers. In total, the number of workers employed will decrease from 2,807 in 1992/93 to 2,090 in 1999/2000. A total of 786 jobs will be created against the retirement of 1,586 workers during the period from 1992/93 to 1999/2000.

It can be said that the strategic investment project would increase employment compared with the case of the project not being implemented. In that case, recruit-ment would be kept at a minimum level to maintain the present production although a large number of workers would leave at retirement age. Productivity would decline due to the aging of equipment in the "without" case.

In addition, the increase in domestic procurement due to the production expansion will have an effect on the employment creation among domestic suppliers.

Table Ⅲ-1-14 Foreign Exchange Flow of MTB
-Strategic Investment Project (At Constant Prices 1992/93)

Unit: Millions of US$ at constant 1992/93 price

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Foreign Exchange Inflows																				
Production Benefits																				
-Increase in Exports	2.28	4.02	4.60	4.88	3.15	4.11	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
-Import Savings	0.00	0.00	0.00	1.23	4.31	4.85	5.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71
Sub-Total	2.28	4.02	4.60	6.11	7.46	8.96	9.87	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88
Project Financing																				
-Foreign Currency Loan	1.48	4.45	4.49	0.48	1.64	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflows	3.76	8.47	9.10	6.58	9.10	10.40	9.87	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88
Foreign Exchange Outflow																				
Production Costs																				
-Imported Materials	3.24	3.75	4.80	5.97	7.31	7.52	7.03	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52
Debt Service																				
-Loan Repayment	0.00	0.00	0.00	0.16	0.66	1.16	1.21	1.39	1.55	1.55	1.55	1.55	1.39	0.89	0.39	0.34	0.16	0.00	0.00	0.00
-Interest	0.18	0.93	2.04	2.84	2.81	2.96	2.85	2.52	2.15	1.77	1.38	0.99	0.62	0.34	0.17	0.08	0.02	0.00	0.00	0.00
Sub-Total	0.18	0.93	2.04	2.81	3.46	4.12	4.06	3.92	3.71	3.32	2.93	2.54	2.01	1.23	0.57	0.42	0.18	0.00	0.00	0.00
Total Outflows	3.42	4.68	6.85	8.78	10.77	11.64	11.08	11.44	11.23	10.84	10.45	10.06	9.53	8.75	8.09	7.95	7.70	7.52	7.52	7.52
Net Foreign Exchange Flow	0.33	3.79	2.25	-2.20	-1.68	-1.24	-1.22	0.45	0.85	1.04	1.43	1.82	2.35	3.13	3.79	3.94	4.18	4.36	4.38	4.36
			Net Foreign Exchange Flow=			35.91		-60.49	NPV(20%)	0.12										

Table Ⅲ-1-15 Foreign Exchange Flow of MTB
-Strategic Investment Project
(At Current Prices)

Unit: Millions of US$ at constant 1992/93 price

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Foreign Exchange Inflows																				
Production Benefits																				
-Increase in Exports	2.28	4.35	5.31	6.00	4.12	5.71	8.16	8.54	8.94	7.37	7.83	8.32	8.83	9.38	9.96	10.58	11.23	11.93	12.67	13.46
-Import Savings	0.00	0.00	0.00	1.31	4.59	5.16	6.06	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19
Sub-Total	2.28	4.35	5.31	7.31	8.71	10.87	12.22	14.73	15.14	15.57	16.02	16.51	17.03	17.57	18.15	18.77	19.43	20.12	20.86	21.65
Project Financing																				
-Foreign Currency Loan	1.48	4.58	4.84	0.56	1.96	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflows	3.76	8.92	10.15	7.87	10.68	12.68	12.22	14.73	15.14	15.57	16.02	16.51	17.03	17.57	18.15	18.77	19.43	20.12	20.86	21.65
Foreign Exchange Outflow																				
Production Costs																				
-Imported Materials	3.24	3.75	4.80	5.97	7.31	7.52	7.03	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52	7.52
Debt Service																				
-Loan Repayment	0.00	0.00	0.00	0.16	0.67	1.21	1.27	1.49	1.69	1.69	1.69	1.69	1.52	1.02	0.48	0.42	0.20	0.00	0.00	0.00
-Interest	0.17	0.84	1.43	1.74	1.95	2.11	1.92	1.73	1.48	1.22	0.96	0.70	0.45	0.25	0.13	0.06	0.02	0.00	0.00	0.00
Sub-Total	0.17	0.84	1.43	1.90	2.62	3.31	3.20	3.22	3.18	2.91	2.65	2.39	1.97	1.27	0.61	0.48	0.21	0.00	0.00	0.00
Total Outflows	3.41	4.59	6.23	7.87	9.93	10.83	10.23	10.75	10.70	10.43	10.17	9.91	9.49	8.79	8.14	8.00	7.74	7.52	7.52	7.52
Net Foreign Exchange Flow	0.35	4.33	3.92	-0.01	0.75	1.83	1.99	3.99	4.44	5.13	5.85	6.60	7.53	8.78	10.02	10.77	11.69	12.60	13.34	14.13
		Net Foreign Exchange Flow=			128.02															

3. Impact on Production

With the strategic investment project, the production of MTB will increase 1.79 times in real terms from 1992/93 to 1999/2000 on an amount basis.

The present productivity level is quite low compared to that of advanced countries. The productivity per worker (added value per worker) will increase from Rs. 1.47 lakh in 1992/93 to Rs. 4.93 lakh in nominal terms or to Rs. 3.15 lakh in real terms in 1999/2000.

To achieve international competitiveness, the improvement in productivity is essential, which will result in the reduction in employment.

The productivity improvement to be achieved as a result of the project is moderate compared to the standard in advanced countries. This level, at least, should be achieved.

In addition, the project would have the following effects.

The capital investments include the procurement of machines within the company. This portion will create additional demand for other units. When MTB starts the sales of FMC and FMS, such module machines as machining centers and turning centers will be procured from other HMT units as the need arises.

The expansion of production will increase the procurement of domestic parts and components. The demand for domestic suppliers will increase from Rs. 2,303 lakh in 1992/93 to Rs. 6,490 lakh in 1999/2000 in nominal terms. This would have a far-reaching influence on the relevant industries.

4. Impact on the Environment

The existing MTB factories are located in HMT's industrial site. There exist no environmental problems regarding the production of machine tools. This project

would not change the nature of machine tool production from the environmental point of view.

Working conditions relative to safety and hygiene would be improved with the modernized production system.

E. Conclusions and Recommendations

The FIRR of 25.1% at constant prices is favorably high compared with other investment candidates in the Action Plan. However, the following problems are pointed out concerning the implementation of the project.

(1) The present financial position and profit structure of MTB is rather weak in terms of bearing the large investment proposed as the Strategic Investment Project.

(2) Technical collaboration is of importance in this project. It would decide the achievement of the Action Program. Because there exists a large gap between the technology level of MTB and that of the top manufacturers in the world, it may be quite difficult for MTB to catch up by themselves.

(3) The production system to be introduced through the project is innovative for MTB workers. The work culture at MTB should be changed to meet this highly productive system.

At the same time the following are pointed out as the positive aspects of the project.

(1) From the strategic point of view, it is considered that this investment is of significant importance. The commercialization of high performance CNC machines and production systems, FMC and FMS, which are essential products in the future market, would be possible through the implementation of the project.

The result of the project would be diffused to other HMT factories and the competitiveness of HMT's machine tool

business as a whole would also be strengthened.

(2) Under the liberalizing trend of the economy in India, it is considered of high importance to foster the competitiveness of the key industries such as the machine tool industry. As the EIRR shows, high economic benefits are expected from this project. It is considered that the current import tariff structure distorts the financial viability of the project.

(3) Without this project, MTB, holding outdated technologies and superannuated facilities, would be on the decline in the competitive market. Except for some general purpose machines, MTB would have no product to sell in the market in the 21th century. In that case, job opportunities would be lost to a large extent.

In conclusion, the following are pointed out.

The necessity of this project is considered to be high. It would provide HMT with the foundation necessary to survive in the business.

It is recommended to examine the measures necessary to increase the project viability and implement this project. The following measures are considered possible to improve the viability.

(1) To reduce the capital cost for the project.

The appropriate capital-mix should be examined to reinforce the stability of HMT's financial position and reduce the average capital cost.

Equity participation by the Government will reduce the average capital cost and reduce the financial burden to HMT.

(2) The introduction of programs to support the implementation of the project

For the creation of a work culture which would accelerate the progress of the Action Program, it is recommended to introduce the Productivity Improvement Program

into the workplace. The proposed Mechatronics Center would support HMT's efforts to catch up with the fore-front technologies in machine tools.

III-2. Press Factory

A. Financial Evaluation

1. Financial Projections

Based on the estimate of revenues and costs, which are discussed in Chapter II-2, an income and cost forecast was calculated for the strategic investment project (Phase 1 of the whole investment program). This forecast covers two cases; one is a base case which is based on constant prices of 1992/93 and the other is an escalation case which is based on escalated prices. Tables III-2-1 and III-2-2 give the basic case and the escalation case, respectively. One of the whole investment program including the future expansion investments (Phases 1 & 2) is shown in Table III-2-3 for comparison.

The flow of funds of the strategic investment based on the escalation case is projected in Table III-2-4.

Summary of the financial projections of the strategic investment is given in Table III-2-5. Key financial ratios are shown in Table III-2-6.

Table III-2-5 Summary of Financial Projections
(100 thousand Rupees at current prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Sales Revenue	2,376	3,161	3,746	4,616	5,982	7,605	8,074	8,578
Profit before Int.& Tax	326	690	658	702	1,127	1,725	1,883	2,096
Profit before Tax	337	652	488	255	548	1,288	1,734	2,301

Table III-2-6 Key Financial Ratios

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Operating Profit /Sales	15.2%	23.3%	19.1%	16.7%	20.3%	24.2%	24.8%	25.9%
Debt Service Coverage Ratio (L-T Loan)	12.8	11.2	5.1	2.5	2.4	2.7	2.4	2.7
Debt Service Coverage Ratio (Total Borrowg)	-1.2	-7.0	-28.6	2.5	2.6	22.9	-2.3	-0.8

As a result of the strategic investment, the sales revenue would increase approximately 3.6 times between 1992/93 and 1999/2000 as given in Table III-2-5.

As shown in Table III-2-6, debt service coverage ratios on total borrowing would go down sharply along with the decline of the profit, but they would remain above 2.0 through 1999/2000. The negative numbers of total borrowing debt service coverage ratios in Table III-2-6 such as those between 1992/93 and 1994/95 mean that the interest inflows which are generated by a short term deposit exceed the interest outflows of long-term debt service.

Table III-2-1 Projected Income Statements (Strategic Investment)
(100 thousand Rupees at constant prices)

HMT-PRH PROJECT
HISTORICAL AND PROJECTED INCOME STATEMENTS
(100 thousand rupee at current prices through 1991 and constant 1992 prices thereafter)

	(actual) 90/91	(prelim) 91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
OPERATING REVENUES										
Net Sales	1,751	1,015	2,378	2,913	3,244	3,754	4,583	5,468	5,468	5,468
RAW MATERIALS	695	247	1,313	1,443	1,613	1,862	2,292	2,771	2,771	2,771
Value Added	1,056	768	1,063	1,475	1,631	1,892	2,276	2,697	2,697	2,697
OPERATING COSTS										
Wages & Salaries	326	340	389	386	402	420	429	437	437	437
Depreciation	21	25	45	83	288	444	444	399	378	311
Other Mfg. Costs	107	72	108	119	133	154	189	228	228	228
R&D	0	0	0	25	30	70	85	100	100	100
Technical Fee	0	0	0	0	0	0	0	0	0	0
Other Expenses	163	165	179	184	195	217	264	282	282	282
Total Ope. Costs	617	602	701	797	1,028	1,305	1,411	1,447	1,424	1,359
Operating Income	439	166	362	679	803	587	865	1,251	1,274	1,339
NON-OPERATING COSTS										
Interest Charges	40	-4	-2	24	108	278	340	259	134	-21
Other Exp(+)/Inc(-)	37	15	39	48	53	61	74	89	89	89
Total Non-Ope. Costs	77	11	37	71	158	340	414	348	223	68
Profit before Tax	362	155	325	607	444	248	451	903	1,051	1,271

Table III-2-2 Projected Income Statements (Strategic Investment)
(100 thousand Rupees at current prices)

HMT-PRH PROJECT
HISTORICAL AND PROJECTED INCOME STATEMENTS
(100 thousand rupee at current prices)

	(actual) 90/91	(prelim) 91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
OPERATING REVENUES										
Net Sales	1,751	1,015	2,376	3,161	3,746	4,616	5,382	7,805	8,074	8,578
RAW MATERIALS	695	247	1,313	1,563	1,863	2,290	3,001	3,854	4,091	4,347
Value Added	1,058	768	1,063	1,598	1,884	2,326	2,981	3,752	3,983	4,231
OPERATING COSTS										
Wages & Salaries	326	340	369	418	484	516	561	608	645	685
Depreciation	21	25	45	85	289	491	491	446	422	352
Other Mfg. Costs	107	72	108	128	153	186	246	316	335	356
R&D	0	0	0	29	38	93	121	151	160	170
Technical Fee	0	0	0	0	0	0	0	0	0	0
Other Expenses	163	165	179	200	226	267	345	392	417	443
Total Ope. Costs	617	602	701	860	1,169	1,555	1,764	1,913	1,979	2,007
Operating Income	439	166	362	738	714	771	1,217	1,839	2,004	2,224
NON-OPERATING COSTS										
Interest Charges	40	-9	-10	38	170	447	579	437	148	-206
Other Exp(+)/Inc(-)	37	15	36	47	56	69	90	114	121	129
Total Non-Ope. Costs	77	7	25	86	226	516	668	551	270	-77
Profit before Tax	362	159	337	652	488	255	548	1,288	1,734	2,301

Table III-2-3 Projected Income Statements (Phases 1 & 2)
(100 thousand Rupees at current prices)

HMT-PRH PROJECT
HISTORICAL AND PROJECTED INCOME STATEMENTS
(100 thousand rupee at current prices)

	(actual) 90/91	(prelim) 91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
OPERATING REVENUES										
Net Sales	1,751	1,015	2,376	3,161	3,746	4,816	5,982	7,605	9,067	11,083
RAW MATERIALS	695	247	1,313	1,563	1,863	2,290	3,001	3,854	4,622	5,386
Value Added	1,056	768	1,063	1,598	1,884	2,326	2,981	3,752	4,445	5,697
OPERATING COSTS										
Wages & Salaries	326	340	369	418	464	516	581	608	658	712
Depreciation	21	25	45	85	289	491	751	1,038	1,166	1,187
Other Mfg. Costs	107	72	108	128	153	188	246	316	379	440
R&D	0	0	0	29	38	93	121	151	160	170
Technical Fee	0	0	0	0	0	0	0	0	0	0
Other Expenses	183	165	179	200	226	267	345	392	468	571
Total Ope. Costs	817	602	701	860	1,169	1,555	2,025	2,505	2,831	3,060
Operating Income	439	166	362	738	714	771	956	1,247	1,814	2,637
NON-OPERATING COSTS										
Interest Charges	40	-9	-10	38	170	447	734	1,213	1,562	1,574
Other Exp(+)/Inc(-)	37	15	36	47	56	69	90	114	136	166
Total Non-Ope. Costs	77	7	25	86	226	516	823	1,327	1,698	1,740
Profit before Tax	362	159	337	652	488	255	133	-80	-84	897

Table III-2-4 Projected Funds Flow Statements (Strategic Investment)
(100 thousand Rupees at current prices)

HMT-PRH PROJECT
HISTORICAL AND PROJECTED FUNDS FLOW STATEMENTS
(100 thousand rupee at current prices)

	(prelim) 91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
SOURCES									
Operations									
Retained Income	159	337	652	488	255	548	1,288	1,734	2,301
add: Depreciation	25	45	85	289	491	491	446	422	352
Foreign LT Interest	0	29	89	183	391	559	641	485	411
Domest. LT Interest	0	0	0	24	55	83	60	54	47
ST Interest	-9	-40	-31	-16	0	-44	-164	-370	-884
Cash Generated by Operations	175	372	775	947	1,193	1,818	2,171	2,304	2,448
Long-Term Borrowing									
Foreign Currency Borrowing	0	256	108	1,198	1,900	0	0	0	0
Domestic Loans	0	0	0	336	115	0	0	0	0
Total Long-Term Borrowing	0	256	108	1,534	2,016	0	0	0	0
Short-Term Loans	-298	-149	-204	0	0	-553	-1,572	-3,223	-5,388
Other Sources	0	0	0	0	0	0	0	0	0
Total Sources	-123	479	679	2,481	3,208	1,065	599	-919	-2,920
APPLICATIONS									
Fixed Capital Investments	36	226	502	2,326	2,450	0	0	0	0
Increase in Working Capital	-350	562	287	188	282	445	505	70	74
Foreign LT Debt Service									
Interest	0	29	89	183	391	559	641	485	411
Repayments	0	0	0	0	28	41	174	385	385
Total Foreign LT Debt Service	0	29	89	183	420	599	715	850	796
Domest. LT Debt Service									
Interest	0	0	0	24	55	83	60	54	47
Repayments	0	0	0	0	0	0	37	50	50
Total Domest LT Debt Service	0	0	0	24	55	83	97	104	97
Short-Term Debt Service									
Interest	-9	-40	-31	-16	0	-44	-164	-370	-884
Repayments	200	-298	-149	-204	0	0	-553	-1,572	-3,223
Total Short-Term Debt Service	191	-338	-180	-220	0	-44	-717	-1,942	-3,887
Total Applications	-123	479	679	2,481	3,208	1,065	599	-919	-2,920

B. Financial Internal Rate of Return

1. Method and the Result of FIRR

In order to appraise the profitability of the project, both the financial internal rate of return method and the economic internal rate of return method are used. The net cash flow of the strategic project ("with" project case) is compared with that of the non-project case ("without" project case). For calculation purposes, the period of the project is assumed to be 15 years after the last capital investment is made in 1995/96, and at the end of the project, invested fixed assets are assumed to be resold at the book values. Working capital, also, is assumed to be completely paid back.

Net cash flows of the strategic project and the resulting financial internal rate of return are shown in Table III-2-7. As shown in the table, the financial internal rate of return for the project is considered to be 10.16 percent.

Table III-2-8 provides the financial internal rate of return of the whole investment program (Phases 1 & 2). The rate, which is 13.29 percent, is much higher than that of the strategic investment. It is recommended that financial and economic feasibility analysis shall be conducted for the Phase 2 investment program when the strategic investment program is completed.

Table III-2-7 Cash Flow Analysis - FIRR (Strategic Investment)
(100 thousand Rupees)

HMT-PRH PROJECT

CASHFLOW ANALYSIS - FIRR

(100 thousand rupee)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11
Project Capital Costs																					
Plant Capital Costs	0	0	226	469	2,067	2,078	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-172
Change in Working Capital	0	0	0	0	129	191	290	301	-31	-30	0	0	0	0	0	0	0	0	0	0	-850
Sub Total	0	0	226	469	2,196	2,269	290	301	-31	-30	0	0	0	0	0	0	0	0	0	0	-1,022
Total Costs w/o Interest & Depr.																					
Without Project	1,328	861	2,065	2,270	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271
With Project	1,328	861	2,065	2,270	2,502	2,875	3,452	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062	4,062
Increase in Total Costs	0	0	0	0	231	605	1,182	1,791	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792
Sales Revenue Increase																					
Without Project	1,751	1,015	2,376	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919
With Project	1,751	1,015	2,376	2,919	3,244	3,754	4,568	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468
Increase in Sales Revenue	0	0	0	0	326	835	1,649	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550
Net Benefit	0	0	-226	-469	-2,102	-2,038	177	458	789	788	758	758	758	758	758	758	758	758	758	758	1,780

FIRR: 10.16%

Table III-2-8 Cash Flow Analysis - FIRR (Phases 1 & 2)
(100 thousand Rupees)

HMT-PRH PROJECT

CASHFLOW ANALYSIS - FIRR

(100 thousand rupee)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14
Project Capital Costs																								
Plant Capital Costs	0	0	228	489	2,087	2,076	1,456	3,884	1,099	443	0	0	0	0	0	0	0	0	0	0	0	0	0	-253
Change in Working Capital	0	0	0	0	129	191	290	301	201	266	203	271	0	0	0	0	0	0	0	0	0	0	0	-1,852
Sub Total	0	0	228	489	2,196	2,269	1,746	4,185	1,300	709	203	271	0	0	0	0	0	0	0	0	0	0	0	-2,105
Total Costs w/o Interest & Depr.																								
Without Project	1,328	861	2,085	2,270	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271	2,271
With Project	1,328	861	2,085	2,270	2,502	2,875	3,452	4,082	4,317	4,853	5,059	5,489	5,489	5,489	5,489	5,489	5,489	5,489	5,489	5,489	5,489	5,489	5,489	5,489
Increase in Total Costs	0	0	0	0	231	604	1,181	1,791	2,046	2,382	2,788	3,218	3,218	3,218	3,218	3,218	3,218	3,218	3,218	3,218	3,218	3,218	3,218	3,218
Sales Revenue Increase																								
Without Project	1,751	1,015	2,376	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919
With Project	1,751	1,015	2,376	2,919	3,244	3,754	4,568	5,468	6,141	7,053	7,860	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474
Increase in Sales Revenue	0	0	0	0	326	835	1,648	2,550	3,222	4,134	4,741	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555
Net Benefit	0	0	-228	-489	-2,101	-2,037	-1,278	-3,426	-124	1,042	1,751	2,086	2,337	2,337	2,337	2,337	2,337	2,337	2,337	2,337	2,337	2,337	2,337	4,442

FIRR: 13.29%

2. Sensitivity Analysis

The financial internal rate of return of the strategic project will depend upon such factors as quantity of sales, sales prices, input costs, investment amounts, and the like. Recognizing these causal relationships, financial internal rates of return of the project under alternative conditions are calculated. The result of the calculation is as follows:

Table III-2-9 Sensitivity Analysis of FIRRs
(Strategic Investment)

Factors	Conditions	FIRR
Base Case		10.16%
Sales Prices	increase by 5%	12.52%
Sales Prices	decrease by 5%	7.62%
Investments	increase by 10%	8.91%
Investments	decrease by 10%	11.59%
Input Costs	increase by 5%	8.34%
Input Costs	decrease by 5%	11.90%

For the whole investment program (Phases 1 & 2), Table III-2-10 shows the result of the sensitivity analysis.

Table III-2-10 Sensitivity Analysis of FIRRs
(Phase 1 & 2)

Factors	Conditions	FIRR
Base Case		13.29%
Sales Prices	increase by 5%	15.21%
Sales Prices	decrease by 5%	11.28%
Investments	increase by 10%	11.98%
Investments	decrease by 10%	14.79%
Input Costs	increase by 5%	12.09%
Input Costs	decrease by 5%	14.46%

C. Economic Internal Rate of Return

1. Method and the Result of EIRR

In order to appraise how much the strategic project would contribute to the Indian economy on the whole, an economic feasibility analysis using the economic internal rate of return method is done.

Financial cash flow is converted to economic cash flow as per the assumptions discussed before.

Net cash flow of the strategic project and the resulting economic internal rate of return are shown in Table III-2-11. The economic internal rate return for the project turned out to be 24.96 percent.

Table III-2-12 gives the cash flow analysis of the whole investment program (Phases 1 & 2), where the economic internal rate of return rate reached 23.99 percent.

2. Sensitivity Analysis

Economic internal rates of return of the strategic project under alternative conditions are calculated. The result of the calculation is as follows:

Table III-2-13 Sensitive Analysis of EIRRs
(Strategic Investment)

Factors	Conditions	EIRR
Base Case		24.96%
Sales Prices	increase by 5%	27.07%
Sales Prices	decrease by 5%	22.78%
Investments	increase by 10%	22.97%
Investments	decrease by 10%	27.29%
Input Costs	increase by 5%	23.88%
Input Costs	decrease by 5%	26.03%

The result of the sensitivity analysis of the whole investment program (Phases 1 & 2) is as follows:

Table III-2-14 Sensitive Analysis of EIRRs
(Phases 1 & 2)

Factors	Conditions	EIRR
Base Case		23.99%
Sales Prices	increase by 5%	26.11%
Sales Prices	decrease by 5%	21.81%
Investments	increase by 10%	21.97%
Investments	decrease by 10%	26.33%
Input Costs	increase by 5%	23.25%
Input Costs	decrease by 5%	24.73%

The economic internal rate of returns of both the Strategic investment and the whole investment are very close each other.

Table III-2-11 Cash Flow Analysis - EIRR (Strategic Investment)
(100 thousand Rupees)

HMT-PRH PROJECT

CASHFLOW ANALYSIS - EIRR

(100 thousand rupee)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11
Project Capital Costs																					
Plant Capital Costs	0	0	228	469	1,747	1,521	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-710
Change in Working Capital	0	0	0	0	119	176	287	277	-28	-27	0	0	0	0	0	0	0	0	0	0	-783
Sub Total	0	0	228	469	1,866	1,697	287	277	-28	-27	0	0	0	0	0	0	0	0	0	0	-1,493
Total Costs w/o Interest & Depr.																					
Without Project	985	644	1,407	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547
With Project	985	644	1,407	1,547	1,700	1,953	2,334	2,732	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,733
Increase in Total Costs	0	0	0	0	154	406	787	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186
Sales Revenue Increase																					
Without Project	1,751	1,015	2,376	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919
With Project	1,751	1,015	2,376	2,919	3,244	3,754	4,568	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468	5,468
Increase in Sales Revenue	0	0	0	0	326	835	1,649	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550
Net Benefit	0	0	-228	-469	-1,894	-1,268	595	1,087	1,392	1,391	1,384	1,384	1,384	1,384	1,384	1,384	1,384	1,384	1,384	1,384	2,857

EIRR: 24.96%

Table III-2-12 Cash Flow Analysis - EIRR (Phases 1 & 2)
(100 thousand Rupees)

HMT-PRH PROJECT

CASHFLOW ANALYSIS - EIRR

(100 thousand rupee)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14
Project Capital Costs																								
Plant Capital Costs	0	0	226	469	1,747	1,521	1,288	2,526	923	443	0	0	0	0	0	0	0	0	0	0	0	0	0	-253
Change in Working Capital	0	0	0	0	119	176	287	277	185	245	187	250	0	0	0	0	0	0	0	0	0	0	0	-1,707
Sub Total	0	0	226	469	1,868	1,697	1,555	2,803	1,108	688	187	250	0	0	0	0	0	0	0	0	0	0	0	-1,959
Total Costs w/o Interest																								
Without Project	985	644	1,407	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547
With Project(incl. dep.)	985	644	1,407	1,547	1,700	1,953	2,334	2,732	3,014	3,248	3,525	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820
Increase in Total Costs	0	0	0	0	154	406	787	1,186	1,467	1,699	1,978	2,273	2,273	2,273	2,273	2,273	2,273	2,273	2,273	2,273	2,273	2,273	2,273	2,273
Sales Revenue Increase																								
Without Project	1,751	1,015	2,376	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919
With Project	1,751	1,015	2,376	2,919	3,244	3,754	4,568	5,468	6,141	7,053	7,680	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474	8,474
Increase in Sales Revenue	0	0	0	0	326	835	1,649	2,550	3,222	4,134	4,741	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555	5,555
Net Benefit	0	0	-226	-469	-1,694	-1,268	-894	-1,439	647	1,746	2,577	3,032	3,282	3,282	3,282	3,282	3,282	3,282	3,282	3,282	3,282	3,282	3,282	5,241

EIRR: 23.99%

D. Technology Assessment

Major machinery and equipment to be introduced in the strategic investment program (Phase 1) include four E.O.T. cranes, one cutting machine, one planomiller, one vertical lathe, three horizontal boring machines, and so on. Through the introduction of these modern facilities, high productivity and quality of welding jobs would be achieved, while reducing the production costs. Not only the modern facilities but also the latest production technology such as group technology would be introduced in the investment for productivity improvement.

Along with the investment, education and training of workers would be conducted in order to acquire the latest press technologies as well as various production skills and know-how. Since the quality of workers at PRH is principally good, the invested modern machinery may be fully utilized with a minimum of training of the workers.

In Phase 2 of the whole investment program, introduction of such machinery as one bending roller, one press brake, one vertical boring machine, and one horizontal boring machine are proposed. As a result of the investment, diversification of products, which would have international quality, would be achieve.

E. Impact Analysis

The project would have various effects on HMT, from financial as well as management viewpoints.

1. Impact on Foreign Exchange

Table III-2-15 shows the flow of foreign exchange until 1999/2000 at current prices. Table III-2-16 summarizes those impacts in foreign exchange until the end of the project period at constant prices. As shown in Table III-2-16, the amount of accumulated foreign exchange makes a total of negative 2,455 Lakh Rupees. Net present value of the accumulated foreign exchange discounted at the real interest rate of foreign long term

loan turns out to be negative 1,340 Lakh Rupees. As a result, it may be said that the project would not necessarily improve the foreign exchange position of the company. One reason is that the products require substantial amount of imported materials. High ratio of imported machinery in the strategic investment may be another reason.

2. Impact on Employment

Table III-2-17 shows the flow of the total man power of PRH by job description by the year 2000. As shown in the table, the project is assumed to create 80 job opportunities between 1992/93 and 1999/2000.

Table III-2-17 Flow of Manpower

	1992/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
PS	219	234	256	276	281	286	286	286
WG	274	274	274	274	281	287	287	287
Total	493	512	530	550	562	573	573	573

3. Impact on Production

Between 1992/93 and 1999/2000, the production value is expected to increase five times as much at current prices, while the number of workers would increase relatively small. As a result, per worker productivity would increase substantially.

4. Impact on Environment

The project would not have any harmful effect on environment.

Table III-2-15 Flow of Foreign Exchange (Strategic Investment)
(100 thousand Rupees at current prices)

HMT-PRH PROJECT
FOREIGN EXCHANGE FLOW ANALYSIS
(100 thousand of rupee at current prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
Foreign Exch. Rec.								
Export	0	316	375	923	1,196	1,521	1,615	1,716
L-T Borrowing	256	108	1,198	1,900	0	0	0	0
Total F.E. Receipt	256	424	1,573	2,823	1,196	1,521	1,615	1,716
Foreign Exch. Pay't								
Capital Invest.	198	84	657	984	0	0	0	0
Parts & Equip.	446	533	619	774	1,035	1,320	1,401	1,489
Foreign L-T Debt Svc.	29	69	163	420	599	715	850	796
Total F. E. Pay't	674	686	1,439	2,178	1,634	2,035	2,251	2,285
Net Foreign Exch. Flow	-417	-262	134	645	-438	-514	-636	-569

Table III-2-16 Flow of Foreign Exchange (Strategic Investment)
(100 thousand Rupees at constant prices)

HMT-PRH PROJECT

FOREIGN EXCHANGE FLOW ANALYSIS

(100 thousand Rupees at constant prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11
Foreign Exch. Rec.																			
Export	0	292	324	751	914	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094
L-T Borrowing	231	96	724	1,033	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total F.E. Receipt	231	388	1,048	1,784	914	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094
Foreign Exch. Pay't																			
Capital Invest.	198	83	628	888	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parts & Equip.	446	492	536	630	790	949	949	949	949	949	949	949	949	949	949	949	949	949	949
Foreign L-T Debt Svc.	16	40	98	247	327	397	487	454	421	388	355	322	265	225	123	0	0	0	0
Total F. E. Pay't	661	614	1,255	1,763	1,118	1,346	1,436	1,403	1,370	1,337	1,304	1,271	1,214	1,174	1,072	949	949	949	949
Net Foreign Exch. Flow	-430	-226	-207	21	-204	-252	-342	-309	-276	-243	-210	-177	-120	-81	22	145	145	145	145

Accumulated Foreign Exchange: -2,455

F. Conclusions and Recommendations

The FIRR of the strategic investment project for PRH is 10.2%, and that of the total project including the future expansion investments is 13.3%. These figures are not necessarily high, taking into consideration the current high interest rates for external borrowings in India. These relatively low financial internal rates of return is partly because of the high import duties on both capital goods and raw materials.

The EIRRs excluding the effects of high import duties shows relatively high rates of 25.0% and 24.0%, respectively. Another factor which included relatively low financial internal rates of return is the fact that the future financial projections are mainly made based on the present low level of sales and the current cost structures of the unit. By identifying good collaborators which would support PRH both in technology and in sales capabilities to the international markets, it would become possible for the unit to improve the financial returns than the level projected.

III-3. Tractor Factory

A. Financial Evaluation

1. Financial Projections

Based on the estimate of revenues and costs, which are discussed in Chapter II-3, an income and cost forecast was calculated. This forecast covers two cases; one is a base case which is based on constant prices of 1992/93 and the other is an escalation case which is based on escalated prices. Tables III-3-1 and III-3-2 give the basic case and the escalation case, respectively.

The flow of funds based on the escalation case is projected in Table III-3-3. Summary of the financial projections is given in Table III-3-4. Key financial ratios are shown in Table III-3-5.

Based on the debt service coverage ratios shown in Table II-3-5, it can be asserted that the project will generate revenue which is sufficient to cover payments of interest and current maturities of principal on outstanding debt. The negative numbers of total borrowing debt service coverage ratios in Table III-3-5 suggest that the interest inflows which are generated by a short term deposit exceed interest outflows of the long-term debt service.

Table III-3-4 Summary of Financial Projections

(million Rupees at current prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Net Sales	2,564	3,143	3,765	4,546	5,384	6,511	7,839	9,412
Profit before Int. & Tax	272	328	362	435	534	684	889	1,154
Profit before Tax	282	350	362	414	523	715	1,016	1,452

Table III-3-5 Key Financial Ratios

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Operating Profit /Net Sales	11.4%	11.2%	10.3%	10.2%	10.5%	11.1%	12.0%	13.0%
Debt Service Coverage Ratio (L-T Loan)	n.a.	33.3	10.8	7.2	5.5	5.5	6.2	7.6
Debt Service Coverage Ratio (Total Borrowg)	n.a.	-2.5	-1.8	-2.2	-1.6	-1.2	-0.9	-0.6

Table III-3-1 Projected Income Statements (Basic Case)

(100 thousand Rupees at constant prices)

HMT-TRP PROJECT
HISTORICAL AND PROJECTED INCOME STATEMENTS
(100 thousand rupee at current prices through 1991 and constant 1992 prices thereafter)

	(actual) 1990/91	(prelim) 1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
OPERATING REVENUES										
Net Sales Revenues	18,864	22,558	25,638	29,016	32,628	36,964	41,126	46,801	53,109	60,017
RAW MATERIALS	13,648	17,250	19,267	21,835	24,595	27,908	31,042	35,311	40,055	45,237
Value Added	5,216	5,308	6,371	7,181	8,033	9,056	10,084	11,490	13,054	14,780
OPERATING COSTS										
Wages & Salaries	1,617	1,787	1,823	1,967	2,125	2,233	2,349	2,368	2,387	2,406
Depreciation	152	240	216	402	816	1,146	1,355	1,610	1,712	1,696
Other Mfg. Costs	211	267	299	338	381	433	481	547	621	701
Technical Fee	23	38	44	49	55	63	70	80	90	102
Other Expenses	766	929	1,056	1,195	1,344	1,523	1,694	1,928	2,188	2,473
Total Ope. Costs	2,769	3,262	3,438	3,952	4,722	5,397	5,950	6,533	6,998	7,379
Operating Income	2,447	2,046	2,933	3,229	3,311	3,658	4,134	4,957	6,056	7,402
NON-OPERATING COSTS										
Interest Charges	132	220	-46	-107	69	271	210	14	-336	-981
Other Exp(+)/Inc(-)	67	197	210	222	227	234	236	297	355	424
Total Non-Ope. Costs	199	417	164	115	296	504	446	311	19	-557
Profit before Tax	2,248	1,630	2,769	3,114	3,015	3,154	3,688	4,646	6,036	7,959

Table III-3-2 Projected Income Statements (Escalation Case)
(100 thousand Rupees at current prices)

HMT-TRP PROJECT
HISTORICAL AND PROJECTED INCOME STATEMENTS
(100 thousand rupee at current prices)

	(actual) 1990/91	(prelim) 1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
OPERATING REVENUES										
Net Sales Revenues	18,864	22,558	25,638	31,427	37,653	45,462	53,836	65,106	78,392	94,115
RAW MATERIALS	13,648	17,250	19,267	23,647	28,383	34,327	40,634	49,118	59,121	70,932
Value Added	5,216	5,308	6,371	7,780	9,270	11,135	13,202	15,989	19,271	23,184
OPERATING COSTS										
Wages & Salaries	1,617	1,787	1,823	2,130	2,452	2,747	3,075	3,294	3,523	3,773
Depreciation	152	240	216	414	879	1,270	1,542	1,887	2,054	2,065
Other Mfg. Costs	211	267	299	367	440	532	630	761	916	1,099
Technical Fee	23	38	44	53	64	77	92	111	133	160
Other Expenses	766	929	1,056	1,295	1,551	1,873	2,218	2,682	3,230	3,878
Total Ope. Costs	2,769	3,262	3,438	4,259	5,386	6,500	7,556	8,735	9,857	10,975
Operating Income	2,447	2,046	2,933	3,521	3,884	4,635	5,646	7,253	9,414	12,208
NON-OPERATING COSTS										
Interest Charges	132	220	-93	-215	1	212	111	-305	-1,266	-2,976
Other Exp(+)/Inc(-)	67	197	210	240	262	287	309	413	524	664
Total Non-Ope. Costs	199	417	117	25	263	499	420	108	-742	-2,312
Profit before Tax	2,248	1,630	2,816	3,496	3,621	4,136	5,225	7,145	10,156	14,520

Table III-3-3 Projected Funds Flow Statements (Escalation Case)

(100 thousand Rupees at current prices)

HMT-TRP PROJECT
HISTORICAL AND PROJECTED FUNDS FLOW STATEMENTS
(100 thousand rupee at current prices)

	(prelim) 91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
S O U R C E S									
Operations									
Retained Income	1,630	2,816	3,496	3,621	4,136	5,225	7,145	10,156	14,520
add: Depreciation	240	216	414	879	1,270	1,542	1,887	2,054	2,065
Foreign LT Interest	0	0	111	415	784	1,048	1,144	1,093	1,036
Domest. LT Interest	0	0	0	0	0	0	0	0	0
ST Interest	220	-93	-326	-414	-572	-937	-1,449	-2,359	-4,013
Cash Generated by Operations	2,090	2,939	3,695	4,501	5,618	6,878	8,727	10,944	13,609
Long-Term Borrowing									
Foreign Currency Borrowing	0	0	995	2,929	2,159	746	978	375	153
Domestic Loans	0	0	0	0	0	0	0	0	0
Total Long-Term Borrowing	0	0	995	2,929	2,159	746	978	375	153
Short-Term Loans	194	-1,237	-2,480	-2,745	-4,518	-7,377	-11,386	-19,145	-32,799
Other Sources	0	0	0	0	0	0	0	0	0
Total Sources	2,284	1,702	2,210	4,685	3,259	247	-1,681	-7,826	-19,037
A P P L I C A T I O N S									
Fixed Capital Investments	1,053	1,340	3,132	6,624	5,129	3,945	4,765	3,256	1,320
Increase in Working Capital	351	260	530	540	663	598	800	894	1,006
Foreign LT Debt Service									
Interest	0	0	111	415	784	1,048	1,144	1,093	1,036
Repayments	0	0	0	0	0	111	436	676	759
Total Foreign LT Debt Service	0	0	111	415	784	1,158	1,580	1,769	1,795
Domest. LT Debt Service									
Interest	0	0	0	0	0	0	0	0	0
Repayments	0	0	0	0	0	0	0	0	0
Total Domest LT Debt Service	0	0	0	0	0	0	0	0	0
Short-Term Debt Service									
Interest	220	-93	-326	-414	-572	-937	-1,449	-2,359	-4,013
Repayments	660	194	-1,237	-2,480	-2,745	-4,518	-7,377	-11,386	-19,145
Total Short-Term Debt Service	880	101	-1,563	-2,894	-3,317	-5,455	-8,826	-13,745	-23,158
Total Applications	2,284	1,702	2,210	4,685	3,259	247	-1,681	-7,826	-19,037

B. Financial Internal Rate of Return

1. Method and the Result of FIRR

In order to appraise the profitability of the project, both the financial internal rate of return method and the economic internal rate of return method are used. The net cash flow of the project case (with project case) is compared with that of the non-project case (without project case). For calculation purposes, the period of the project is assumed to be 15 years after the last capital investment is made in 1996/97, and at the end of the project, invested fixed assets are assumed to be resold at the book values. Working capital, also, is assumed to be completely paid back.

Net cash flows of the project and the resulting financial internal rate of return are shown in Table III-3-6. As shown in the table, the financial internal rate of return for the project is considered to be 21.62 percent.

Table III-3-6 Cash Flow Analysis (FIRR)
(100 thousand Rupees)

HNT-TRP PROJECT

CASHFLOW ANALYSIS

(100 thousand rupee)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Project Capital Costs																									
Plant Capital Costs	0	0	0	2,837	5,929	4,329	3,077	3,520	2,244	858	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238
Change in Working Capital	0	0	0	274	279	331	233	343	360	369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,189
Sub Total	0	0	0	3,211	6,208	4,660	3,310	3,863	2,604	1,227	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,427
Total Costs w/o Interest & Depr.																									
Without Project	18,332	20,469	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699	22,699
With Project	18,332	20,469	22,699	25,607	28,728	32,393	35,873	40,531	45,696	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343	51,343
Increase in Total Costs	0	0	0	2,908	6,029	9,695	13,174	17,832	22,998	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644	28,644
Sales Revenue Increase																									
Without Project	18,864	22,558	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638	25,638
With Project	18,864	22,558	25,638	29,016	32,628	36,964	41,126	46,801	53,109	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017	60,017
Increase in Sales Revenue	-0	0	0	3,378	6,990	11,326	15,488	21,163	27,471	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379	34,379
Net Benefit	-0	0	0	-2,741	-5,247	-3,028	-996	-533	1,889	4,508	5,735	5,735	5,735	5,735	5,735	5,735	5,735	5,735	5,735	5,735	5,735	5,735	5,735	5,735	8,163

FIRR: 21.82%

2. Sensitivity Analysis

The financial internal rate of return of the project will depend upon such factors as quantity of sales, sales prices, input costs, investment amounts, and the like. Recognizing these causal relationships, financial internal rates of return of the project under alternative conditions are calculated. The result of the calculation is as follows:

Table III-3-7 Sensitivity Analysis of FIRRs

Factors	Conditions	FIRR
Base Case		21.62%
Sales Prices	increase by 5%	28.93%
Sales Prices	decrease by 5%	14.18%
Investments	increase by 10%	19.63%
Investments	decrease by 10%	23.98%
Input Costs	increase by 5%	16.03%
Input Costs	decrease by 5%	27.15%

C. Economic Internal Rate of Return

1. Method and the Result of EIRR

In order to appraise how much the project would contribute to the Indian economy on the whole, an economic feasibility analysis using the economic internal rate of return method is done.

Financial cash flow is converted to economic cash flow as per the assumptions discussed before. In addition, a conversion factor of 0.9 is applied for the export sales of tractors considering the competitiveness of HMT tractors in the international market.

Net cash flow of the project and the resulting economic internal rate of return are shown in Table III-3-8. The economic internal rate return for the project turned out to be 45.30 percent.

Table III-3-8 Cash Flow Analysis (EIRR)
(100 thousand Rupees)

HMT-TRP PROJECT

CASHFLOW ANALYSIS - EIRR

(100 thousand rupee)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Project Capital Costs																									
Plant Capital Costs	0	0	0	2,585	4,323	3,526	2,824	3,322	2,035	781	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-238
Change in Working Capital	0	0	0	274	278	331	233	343	360	370	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,189
Sub Total	0	0	0	2,859	4,601	3,857	3,057	3,665	2,395	1,151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,428
Total Costs w/o Interest																									
Without Project	15,352	15,491	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,419	17,418	17,419	17,419	17,419	17,419
With Project(incl. dep.)	15,352	15,491	17,419	19,635	22,008	24,775	27,412	30,927	34,818	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074	38,074
Increase in Total Costs	0	0	0	2,216	4,587	7,356	9,993	13,508	17,397	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655	21,655
Sales Revenue Increase																									
Without Project	16,978	20,302	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074	23,074
With Project	16,978	20,302	23,074	26,117	29,365	33,265	37,015	42,125	47,800	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020	54,020
Increase in Sales Revenue	0	0	0	3,043	6,291	10,191	13,940	19,051	24,726	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946	30,946
Net Benefit	0	0	0	-2,032	-2,898	-1,022	890	1,877	4,934	8,140	9,291	9,291	9,291	9,291	9,291	9,291	9,291	9,291	9,291	9,291	9,291	9,291	9,291	9,291	11,719

EIRR: 45.30%

2. Sensitivity Analysis

Economic internal rates of return of the project under alternative conditions are calculated. The result of the calculation is as follows:

Table III-3-9 Sensitive Analysis of EIRRs

Factors	Conditions	EIRR
Base Case		45.30%
Sales Prices	increase by 5%	54.74%
Sales Prices	decrease by 5%	36.62%
Investments	increase by 10%	41.03%
Investments	decrease by 10%	50.64%
Input Costs	increase by 5%	39.72%
Input Costs	decrease by 5%	51.19%

D. Technology Assessment

To maintain the reputation of the present HMT tractors, and to increase sales in accordance with the market expansion, it is essential to keep the core product technology in-house, generating constant improvement activity so that there is a clear distinction from the competitors' products.

The specific technology for the components is not especially new, nor extremely high-tech. Technology is more important in the field of production engineering and production technology.

To guarantee quality with a minimum of disruption to the continuous mass production is the prime target of the project.

Major considerations are to be paid to the following.

i) Foundry Renovation
All the important casting components, engine blocks, cylinder blocks, gear boxes, and transmission boxes are to be produced in-house. Targeted ratio of the in-house production is 40% in 1999/2000.

ii) Diesel engine machining is to be renovated in the automatic transfer process, with CNC machines.

iii) Sheet press work is handled outside at present, but in the new factory, hood and fender pressing line is to be included in-house.

iv) The painting and test/trial line is to be automated to achieve uniformity of quality.

v) Assembly lines for diesel engines and tractors are to be totally renovated with an automatic continuous transfer system.

The desired equipment is available in the current international and domestic market, however, it is expensive. Fortunately, HMT has its own technology and in-house production for candidate machines, which is advantageous for the modernization.

Software renovation is indivisible from hardware investment. R&D reinforcement especially, is an urgent requirement and a considerable amount of investment is to be directed to this field, including long term technical assistance from leading world enterprises.

Plans for production control, productivity increases and raising employee motivation are also included in the renovation implementation.

E. Impact Analysis

The project would have various effects on HMT, from financial as well as management viewpoints.

1. Impact on Foreign Exchange

Exports of tractors are planned to begin in 1995/96 with 500 units, and the number is expected to reach 4,000 units in 1999/2000. Projected export sales of the tractors is given in Table II-3-10. On the other hand, increase in production would require more imported parts which presently account for approximately 2 percent of the total material costs excluding import tariffs. Table III-3-10 shows the flow of foreign exchange until 1999/2000 at current prices, while Table III-3-11 summarizes those impacts in foreign exchange through the project period. As shown in Table III-3-11, the amount of accumulated foreign exchange makes a total of 75,205 Lakh Rupees through the period. Net present value of the accumulated foreign exchange discounted at the real interest rate of foreign long term loan turns out to be 7,810 Lakh Rupees. From these figures, the project is considered to improve the foreign exchange position of the company. TRP, however, is requested to make continuous efforts to increase the exportation of its tractors.

2. Impact on Employment

Table III-3-12 shows the flow of the total man power of TRP by job description by the year 2000. As shown in the table, the project is assumed to create approximately 1,040 job opportunities between 1992/93 and 1999/2000.

3. Impact on Production

The biggest impact of the project on production is drastic improvement of productivity. The total number of workers would increase by 32%, while the total production of tractors would increase approximately 2.6 times. This means that the new investments would in-

crease per worker productivity from 5.8 units in 1991/92 to 10.4 units in 1999/2000.

4. Impact on Environment

Tractor production is relatively clean being free from the emission of harmful materials or noise pollution. In addition, TRP is located in an isolated industrial area, far from major cities. In the investment program, much attention is paid to improvement of the work environment than to the neighborhood. Various automated machinery proposed in the investment program would surely mitigate the physical labor.

Table III-3-10 Flow of Foreign Exchange
(100 thousand Rupees at current prices)

HMT-TRP PROJECT
FOREIGN EXCHANGE FLOW ANALYSIS
(100 thousand of rupee at current prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
Foreign Exch. Rec.								
Export	0	0	0	962	1,720	3,088	5,541	9,816
L-T Borrowing	0	995	2,929	2,159	746	978	375	153
Total F.E. Receipt	0	995	2,929	3,121	2,466	4,066	5,915	9,970
Foreign Exch. Pay't								
Capital Invest.	0	773	2,435	1,821	624	818	317	130
Parts & Equip.	332	426	534	701	776	884	1,008	1,154
Foreign L-T Debt Svc	0	111	415	784	1,158	1,580	1,769	1,795
Total F. E. Pay't	332	1,310	3,383	3,306	2,557	3,282	3,094	3,078
Net Foreign Exch. Flow	-332	-1,310	-3,383	-2,344	-837	-194	2,446	6,738

Table III-3-11 Flow of Foreign Exchange
(100 thousand Rupees at constant prices)

HMT-TRP PROJECT

FOREIGN EXCHANGE FLOW ANALYSIS

(100 thousand of Rupees at constant prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Foreign Exch. Rec.																							
Export	0	0	0	782	1,314	2,228	3,754	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268
L-T Borrowing	0	693	2,489	1,527	568	539	295	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total F.E. Receipt	0	693	2,469	2,309	1,815	2,759	4,049	5,376	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268	5,268
Foreign Exch. Pay't																							
Capital Invest.	0	594	2,134	1,389	429	462	259	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parts & Equip.	332	393	462	578	592	636	683	736	736	736	736	736	736	736	736	736	736	736	736	736	736	736	736
Foreign L-T Debt Svc	0	49	276	563	778	1,099	1,266	1,272	1,253	1,193	1,109	1,011	913	744	481	196	121	51	14	0	0	2	0
Total F. E. Pay't	332	1,036	2,873	2,442	1,801	2,197	2,282	2,107	1,989	1,928	1,844	1,747	1,649	1,480	1,136	932	857	786	749	736	736	736	736
Net Foreign Exch. Flow	-332	-1,036	-2,873	-1,660	-486	23	1,552	4,154	4,271	4,332	4,416	4,514	4,611	4,780	5,124	5,329	5,403	5,474	5,511	5,525	5,525	5,525	5,525

Accumulated Foreign Exchange: 75,285

Table III-3-12 Flow of Manpower
(Number of workers)

HMT-TRP PROJECT

MANPOWER SCHEDULE & PROJECTED MANPOWER COST

	(actual) 90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
Manager	184	185	186	188	194	195	197	198	193	189
Design/R&D Engineer	52	57	62	67	72	77	82	85	89	92
Prod. Engineer & Staff	121	123	126	129	133	135	137	138	140	141
Prod. Control Engineer & Staff	134	136	139	144	149	153	157	159	162	164
Shop Workers	1,497	1,522	1,547	1,738	1,947	2,092	2,247	2,264	2,268	2,297
Shop Foreman/Supervisors	115	116	118	120	123	130	138	140	143	145
Q/C Engineers & Staff	132	134	137	142	147	152	157	159	160	162
Procurement Engineer & Staff	54	56	59	64	69	70	72	73	73	74
Equip. Maint. Engr/Staff/Worker	129	131	134	141	149	151	154	156	157	159
System & Training	23	24	25	26	26	28	28	28	28	28
Civil Engr & Power Dist.	41	42	43	44	46	46	46	46	46	46
Marketing	184	194	204	214	224	234	244	244	244	244
Material Planning	23	24	25	26	28	28	28	28	28	28
Stores	99	101	103	107	111	113	115	116	118	119
Finance	61	61	62	63	64	64	65	65	66	66
Security	29	29	30	31	33	33	34	34	34	34
Others	144	145	146	147	149	150	152	153	153	154
Mohali	99	101	103	111	120	120	133	134	135	138
TOTAL MANPOWER	3,121	3,184	3,249	3,584	3,786	3,988	4,196	4,220	4,254	4,288

F. Conclusions and Recommendations

From the financial and economic analysis of the project discussed in this chapter, followings are pointed out.

(a) The FIRR of 21.62% is around the hurdle rate that justifies the investment. On the other hand, the EIRR, that is 45.30% for a base case, is considerably high.

(b) The present financial position of TRP is considered to be strong to implement the large investment proposed in the action program.

From the strategic point of view followings are pointed out.

(a) In order to rebound from its reduced market share of tractors, implementation of the investment is significantly important. Without expansion of the existing production capacity, TRP would not only loose the market share but also make the present profitability worse.

(b) Tractor production is one of the most promising fields among HMT's diversified business. For HMT to continue to lead the industry, high priority should be put on the strengthening of TRP factory.

At the implementation of the projects, the following points should be carefully examined.

i) Market demand and the governmental policy
ii) Introduction of new technology
iii) An optimum ratio of borrowing

III-4. Kalamassery Printing Machinery Factory (PMK)

A. Financial Analysis

1. Financial Projections

Tables III-4-2 to 4 show projected income statement, cash budget, and balance sheet for PMK (the Printing Machinery, Kalamassery) at current prices, respectively, when the investment plan is implemented.

A summary of projected financial data is shown in Table III-4-5. Key financial ratios are as shown in Table III-4-6.

The investment would have a considerable impact on the profitability of PMK's operation as well as on the increase in sales revenue. At the latter stage of the project life, the financial position of PMK would be quite sound and stable. However, at the early stage of the project, PMK's financial position would become worse judging from the debt coverage ratio. The ratio would remain below 2.0 until 1997/98.

The operating profits would increase sharply with the investment plan, from Rs. 584 lakh in 1994/95 to Rs. 3,689 lakh in 1999/2000 in nominal terms. PMK would start to produce profits after the sixth year of the investment plan, 1997/98, on an after-interest basis.

The ratio of operating profits to sales would decrease to 16% in 1994/95, but it would be considerably improved to 30% in 1999/00. Operating profits as a percentage of total assets would continue to rise up to 1999/2000 and then start to decline as the retained earnings grow at a rapid pace.

Table Ⅲ-4-1 Projected Income Statement of PMK
(At Constant Prices 1992/93)

Unit: Rs. Lakh

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Sales	2,145	2,518	3,154	3,864	4,507	5,377	6,475	7,865
-Inland Sales	2,145	2,518	3,154	3,640	4,148	4,823	5,640	6,829
-Export	0	0	0	225	360	554	835	1,036
Materials	923	1,083	1,355	1,662	1,938	2,313	2,784	3,382
Sub Contract	0	0	0	0	14	46	73	139
Value Added	1,221	1,435	1,798	2,203	2,555	3,018	3,618	4,345
Expenses	765	989	1,338	1,539	1,729	1,893	2,041	2,154
Personnel	392	442	503	532	578	627	688	758
Power	18	26	37	52	73	80	88	97
Marketing Commission	88	103	129	158	185	220	265	322
Charges Paid	112	125	149	173	191	216	247	275
Depreciation	46	176	393	487	553	588	580	515
Other Expenses	109	117	127	138	149	161	173	187
Operating Profit	457	446	460	663	827	1,125	1,577	2,191
Interest -Payment	81	294	495	587	614	605	577	515
Interest -Receipt	4	18	37	57	77	102	148	228
Before-Tax Profit/Loss	380	171	2	133	290	622	1,149	1,904

Table Ⅲ-4-2 Projected Income Statement of PMK (at Current Prices)

Unit: Rs. Lakh

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Sales	2,145	2,727	3,641	4,751	5,902	7,478	9,562	12,336
-Domestic Sales	2,145	2,727	3,641	4,475	5,431	6,708	8,330	10,711
-Export	0	0	0	276	471	770	1,232	1,625
Materials	923	1,173	1,565	2,043	2,537	3,217	4,112	5,304
Sub Contract	0	0	0	0	18	64	107	217
Value Added	1,221	1,554	2,076	2,708	3,346	4,197	5,343	6,815
Expenses	765	1,056	1,489	1,794	2,114	2,434	2,783	3,134
Personnel	392	478	581	654	757	872	1,016	1,190
Power	18	28	43	64	95	112	130	151
Marketing Commission	88	112	149	195	242	307	392	506
Charges Paid	112	135	172	212	250	300	365	431
Depreciation	46	176	398	500	575	620	625	564
Other Expenses	109	127	147	169	195	223	255	293
Operating Profit	457	498	587	914	1,232	1,763	2,560	3,680
Interest -Payment	150	528	739	864	947	958	915	839
Interest -Receipt	2	6	9	17	31	58	126	261
Before-Tax Profit/Loss	310	-25	-144	68	317	863	1,770	3,102

Table Ⅲ-4-3 Projected Funds Flow of PMK (at Current Prices)

Unit: Rs. Lahk

		1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Cash Balance at the Beginning		0	75	75	75	75	75	75	75
Revenue		2,145	2,727	3,641	4,751	5,902	7,478	9,562	12,336
Expenses		1,688	2,229	3,054	3,837	4,670	5,715	7,002	8,656
Operating Profit		457	498	587	914	1,232	1,763	2,560	3,680
Corporate Tax Payment		0	0	0	0	0	0	0	0
Working Capital at the Beginning		401	481	606	802	1,040	1,288	1,630	2,082
Working Captial at the End		481	606	802	1,040	1,288	1,630	2,082	2,688
Net Change in Working Capital		80	125	196	238	248	342	452	607
Capital Investment		1,462	2,691	1,282	984	533	911	221	192
Depreciation Expense		46	176	398	500	575	620	625	564
Net Fixed Investment		1,416	2,515	884	484	-42	291	-404	-373
Cash Surplus (Deficit)		-1,039	-2,067	-417	267	1,101	1,205	2,588	3,522
Foreign Currency Borrowing	Borrowing	571	1,444	419	409	0	198	0	0
	Repayment				63	224	270	316	316
25.00%	Interest Payment	65	288	375	408	437	412	357	313
	Balance at the End	571	2,015	2,434	2,780	2,556	2,483	2,167	1,851
	Net Receipt	506	1,156	44	-63	-661	-485	-673	-629
Domestic Currency Borrowing	Borrowing	891	1,247	862	575	533	713	198	192
(Long-term)	Repayment				99	238	333	397	456
19.50%	Interest Payment	72	240	364	456	510	545	558	526
	Balance at the End	891	2,138	3,001	3,476	3,772	4,151	3,952	3,687
(Short-term)	Borrowing								
	Repayment	148	0	0	0	0	0	0	0
21.25%	Interest Payment	13	0	0	0	0	0	0	0
	Balance at the End	0	0	0	0	0	0	0	0
	Net Receipt	658	1,007	498	20	-215	-166	-757	-791
Borrowing Cashflow		1,164	2,163	542	-43	-875	-651	-1,431	-1,420
Deposit	Deposit	52	59	58	167	182	537	1,208	2,288
(Interest Rate)	Drawing	0	32		0	0	0		
10.00%	Interest Receipt	2	6	9	17	31	58	126	261
	Balance at the End	52	79	137	304	486	1,023	2,231	4,519
Deposit Cashflow		-50	-21	-50	-150	-151	-479	-1,082	-2,027
Cashflow from Financing		1,114	2,142	492	-192	-1,026	-1,130	-2,513	-3,447
Cash Balance at the End		75	75	75	75	75	75	75	75

Table Ⅲ-4-4 Projected Balance Sheet of PMK (At Current Prices)

Unit: Rs. Lakh (Unit : Rs Lakhs.)

Items	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Material	231	293	391	511	639	820	1,055	1,380
Material in Transit	23	28	37	48	60	76	99	130
Work in Progress	119	151	202	264	328	415	531	685
Stock in Trade	179	227	303	396	492	623	797	1,028
Debtors	179	227	303	396	492	623	797	1,028
Advances Paid	69	88	117	153	192	246	316	414
Other Current Assets	20	20	20	20	20	20	20	20
Inter Unit Account	50	50	50	50	50	50	50	50
Total Current Assets	869	1,085	1,425	1,838	2,272	2,874	3,665	4,736
Sundry Creditors	231	293	391	511	639	820	1,055	1,380
Advances Received	107	136	182	238	295	374	478	617
Other Current Liabilities	50	50	50	50	50	50	50	50
Total Current Liabilities	388	480	623	798	984	1,244	1,583	2,047
Working Capital	481	606	802	1,040	1,288	1,630	2,082	2,688
Fixed Asset (Net)	1,786	4,301	5,184	5,669	5,627	5,917	5,513	5,140
Deposit	127	154	212	379	561	1,098	2,306	4,594
Total Capital Employed	2,394	5,060	6,198	7,088	7,476	8,646	9,901	12,422
Sources								
H.O. Account (Equity)	501	501	501	501	501	501	501	501
H.O. Account (Loan)	0	0	0	0	0	0	0	0
Profit	432	407	263	331	647	1,510	3,281	6,383
Cash Credit	0	0	0	0	0	0	0	0
Term Loan (Domestic)	891	2,138	3,001	3,476	3,772	4,151	3,952	3,687
Term Loan (Foreign)	571	2,015	2,434	2,780	2,556	2,483	2,167	1,851
Total	2,394	5,060	6,198	7,088	7,476	8,646	9,901	12,422

Table III-4-5 Summary of Projected Financial Data of PMK
(at Current Price Basis)

Unit: Rs. Lakh

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Sales Revenue	2,145	2,727	3,641	4,751	5,902	7,478	9,562	12,336
Profit Before Interest and Tax	457	498	587	914	1,232	1,763	2,560	3,680
Profit Before Tax	310	-25	-144	68	317	863	1,770	3,102
Total Assets	2,782	5,540	6,822	7,866	8,460	9,890	11,484	14,469

Table III-4-6 Key Financial Ratios of PMK
(At Current Price Basis)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Operating Profit/ Sales	21.3%	18.3%	16.1%	19.2%	20.9%	23.6%	26.8%	29.8%
Operating Profit/ Total Assets Ratio	16.4%	9.0%	8.6%	11.6%	14.6%	17.8%	22.3%	25.4%
Current Ratio	2.57	2.58	2.63	2.78	2.88	3.19	3.77	4.56
Debt Service Coverage Ratio (Long-term Loan)	3.60	1.29	1.34	1.39	1.31	1.56	2.03	2.80
Debt Service Coverage Ratio (Total Borrowing)	1.70	1.29	1.34	1.39	1.31	1.56	2.03	2.80

2. Financial Internal Rates of Return

The incremental pre-tax financial internal rates of return (FIRR), which result from accounting for the incremental investment, sales and operating costs on a constant price basis, have been calculated for the investment plan. Cost and benefit streams are presented in Table III-4-7.

A sensitivity analysis has been undertaken to evaluate the effects of changes in basic assumptions. Results of the sensitivity analysis are shown in Table III-4-8.

Table III-4-8 Sensitivity Test on FIRR

At 1992/93 Constant Prices

	I R R
1. Base Case	18.7%
2. Sales Prices	
Up 5%	21.0%
Down 5%	16.3%
3. Production Costs	
Up 5%	17.2%
Down 5%	20.2%
4. Capital Costs	
Up 10%	17.2%
Down 10%	20.4%

The FIRR of the project in real terms is 18.69%. The interest rates in nominal terms in India are currently around 20%. This FIRR at constant prices can be considered is at around the cut-off rate in real terms, or above it when the current high inflation rate is considered. The FIRR at current prices is 25.7% for the base case.

Table Ⅲ-4-7 Cash Flow Table of PMK
(At Constant Prices)

Unit: Rs. Lakh

FIRR	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Project Capital Cost	1,482	2,848	1,279	988	548	867	388	427	0	0	0	0	0	0	0
Plant Capital Cost	1,482	2,569	1,143	836	407	678	150	122	0	0	0	0	0	0	0
Working Capital Increase		80	136	152	139	190	238	305	0	0	0	0	0	0	0
Production Cost (Increase from Proje	0	254	659	1,073	1,486	2,022	2,877	3,518	3,518	3,518	3,518	3,518	3,518	3,518	3,518
Without Project	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641
With Project	1,641	1,895	2,301	2,714	3,127	3,664	4,318	5,159	5,160	5,160	5,160	5,160	5,160	5,160	5,160
Sales Revenue (Increase from Project	0	373	1,009	1,720	2,383	3,233	4,330	5,721	5,721	5,721	5,721	5,721	5,721	5,721	5,721
Without Project	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145
With Project	2,145	2,518	3,154	3,864	4,507	5,377	6,475	7,865	7,865	7,865	7,865	7,865	7,865	7,865	7,865
Net Benefit	-1,482	-2,529	-929	-341	331	343	1,286	1,778	2,202	2,203	2,203	2,203	2,203	2,203	2,203

Import Duty

FIRR= 18.69%

2007/08	2008/09	2009/10	2010/11	2011/12
0	0	0	0	-1,557
0	0	0	0	0
0	0	0	0	-1,557
3,518	3,518	3,518	3,518	3,518
1,641	1,641	1,641	1,641	1,641
5,160	5,160	5,160	5,160	5,160
5,721	5,721	5,721	5,721	5,721
2,145	2,145	2,145	2,145	2,145
7,865	7,865	7,865	7,865	7,865
2,203	2,203	2,203	2,203	3,759

Salvage Value	
Building	228
Machinery & Equ	90
Working Capital	1,241
Total	1,557

EIRR	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Project Capital Cost	1,075	1,803	990	868	405	594	301	348	-40	0	0	0	0	0	0
Plant Capital Cost	1,075	1,739	881	547	293	442	111	102	-40						
Working Capital Increase	0	84	109	122	111	152	191	244	0	0	0	0	0	0	0
Production Cost (Increase from Project)	0	194	499	799	1,105	1,500	1,978	2,592	2,593	2,593	2,593	2,593	2,593	2,593	2,593
Without Project	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285
With Project	1,285	1,480	1,784	2,084	2,391	2,785	3,263	3,878	3,878	3,878	3,878	3,878	3,878	3,878	3,878
Sales Revenue (Increase from Project)	0	373	1,009	1,720	2,383	3,233	4,330	5,721	5,721	5,721	5,721	5,721	5,721	5,721	5,721
Without Project	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145	2,145
With Project	2,145	2,518	3,154	3,864	4,507	5,377	6,475	7,865	7,865	7,865	7,865	7,865	7,865	7,865	7,865
Net Benefit	-1,075	-1,824	-479	253	853	1,139	2,051	2,782	3,188	3,128	3,128	3,128	3,128	3,128	3,128

EIRR= 33.85%

2007/08	2008/09	2009/10	2010/11	2011/12
0	0	0	0	-1,308
0	0	0	0	-1,308
2,593	2,593	2,593	2,593	2,593
1,285	1,285	1,285	1,285	1,285
3,878	3,878	3,878	3,878	3,878
5,721	5,721	5,721	5,721	5,721
2,145	2,145	2,145	2,145	2,145
7,865	7,865	7,865	7,865	7,865
3,128	3,128	3,128	3,128	4,436

Salvage Value	
Building	228
Machinery & Equipment	90
Working Capital	993
Total	1,308

B. Economic Analysis and Economic Internal Rate of Return

Incremental economic cost and benefit streams for the project is shown in Table III-4-7.

The economic internal rate of return (EIRR) for the investment plan is 33.65%. This is significantly higher than the FIRR. This is largely because high import tariffs are levied on materials as well as on capital goods.

The sensitivity of the base-case EIRR to changes in base-case assumptions has been tested. The results of the sensitivity analysis are shown in Tale III-4-9. The EIRR ranges from 29% to 38%.

Table III-4-9 Sensitivity Test on EIRR

At 1992/93 Constant Prices

	I R R
1. Base Case	30.6%
2. Sales Prices	
Up 5%	35.0%
Down 5%	26.2%
3. Production Costs	
Up 5%	29.5%
Down 5%	31.7%
4. Capital Costs	
Up 10%	28.6%
Down 10%	32.9%

C. Assessment of Technological Viability

PMK's two major thrust areas concerning technologies are (1) the acquisition of product design technologies which enable the commercialization of multi-color machines; and (2) the modernization of production technology.

According to the market forecast, the following are recommended relative to product development.

- Enlargement of 31-inch machines for the domestic market
- Development of the perfecter
- Development of 41-inch machines for the overseas market
- Development of multi-color machines for each size group

For PMK, it is an urgent task to upgrade the product design technology, especially in multi-color machines. This is considered essential for PMK's survival in the printing machinery business. In the Action Program the necessity of technical collaboration has been stressed and the necessary technologies have been identified.

For these technologies, PMK's existing capability of absorbing technologies through collaboration can be said to be sufficient when their experience in technical collaboration and the technological level of existing products are considered. However, there exist limitations due to the amount of personnel in R&D activities. The reinforcement of R&D personnel is proposed in the Action Program to solve this problem.

As for the modernization of production facilities, the plan has been formulated modeled on the modernization used by top makers in the world.

The facility improvement plan for PMK consists of four steps. The plant expansion and installation of production facilities would be carried out step by step. A phasing approach to modernization would enable PMK to respond flexibly to changes in the market. It would also allow engineers and operators of PMK sufficient time to adapt themselves to the new production technology.

It is planned to attain the level of production technologies at which top makers in the world currently stand.

The 1st step is dedicated to the installation of NC machines, the 2nd step for the establishment of FMC operation by attaching automatic control mechanisms to CNC machines. Under this conception, the building-up of FMS production would be possible by connecting FMCs by transfer line after the 3rd step.

D. Impact of the Project on Other Aspects

1. Impact on Foreign Exchange

Net foreign exchange savings have been calculated on a constant price basis and the results are shown in Table III-4-10. The four-color printing machinery to be newly developed through the project is considered to contribute to import savings because they are presently not manufactured in India.

The net foreign exchange inflow would be US$ 117 million on constant prices over the life of the project. When import savings are not considered it would be minus US$ 0.1 million. The net present value of foreign exchange flows discounted by 20% would be US$ 10.6 million.

The efforts to reduce the use of imported material would ease the foreign exchange balance to a large extent.

2. Impact on Employment

The flow of the number of workers is as shown in Table II-4-8.

The number of workers to be recruited is more than the number of retiring workers. In total, the number of workers employed will increase from 179 in 1992/93 to 280 in 1999/2000.

The domestic procurement will be considerably increased due to the production expansion and the increasing use of domestic materials instead of imported materials. In addition, the use of sub-contractors will be positively promoted as a part of the productivity improvement. These would create more job opportunities at the related industries.

3. Impact on Production

With the project, the production of PMK will increase 5.8 times from 1992/93 to 1999/2000 in nominal terms.

Table Ⅲ-4-10 Foreign Exchange Flow of PMK (At Constant Prices 1992/93)

Unit: Millions of US$ at constant 1992/93 price

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Foreign Exchange Inflows																				
Production Benefits																				
-Increase in Exports	0.00	0.00	0.00	0.87	1.39	2.14	3.23	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
-Import Savings	0.00	0.42	1.52	2.34	2.77	3.47	4.34	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97
Sub-Total	0.00	0.42	1.52	3.21	4.16	5.61	7.57	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97
Project Financing																				
-Foreign Currency Loan	2.21	5.48	1.53	1.42	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflows	2.21	5.89	3.05	4.64	4.16	6.25	7.57	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97	11.97
Foreign Exchange Outflow																				
Production Costs																				
-Imported Materials	0.58	0.70	0.88	1.10	1.30	1.56	1.92	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36
Capital Investment	2.21	5.48	1.53	1.42	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Debt Service																				
-Loan Repayment	0.00	0.00	0.00	0.25	0.85	1.02	1.18	1.18	1.25	1.25	1.25	1.25	1.01	0.40	0.23	0.07	0.07	0.00	0.00	0.00
-Interest	0.16	0.71	1.21	1.40	1.42	1.33	1.22	1.05	0.88	0.70	0.52	0.34	0.18	0.08	0.04	0.02	0.01	0.00	0.00	0.00
Sub-Total	0.16	0.71	1.21	1.64	2.28	2.36	2.40	2.24	2.13	1.95	1.77	1.60	1.19	0.48	0.27	0.09	0.08	0.00	0.00	0.00
Total Outflows	2.95	6.88	3.81	4.17	3.58	4.55	4.32	4.60	4.49	4.31	4.14	3.96	3.55	2.84	2.63	2.45	2.44	2.36	2.36	2.36
Net Foreign Exchange Flow	-0.74	-0.99	-0.57	0.47	0.59	1.70	3.25	7.38	7.48	7.66	7.84	8.01	8.42	9.13	9.34	9.52	9.53	9.61	9.61	9.61
Net foreign exhange flow during the project	116.8554				-1.57998	NPV20%	10.62330													

Table Ⅲ-4-11 Foreign Exchange Flow of PMK
(At Current Prices)

Unit: Millions of US$ at current 1992/93 price

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Foreign Exchange Inflows																				
Production Benefits																				
-Increase in Exports	0.00	0.00	0.00	1.07	1.82	2.96	4.78	6.26	6.87	7.08	7.52	7.99	8.48	9.01	9.57	10.18	10.79	11.48	12.17	12.93
-Import Savings	0.00	0.45	1.75	2.88	3.63	4.83	6.42	12.50	13.27	13.27	13.27	13.27	13.27	13.27	13.27	13.27	13.27	13.27	13.27	13.27
Sub-Total	0.00	0.45	1.75	3.95	5.45	7.81	11.18	18.76	19.94	20.35	20.79	21.26	21.75	22.28	22.84	23.43	24.06	24.73	25.44	26.20
Project Financing																				
-Foreign Currency Loan	2.21	5.58	1.62	1.58	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflows	2.21	6.03	3.37	5.53	5.45	8.57	11.18	18.76	19.94	20.35	20.79	21.26	21.75	22.28	22.84	23.43	24.06	24.73	25.44	26.20
Foreign Exchange Outflow																				
Production Costs																				
-Imported Materials	0.58	0.77	1.07	1.50	1.97	2.59	3.55	4.85	5.38	5.98	6.81	7.33	8.12	9.01	9.98	11.07	12.27	13.61	15.09	16.73
Capital Investment	2.21	5.58	1.82	1.58	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Debt Service																				
-Loan Repayment	0.00	0.00	0.00	0.25	0.87	1.05	1.22	1.22	1.31	1.31	1.31	1.31	1.08	0.44	0.28	0.08	0.08	0.00	0.00	0.00
-Interest	0.25	1.11	1.45	1.58	1.69	1.59	1.38	1.21	1.01	0.81	0.61	0.40	0.22	0.10	0.05	0.02	0.01	0.00	0.00	0.00
Sub-Total	0.25	1.11	1.45	1.82	2.55	2.64	2.60	2.43	2.32	2.12	1.91	1.71	1.28	0.54	0.31	0.10	0.09	0.00	0.00	0.00
Total Outflows	3.04	7.46	4.14	4.91	4.53	8.00	8.15	7.28	7.69	8.07	8.52	9.03	9.40	9.55	10.29	11.18	12.37	13.81	15.09	16.73
Net Foreign Exchange Flow	-0.83	-1.43	-0.77	0.62	0.93	2.57	5.03	11.50	12.25	12.28	12.27	12.22	12.35	12.73	12.55	12.28	11.70	11.12	10.35	9.47

Net foreign exhange flow during the project period(92 159.16

The present productivity level is quite low compared to that of advanced countries. The productivity per worker (added value per worker) will increase from Rs. 6.8 lakh in 1992/93 to Rs.15.5 lakh in constant prices or Rs. 24.3 lakh in current prices in 1999/2000.

To achieve international competitiveness, the improvement in productivity is essential. The productivity improvement to be achieved is the minimum level to gain competitiveness in the domestic and overseas markets.

In addition, the project will have some side effects. The capital investments include the procurement of machines within the company. This portion will generate additional demand for other units.

The expansion of production will increase the procurement of domestic parts and components. The demand for domestic suppliers will increase from Rs. 672.2 lakh in 1992/93 to Rs. 3,708.9 lakh in nominal terms in 1999/2000 for direct materials. The sub-contracting work of Rs. 217.4 lakh would be ordered from sub-contractors.

4. Impact on the Environment

There exist no specific environmental problems regarding the production of printing machinery. The factory is to be expanded within HMT's industrial site. This project would not change the nature of production from the environmental point of view.

E. Conclusions and Recommendations

The following problems are pointed out concerning the implementation of the project.

(1) Considering the risks concerning R&D and the market competition, the FIRR of 18.7% is not sufficiently high to make the investment attractive under the situation of high interest rates while the EIRR is favorably high, 33.7% for the base case.

(2) Technical collaboration is of importance in this project. To catch up with the technologies concerning four-color printing machinery, technical collaboration is essential considering the existing expertise in R&D at PMK.

(3) The investments in facilities should be accompanied by the improvement in the production control and management for the achievement of the targets in the Action Program. The work culture at PMK should also be changed to meet a highly productive system. There is plenty of room for improvement in the management system and work culture.

At the same time the following are pointed out as the positive aspects of the project.

(1) From the strategic point of view, it is considered that this investment is of significant importance.

The market shows a fair opportunity for growth. The market is shifting to multi-color machinery. HMT should take this opportunity of growing by commercializing four-color printing machinery. Without four-color printing machinery, PMK would be far behind other competitors in the future market.

(2) Without this project, PMK will not be able to expand production to meet the market demand because it is in full operation.

(3) Under the liberalizing trend of the economy in India, it is considered of high importance to foster the competi-

tiveness of key industries. As the EIRR shows, high economic benefits are expected from this project. It is considered that the current high import tariff distorts the financial viability of the project.

In conclusion, the following are pointed out.

The necessity of this project is considered to be high. It would provide HMT with the foundation for growth.

It is recommended to examine the measures necessary to increase the project viability and implement this project. The following measures are considered possible to improve the viability.

(1) To reduce the capital cost for the project.

Equity participation by the Government will reduce the average capital cost and reduce the financial burden to HMT.

(2) To support PMK's financial position for financing the project.

At the early stage of the project, PMK's long-term debts would be around 80% of total assets. The debt coverage ratio would also be worsened. This situation would continue up to the end of the 1990s. The weak financial stability should be supported by the company.

(3) The introduction of programs to support the implementation of the project

For the creation of a work culture which would accelerate the progress of the Action Program, it is recommended to introduce the Productivity Improvement Program into the workplace.

III-5. Foundries

III-5-1. Bangalore Foundry

A. Financial Analysis

1. Financial Projections

Tables III-5-1-1 to 4 show projected income statement, cash budget, and balance sheet for the Bangalore foundry, respectively, when the investment plan is implemented.

A summary of projected financial data is shown in Table III-5-1-5. Key financial ratios are as shown in Table III-5-1-6.

The sales revenue would increase approximately 7 times in nominal terms from 1992/93 to 1999/2000 as a result of the investment plan. The Bangalore foundry would produce losses on a before-tax basis for only two years after the start of the operation of the new foundry.

The ratio of operating profits to sales would be significantly improved with the investment. The ratio would sharply increase from minus at present to 20% in 1995/96 and reach 33% in 1999/2000. Operating profits as a percentage of total assets would also rise sharply after the start of operation and reach to 36% in 1999/2000 partly because sales and costs (excluding depreciation) would be influenced by inflation while the book value of fixed assets is not.

Debt service coverage ratios would be bad in early operations. Debt service coverage ratio for long-term loans would turn to be over 1.0 at the end of the 1990s.

The current ratio is at a high level. The reason may be that the incremental working capital is assumed to be financed by long-term loans for three years after the start of production and that the increase in accounts payable due to the expansion of outside sales is not considered in the assumptions.

Table Ⅲ-5-1-1 Projected Income Statement of Bangalore Foundry

Unit: Rs. Lakh (At Constant Prices 1992/93)

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Sales	846	846	846	2,308	2,664	3,020	3,376	4,088
Inhouse Sales	742	742	742	1,240	1,240	1,240	1,240	1,240
Outside Sales	104	104	104	1,068	1,424	1,780	2,136	2,848
Machining	0	0	0	0	0	0	0	0
Direct Materials	256	256	256	587	671	755	839	999
Indirect Materials	172	172	172	295	333	370	407	479
Offload Labour Cost	7	7	7	28	33	37	41	50
Value Added	412	412	412	1,398	1,628	1,858	2,089	2,560
Expenses	438	422	472	958	1,029	1,100	1,166	1,285
Personnel	229	213	195	177	182	188	193	199
Electricity & Water	99	99	99	194	222	249	277	332
Fuel	12	12	12	1	1	1	1	1
Repair & Maintenance	30	30	30	11	16	22	25	27
Machine Shop Rejection	0	0	0	0	0	0	0	0
Other Production Cost	3	3	3	7	8	9	10	12
Depreciation	0	1	65	273	273	273	271	268
Administration Expenses	65	63	67	126	139	152	165	189
Selling Expenses	0	0	0	170	188	206	223	256
Operating Profit	-26	-10	-60	440	599	759	922	1,274
Interest -Payment	5	67	295	464	459	431	382	330
Interest -Receipt	0	0	0	6	27	45	64	110
Before-Tax Profit/Loss	-30	-77	-355	-18	166	373	604	1,055

Table Ⅲ-5-1-2 Projected Income Statement of the Bangalore Foundry (at Current Prices)

Unit: Rs. Lakh

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Sales	846	916	977	2,838	3,488	4,200	4,986	6,412
Direct Materials	256	277	295	721	879	1,050	1,239	1,568
Indirect Materials	172	186	198	363	435	515	602	751
Offload Labour Cost	7	7	8	35	43	51	61	78
Value Added	412	446	476	1,719	2,131	2,584	3,084	4,014
Expenses	438	457	540	1,139	1,282	1,438	1,604	1,870
Personnel	229	230	226	218	239	261	286	312
Electricity & Water	99	108	115	238	290	347	409	521
Fuel	12	13	13	1	1	1	1	2
Repair & Maintenance	30	33	35	13	21	30	37	43
Machine Shop Rejection	0	0	0	0	0	0	0	0
Other Production Cost	3	3	4	9	11	13	15	20
Depreciation	0	1	70	302	302	302	301	297
Administration Expenses	65	69	77	152	178	206	236	287
Selling Expenses	0	0	0	205	240	278	319	388
Operating Profit	-26	-11	-64	580	849	1,146	1,480	2,144
Interest -Payment	9	157	577	881	896	832	729	633
Interest -Receipt	0	0	6	12	15	16	25	74
Profit/Loss Before Tax	-35	-167	-636	-289	-32	330	777	1,586

Table Ⅲ-5-1-3 Projected Funds Flow Statement (at Current Prices)

Unit: Rs. Lahk

		1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Cash Balance at the Beginning		0	75	75	75	75	75	75	75
Revenue		846	916	977	2,838	3,488	4,200	4,986	6,412
Expenses		872	927	1,041	2,258	2,639	3,054	3,505	4,267
Operating Profit		-26	-11	-64	580	849	1,146	1,480	2,144
Corporate Tax Payment		0	0	0	0	0	0	0	0
Working Capital at the Beginning		179	166	181	197	366	461	545	662
Working Captial at the End		166	181	197	366	461	545	662	852
Net Change in Working Capital		-12	14	16	170	94	84	118	189
Capital Investment		7	1,562	3,445	0	0	0	0	0
Depreciation Expense		0	1	70	302	302	302	301	297
Net Fixed Investment		7	1,561	3,375	-302	-302	-302	-301	-297
Cash Surplus (Deficit)		-20	-1,511	-3,380	788	1,132	1,439	1,739	2,327
Foreign Currency Borrowing	Borrowing	0	13	1,416	0	0	0	0	0
	Repayment				0	1	159	159	159
25.00%	Interest Payment	0	1	122	224	234	221	183	160
	Balance at the End	0	13	1,429	1,429	1,428	1,269	1,110	951
	Net Receipt	0	11	1,295	-224	-235	-379	-342	-319
Domestic Currency Borrowing	Borrowing	7	1,736	2,842	170	94	84	0	0
(Long-term)	Repayment				1	194	509	528	539
19.50%	Interest Payment	1	139	448	657	662	612	546	473
	Balance at the End	7	1,743	4,585	4,754	4,654	4,229	3,701	3,162
(Short-term)	Borrowing	97	91						
	Repayment	0	97	91	0	0	0	0	0
21.25%	Interest Payment	9	16	7	0	0	0	0	0
	Balance at the End	97	91	0	0	0	0	0	0
	Net Receipt	95	1,574	2,295	-488	-761	-1,037	-1,074	-1,011
Borrowing Cashflow		95	1,586	3,590	-712	-996	-1,416	-1,416	-1,331
Deposit	Deposit			141	12	76	0	274	996
(Interest Rate)	Drawing	0	0	0	0	0	36	0	0
10.00%	Interest Receipt	0	0	6	12	15	16	25	74
	Balance at the End	0	0	141	153	229	193	466	1,462
Deposit Cashflow		0	0	-135	-1	-61	52	-248	-921
Cashflow from Financing		95	1,586	3,455	-713	-1,057	-1,364	-1,664	-2,252
Cash Balance at the End		75	75	75	75	75	75	75	75

Table Ⅲ-5-1-4 Projected Balance Sheet of the Bangalore Foundry (At Current Prices)

Unit: Rs. Lakh

Items	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Material	99	107	116	220	274	325	396	510
Material in Transit	0	0	0	0	0	0	0	0
Work in Progress	33	36	39	73	92	109	132	169
Stock in Trade	33	36	39	79	98	118	141	182
Debtors	0	0	0	0	0	0	0	0
Advances Paid	0	0	0	0	0	0	0	0
Other Current Assets	30	35	70	57	61	64	70	90
Inter Unit Account	0	0	0	0	0	0	0	0
Total Current Assets	194	214	264	428	525	615	739	951
Sundry Creditors	0	0	1	1	0	0	0	0
Advances Received	0	0	0	0	0	0	0	0
Other Current Liabilities	28	33	67	61	65	70	77	99
Total Current Liabilities	28	33	68	62	65	70	77	99
Working Capital	166	181	197	366	461	545	662	852
Fixed Asset (Net)	7	1,568	4,942	4,640	4,338	4,035	3,734	3,437
Deposit	75	75	216	228	304	268	541	1,537
Total Capital Empl.	248	1,823	5,355	5,234	5,102	4,848	4,938	5,826
Sources								
H.O. Account (Equity)	134	134	134	134	134	134	134	134
H.O. Account (Loan)	0	0	0	0	0	0	0	0
Profit	10	-157	-793	-1,082	-1,114	-784	-7	1,579
Cash Credit	97	91	0	0	0	0	0	0
Term Loan (Domestic)	7	1,743	4,585	4,754	4,654	4,229	3,701	3,162
Term Loan (Foreign)	0	13	1,429	1,429	1,428	1,269	1,110	951
Total	248	1,824	5,355	5,234	5,102	4,848	4,938	5,827

Table III-5-1-5 Summary of Projected Financial Data of Bangalore Foundry (at Current Price Basis)

Unit: Rs. Lakh

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Sales Revenue	846	916	977	2,838	3,488	4,200	4,986	6,412
Profit Before Interest and Tax	-26	-11	-64	580	849	1,146	1,480	2,144
Profit Before Tax	-35	-167	-636	-289	-32	330	777	1,586
Total Assets	276	1,856	5,423	5,296	5,167	4,918	5,015	5,925

Table III-5-1-6 Key Financial Ratios of Bangalore Foundry (At Current Price Basis)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Operating Profit/ Sales	-3.1%	-1.2%	-6.6%	20.4%	24.3%	27.3%	29.8%	33.4%
Operating Profit/ Total Assets Ratio	-9.3%	-0.6%	-1.2%	11.0%	16.4%	23.3%	29.5%	36.2%
Current Ratio	2.16	2.33	7.07	10.56	12.77	12.55	16.63	25.12
Debt Service Coverage Ratio (Long-term Loan)	-58.53	-0.18	0.01	1.01	1.07	0.98	1.28	1.89
Debt Service Coverage Ratio (Total Borrowing)	-2.80	-0.04	0.02	1.01	1.07	0.98	1.28	1.89

Table Ⅲ-5-1-7 Cash Flow Table of Bangalore Foundry
(At Constant Prices)

Unit: Rs. Lakh

FIRR	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Project Capital Cost	7	1,443	3,081	127	54	40	57	95	0	0	0	0	0	0	0
Plant Capital Cost	7	1,443	3,081	0	0	0	0	0	0	0	0	0	0	0	0
Working Capital Increase				127	54	40	57	95	0	0	0	0	0	0	0
Production Cost (Increase from Project)	0	-0	0	754	951	1,148	1,341	1,705	1,704	1,704	1,704	1,704	1,704	1,704	1,704
Without Project	872	855	841	841	841	841	841	841	841	841	841	841	841	841	841
With Project	872	855	841	1,595	1,793	1,989	2,182	2,546	2,545	2,545	2,545	2,545	2,545	2,545	2,545
Sales Revenue (Increase from Project)	0	0	0	1,462	1,818	2,174	2,530	3,242	3,242	3,242	3,242	3,242	3,242	3,242	3,242
Without Project	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848
With Project	848	848	848	2,308	2,664	3,020	3,378	4,088	4,088	4,088	4,088	4,088	4,088	4,088	4,088
Net Benefit	-7	-1,443	-3,081	580	813	986	1,132	1,442	1,538	1,538	1,538	1,538	1,538	1,538	1,538

FIRR= 22.14%

2007/08	2008/09	2009/10
0	0	-848
0	0	0
0	0	-848
1,704	1,704	1,703
841	841	841
2,545	2,545	2,544
3,242	3,242	3,242
848	848	848
4,088	4,088	4,088
1,538	1,538	2,387

Salvage Value	
Building	475
Machinery	0
Working C	373
Total	848

EIRR	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Project Capital Cost	-0	1,051	1,874	102	43	32	45	76	0	0	0	0	0	0	0
Plant Capital Cost	-0	1,051	1,874	0	0	0	0	0	0	0	0	0	0	0	0
Working Capital Increase				102	43	32	45	76	0	0	0	0	0	0	0
Production Cost (Increase from Project)	0	0	0	515	653	791	928	1,182	1,182	1,182	1,182	1,182	1,182	1,182	1,182
Without Project	660	644	627	627	627	627	627	627	627	627	627	627	627	627	627
With Project	660	644	627	1,142	1,280	1,418	1,555	1,809	1,809	1,809	1,809	1,809	1,809	1,809	1,809
Sales Revenue (Increase from Project)	0	0	0	1,462	1,818	2,174	2,530	3,242	3,242	3,242	3,242	3,242	3,242	3,242	3,242
Without Project	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848
With Project	848	848	848	2,308	2,664	3,020	3,378	4,088	4,088	4,088	4,088	4,088	4,088	4,088	4,088
Net Benefit	0	-1,051	-1,874	845	1,121	1,351	1,557	1,984	2,060	2,060	2,060	2,060	2,060	2,060	2,060

EIRR= 40.24%

2007/08	2008/09	2009/10
0	0	-774
0	0	0
0	0	-774
1,182	1,182	1,181
627	627	627
1,809	1,809	1,808
3,242	3,242	3,242
848	848	848
4,088	4,088	4,088
2,060	2,060	2,834

Salvage Value	
Building	475
Machinery & Equipment	0
Working Capital	298
Total	774

2. Financial Internal Rates of Return

The incremental pre-tax financial internal rates of return (FIRR), which result from accounting for the incremental investment, sales and operating costs on a constant price basis, have been calculated for the investment plan of the Bangalore foundry. Cost and benefit streams are presented in Table III-5-1-7.

A sensitivity analysis has been undertaken to evaluate the effects of changes in basic assumptions. Results of the sensitivity analysis are shown in Table III-5-1-8.

Table III-5-1-8 Sensitivity Test on FIRR

At 1992/93 Constant Prices

	I R R
1. Base Case	22.1%
2. Sales Prices	
Up 5%	24.2%
Down 5%	19.9%
3. Production Costs	
Up 5%	21.0%
Down 5%	23.3%
4. Capital Costs	
Up 10%	20.3%
Down 10%	24.3%

The FIRR of the project is 22.14% in constant prices for the base case. Under current high interest rates in India, this ratio seems to be at a favorable, being much above the interest rates in real terms.

According to the plan, the Bangalore foundry would sell two thirds of its products to outside concerns. The possibility of the Bangalore foundry attaining that target of outside sales will have a considerable influence on the viability of the project. An additional sensitivity test has been done regarding changes in outside sales. The results are as follows.

	FIRR	EIRR
Outside Sales		
Down 10%	20.5%	37.7%
Down 20%	18.7%	35.1%
Down 30%	16.9%	32.3%
Down 40%	14.9%	29.5%

Although the break-even point of sales (around 34% in 1999/2000) would suggest a fair allowance for lower sales, it can be said a failure in the market would have a serious financial impact on the project.

B. Economic Analysis and Economic Internal Rate of Return

Incremental economic cost and benefit streams for this investment project are shown in Table III-4-7.

The economic internal rate of return (EIRR) for the strategic investment project is 40.24% (at constant prices). This is significantly higher than the FIRR. This is largely because of high import tariffs on capital goods.

The sensitivity of the base-case EIRR to changes in base-case assumptions have been tested. The results of the sensitivity analysis are shown in Table III-5-1-9. The EIRR ranges from 38% to 44%.

Table III-5-1-9 Sensitivity Test on EIRR

At 1992/93 Constant Prices

	I R R
1. Base Case	40.2%
2. Sales Prices	
Up 5%	42.7%
Down 5%	37.8%
3. Production Costs	
Up 5%	39.3%
Down 5%	41.2%
4. Capital Costs	
Up 10%	37.5%
Down 10%	43.5%

C. Assessment of Technological Viability

The production facilities of the Bangalore foundry have become superannuated and require total replacement. The factory building is also too old to use.

For a new foundry, two alternatives, the renovation of the existing plant and the construction of a new plant, were examined, which resulted in the proposal of the construction

of new foundry plant at the site adjoining the present plant in the Action Program. This is due to the following.

- The building structure should be extended and reinforced for the installation of high-capacity cranes. The factory building also requires thorough repair. The construction cost of a new building would not be high compared with the cost required for the renovation of the existing plant.

- In the case of renovation, almost all the facilities would have to be removed for the installation of machinery and equipment. During the construction period, the operation would have to be stopped.

- The renovation of the complete process of the operation from sand preparation to fettling is required to establish an efficient production system. Therefore, limited or gradual investment is not recommended.

The existing plant is to be used for such processes as machining and fettling.

The machinery and equipment have been selected to secure the production capacity of 1000 tons per month, which will meet the sales plan in the Action Program.

The technologies to be introduced also aim at improvement in the quality level of castings. Castings of higher quality are demanded by machine tool units in HMT as the market of machine tools shifts to high-quality machines. The requirements for high quality casting will increase for outside customers, especially overseas customers.

As a result, it is proposed to introduce the Furan sand molding system into the Bangalore foundry. The facilities to improve the efficiency of production are to be installed to realize the targeted expansion of production.

The technologies to be introduced are considered adequate for the level of the Bangalore foundry. There would be no problem in acquiring the necessary expertise to utilize the new facilities while the training of engineers and workers would be necessary at the construction stage.

D. Impact of the Project on Other Aspects

1. Impact on Foreign Exchange

In the Action Program, the positive sales to overseas customers is envisaged considering the price competitiveness of Indian castings and their increasing demand for procurement from abroad.

Net foreign exchange savings have been calculated on a constant price basis assuming 10% of outside sales are directed to export. The results are shown in Table III-5-1-10. The net foreign exchange inflow at constant prices is US$ 5.45 million over the life of the project. The net present value of foreign exchange inflow deducted by 20% is Rs. 1.43 million.

2. Impact on Employment

The flow of the number of workers is shown in Table II-5-1-8.

The number of workers to be recruited is far less than the number of retiring workers. In total, the number of workers employed will decrease from 381 in 1992/93 to 270 in 1999/2000.

It can be said that the project would increase employment compared with the case of the project not being implemented. In that case, new workers to be recruited would be kept at a minimum level to maintain the production and supply castings to MTB although a large number of workers would leave at retirement age.

3. Impact on Production

With the project, the production of the Bangalore foundry will increase from the present 3,000 tons per year to 12,000 tons per year in 1999/2000.

The annual production per worker will increase from 8 tons in 1992/93 to 44 tons in 1999/2000. Value added

Table Ⅲ-5-1-10 Foreign Exchange Flow of Bangalore Foundry
(At Constant Prices 1992/93)

Unit: Millions of US$ at constant 1992/93 price

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Foreign Exchange Inflows																		
Production Benefits																		
-Increase in Exports	0.00	0.00	0.00	0.41	0.55	0.69	0.83	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
-Import Savings																		
Sub-Total	0.00	0.00	0.00	0.41	0.55	0.69	0.83	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Project Financing																		
-Foreign Currency Loan	0.00	0.05	4.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflows	0.00	0.05	4.87	0.41	0.55	0.69	0.83	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Foreign Exchange Outflow																		
Production Costs																		
-Imported Materials	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Debt Service																		
-Loan Repayment	0.00	0.00	0.00	0.00	0.01	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.54	0.00	0.00	0.00	0.00
-Interest	0.00	0.00	0.35	0.70	0.70	0.66	0.58	0.51	0.43	0.35	0.27	0.19	0.12	0.04	0.00	0.00	0.00	0.00
Sub-Total	0.00	0.00	0.35	0.70	0.71	1.21	1.13	1.05	0.97	0.90	0.82	0.74	0.66	0.58	0.00	0.00	0.00	0.00
Total Outflows	0.00	0.00	0.35	0.70	0.71	1.21	1.13	1.05	0.97	0.90	0.82	0.74	0.66	0.58	0.00	0.00	0.00	0.00
Net Foreign Exchange Flow	0.00	0.04	4.51	-0.29	-0.16	-0.52	-0.30	0.05	0.13	0.21	0.28	0.36	0.44	0.52	1.10	1.10	1.10	1.10

Net foreign exhange flow during the project9.879438 NPV20% 2.832539

Table Ⅲ-5-1-11 Foreign Exchange Flow of Bangalore Foundry (At Current Prices)

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Foreign Exchange Inflows																		
Production Benefits																		
-Increase in Exports	0.00	0.00	0.00	0.51	0.72	0.98	1.22	1.73	1.83	1.95	2.07	2.20	2.33	2.48	2.63	2.79	2.97	3.15
-Import Savings																		
Sub-Total	0.00	0.00	0.00	0.51	0.72	0.98	1.22	1.73	1.83	1.95	2.07	2.20	2.33	2.48	2.63	2.79	2.97	3.15
Project Financing																		
-Foreign Currency Loan	0.00	0.05	5.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflows	0.00	0.05	5.47	0.51	0.72	0.98	1.22	1.73	1.83	1.95	2.07	2.20	2.33	2.48	2.63	2.79	2.97	3.15
Foreign Exchange Outflow																		
Production Costs																		
-Imported Materials	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Debt Service																		
-Loan Repayment	0.00	0.00	0.00	0.00	0.01	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.00	0.00	0.00	0.00
-Interest	0.00	0.01	0.47	0.87	0.90	0.85	0.71	0.62	0.52	0.43	0.33	0.24	0.14	0.05	0.00	0.00	0.00	0.00
Sub-Total	0.00	0.01	0.47	0.87	0.91	1.47	1.32	1.23	1.14	1.04	0.95	0.85	0.76	0.66	0.00	0.00	0.00	0.00
Total Outflows	0.00	0.01	0.47	0.87	0.91	1.47	1.32	1.23	1.14	1.04	0.95	0.85	0.76	0.66	0.00	0.00	0.00	0.00
Net Foreign Exchange Flow	0.00	0.04	5.00	-0.36	-0.19	-0.51	-0.10	0.49	0.70	0.90	1.12	1.34	1.58	1.82	2.63	2.79	2.97	3.15
Net foreign exhange flow during the project			23.39															

per worker will increase from Rs. 1.1 lakh in 1992/93 to Rs. 9.5 lakh in 1999/2000 at constant prices and Rs.14.9 lakh at current prices.

With this project the productivity of the Bangalore foundry would improve significantly and the Bangalore foundry could obtain a level of competitiveness high enough to enable outside sales.

4. Impact on the Environment

The introduction of the new system would significantly reduce the existing pollution level. The introduction of the sand reclamation/reconditioning system would reduce dust in the workshop. Air pollution control would be improved through the project.

E. Conclusions and Recommendations

The following problems are pointed out concerning the implementation of the project.

(1) The Bangalore foundry will largely depend on outside customers for sales.

In the action plan, outside sales are estimated to increase from 400 tons per year in 1992/93 to 7,200 tons in 1999/2000.

To achieve this target, improvement in quality and active sales promotion activities are required.

At this moment there exists an uncertainty regarding market prospects.

(2) The debt burden would be big at the earlier years of the project.

(3) It will be necessary to take more stringent counter-measures against pollution.

This project will improve the pollution situation but

more consideration should be made as production volume increases.

On the other hand, the following are pointed out as the positive aspects of the project.

(1) Existing facilities are too old. Productivity will continue to decline and more and more repairs will be necessary every year just to maintain the current production level.

(2) On the other hand, it is not advantageous that the machine tool production fully depends on outside suppliers for castings because it would lose bargaining power without in-house production capability.

Once HMT stops casting production, the prices of outsourced castings would naturally go up.

(3) There exists a fairly high potential of casting exports.

Although there are problems concerning export promotion such as strict requirements as to quality, transportation to the ports, and expensive Indian scrap steel, HMT has a high possibility of gaining international competitiveness and, thus, orders from abroad.

(4) The project would improve working conditions at the workplace and increase workers' morale.
The present working conditions, which are dangerous, dusty and dark, are not favorable for workers. This should be improved.

(5) Technologies acquired through this investment will be diffused to other foundries in HMT, which will contribute largely to raising the technology level of all of the foundries.

In conclusion, the following are pointed out.

The necessity of this project is considered to be high considering the fact that all the foundries in HMT should be updated and become one of the business groups which constitute the future HMT and that this project is positioned as

the establishment of a model foundry.

It is recommended to examine the measures necessary to increase the project viability and implement this project. The following measures are considered possible to improve the viability.

(1) To reduce the capital cost for the project

Equity participation by the Government will reduce the average capital cost and reduce the financial burden to HMT.

(2) To reinforce the marketing force and develop active market promotion activities

(3) To take measures for technology improvement to satisfy outside customers

(4) To conduct a further study on the influence on the environment and take proper measures for pollution control.

III-5-2. Pinjore Foundry

A. Financial Evaluation

1. Financial Projections

Based on the estimate of revenues and costs, which are discussed in Chapter II-5, an income and cost forecast was calculated. This forecast covers two cases; one is a base case which is based on constant prices of 1992/93 and the other is an escalation case which is based on escalated prices. Tables III-5-2-1 and III-5-2-2 give the basic case and the escalation case, respectively. The flow of funds of the strategic investment based on the escalation case is projected in Table III-5-2-3.

Summary of the financial projections is given in Table III-5-2-4. Key financial ratios are shown in Table III-5-2-5.

Table III-5-2-4 Summary of Financial Projections

(100 thousand Rupees at current prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Sales Revenue	1,367	1,481	1,735	3,023	4,069	4,777	5,559	6,431
Profit before Int. & Tax	213	96	-88	208	543	764	1,003	1,293
Profit before Tax	213	-67	-681	-694	-435	-218	87	464

Table III-5-2-5 Key Financial Ratios

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Operating Profit /Sales	15.6%	6.5%	-5.1%	6.9%	13.4%	16.0%	18.0%	20.1%
Debt Service Coverage Ratio (L-T Loan)	n.a.	1.4	0.2	0.7	0.9	0.8	1.0	1.3
Debt Service Coverage Ratio (Total Borrowg)	n.a.	4.9	0.2	0.7	0.6	0.5	0.5	0.6

As a result of the investment, the sales revenue would increase approximately 4.7 times between 1992/93 and 1999/2000 as given in Table III-5-2-4. Although Pinjore foundry would operate at a deficit through 1997/98, it would run in to the black in 1998/99, and continue to increase its profit.

Based on the debt service coverage ratios shown in Table III-5-2-5, it can be asserted that the project will not generate revenue which is sufficient to cover payments of interest and current maturities of principal on outstanding debt.

Table III-5-2-1 Projected Income Statements (Basic Case)
(100 thousand Rupees at constant prices)

HMT-MTP FOUNDRY PROJECT
HISTORICAL AND PROJECTED INCOME STATEMENTS
- WITH PROJECT CASE -
(100 thousand rupee at constant prices)

	(actual) 1990/91	(prelim) 1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
OPERATING REVENUES										
Net Sales Revenues	910	1,120	1,367	1,367	1,504	2,458	3,109	3,434	3,768	4,101
MATERIALS										
Direct Material	542	570	618	618	688	1,250	1,581	1,747	1,918	2,086
Indirect Material	52	52	58	58	58	67	54	53	60	53
Total Materials Cost	594	622	675	675	743	1,317	1,635	1,800	1,978	2,140
Value Added	316	498	692	692	760	1,140	1,473	1,634	1,790	1,962
OPERATING COSTS										
Utilities	159	181	198	198	215	370	475	528	580	634
Repairs	3	3	3	3	3	3	3	3	3	3
Depreciation	21	32	28	147	374	371	381	379	377	376
Other Exp.	12	14	15	15	18	27	27	34	40	44
Personnel Exp.	172	202	225	237	240	231	219	204	189	173
Selling Exp.	10	10	11	11	11	12	15	17	18	21
Total Operating Cost	377	442	479	609	859	1,015	1,121	1,166	1,206	1,250
NON-OPERATING COSTS										
Interest Charges	30	40	-0	88	380	581	588	571	529	473
Profit before Tax	-91	16	213	-5	-479	-455	-235	-102	53	239

Table III-5-2-2 Projected Income Statements (Escalation Case)

(100 thousand Rupees at current prices)

HMT-MTP FOUNDRY PROJECT
HISTORICAL AND PROJECTED INCOME STATEMENTS
- WITH PROJECT CASE -
(100 thousand rupee at current prices)

	(actual) 1990/91	(prelim) 1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
OPERATING REVENUES										
Net Sales Revenues	910	1,120	1,367	1,481	1,735	3,023	4,069	4,777	5,559	6,431
MATERIALS										
Direct Material	542	570	618	670	791	1,537	2,069	2,430	2,828	3,272
Indirect Material	52	52	58	61	68	83	71	74	88	83
Total Materials Cost	594	622	675	731	858	1,620	2,140	2,504	2,916	3,355
Value Added	316	498	692	750	878	1,403	1,929	2,273	2,642	3,076
OPERATING COSTS										
Utilities	159	181	196	213	246	455	622	735	857	994
Repairs	3	3	3	4	4	4	4	5	5	5
Depreciation	21	32	29	153	406	403	417	415	413	411
Other Exp.	12	14	15	16	19	33	36	47	59	70
Personnel Exp.	172	202	225	256	277	284	287	284	279	271
Selling Exp.	10	10	11	12	13	15	20	24	27	32
Total Operating Cost	377	442	479	653	968	1,195	1,385	1,509	1,840	1,783
NON-OPERATING COSTS										
Interest Charges	30	40	-0	163	592	902	979	982	918	829
Profit before Tax	-91	16	213	-67	-681	-894	-435	-218	87	464

Table III-5-2-3 Projected Funds Flow Statements (Escalation Case)

(100 thousand Rupees at current prices)

HMT-MTP FOUNDRY PROJECT
HISTORICAL AND PROJECTED FUNDS FLOW STATEMENTS
(100 thousand rupee at current prices)

	(prelim) 91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
SOURCES									
Operations									
Retained Income	18	213	-67	-681	-894	-435	-218	87	484
add: Depreciation	32	29	153	408	403	417	415	413	411
Foreign LT Interest	0	0	129	356	480	491	452	372	324
Domest. LT Interest	0	0	44	237	391	403	385	342	298
ST Interest	40	-0	-10	0	31	85	145	201	207
Cash Generated by Operations	88	242	249	317	611	980	1,179	1,416	1,705
Long-Term Borrowing									
Foreign Currency Borrowing	0	0	1,155	1,908	0	0	0	0	0
Domestic Loans	0	0	558	2,223	0	229	0	0	0
Total Long-Term Borrowing	0	0	1,714	4,129	0	229	0	0	0
Short-Term Loans	110	-112	0	0	394	667	1,196	1,407	1,276
Other Sources	0	0	0	0	0	0	0	0	0
Total Sources	198	130	1,963	4,446	1,005	1,876	2,375	2,823	2,981
APPLICATIONS									
Fixed Capital Investments	0	0	1,903	3,834	0	229	0	0	0
Increase in Working Capital	17	20	9	20	103	84	57	83	70
Foreign LT Debt Service									
Interest	0	0	129	356	480	491	452	372	324
Repayments	0	0	0	0	0	128	340	340	340
Total Foreign LT Debt Service	0	0	129	356	480	619	792	712	664
Domest. LT Debt Service									
Interest	0	0	44	237	391	403	385	342	298
Repayments	0	0	0	0	0	62	309	309	335
Total Domest LT Debt Service	0	0	44	237	391	465	694	651	632
Short-Term Debt Service									
Interest	40	-0	-10	0	31	85	145	201	207
Repayments	141	110	-112	0	0	394	667	1,196	1,407
Total Short-Term Debt Service	181	110	-122	0	31	479	832	1,397	1,614
Total Applications	198	130	1,963	446	1,005	1,876	2,375	2,823	2,981

B. Financial Internal Rate of Return

1. Method and the Result of FIRR

In order to appraise the profitability of the project, both the financial internal rate of return method and the economic internal rate of return method are used. The net cash flow of the project case (with project case) is compared with that of the non-project case (without project case). For calculation purposes, the period of the project is assumed to be 15 years after the last capital investment is made in 1996/97, and at the end of the project, invested fixed assets are assumed to be resold at the book values. Working capital, also, is assumed to be completely paid back.

Net cash flows of the project and the resulting financial internal rate of return are shown in Table III-5-2-6. As shown in the table, the financial internal rate of return for the project is considered to be 9.44 percent.

Table III-5-2-6 Cash Flow Analysis (FIRR)
(100 thousand Rupees)

HMT-NTP FOUNDRY PROJECT

CASHFLOW ANALYSIS - FIRR

(100 thousand rupee)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Project Capital Costs																						
Plant Capital Costs	0	0	0	1,809	3,445	0	175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Working Capital	0	0	0	0	11	76	52	26	27	27	0	0	0	0	0	0	0	0	0	0	0	-219
Sub Total	0	0	0	1,809	3,456	76	227	26	27	27	0	0	0	0	0	0	0	0	0	0	0	-219
Total Costs w/o Interest & Depr.																						
Without Project	950	1,032	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125
With Project	950	1,032	1,125	1,137	1,229	1,981	2,375	2,587	2,807	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014
Increase in Total Costs	0	0	0	12	104	835	1,250	1,461	1,682	1,889	1,889	1,889	1,889	1,889	1,889	1,889	1,889	1,889	1,889	1,889	1,889	1,889
Sales Revenue Increase																						
Without Project	910	1,120	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367	1,367
With Project	910	1,120	1,367	1,367	1,504	2,458	3,109	3,434	3,766	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101
Increase in Sales Revenue	0	0	0	0	137	1,090	1,741	2,067	2,399	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734
Net Benefit	0	0	0	-1,821	-3,423	179	265	579	891	818	845	845	845	845	845	845	845	845	845	845	845	1,064

FIRR: 9.44%

2. Sensitivity Analysis

The financial internal rate of return of the project will depend upon such factors as quantity of sales, sales prices, input costs, investment amounts, and the like. Recognizing these causal relationships, financial internal rates of return of the project under alternative conditions are calculated. The result of the calculation is as follows:

Table III-5-2-7 Sensitivity Analysis of FIRRs

Factors	Conditions	FIRR
Base Case		9.44%
Sales Prices	increase by 5%	11.67%
Sales Prices	decrease by 5%	7.00%
Investments	increase by 10%	8.17%
Investments	decrease by 10%	10.91%
Input Costs	increase by 5%	7.75%
Input Costs	decrease by 5%	11.04%

C. Economic Internal Rate of Return

1. Method and the Result of EIRR

In order to appraise how much the project would contribute to the Indian economy on the whole, an economic feasibility analysis using the economic internal rate of return method is done.

Financial cash flow is converted to economic cash flow as per the assumptions discussed before.

Net cash flow of the project and the resulting economic internal rate of return are shown in Table III-5-2-8. The economic internal rate return for the project turned out to be 28.71 percent.

Table III-5-2-8 Cash Flow Analysis (EIRR)
(100 thousand Rupees)

HNT-MTP FOUNDRY PROJECT

CASHFLOW ANALYSIS - EIRR

(100 thousand rupee)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Project Capital Costs																						
Plant Capital Costs	0	0	0	1,035	2,014	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Working Capital	0	0	0	0	11	76	52	26	27	27	0	0	0	0	0	0	0	0	0	0	0	-219
Sub Total	0	0	0	1,035	2,025	76	172	26	27	27	0	0	0	0	0	0	0	0	0	0	0	-219
Total Costs w/o Interest & Depr.																						
Without Project	728	796	869	869	869	869	869	869	869	869	869	869	869	869	869	869	869	869	869	869	869	869
With Project	728	796	869	881	948	1,467	1,761	1,909	2,062	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206	2,206
Increase in Total Costs	0	0	0	12	78	598	891	1,039	1,193	1,337	1,337	1,337	1,337	1,337	1,337	1,337	1,337	1,337	1,337	1,337	1,337	1,337
Sales Revenue Increase																						
Without Project	910	1,120	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387
With Project	910	1,120	1,387	1,387	1,504	2,458	3,109	3,434	3,786	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101	4,101
Increase in Sales Revenue	0	0	0	0	137	1,090	1,741	2,067	2,399	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734
Net Benefit	0	0	0	-1,047	-1,966	416	678	1,002	1,180	1,371	1,397	1,397	1,397	1,397	1,397	1,397	1,397	1,397	1,397	1,397	1,397	1,816

EIRR: 28.71%

2. Sensitivity Analysis

Economic internal rates of return of the project under alternative conditions are calculated. The result of the calculation is as follows:

Table III-5-2-9 Sensitive Analysis of EIRRs

Factors	Conditions	EIRR
Base Case		28.71%
Sales Prices	increase by 5%	31.06%
Sales Prices	decrease by 5%	26.25%
Investments	increase by 10%	26.54%
Investments	decrease by 10%	31.23%
Input Costs	increase by 5%	27.46%
Input Costs	decrease by 5%	29.93%

D. Technology Assessment

The production engineering technology in the field of foundry has advanced tremendously in recent years in advanced countries, while at PRH, obsolete production facilities and less advanced engineering technology have been used since its inception in 1964. The quality of products as well as price competitiveness of Pinjore Foundry are relatively poor, and it may not survive without introduction of modern automated machinery as well as advanced technologies. Recognizing the present circumstance, the investment program of Pinjore Foundry has been formulated.

Some of the major machinery in the investment are one furan sand system and one impact molding system. In particular, the impact molding system is the most advanced molding system with very high productivity which is approximately 5.4 times as much as that of the present molding facility. In line with the investment, the renovation of the complete cycle of the operation from sand preparation to fettling is proposed. This investment also pays much attention to the environmental protection through introduction of the enclosed sand transfer system and the enclosed fettling mechanism with dust control system.

With the above investment, Pinjore Foundry could increase the output approximately 3.2 times from 3,720 tons/year in 1992/93 to 12,000 tons/year in 1999/2000. This would enable them to suffice about 39 percent of the in-house requirement for the production of tractors.

E. Impact Analysis

The project would have various effects on HMT, from financial as well as management viewpoints.

1. Impact on Foreign Exchange

Table III-5-2-10 shows the flow of foreign exchange until 1999/2000 at current prices, while table III-5-2-11 summarizes those impacts in foreign exchange through the project period. As shown in Table III-5-2-11, the amount of accumulated foreign exchange makes a total of negative 7,920 Lakh Rupees through the period. Net present value of the accumulated foreign exchange discounted at the real interest rate of foreign long term loan turns out to be negative 3,715 Lakh Rupees. From these figures, it is assumed that the project would not contribute improvement of the foreign exchange position of the company. However, supply of quality casting products would enable the final products to become internationally competitive, thus would earn the foreign exchange.

2. Impact on Employment

The investment project would reduce the number of workers from 459 in 1992/93 to 354 in 1999/2000 as a result of higher productivity to be achieved by the introduction of modern production facilities as well as modern technologies.

3. Impact on Production

Per worker output would be dramatically improved from 8.1 tons in 1992/93 to 33.9 tons in 1999/2000. This significant improvement of productivity may give price competitiveness to Pinjore Foundry over competitors.

4. Impact on Environment

This investment project considers environmental protection through introduction of the enclosed sand transfer system as well as the enclosed fettling mechanism with dust control system.

Table III-5-2-10 Flow of Foreign Exchange
(100 thousand Rupees at current prices)

HMT-MTP FOUNDRY PROJECT
FOREIGN EXCHANGE FLOW ANALYSIS
(100 thousand of rupee at current prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
Foreign Exch. Rec.								
Export	0	0	0	0	0	0	0	0
L-T Borrowing	0	1,155	1,906	0	0	0	0	0
Total F.E. Receipt	0	1,155	1,906	0	0	0	0	0
Foreign Exch. Pay't								
Capital Invest.	0	898	1,584	0	0	0	0	0
Parts & Equip.	0	0	0	0	0	0	0	0
Foreign L-T Debt Svc.	0	129	356	480	619	792	712	664
Total F. E. Pay't	0	1,026	1,940	480	619	792	712	664
Net Foreign Exch. Flow	0	-1,026	-1,940	-480	-619	-792	-712	-664

Table III-5-2-11 Flow of Foreign Exchange
(100 thousand Rupees at constant prices)

HMT-MTP FOUNDRY PROJECT

FOREIGN EXCHANGE FLOW ANALYSIS

(100 thousand of rupee at constant prices)

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/2000	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Foreign Exch. Rec.																				
Export	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L-T Borrowing	0	1,028	1,745	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total F.E. Receipt	0	1,028	1,745	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Exch. Pay't																				
Capital Invest.	0	881	1,496	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parts & Equip.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign L-T Debt Svc.	0	73	271	396	502	665	622	578	534	490	446	402	358	208	0	0	0	0	0	0
Total F. E. Pay't	0	954	1,767	396	502	665	622	578	534	490	446	402	358	208	0	0	0	0	0	0
Net Foreign Exch. Flow	0	-954	-1,767	-396	-502	-665	-622	-578	-534	-490	-446	-402	-358	-208	-0	-0	-0	-0	-0	-0

Accumulated Foreign Exchange: -7,920

F. Conclusions and Recommendations

The financial internal rate of return of the strategic investment project for the Pinjore Foundry is as low as 9.4%, and the economic internal rate of return is 28.7%. These figures are both the lowest among the proposed strategic investment projects. This is mainly because of the current availability of the casting parts for tractors from good external sources with reasonable prices. The viability of the project should thus be judged not from the financial viability of the project but from the view of the availability of casting parts of tractors from the external sources even after the increase of production volume of TRP.

IV. RECOMMENDATION

For the attainment of the long-term corporate mission and objectives of HMT, the implementation of the proposed physical and organizational restructuring is essential.

Specifically, the early implementation of the proposed strategic investment programs is highly desired, for which the support of domestic and international financing organizations is indispensable. The financial and economic evaluation results show that all of the proposed projects are viable both independently and collectively.

The modernization of production facilities of HMT should proceed not only with the purpose of increasing production capacities or efficiencies, but also with the clear purposes of both (1) making HMT factories "showrooms" of modern production technologies and (2) accumulating production technologies by developing major machinery and equipment needed for modernization within the company.

Together with the implementation of the modernization investments, the proposed organizational restructuring of HMT with the purpose of productivity improvements has to be conducted, for which the political support of the Indian government by giving higher autonomy to HMT management is required. The privatization of HMT would be one of the most practical solutions for this purpose.

For the attainment of the long-term growth targets, the total funds requirement of the HMT Group during the long-term plan period is much higher than that of the total of strategic investment projects. In order to enable smooth fund raising to cover these costs, the increase of paid-up capital of HMT by a considerable amount is needed. The gradual privatization of HMT through the sale of increased equity to the public through the capital stock exchange market would also achieve this goal.