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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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Industrial Feasibility Studies

21790

MANUFACTURING OF GEAR BOXES IN INDIA

IND/012/M/90-02

IPO
Industrial Promotion Office - Milan

112p.
tables
graphs
diagrams

FEASIBILITY STUDY

OF A JOINT-VENTURE INDUSTRIAL PROJECT FOR THE

PRODUCTION OF GEAR BOXES IN INDIA

IND/012/M/90-02

March, 1996

Feasibility Study

of a Joint-Venture
Industrial Project for the

Production of Gear Boxes
in India

IND/012/M/90-02

This Feasibility Study was carried out on behalf of UNIDO
by a Project Team whose components were:

- Mr. Sauro Mezzetti, Project Leader and Industrial Economist
- Mr. Leo Girotti, Industrial Engineer
- Mr. Claudio Lorenzoni, Market Analyst
- Mr Andrea Baldoni, Financial Analyst
- Mr Paul Richardson, Financial Analyst

Milan, March 1996

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CHAPTER 1 : EXECUTIVE SUMMARY

1.1 Introduction

The present study was developed by a study team under the auspices of UNIDO according to the Project Completion Facility and co-ordinated by the Industrial Promotion Office in Milan, Italy. The study was requested by the Italian company in order to assess the viability of a Joint Venture project for the manufacturing of gear boxes in India.

1.2 Project Background and Basic Idea

The aim of the project is to manufacture gear boxes for the Indian market. It is a domestic oriented project. Some export activity will be undertaken by the JV but on a commercial scale and not with the products directly manufactured.

The basic parameter of the project is to analyse the competitiveness of the products manufactured in India for the local market in terms of price, quality, delivery and technical performance. Another parameter to consider is the competitiveness of the product in comparison with international prices, that are presently lower than in India.

The Joint-Venture will be realised as an equal partnership and the promoters will strive to also involve the local and European financing institutions.

The product manufactured will be WORM GEAR, HELICAL GEAR and CO- AXIAL GEAR BOXES.

The promoters of the project are STM s.p.a. from Italy. A company established in 1975, with a turn-over of 37 billion ITL in 1995. The company experienced rapid growth from being a small artisanal unit, to being the leading holder of a cluster of various companies operating in power transmission.

The Indian partner is TRINA ENGINEERING from New Delhi, a family concern operating in this sector since 1967. In the last few years, TRINA incorporated itself as a limited concern and is now growing rapidly by undertaking some export activities.

1.3 The Market

Gear boxes are a product quite commonly used in the Indian market and are utilised by various industries. Therefore, in order to determine the size of the effective demand, it was decided to analyse the present end user consumption. This has been accomplished by a mix of desk research and field survey.

While the research work was relevant to evaluate the size of the total consumption, the field survey provided a deeper insight in order to have a more accurate estimation of the specific demand for the different types of gear-boxes. It also yielded performance aspects which were helpful in elaborating a market strategy as well as providing an idea of how far TRINA-STM products could penetrate the market. The field survey was also very relevant to understanding the standard marketing requirements and operations.

After the determination of the total demand, the future trend was forecasted by:

1. analysing the estimates collected from various materials for the desk work;
2. analysing the trend of demand for gear boxes in the past few years and its correlation or discrepancies from previous forecasts;
3. growth trend expected for a few of the end user sectors, selected among the most relevant ones.

For the determination of the end-user sectors, it was necessary to ascertain the likely differences in the sector-wise consumption of STM products in India in comparison with the European pattern. In this regard, it has been noted that the project sector and textile machine manufacturers have a higher share in market demand than in Europe.

The market size has been based mainly on value because quantitative data in this area is more reliable. However, some crude estimation of the number of units presently sold in the Indian market has been done in order to understand the share of the various sizes and types of gear boxes.

The present market consumption has been estimated at around 2 billion Rupees in term of value and more than 400,000 units per annum. The market is expected to grow and begin to stabilise in five years at around 3.2 billion Rupees.

The market share of TRINA-STM is estimated at 4% in the initial year of the project and will exceed 6% at regime. The overall marketing mix will allow TRINA- STM to have even a higher market share of up to 13-20%. But we preferred a lower level of market penetration, taking into consideration possible contingencies and the plant capacity that has been selected in order to optimise the ratio between investment in machines and output.

The favourable marketing mix is given by the fact that it will be possible to sell at competitive prices, and to have quick delivery and new technology and design. The sales and revenue plan have been prepared by identifying the pattern of consumption and by selecting five products as a general exemplification.

Since the location of the project is in Northern India, the marketing strategy will be based on the creation of two sales points in Western and Southern India which are the major centres of

consumption. Moreover there will be organisation of seminars, participation in trade fairs and advertisements in the general and specialised press. All these costs amount to lower than 1% of the total sales revenue. The marketing strategy also envisages the creation of a sales network with dealers and personnel also trained for after-sales service. As an alternative, however, it could be possible to join with a larger commercial company with sales and distribution networks throughout India.

1.4 Raw Materials

Gear and gear boxes are manufactured from casted mould and die, with the exception of a few commercial parts. The cost of mould and die is quite cheap in India and competitive even for export. However, the processing cost for manufacturing them into components is high, due to the old type of machines used. Therefore, the cost is cheaper if the incidence of material is higher. This creates a situation where for small size model the processing cost is relatively high compared to that of materials and final costs of components would be more expensive than in Italy. On the other side for bigger size model the relative incidence of processing is less and the cost of the single components is cheaper if made in India than in Italy.

However, the decision has been made to manufacture the full range of worm gear, helical worm and co-axial gear in India, both for the convenience of production planning and to take advantage of the low cost of local components. Thus, the JV company will be able to enter the market with competitive prices as envisaged in the market analysis.

As far as other input costs are concerned, there is just the electricity charge which is forecasted at an installed capacity of 150 Kwh at an annual cost of 135,000 Rs. However, the cost is likely to be lower due to the availability of concessions which are available from the local government.

The supply program will be organised in order to have a component stock for one month with a mobilisation of capital changing from 3.8 million Rupees in the initial year, to 7.1 million Rs. at regime.

1.5 Site, Location and Environment

The location of the project will be in the State of Haryana, near the administrative border with Delhi, the capital of India. This combines three relevant advantages:

1. the location in the capital with all the related infrastructural facilities, including the international airport and also rail and road services for domestic transport of goods;
2. the possibility of obtaining incentives for industrial development;
3. the opportunity of having lower prices for renting or purchasing land and industrial buildings in comparison to the metropolitan area. In this case, the cost of land or the rental value are more than half than in Delhi proper.

There are incentives for new projects available from the Haryana government that are mainly related to investment and fiscal concessions. The environmental impact is minimal because the

project is located in an industrial park with all the related infrastructural facilities and does not involve discharge of any particular effluent.

Alternative locations were briefly analysed, but considered not viable because it would have involved the transfer of all the TRINA facilities operating from Delhi

1.6 Engineering

The project will require a total land surface of 121 000 sq. ft. and 39 600 of sq. ft.

Production equipment consists mainly of both machine tools and CNC. Part of the equipment is locally available and will be purchased in the domestic market. The total investment for domestic equipment is estimated at 9,700,000 Rs. Other equipment, especially the most automatic, will be imported from Italy at a value corresponding to approximately 29,500,000 Rs. The imported machines will be procured by STM. The value will be partly adjusted as equity participation and partly reimbursed by the Joint Venture company.

The production process consists of production of components, assembly and testing and will require a total number of 42 operators in two shifts plus 8 engineers.

1.7 Human Resources

The company staff is basically divided between the Finance and Administration Department and the Operation Department. Each has its own director, directly responsible to the Managing Director. The Finance and Administration Department covers the account activities, the management of personnel and the general services. Account activities include also all the tax, fiscal and customs procedures. The Finance and Administration Department account for 1/5 of people employed and 23 % of the personnel cost.

The Operation area employees comprise the largest part of the staff and it includes the following areas of operations: Material, Engineering, Production, Quality Control and Marketing.

Overall the total number of people employed is...

Training of personnel will take place in a period of two years time and will be related to the following areas:

1. Marketing and sales
2. Assembling, testing and final inspection
3. Training as per manufacturing process of components including training on imported machines.

Part of the training will take place in Italy where the general transmission of technical knowledge, design, procurement and selection of proper material can be controlled. The training will require two weeks per man for the five Operation employees. Total cost of training in Italy will be 23.5 million Italian Lire.

The remaining training will take place in India and will require the presence of Italian staff for commercial and technical training for a period of six months in two years time. The total cost of training in India will be 379 million Italian Lire.

1.8 Overhead Costs

The following overhead costs (reported in Table X.4) have been considered in the Study:

- Factory Overhead costs
- Administrative Overhead costs
- Marketing Overhead costs.

1.9 Implementation Planning And Budgeting

The whole implementation process has been divided into three main phases:

1. Pre-Investment Phase: started in 1994; preliminary studies have been prepared which have been used as input data for the present Feasibility Study.
2. Investment Phase, including the construction period and the pre-production and training period: this phase will begin in January 1996 with negotiation and contracting for financial assets and all construction activities.
3. Operational Phase: the operational (production) phase will start, after the completion of construction period, with the commissioning of the plant and pre-production trial, as well as after a successful multi-functional training program. That is foreseen for the beginning of 1997.

1.10 Financial Analysis And Investment Appraisal

The project analysed is considered feasible from the economic and financial point of view, even when viewed from unfavourable conditions. The financial evaluation has been carried out assuming a basic situation defined by the cost estimates summarised in the previous paragraphs. The base version of the investment presents a 0% inflation rate. COMFAR printouts are included as appendices.

The base consideration shows:

- an Internal Rate of Return (IRR) of the investment of about 42% - 27 points higher than the posted discount rate.
- a positive NPV of 6,580 Million ITL (131 million IRs).
- the discounted cumulated cash flow becoming positive from the third year of production onwards, thus limiting the discounted payback period to less than 5 years from the beginning of the investment.
- the operational margin reaches about 31% of the gross sales in 2001, maintaining this value until the end of the project life.

- break-even ratio levels of about 20% of operating capacity (year 2001 onwards).

Following these results and after verifying the implementation status and on the base of a careful assessment of the quantitative and qualitative aspects of the Joint Venture, it can be reasonably stated that the Project is financially and economically feasible.

A parametric analysis was performed on the predicted sales volume in order to take into account the risk of market unpredictability in terms of supply and demand conditions. Parametric changes of +/- 10% were introduced in sales and operating expenditures on the base case while everything else was kept the same.

Utilising the parametric analysis tool of COMFAR III (please refer to the attached diagrams in the appendix), it has been calculated that :

- if the sales decrease by 10%, the estimated value of IRR decreases from 42% to 35%
- if sale revenues decrease by 25%, the IRR still remains higher then the requested hurdle rate of 15.4%, in fact reaching the level of 25%.
- if the increase of the operating expenditures is set at 10%, the IRR decreases to 28%, while forcing the increase of costs up to 18%, the final value of IRR=15% is reached.

Therefore, we can assume the project is resilient to fluctuation of more than 25% decrease in revenues, or up to 18% in operating costs increase10%.

CHAPTER 2: PROJECT BACKGROUND AND BASIC IDEA

2.1 Description of Project Idea

The basic aim of the project is to manufacture gear boxes in India for supply to the local market. It is therefore, a market oriented project with the aim to serve all of India. At present, there are no plans to export the completed gear boxes because the Italian partner has sufficient production capacity to cover the European market and Asia through its branches in Singapore and Hong-Kong. The Indian company is small but growing quickly and enjoys long-standing experience in the sector. So far, there are only a few companies operating within this sector.

Given the current market conditions, the manufacture of gears and gear boxes is not yet competitive in terms of price and exports. The reason will become clearer after reading Chapter 4 on input supplies. However, some export possibilities will exist. It is planned to organise a supply of castings from India to Italy. But this is purely a commercial activity. The Indian JV partner will procure the casting from local suppliers and export to the partner in Italy. This activity could be carried on independently from any manufacturing activity and does not require any training nor any pre-operative expenses. Therefore, it has not been considered in this project analysis, but has been based only on the revenues generated by the products directly linked to the investment. The commercial activity of exporting castings from India to Italy will be analysed only from the aspect directly affecting the input of the investment project, because it will allow the JV to obtain customs benefit for the importation of equipment and of any eventual components as well.

The main scope of the project is therefore, to analyse whether the products to be manufactured in India will be competitive with the present local production in term of price, quality, delivery and technical performance. This has been mainly explained in Chapter 3 and 4.

Another aspect of the project, has been to consider the competitiveness in comparison with international prices. Since the beginning of the project, it was noted that the ex-factory prices of the gear boxes in Italy were much cheaper than in India. This was due entirely to the high customs tariff imposed on imported products which was included in the cost. This consideration initially prompted both parties to push forth for a manufacturing project.

However, in the meantime, the customs duty structure has been reduced and a further reduction is expected within two years. For this reason, the hypothetical sales prices which have been assumed for the calculation of the total revenues, are based on the prevailing quotations in the international market. The sales prices are lower than those prevailing in India, and as long as a complete liberalisation of the market does not occur, the forecasted sales revenues in the present study are likely to be underestimated. This will probably yield a profit lower than in reality.
But in this way, the feasibility study analysed the competitiveness and the investment return in the most difficult market conditions, where besides local manufacturers, international competitors are also operating. If the profitability can be acceptable with this scenario, it will be even higher and more satisfactory in case of complete customs liberalisation which is expected to be implemented in the future.

The JV will be formed on an equal partnership basis between the Indian and the Italian promoters. An equity participation of 10% from a local regional development institution is expected. In addition, a contribution through equity participation will be requested from the EU through ECIP 2. The JV company will be incorporated as a private deemed public, with an equal 50% ownership share between the Indian and Italian partners, or a 40% split between the Indian and Italian partners and 10% ownership by the local and European financing institution. At the second stage, if further financing is needed, the JV will be converted into a public limited company and offer 40-50% shares in the company through the local stock market.

The project will be implemented by manufacturing the following models of gear boxes, all of them in the range up to 14 inches size:

- WORM GEAR
- HELICAL WORM GEAR BOXES
- CO-AXIAL GEAR BOXES

The following complementary products which are manufactured by associated companies of the Italian partner will be imported at least for an initial period of 3-5 years: However, these items are for commercial purposes only and are not considered in this study.

- VARIABLE SPEED DRIVERS
- PARALLEL HELICAL GEAR BOXES
- BEVEL HELICAL GEAR BOXES
- BEVEL GEAR BOX
- ELECTRIC MOTORS

As far as economic and industrial policies are concerned, there are no specific incentives for the manufacture of gear boxes, but it will be possible to benefit from general industrial incentives which are offered by the regional government of Haryana (the State where the project is located). This will be discussed further in Chapter 5.

2.2 Project promoters

The project promoters are STM s.p.a. from Bologna, Italy and TRINA ENGINEERING pvt. ltd from New Delhi, India.

STM started its operations in 1975 as a small artisanal firm but has now evolved into an incorporated company under Italian State Law and now has equity investments in other enterprises, such as TRAMEC, RETTIFICHE RESCA, SET, TRANSTECNO, TECNOBI, UNIMOV, COSIMEC and ELLEMMETI. (see Chart 2.1). STM has become in fact, the main holder of an Italian group of a small scale companies which can provide a wide range of products in the field of gear boxes and speed reduction.

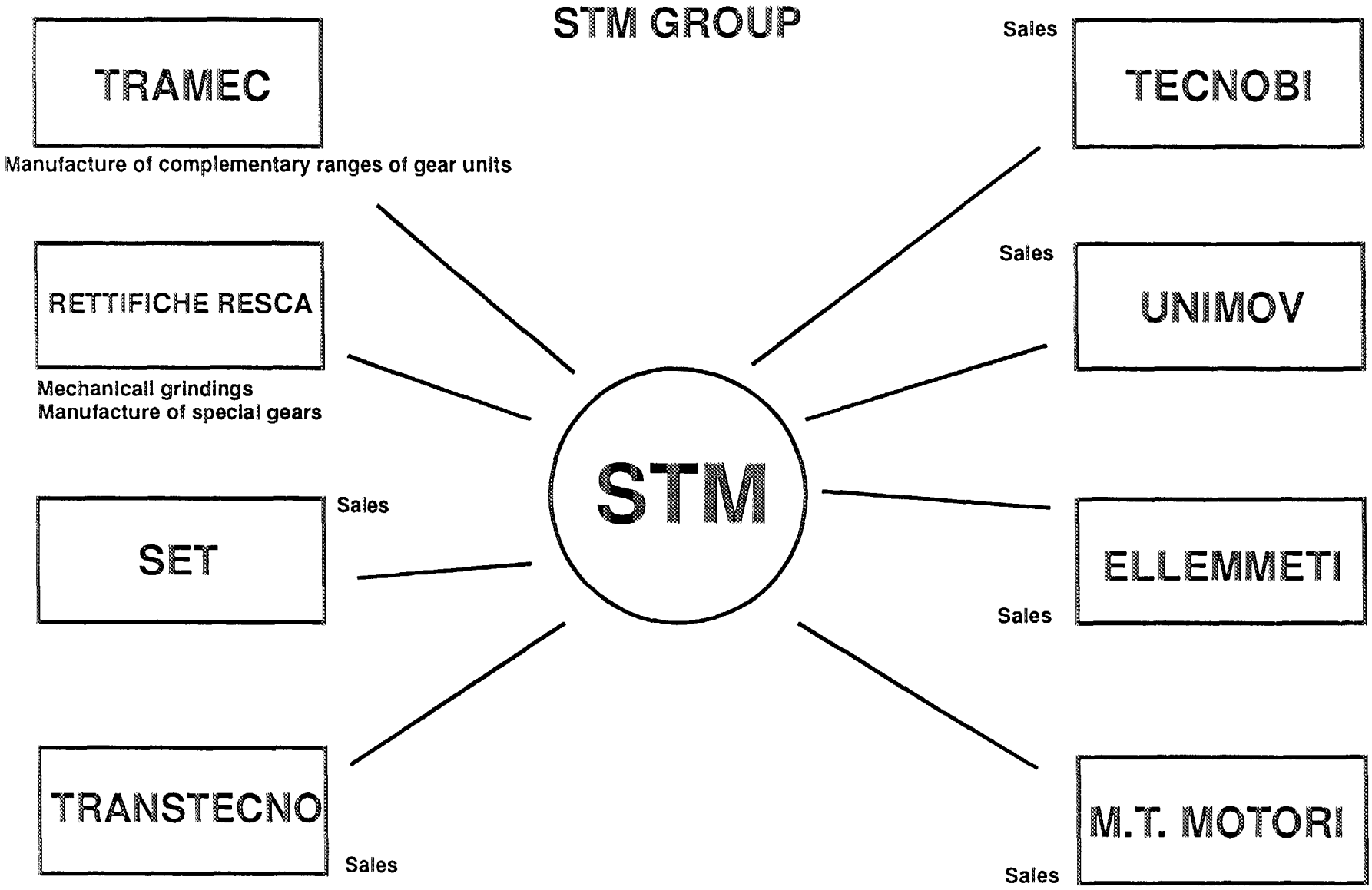

STM GROUP
TRAMEC
Manufacture of complementary ranges of gear units
RETTIFICHE RESCA
Mechanicall grindings
Manufacture of special gears
SET
Sales
TRANSTECNO
Sales
STM
Sales
TECNOBI
Sales
UNIMOV
ELLEMMETI
Sales
M.T. MOTORI
Sales

CHART 2.1

However, for the time being, only the products specifically made by STM s.p.a. will be manufactured in the JV and are therefore, the object of this study. The items manufactured by the other companies of the group will continue to be imported into India.
Therefore, all the information provided herebelow are related to STM s.p.a. only and not to entire group.

The growth of STM and its affiliated companies proceeded together with the growth of STM's exports and its level of globalisation. STM is giving special attention to the Asian market and, apart from the impending collaboration with TRINA, has already opened two commercial offices in Singapore and Hong-Kong. During the past two years, STM registered a tremendous growth in sales turn-over (approximately 33 %) which was almost entirely due to its export performance (98 % of the total growth).

TRINA ENGINEERING started essentially as a partnership concern in 1962 and was later converted into a private limited company on 1987. It has always operated in the gear boxes and speed reduction sector. For a long period, it operated only from a small workshop in Delhi, but two years ago started working from a new factory in Haryana, 25 km. from Delhi. The factory is currently manufacturing for 100 % export, gear boxes for locomotives in a JV agreement with Canadian company QUEBEC GEARS. An item which does not fall into the range of STM production. After starting this collaboration, TRINA received numerous export orders in North America, Europe and Japan.

The site in Haryana is the likely choice also for the project with STM due to the availability of land for the new project.

The name of the new joint-venture company, at least as it will be referred to in the present study, will be TRINA-STM.

Further information on STM and TRINA Engineering are hereby enclosed annexed:

TRADE NAME:	STM s.p.a.
ADDRESS:	Via del Maccabreccia 39, 40012 Lippo di Calderara (Bo), ITALY
DATE OF ESTABLISHMENT:	1975
ACTIVITY:	Construction and trade of transmission gears
MARKETS COVERED:	Europe, Middle-east, China, Honk-Kong, Korea, Singapore, Malaysia, India, Chile, South Africa.
NAME OF THE PARTNERS:	Girotti Leo, Girotti Tiziano, Vignoli Altero, Lucchini Giuseppe
NUMBER OF PEOPLE EMPLOYED:	130
PAID UP CAPITAL:	200 million ITL
YEARLY TURN-OVER:	

1993	21 billion ITL
1994	28 billion ITL
1995 (forecast)	37 billion ITL
Export % on turn-over	35 %
TRADE NAME:	TRINA ENGINEERING Co. Pvt Ltd.
ADDRESS:	9/46 Industrial area, Kirti Nagar New Delhi 110 015 INDIA
DATE OF ESTABLISHMENT:	1962 converted into pvt. ltd in 1987
ACTIVITY:	production of gear and gear boxes, especially traction gearing.
MARKETS COVERED:	INDIA, ITALY, CANADA
NAME OF THE PARTNERS:	Mr. Trilok Khera, MRs. K.N. Khera, Mr. Pankaj Khera, Mr. Hemant Khera, Mr. Lokesh Khera, Mr. Satinder Khera, Mr. R.C. Gambir, MRs.Bimla Arora, MRs.Purnima Sachdeva
PAID UP CAPITAL:	Share Capital Rs. 749,200.00
Reserve & Surplus	Rs. 2,835,804.44 Rs. 3,585,004.44
NUMBER OF PEOPLE EMPLOYED:	48
YEARLY TURN-OVER:	
1992	Rs. 7,326,000
1993	Rs. 7,902,000
1994	Rs. 13,298,000
1995 (forecast)	Rs. 18,000,000
Export % on turn-over	
1992 -	
1993 3.5 %	
1994 20.0 %	
1995 (forecast) 35.0 %	

2.3 Project History

The project idea was started by TRINA ENGINEERING with the initial support of UNIDO. In June 1991, a representative from TRINA visited the BORITEC Exhibition organised by IPO Milan. On that occasion, an agreement was reached with another Italian party. However, the collaboration did not work out and a few months later, in April 92, a representative of TRINA ENGINEERING met STM at the HANNOVER exhibition. After some correspondence, the two parties decided to have a joint-participation in a specialised exhibition in India (Indian Engineering Trade Fair) in February 1993. It was on that occasion that the two parties signed a Memorandum Of Understanding providing for a joint-venture collaboration on an equal partnership basis. Following that, TRINA commissioned a preliminary study, which was meant to provide the basis for an initial financial evaluation. On that basis, TRINA submitted a

proposal at the end of 1993, for a phase approach to the manufacturing collaboration. It was agreed to have an initial period of trading collaboration before entering into the proper manufacturing phase. During the period of trade collaboration, various orders were collected which confirmed the potential of the Indian market, but a few others were lost because of the long procedures in the opening of the L/C or due to the long delivery period required for import operations. This definitely convinced both partners that, in order to tap the big potential of the Indian market, it was necessary to proceed at the earliest opportunity with the manufacturing phase. Therefore, they approached UNIDO again for the preparation of the present report and for any future assistance that be required for its implementation.

CHAPTER 3 : MARKET ANALYSIS

3.1 Analysis of Demand

3.1.1 Data and Projection Methods.

Gear boxes are a product commonly used in the Indian market. The Indian mechanical industry is quite developed and has a relatively high production. Gear boxes in India are utilised by various industries such as: in the manufacture of printing machines, machine tools, material handling equipment, turbines, packaging machines, tube mill plants, compressors, textile machines, automobile industry, refrigeration industry, switch gears, water treatment, sugar and cement industries and diesel generators.

In order to determine the size of the effective demand in India, the consumption of end users was analysed. This was undertaken by blend of desk research and field survey .

Desk research for this specific category of products was possible because of the large amount of existing information available from published sources, lectures at seminars and conferences and other private surveys. Moreover, as these components are widely used in various key sectors for the Indian industry, a lot of information were derived through the analysis of specific sectorial trends.

The field survey was undertaken during the second phase in order to verify and check all the information collected through the desk work. Secondly, it was relevant to understand the problem related to the quality and type of gear boxes required in the Indian market.

While the desk work could be used to better understand the dimension of the market and some related future trend, the field survey would provide a more accurate estimation of the specific demand for the various types of gear-boxes, as well as listing the quality and performance aspects helpful to incorporate into a marketing strategy and understanding what level of market penetration TRINA-STM products could expect. The field survey was also very relevant to understanding the standard marketing requirements and operations.

The field survey consisted of sending a questionnaire to a selected category of end user industries and by personal interviews with various operators.

Once determining the present size of the demand, it was necessary to forecast the future trends. This has been done by analysing a mix of information coming from:

1. trend forecasts based on estimates from various materials collected during research;
2. trend analysis of the demand for gear boxes over the past few years and its correlation or discrepancy to forecasted estimates;
3. trend forecasts of growth for a few of the end user sectors, selected among the most relevant ones.

Sectors in which STM Gear Units are used

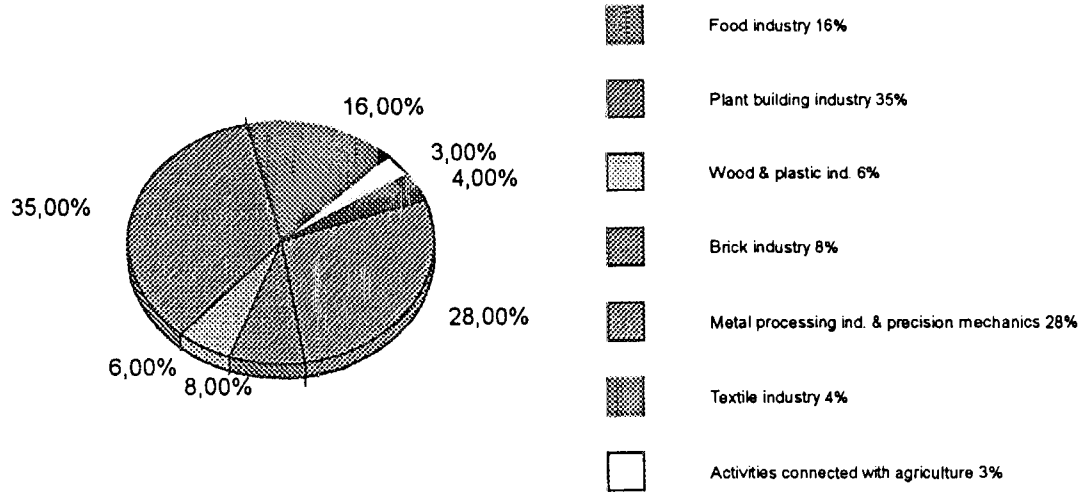


CHART 3.1

SECTOR-WISE DEMAND OF GEAR UNITS IN THE INDIAN MARKET

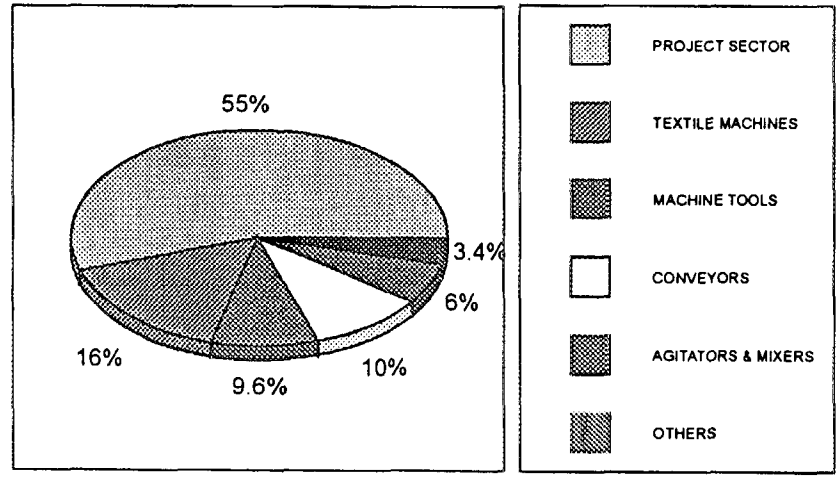


CHART 3.2

For the selection of the end user sectors, it was necessary to understand if the sector-wide consumption was similar to the European pattern or not.

As shown in Chart 3.1, the bulk of the demand for STM gear units comes mainly from the following sectors: plant building industry (hereinafter called the project sector), metal working machines and food industry. It was immediately clear that the Indian pattern would be different. First of all, the food processing industry in India is not as developed as in Europe. Secondly, since India is a developing country, the share of turn-key supply to industry, or what we have defined as project sector, would be bigger than in Europe. The third aspect to consider is that India has a very large textile and garments sector and is one of the main exporting country's in the world. India also has one of the largest number of textile machine manufacturers (100 companies manufacturing complete machines and 500 companies manufacturing components and accessories). Therefore, the demand coming from the textile machine manufactures sector has a higher share than the European market.

These hypotheses were in fact confirmed by our field survey that provided a sector-wide share of demand as illustrated in Chart 3.2.

3.1.2 Determination of Demand and Market Size for Products

The market size can be estimated by two methods; in terms of value and number of units. The first method of estimation is the most relevant in order to understand the potential of the demand. It is also the most easy to estimate. The second method is useful in understanding the share of the various sizes and types of gear boxes.

Our determination of demand and market share of TRINA-STM has been mainly value oriented. Quantitative data on value is more reliable and easy to obtain for reasons that will be explained in this section. The total demand per number of units has been estimated only in aggregate figures and in a very approximate way. The only purpose is to have a general idea of the market size and a basic parameter to determine the share of the different models for the preparation of TRINA-STM sales revenue.

Gear boxes are items widely different in terms of size and types. This also creates also a wide difference in terms of prices as well. For this reason, it is relatively simple to estimate the market in terms of value and more complicated in terms of number. Or, in other words, while it is possible to ascertain an approximate aggregate number of units annually sold in India, it is very difficult to determine the disaggregate figures for each type of gear box. Indian companies are not so willing to release detailed and disaggregated statistics of their own sales.

The situation is further complicated by the fact that not all the gear boxes are sold as complete assembled units. A part of them are sold either in disassembled condition, in semi-assembled condition or in specially designed condition. This group of items is normally defined in the local market as loose gears and correspond to 1/3 of the total Indian sales value.

Although, it is difficult to have exact disaggregate data, effort was made to identify an approximate share of consumption for the various models and sizes. This was helpful in determining the revenue forecast and profit margin, because every model has different prices and different profit percentages.

This estimate has been done by analysing the general pattern of consumption for the most relevant industrial user sectors, and by making a quotient between the total consumption and an average parameter price. For an easier reference and better understanding of market trend and ratio, by applying a quotient based on the value of their sales, even the loose gears have been converted into equivalent numbers of assembled units.

According to all the sources analysed during our research, the total market consumption of gear boxes in India is approximately 2-2.5 billion Rupees (62-80 million US) calculated at ex-factory price.

During the past few years (from 1992 onwards), the market witnessed a very relevant rate of growth that has been estimated according to the most conservative sources at 8-10% and by others at 15% per year. As compared to the actual 1992 sales, the first rate of growth would provide the total market demand of 2 billion Rupees in 1994, while the second would confirm the higher figure of 2.5 billion Rupees. After the field survey and by comparing unofficial turn-over figures of the few most important companies operating in the organised sector, our perception was to estimate a total market demand for 1994 of about 2.2 billion Rupees. However, since we lack accurate and objective data to confirm it, we decided on the most cautious figure of 2 billion Rupees as the best estimate of the value of growth over the next few years.

The spectacular growth in Indian demand for gear boxes in recent years has been determined mainly by the growth of the industrial users sectors and the large number of projects implemented. Overall, the composite growth rate of the end user industry has been worked out to be 11 % per year. Similar high growth trends are expected to remain constant for the next few years (see Table 3.1)

Table 3.1 Different Growth Trends Over the Next Five Years (million Rupees)

Year	1994	1995	1996	1997	1998	1999
rate 8%	2000	2160	2338	2525	2727	2945
rate 8%	2200	2376	2566	2771	2992	3231
rate 8%	2500	2700	2916	3150	3402	3674
rate 10%	2000	2200	2420	2662	2928	3220
rate 10%	2200	2420	2662	2928	3220	3542
rate 10%	2500	2750	3025	3327	3660	4026
rate 15%	2000	2300	2645	3041	3497	4021
rate 15%	2200	2530	2909	3345	3846	4422
rate 15%	2500	2875	3306	3801	4371	5026

It is estimated by many local dealers and manufacturers that the demand for gear boxes will continue to grow at the same level of the previous five years. It means a rate either of 10-15%. The forecasted estimate that was undertaken in the early 1990's, proved substantially correct. The early 1990's forecast estimated a sales of gear boxes worth 2.18 billion Rs. in 1994 and 2.53 billion Rs. in 1995. This corresponds more or less to our basic findings with some slight variation. These sources, in the past, have proved themselves to be reliable enough and, therefore, their forecasted estimates can be taken into serious consideration even for the next five year period. However, we decided to consider an even more cautious option at 8%, which is the average rate of growth of the Indian industry over the past few years.

Based on this, we estimated the growth of demand shown in the Table 3.1.

Please note that in India, the growth of the mechanical industry is higher than that of the general industry. Therefore, the estimate of 10% growth is the most likely parameter to forecast future trends, on the basis of the present performance of the Indian industry.

One more case might be elaborated in the event of a long-term industrial slow-down in India. It considers however, that the short-term perspective of the end user industry for the next two years is very bright with an aggregate conjunctural growth exceeding 30-31% and that the demand for gear boxes could grow at the same pace or at least at 25% (the difference being covered by imports). Assuming an abrupt slow down after 1997-98, with zero growth, by the year 1999 the market demand will be the same or 3% less of what has been estimated with the case at 10% regular growth in five years. (see Chart 3.3).

By that time, it is assumed that the JV will have stabilised the production level and regardless of the scenario, it is highly probable to forecast a demand around 3.1-3.2 billion Rupees. (see Chart 3.4).

All this data was counterchecked by investigating the actual production of industrial end users to determine the approximate amount of gear boxes needed. This has been done either by ascertaining the number of gear boxes required per single machine or the percentage value of the gear boxes on the cost of the machines. Everything was converted into units or value according to a parameter based on the average price and the standard model size needed for every sector. (see Table 3.2).

Table 3.2 Sector Demand For Gear Boxes; value (Million of Rs.) N. of Pcs.

Sector		Units	
PROJECT SECTOR	1,100	275 000	55 %
TEXTILE MACHINES	320	80 000	16 %
MACHINE TOOLS	192	48 000	9.6%
MATERIAL HANDLING	200	50 000	10 %
AGITATORS & MIXERS	120	30 000	6 %
OTHERS	68	17 000	3.4%

COMPARATIVE GROWTH OF INDUSTRIAL USER SECTORS AND DEMAND OF GEAR BOXES
(CASE WITH INDUSTRIAL RECESSION)

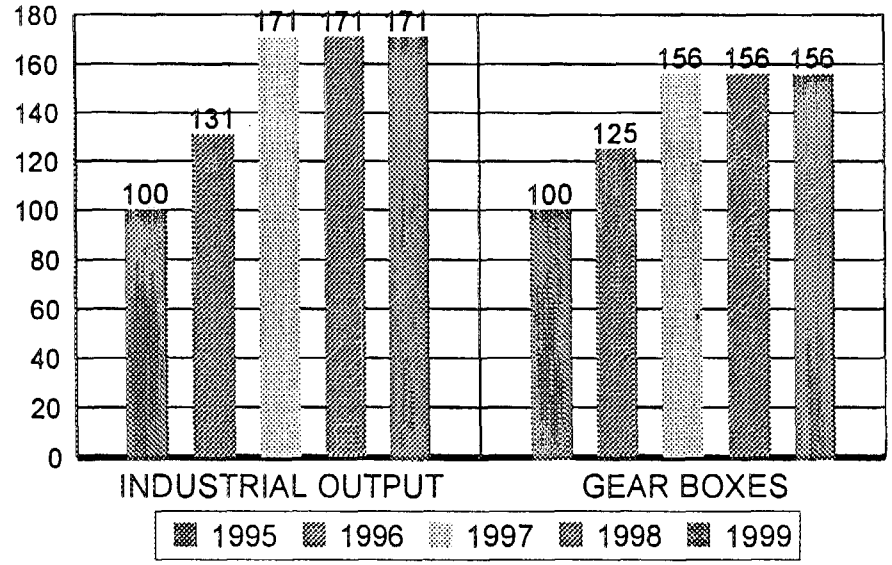


CHART 3.3

COMPARATIVE TREND OF GROWTH

with regular and irregular industrial growth

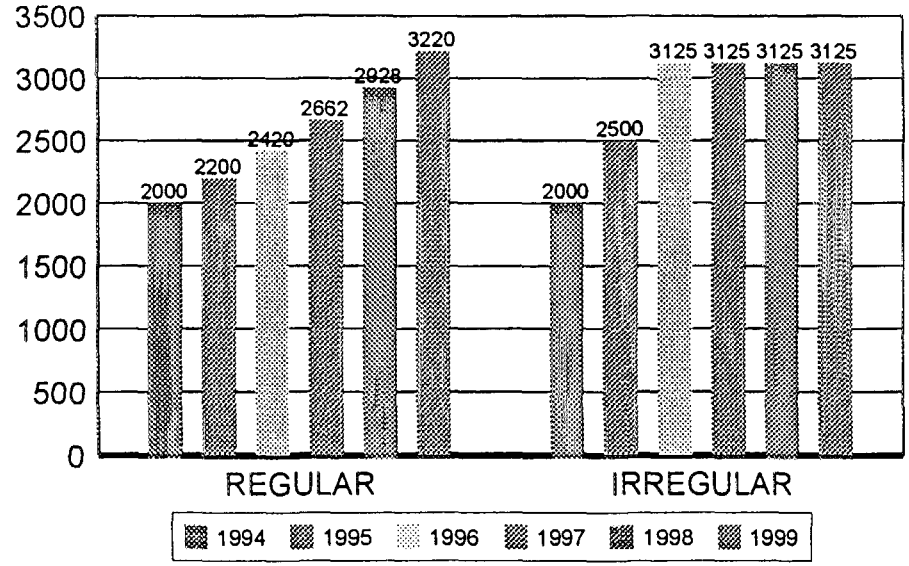


CHART 3.4

It is more complex to determine the number of units sold, given the high variety in type and size. However, in order to understand what would be the market share of TRINA-STM in terms of number of units, we made a crude estimation. It has been decided to roughly divide the gears boxes in two ranges; the small one that includes all the models below 4 inches and the big ones that includes all the models above 4 inches. According to the local pattern of consumption, the ratio in terms of numbers between small and big are in the range of 10:1. Based on this assumption, we calculated the total number of units using the following formula:

$$\frac{TMV}{\frac{10\,(Pas) + Pab}{11}}$$

where TMV is the total market value, Pas is the average price of small units and Pab the average price of big units. The weighted average price of big units (Pab) has been calculated at 14,000 Rs. Pas has been calculated with two different values. The first case considered the amount of 3.500 Rs. as the average cost of the unit most commonly sold in the Indian market. In the second case, the amount was calculated to be 4,600 Rs. as the average weighted price of the entire range of the smaller units.

The TMV has been calculated to be 2 billion Rupees, which is the lowest of the various market estimations. The first case gives a number exceeding 450,000 units, the second case, a number exceeding 360,000 units. The latter corresponds to information provided by other reports and sources. The former is more in tune with the fact that the three largest Indian manufacturers who collectively control 60% of the total market, claim to sell approximately 100,000 units each per annum. It has also more correspondence with the indications of Table 3.2.

Such oscillations may depend on several reasons. It might be that our TMV is slightly undervalued and is providing in the second case, a number of units lower than other findings are suggesting. But this is relevant only to some extent, because the calculation of the average price might have underestimated them, thus increasing the volume. Therefore, the two variables might be considered as reciprocally compensating. The main problem lies in the fact that it is not possible to determine an average price with exact accuracy. The same brand items might have a different ex-factory price depending on the case. Local manufacturers are used to applying different discounts to their price list according to their relations with the customer, the single quantity purchased by him and its capacity of negotiations. The average price is calculated for a wide number of items, at least 50-60 in the Indian market, each of them with its own market trend and price fluctuations. Objective and accurate data should also take into consideration these variables. But such information is available only by making an extensive survey of the sales books of all the Indian manufacturers; a task that is impossible to fulfil within the framework of this study. Moreover, for the convenience of this study, we have converted loose gears into an equivalent number of assembled units. This itself makes unachievable the task to determine average prices and number of units as per actual ground reality.

There could be alternative methods for calculating the number of units by disaggregating loose gears. According to sectorial sources, they correspond to 1/3 of the total market. The value for the assembled units is 2/3 for small ones and 1/3 for big ones. Therefore, by applying the same average prices, which are now more accurate because they are based only on cost of assembled units, it is possible to determine separately the number of units in the following way:

$$\frac{2/3\ (2/3\ TMV)}{Pas} = Ns \qquad \frac{1/3\ (2/3\ TMV)}{Pab} = Nb$$

Where Ns is the number of small units and Nb the number of big ones. It yields a result of 253,000 small units and 31,000 big ones. Conversion of the loose gears into equivalent numbers of assembled units will be done through:

$$\frac{2/3\ TMV}{Ns + Nb} = Pal \qquad \frac{1/3\ TMV}{Pal}$$

Where Pal is the average price of loose gears converted into assembled units. Their total number will correspond approximately to 144,000 units. Thus making a final toll of 428,000.

By applying the higher parameter to Pas, we will have 193,000 small units and 230,000 equivalent number of loose gears and a total number (including big units) of 454,000.

With this system of calculation, the gap is very much reduced. Even by changing the parameter for Pab, the absolute variations would be only for a few thousand units. Therefore, by all means, the total number of units sold into the Indian market is very likely to be more than 400,000.

The figures that we have determined are just for general reference in order to understand the market dimension. They were deemed satisfactory for this reason. Our market survey is in fact, based on value ex per factory prices rather than on number of units. In this regard, there is enough evidence to suggest that the market is surely not lower than 2 billion Rupees and we have used this value to analyse the level of market penetration of TRINA-STM.

3.2 Sales Forecast And Marketing

There are three critical factors in order to evaluate the penetration level into the Indian market of gear boxes: quality, price and quick delivery time.

The latest could be sorted out by manufacturing locally and by adopting a stock and sales program as described in Chapter 4.

In term of quality and price, TRINA-STM products may have a competitive edge in both cases.

Regarding price, Table 3.3 shows the lowest prices in the Indian market for various models which are comparable to those of STM. The quotations are normally based on standard industrial price lists, which are usually discounted, according to the quantity purchased by the customer or the negotiation agreement. The highest discounts given are in the range of between 30-40%. The market policy of TRINA-STM would be that of adopting the lower price list for every item and providing, on a case to case basis, the maximum discount required to gain an edge over the competitors.

However, it was necessary to fix a minimum price, below which sales were not considered sustainable. This price has been calculated mainly on the basis of the input cost (see Chapter 4) and the ex-factory price of STM. Table 3.4 shows a comparison between the minimum sales price of five STM models which have been considered as the reference models for the study, and the equivalent cheapest model manufactured by competitors. These minimum prices are also used as the reference price for the calculation of sales revenue.

TABLE 3.3 COMPETITORS PRICE** IN THE INDIAN MARKET

LOCAL MODEL	STM MODEL	L.P.*	DISC.NT 30%	DISC.NT 35%	DISC.NT 40%
SA 112	RI 28	3841	2688.7	2496.7	2304.6
SA 162	RI 40	5200	3640.0	3380.0	3120
SA 200	RI 50	6050	4235.0	3932.5	3630
SA 237	RI 63	6900	4830.0	4485.0	4140
SA 287	RI 70	8245	5771.5	5359.3	4947
SA 337	RI 85	10350	7245.0	6727.5	6210
FU 4	RI 110	14225	9957.5	9246.3	8535
FU 5	RI 130	19251	13475.7	12513.2	11550.6
FU 6	RI 150	23865	16705.5	15512.3	14319
FU 7	RI 180	30765	21535.5	19997.3	18459

*L.P.= Lowest Indian Price List
** all prices are net of sales tax

TABLE 3.4 COMPARISON PRICE FOR SELECTED MODELS (price net of local sales tax)

Model	RI 50	RI 85	RI 130	CB 85	Coaxial 60/3 PAM
TRINA STM	3400	6000	11000	5590	6032
INDIAN LOWEST PRICE discount 40%	3630	6210	11550.6	6780	9384

As far as quality is concerned, TRINA-STM might have a competitive edge for the following reasons:

3.2.1 Advantages over the Organised Sector

1. Companies in the organiseds sector use the 1950's design provided by M/s David Brown, a UK-based company. They had limited design to support all different applications. Therefore, the customer had to modify their equipment design to suit the gearboxes available. Now, TRINA-STM will be able to manufacture universal designed gearboxes to meet the requirements of all applications. The new design will be more efficient and have a longer life. Since the design is based on the modular design concept, it will also reduce production and inventory costs and have faster delivery time.

2. Gearbox casings produced by other companies are in cast iron, whereas, those produced by TRINA-STM are in aluminium pressure die casting. This makes the gearbox obviously lighter in weight than the others made in cast iron. In addition, the dead weight to power transmission ratio of TRINA-STM gearbox will be low in comparison with gearboxes made from cast iron.

3. Since TRINA-STM gearboxes are made in aluminium and are universally designed, the same gearbox, with slight alterations can be used for different mounting applications compared to the gearboxes which are currently manufactured. Construction features are such that, different gearboxes are required for different applications.

4. TRINA-STM gearboxes can be internally coupled with the electric motor to make a compact geared motor compared to current gearboxes which can only be externally coupled.

3.2.2 Advantages over the Unorganised Sector

Since the company will be using the CNC machines in manufacturing the gearboxes, this will result in better delivery, quality and added benefits as mentioned above, and it will also offset the competition from the unorganised sector.

Gear and pinions are made out of case hardened and tempered steel which are then subsequently ground in order to optimise performance and quitness under load. Worm shafts are made in case hardened and tempered steel. The threads are also ground finished so that high efficiency is guaranteed. Wormwheels are made from cast iron and bronze casting. The output and input shaft is made from case hardened and tempered steel.

The manufacturing process will employ the CNC machines for manufacturing. This process will insure the highest productivity and maximum precision. Since the quality is the foremost criteria for the selection of the product in the industry, the company will have an edge over the existing products in the industry.
The company is also provisionally approved by RDSO (Research Development and Design Organisation) for the manufacture and supply of traction gear and pinion for the Indian railway.

3.3 Market Share And Competitions

In the Indian market, the supply of gear boxes is partly provided by the organised sector and partly by the unorganised. In India, the latter are define small scale companies and artisanal units. This category of industries in the mechanical sector manufactures very simple items and is often operating as a sub-contractor for larger companies and sales mainly in their local area. There is of course, a very big difference between the organised and the unorganised sector in terms of quality of production as well as marketing. This is the reason why, when the demand for gear boxes started growing in the last few years, the organised sector has been able to take a larger share. It is commonly assumed in India that until 1992, the market share was 50:50, however, the organised sector has acquired a predominant lead since then. The share of the organised sector is 60-80% of the total Indian market with only six relevant manufacturers.

Since there are various favourable factors and the number of competitors in the organised sector is low, we can easily expect that the market share of TRINA-STM, would be at least 1/10 of the total value in the organised sector. This would correspond to 200-250 million Rupees at regime and, a market share of between 6-7.5%. These values are very cautious and conservative.

If we analyse the region-wide distribution of gear box consumption and the distribution of the local manufacturers, we may further increase the TRINA-STM sales expectations.

All the local manufacturers in the organised sector are concentrated either in the Southern or in the Western regions of India, which accounts for 75% of the demand in the non- project sector and has the largest consumption in the Indian market (see Table 3.5).

Table 3.5 REGION WIDE CONSUMPTION OF GEAR BOXES IN NON PROJECT SECTOR (Factory price in Million Rs.)[1]
(state distribution is available only for the regions with higher or relevant consumption)

- South of India 300
  (Tamil Nadu 150, Bangalore & Karnataka 80, Andhra Pradesh & Kerala 70)
- Western India 380
  (Gujerat 210, Maharashtra 170)
- Northern India 120
- Eastern India 100

TRINA-STM is the only company in the organised sector located in Northern India, which accounts for 12-14% of the total market. Since it is the only large scale manufacturer and has a relevant advantage in quality and delivery towards small manufacturers and is price-competitive with them, it may be assumed that TRINA-STM can easily cater to the demand of the big industry in the North and tap between 50-80% of the local market. This will correspond to 6-11% of the whole Indian market. Therefore, North India alone would be able to provide a market share similar or bigger to what has been assumed for the basic case.

[1] state distribution is available only for the regions with higher or relevent consumptions

In addition, TRINA has recently established a commercial office in Coimbatore, in the core of the industrial area of Tamil Nadu and very near to Bangalore. These two areas together account for 25% of the all Indian consumption and only one manufacturer from the organised sector is located there. By taking only a marginal share of this regional sector (e.g. 1/5), TRINA-STM could add another 4% to its share of the total Indian market. In the Western region, which accounts for 42% of the total market, the competition is very strong and five main manufacturers are located there. TRINA-STM has already appointed two dealers or agents in Ahmedabad - capital town of the region with the highest consumption in India - and one in Bombay. This might help to gain at least a 1/10 share of the local market, or even half of that (1/20). It would add another 2-4% to the total market share.

Eastern India is the less industrialised region of the country, and for the initial phase, not many efforts will be concentrated there. The contribution in the total market share of TRINA-STM could be calculated at 0.5-1%.

(See Chart 3.5 Regional contribution to TRINA STM market).

By taking into consideration this marketing mix, TRINA-STM would have a total market share of between 13-20%. However, this hypothesis has not been taken into consideration for the sales revenue and the financial analysis. As a guideline, we have given preference to the more cautious estimate. Therefore, we have also considered a pessimistic case that takes into consideration contingencies or failures in reaching the marketing targets due to unexpected reasons. It assumes that TRINA-STM will take only 1/4 of the North Indian segment, corresponding to 3% of the total market and just 1% in each of the Southern and Western region. This case could be constructed also by assuming a good performance by TRINA-STM in North India but a complete lack of significant penetration in other regions. It illustrates a market share of approximately around 5%, which has been our parameter of reference.

This would correspond also to the optimal utilisation of the plant capacity. For this reason, we have prepared a production plan and a sales forecast that considers a value-based market share fluctuating between 4% in the first year of production and exceeding 6% at regime. Production at regime will be reached after five years. By then, the TRINA-STM market is expected to be stabilised. We do not forecast any further increase, even if it is expected that the market demand will keep growing. There might be new entrants or the imports might increase due to lowering of customs duty. Therefore, the market share of TRINA-STM may decrease, but the turnover and the number of units sold will remain stable.

The market share has been referred to a total demand growing at 10% per year, that is the average growth forecasted in the sector for the next five years (see Chart 3.6). However, even if the actual market demand will be less, there is no reason to change the production plan and the sales revenue, because we have just analysed that the marketing mix provides ample scope for a bigger market share. The biggest limitation comes mainly from the plant capacity.

REGIONAL CONTRIBUTION TO TRINA STM MARKET

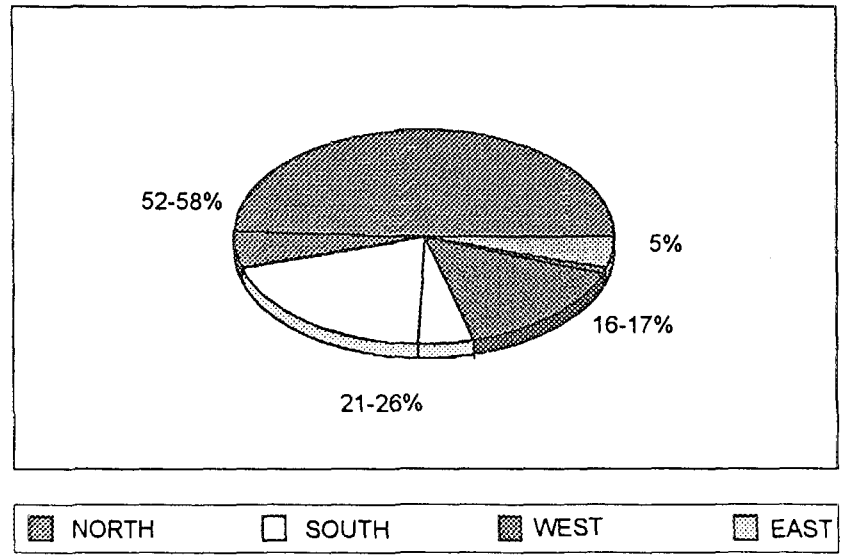


CHART 3.5

COMPARISON BETWEEN GROWTH OF TOTAL DEMAND
AND MARKET SHARE OF TRINA-STM

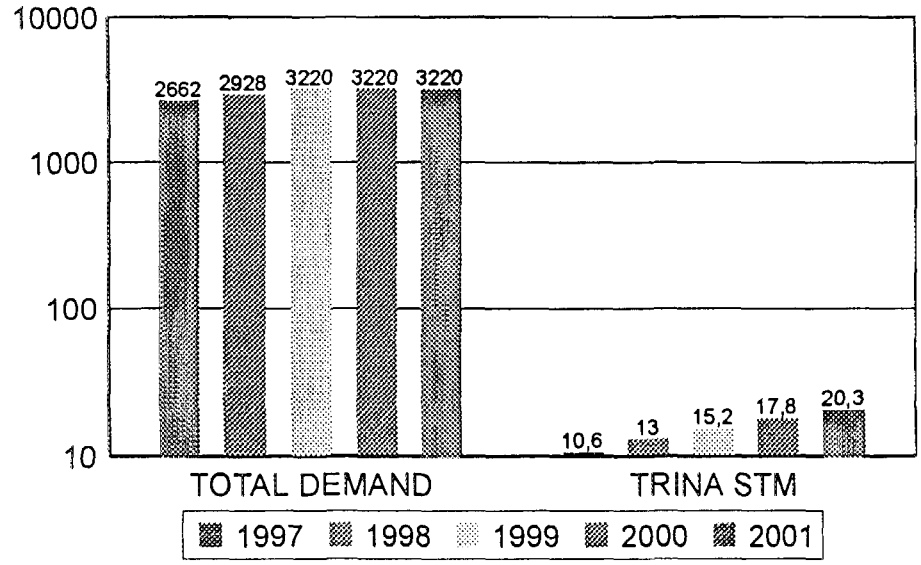


CHART 3.6

3.4 Production Plan And Plant Capacity

The capacity utilisation of the plant has been worked out in order to optimise the ratio between the investment in machines and the production. With the equipment selected and illustrated in Chapter 6, it is expected that TRINA's production capacity will be equal to almost 10% of the total number of units sold in the market. The reason that the market share based on value is lower is because, the sales revenue is calculated on the cheapest ex-factory prices that is possible to apply in the market. It has been considered that this is a proper share of total Indian production. Moreover, it is the most favourable option in relation to the selected budget for investment in equipment.

As it is shown in Table 3.6, 15-20% increases in production capacity will require a higher increase in investment for machines exceeding 25% of the planned cost. Only if we increase the plant capacity by 60 % will the additional investment in machines become feasible.

Table 3.6

increase in investment for machines	+25%	+40%	+70%
increase in production	+15% / +20%	+60%	+100%

The reason for this is related to the fact that some machines , which are used for the turning and housing operations, will already be working almost 100 % of their total capacity after five years.They are the most expensive and correspond to 1/4th of the initial investment in equipments.

However, it is considered that a plant capacity of approximately 40,000 units per year at regime over a five year time frame is an acceptable dimension. If, for any reason, the market requires higher production, it will be possible to plan a gradual expansion of the plant.

The production plan that has been worked out, forecasts a production for the 1997 initial year, of slightly more than half the plant capacity at regime and reaching full capacity by the year 2001. For contingencies, the actual production for every year has been forecasted slightly lower than the maximum utilisation level of the machines during the corresponding period of time (Table 3.7).

Table 3.7

PRODUCTION PLAN	1	2	3	4	5
Actual utilisation (%)	52%	63%	74%	86%	98%
Number of pieces	20810	25440	29780	34550	39200

The capacity utilisation of the plant has been calculated on the following basis:.
a) Number of components required for manufacturing different type of gear boxes;
b) Total production per year of different components;
c) The percentage of utilisation of each machine has been calculated based on the number of components to be produced per annum and time required for production of each of them.

3.5 Determination of Sales Revenue

To determine the sales revenue, we first established the pattern of sales of the different models. In India 65% of the total demand is for worm-gear type boxes (worm 40%; helical/worm 25%). The remaining share is for co-axial gears estimated at 15% and for other type of boxes that corresponds to 20% of the local demand. For the convenience of the study, the sales program and the input analysis have been based on only 5 items: three worm gear, one helical worm gear and one co-axial gear. The market share of the other type of products has been proportionally distributed among them.

Worm gears are the most relevant gearbox in the market, and therefore, the forecast was based on three different models and employed the ratio 1:10 in order to estimate the number of big units. Their share, however, has been slightly increased to 12% of the total number of worm gears, because - as it will be analysed in the next chapter - they are the most convenient to manufacture in India and some additional marketing emphasis will be placed on them. The remaining share of worm gears, has been divided according to the most common market ratio, taking one small and one middle range. For helical worm/gears and co-axial gears, the most common middle- range models were selected for marketing projection and sales revenue.

TABLE 3.8 SALES PROGRAM

	1997	1998	1999	2000	2001
RMI 50	10000	12000	13800	15200	16500
RMI 85	5100	6100	7050	7750	8400
RMI 130	2110	2540	2930	3200	3500
CB 85 HW	1800	2400	3000	4200	5400
COAXIAL	1800	2400	3000	4200	5400

TABLE 3.9 SALES REVENUE (Price in Rs. inclusive of local sales taxes)

	1997	1998	1999	2000	2001
RMI 50	10,000	12,000	13,800	15,200	16,500
Price Unit	3,961	3,961	3,961	3,961	3,961
Gross Sale	39,610,000	47,532,000	54,661,800	60,207,200	65,356,500
RMI 85	5,100	6,100	7,050	7,750	8,400
Price Unit	6,990	6,990	6,990	6,990	6,990
Gross Sale	35,649,000	42,639,000	49,279,500	54,172,500	58,716,000

	1997	1998	1999	2000	2001
RMI 130	2,110	2,540	2,930	3,200	3,500
Price Unit	12,815	12,815	12,815	12,815	12,815
Gross Sale	27,039,650	32,550,100	37,547,950	41,008,000	44,852,500
CB 85 H W	1,800	2,400	3,000	4,200	5,400
Price Unit	6,512	6,512	6,512	6,512	6,512
Gross Sale	11,722,230	15,629,640	19,537,050	27,351,870	35,166,690
COAXIAL	1,800	2,400	3,000	4,200	5,400
Price Unit	7,027	7,027	7,027	7,027	7,027
Gross Sale	12,649,104	16,865,472	21,081,840	29,514,576	37,947,312
TOTAL UNITS	20,810	25,440	29,780	34,450	39,200
TOTAL GROSS SALE	126,669,984	155,216,212	182,108,140	212,254,146	242,039,002

3.6 Marketing Strategy

The marketing strategy has already been partly outlined previously, particularly when it was mentioned to try to pay more attention to the bigger or middle range models, which seem to provide a higher margin in Indian conditions (as discussed in Chapter 4). Moreover a few sales points will be established in key locations (see Map 3.1) selected according to the regions with high gear box demand (see Map 3.2)

An alternative strategy to the creation of a distribution network on its own, would be to collaborate with a large commercial company with sales and distribution all over India. In fact, TRINA-STM is also considering a collaboration with a company that has the following characteristics:

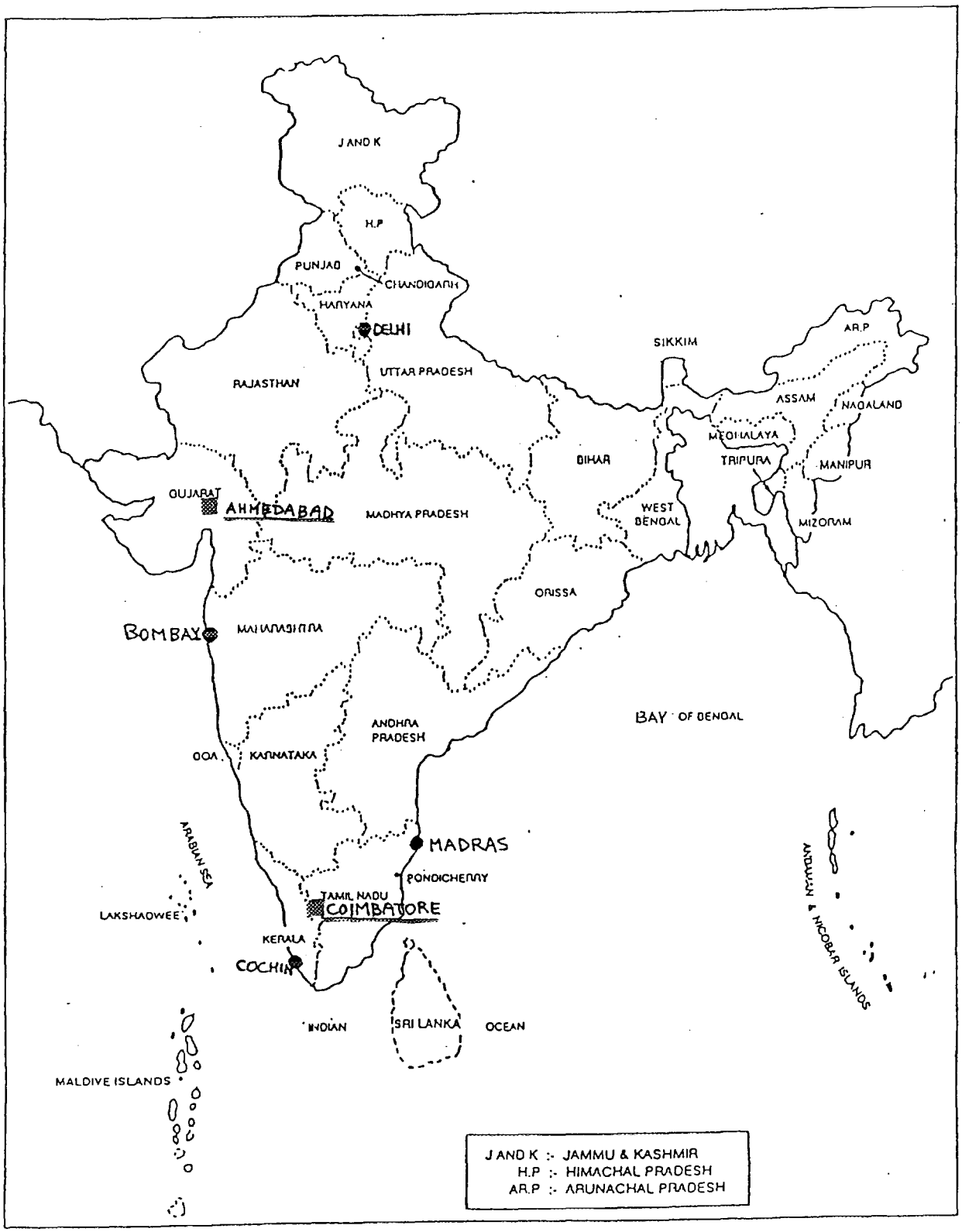
HEAD-QUARTERS:		Hyderabad
Regional Offices:		Sub-Regional Offices:
Bombay	W	Ahmedabad, Vadodara, Indore Nagpur, Pune, Raipur,
Calcutta	E	Jamshedpur, Guhawati, Dhambar
Delhi	N	
Hyderabad	S	Madras, Coimbatore, Bangalore

The above company has a regional distribution share of 35% in West India, 26% in South India, 23% in North India and 16% in Eastern India.

In case of such a collaboration, the TRINA marketing offices in Southern and Western India will operate as sales inspectors or marketing supervisors. This arrangement is likely to enhance the market prospects of TRINA-STM in Eastern India and reinforce them in the West and South. As far as the Southern market is concerned, it must be considered that with the location of one more office in Hyderabad, it will be possible to have a stronger presence in the Andhra

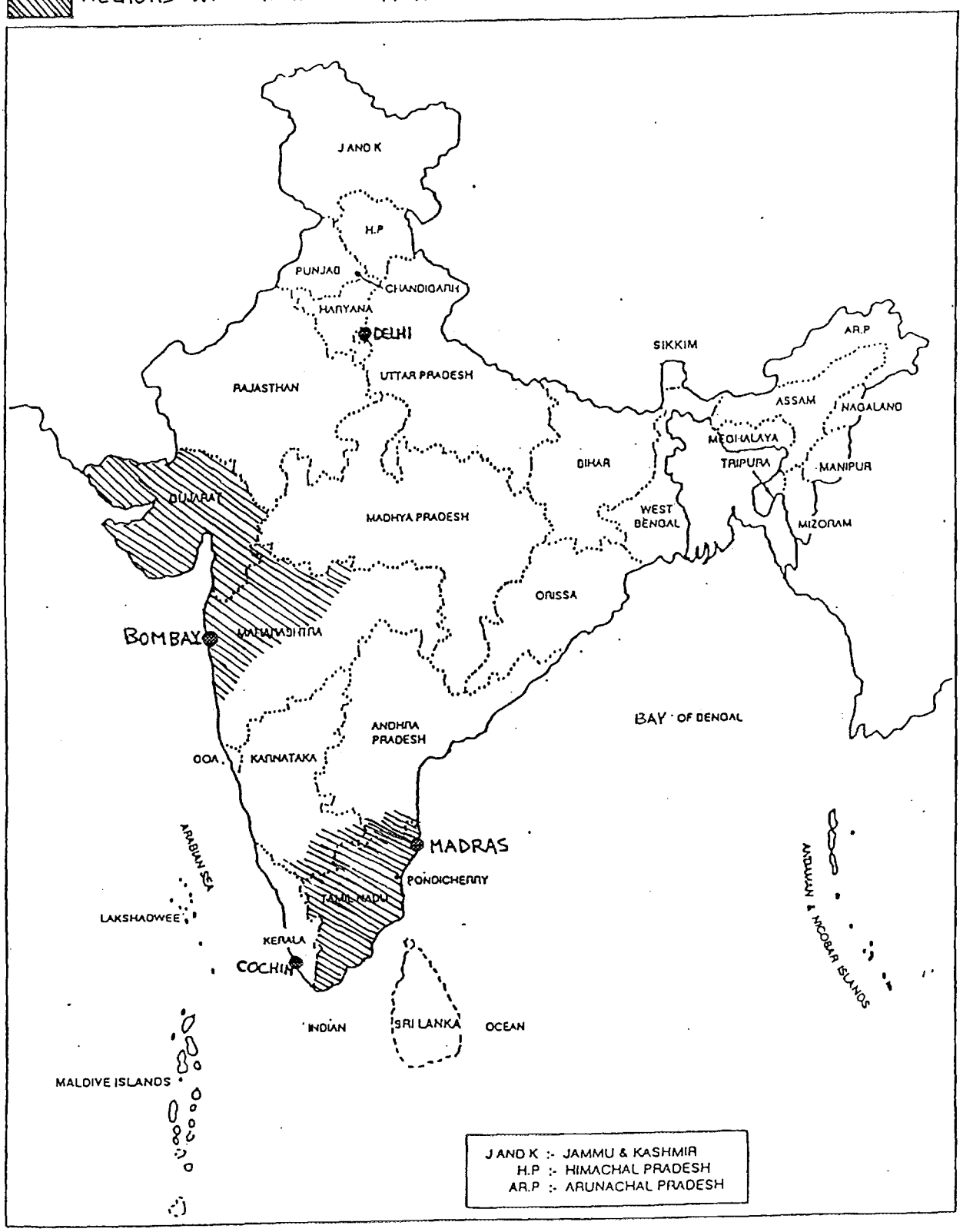
MAP 3.1

■ SALES POINT LOCATION OF TRINA - STM



MAP 3.2

REGIONS WITH HIGH CONSUMPTION OF GEAR BOXES (75% OF TOTAL DEMAND)



Pradesh market and increase the market share of TRINA-STM. Northern India, will remain a priority for TRINA-STM Apart from the sales network, promotional activity will be another relevant aspect of the marketing strategy. It will be mainly conducted through exhibitions, trade fairs, seminars, and advertisements.

For Exhibition and Trade fairs, there are various specialised events. It is planned to participate in at least three of them per year with an approximate cost of 300,000 Rupees.

Another promotional activity will be that to organise seminars where to invite local customers and explain them the technological significance of a new product. This is common system to introduce new products in India.
Plans are underway to organise six seminars within the first two year in the following major centres: Bombay, Bangalore, Coimbatore, Madras, Ahmedabad, and New Delhi. The approximate cost of the seminars is approximately 100,000 Rupees each. From the third year onwards, there will continue to be three seminars per year. Two of them will take place in minor consumption centres in order to have more widespread diffusion of the product - at a cost of 80,000 Rupees each. The remaining seminar will be held in one of the previously identified centres, to introduce new technological developments and adaptations.

Advertising will be done mainly through specialised press and economic magazines. Advertisements in economic press with nation-wide distribution is normally more expensive because of its large readership. Nevertheless, 134,000 Rupees has been budgeted for a special isssues in the daily economic newspaper related to the sector or in the occasion of a national exhibition. Another 102,000 Rupees will be allocated to release 4 advertisements per year in the most diffused business magazine which is a forthnightly publication. A further allocation of 100,000 Rupees per year will be allocated for advertisement in regional or local press. Moreover, in India there are a lot of specialised magazines that cover one particular industrial sector. Advertisement rates are very affordable and highly effective, because they reach only companies belonging to a specific market segment. For a full year's advertisement in three monthly magazines covering different industrial sectors, the cost is approximately 150,000 Rupees.

Table 3.10

TRADE FAIRS	300,000
SEMINARS	300,000
ADVERTISEMENTS:	
NATIONAL NEWSPAPER	134,000
LOCAL NEWSPAPERS	100,000
NATIONAL MAGAZINE	102,000
INDUSTRIAL MAGAZINE	150,000
TOTAL	**1,086,000**

Overall marketing expenses account for less than 1 % of total sales revenue and the investment in this area could be considerably increased.

CHAPTER 4: RAW MATERIALS AND SUPPLIES

4.1 Raw Materials

As indicated earlier, except for a few parts, all components comprising of gear and gear boxes are constructed out of casted mould and die. Therefore, a limited number of foundries were contacted to evaluate their production capacity as well as their quality level and price for pig iron and aluminium cast.

The basic findings indicated that in this particular industry, the cost of labour is very low and there is an high availability of unspecialised manpower. However, this manpower shows a penchant for doing repetitive work and can be easily trained.

The main problem is related to the local machines which are very old fashioned and normally are conceived for reducing the working time. This creates a situation where the cost of casting is cheap for the material, but quite expensive overall for the manufacturing process. To provide an example, consider that the working cost in Italy with last generation machines is approximately 20 Rs. per minute, compared with 6 Rs. per minute in India. However Italian productivity is higher with an approximate output ratio 1:11. This translates into a situation where the incidence of working cost of making small size models is relatively high compared to that of materials and the final costs of components is more expensive than in Italy. However, on the other hand, in the bigger sized models, where the relative incidence of processing is less, the cost of the single components is cheaper if made in India than in Italy (see Table 4.1 for an example).

Table 4.1 COMPARISON BETWEEN ITALIAN & INDIAN COMPONENT COSTS
(in Rs)

	RMI 50		RMI 85		RMI 130	
	Italy	India	Italy	India	Italy	India
HOUSING	182	305	340	408	1178	506
FEET	54	49	220	102	472	238
INPUT FLANGES	56	57	82	84	209	112
WORM SHAFT	214	125	380	295	1060	550
WORM WHEEL	274	250	616	680	1580	1570
BEARING		354		530		892
TOTAL	780	1140	1638	2099	4499	3868

It is for this reason that at the initial stage of the project proposal, it was taken into consideration to manufacture only the models from 110 RMI and above, and to import the other models per assembled or dissembled components. However, since the production costs of components for the small models - even if higher than in Italy - leaves a very high margin of profitability in comparison to the average price of the Indian market (analysed in Chapter 3) it has been decided to manufacture locally all size of models.

Moreover, this will provide the additional advantage of prompt delivery which is very important for a successful operation in the Indian market. It must also be mentioned, that if the new generation metal working machines are introduced, the Indian cost of processing would decrease by 25-30%. Therefore, the following input tables have been prepared taking into consideration cost of components locally manufactured with a final products 100 per indigenised. For this reason, the project will also be beneficial to India's balance of payments.

Table 4.2 INPUT MATERIALS OF SELECTED MODELS

MOD RMI 130 WORM GEAR COST in Rs.

	LOCAL COST
HOUSING	506
FEET	238 x 2
INPUT FLANGES	112
WORM SHAFT	550
WORM WHEEL	1570
BEARING	892
BEARING CLOSED COVER	43
COMMERCIAL PARTS:	
screws, bolts, sheems	
sealant, plugs	160
COST OF COMPONENTS	**4309**
ASSEMBLY & TESTING COSTS	**30**
TOTAL	**4339**

MOD RMI 85 WORM GEAR Cost in Rs.

	LOCAL COST
HOUSING	408
FEET	102 x 2
INPUT FLANGES	84
WORM SHAFT	295
WORM WHEEL	680
BEARING	530
BEARING CLOSED COVER	12
COMMERCIAL PARTS:	
screws, bolts, sheems	
sealant, plugs	108
COST OF COMPONENTS	**2321**
ASSEMBLY & TESTING COSTS	**60**
TOTAL	**2381**

MOD RMI 50 WORM GEAR Cost in Rs.

	LOCAL COST
HOUSING	305
FEET	49 X 2
INPUT FLANGES	57
WORM SHAFT	125
WORM WHEEL	250
BEARING	354
BEARING CLOSED COVER	11
COMMERCIAL PARTS:	
screws, bolts, sheems	
sealant, plugs	89
COST OF COMPONENTS	**1289**
ASSEMBLY & TESTING COST	**50**
TOTAL	**1339**

HELICAL WORM Mod CB 85 Cost in Rs.

	LOCAL COST
HOUSING	483
FO 85 ALUMINIUM	72
INPUT FLANGES	116
MUFF	70
WORM SHAFT	295
WORM WHEEL	680
PINION 112	55
GEAR WHEEL 112	200
BEARING	826
BEARING CLOSED COVER	12
COMMERCIAL PARTS:	
screws, bolts, sheems	
sealant, plugs	105
COST OF COMPONENTS	**2914**
ASSEMBLY & TESTING COST	**50**
TOTAL	**2964**

Co-AXIAL GEAR BOX Mod. AMP 60/ 3 PAM Cost in Rs.

	LOCAL COST
HOUSING	397
OUTPUT COVER ALUMINIUM	83
INPUT FLANGES	208
INPUT HOLLOW SHAFT	110
OUTPUT SHAFT	160
PINIONS	295
WORM WHEELS 12	760
BEARING	1572
COMMERCIAL PARTS:	
screws, bolts, sheems	
sealant, plugs	250
COST OF COMPONENTS	**3835**
ASSEMBLY & TESTING COST	**100**
TOTAL	**3935**

4.2 Other Supplies

The installed electricity capacity will be 150 KWa. The real consumption would be 100 KWa per hour. The installed capacity is higher than effective consumption because it has taken into consideration that it may increase in the future and that for industrial use, the minimum electricity bill will correspond to 75% of the installed capacity. Considering that the electricity cost is 2.25 Rs. per KWa and the working period is approximately 4800 hours per year (two 8/hour shifts per day, 25 days per month and 12 months per year) it yields an annual figure of 1.08 million Rupees. To this must be added another amount of 135,000 Rupees in order to cover 75% of installed capacity. The total cost of 1,215,000 Rupees (corresponding to 64.5 million Italian Lire) will be the annual electricity charge at regime. However, (as explained in the next chapter), there will be some tariff concessions from the State of Haryana where the project is to be located which means that the overall annual electricity bill should be in the vicinity of 1,000,000 million Rupees only.

The water consumption will be negligible.

Other basic requirements for operating the factory are:

1. Oxygen for gas welding set
   Acetylene for gas welding set
2. Kerosene oil for soldering and brazing
3. Lubricating oil
4. Diesel oil for generating set
5. Primer & painting
6. Packing materials

4.3 Supply Program

Since all the materials are locally available and the delivery time is very short, stock should be arranged to provide for two working weeks. However, since some die and casting will be re-exported to Italy, the supply program will have to take into consideration the storage period required for them. Therefore, it is better to be on the safe side and consider a minimum stock equal to at least one month (see Table 4.3).

Table 4.3 STOCK/SUPPLY PROGRAM

MATERIALS	MONTHLY PROCUREMENT					COST X MONTH IN Rs. (000 UNITS)				
	1	2	3	4	5	1	2	3	4	5
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Housing	2199	2682	3145	3650	4134	646	788	924	1072	1215
Feet	389	467	517	591	642	250	300	333	380	413
Input	577	704	825	958	1085	151	185	216	251	284
Worm Shaft	1265	1531	1784	2024	2150	369	445	520	590	628
Worm Wheel	3940	4807	5634	6540	7407	985	1202	1409	1635	1852
Bearing	4174	5092	5969	6929	7847	1033	1260	1477	1715	1942
Bearing Closed Cover	1578	2225	2525	2525	2683	24	30	34	38	41
FO 85	150	200	250	350	450	11	15	18	26	33
Muff	150	200	250	350	450	11	15	18	26	33
Pinions	300	400	500	700	900	53	70	88	123	159
Output Cover	150	200	250	350	450	12	16	20	28	36
Input HollowShaft	150	200	250	350	450	17	23	28	39	51
Output Shaft	150	200	250	350	450	16	21	27	37	48
Commercial Parts						243	296	347	403	457
TOTAL COST X MONTH (.000 of Rs)						3821	4666	5459	6363	7192

CHAPTER 5: LOCATION AND SITE

5.1 Location And Site Selection

The location of the project could be indicated as Delhi even if the actual site is in the State of Haryana in the industrial area of Bhadurgarh, 25 kms. from town and 8 kms. past the administrative border with the capital. The territory of the Delhi State is limited to the metropolitan area and many industrial areas servicing and surrounding it are located within the administrative limits of the neighbouring regions.

This situation combines three relevant advantages:

1. location in the capital with all the related infrastructural facilities, including the international airport and also the rail and road services for domestic transport of good;
2. the possibility of obtaining incentives for industrial development. These incentives are normally available in various Indian States, but not within Delhi administrative border as the area is already congested.
3. lower prices for renting or purchasing of land and industrial buildings in comparison with the metropolitan area. In this case, the cost of land or the rental value is more than half in Delhi proper (see Table 5.1).

The sales office will be located in Kirti Nagar, Delhi, , where there are the old TRINA premises. This location allows for easy contact with customers and visitors from all over India, while the manufacturing units and the registered office will be located in Bhadurgarh. There was actually another site considered, but it is located in Haryana and apart from different land and rental costs, is comparable with the existing site.

Tab 5.1 Comparison of Prices Between Land and Rental Values in Delhi and Bhadurgarh

PLACE	COST OF LAND	RENTAL VALUE
	Sq. feet	Sq. feet
NEW DELHI (OKHLA)	10000/11000 Rs.	10-12 Rs
BHADURGARH	4400/5500 Rs.	6-7 Rs.

5.2 Public Policies

There are various incentives provided by the Haryana government and those applicable to the project are the following:

A) INVESTMENT INCENTIVES A grant to meet part of the cost of captive electric generating set.

B) FISCAL CONCESSIONS
- Concessional power tariff for a period of five yeas.
- Exemption/deferment of sales tax up to Rs. 60 million for a period of 5 to 9 years

5.3 Environmental Assessment

The factory is located in an organised industrial park with all the related infrastructural facilities. Moreover, the type of processing has a minimal environmental impact. There is no discharge of polluting effluents, the consumption of water is negligible and electrical energy consumption is approximately 100 KWa per hour. Electricity supply is assured by the Haryana State Electric Board. There are some occasional power failures, but this can be rectified by the installation of an electric generator considered as a factory auxiliary. The 200 Kwa auxiliary generator does generate diesel fume exhaust but not in sufficient quantities to pose a health risk to employees or to the external environment, if used as a temporary means to restore electricity.

5.4 Alternative Location

The location and site has been selected in Delhi and surrounding area because TRINA premises are already located there. The location has both some advantages and disadvantages. As noted in the market analysis, more than 3/4 of the local gear box consumption is in Western and Southern India. All the other manufacturers from the organised sector are located there. In comparison with these locations, the cost of labour in Delhi is the same as in Western India, but is almost double than in the South, especially in Coimbatore which is one of the major consumption centres .

However, nothwistanding this disadvantage with Southern manufacturers, the cost of labour in Delhi will allow TRINA to maintain competitive. After all, the largest number of manufacturers are located in Western India. As far as the problem of delivery time is concerned, at least in Southern India, this can be easily sorted out by renting a storehouse in Coimbatore, where TRINA already has appointed a sales manager. The cost for renting this additional building would be below 100,000 Rupees, adding only minimally to the impact on total cost for land and building.

However, on the other side, it should be considered that the location in Delhi, where TRINA-STM is expected to be the only manufacturer from the organised sector, will provide the opportunity of becoming the leading supplier in the Northern Indian market. As mentioned in Chapter 3, this alone will provide revenue large enough to make the project sustainable.

CHAPTER 6: ENGINEERING & TECHNOLOGY

6.1 Industrial Building

The total area of the factory is comprised as follows (see also Map 6.1):

TOTAL LAND	121,000 sq. ft.
TOTAL COVERED AREA	39,600 sq. ft.

of which 18,000 sq. ft. for manufacturing activities
18,000 sq. ft. for warehouse and component stock
300 sq. ft. for dressing and auxiliary services
3,000 sq. ft. for administrative buildings

6.2 Production Plant & Machines

Production equipment consists mainly of machine tools, both conventional and CNC. Part of the equipment is locally available and will be purchased in the domestic market. Other equipment, especially the most automated will be imported from Italy. The imported machineries will be procured by STM. The value will be partly adjusted as equity participation and partly reimbursed by the JV company. The value of the imported equipment is estimated at the best market quotations for the JV company. The imported, as well the domestic equipment have been selected with the proper technical specifications to match the desired plant capacity. The quotations for the local machines are listed at the prevailing market quotations for the equipment with the desired specifications (see Table 6.1 and 6.2).

TAB 6.1 LIST OF INDIAN MACHINES

MACHINES	Components	Qty	UNIT PRICE	PRICE Rs.
Bandsaw Machine	Cutting Blanks	1	500,000	500,000
C.N.C. Turning	Blank Size 28-180	1	3,000,000	3,000,000
Lathe Machine	Tool Work/Misc. Work	1	3,200,000	600,000
Broaching Machine	Keyway Size 28-128	1	600,000	600,000
Drilling Machine	covers Size 28-180	1	300,000	300,000
Drilling Machine	Body Size 28-180	1	300,000	300,000
Slotting Machine	Keyway of Worm Shaft	1	500,000	500,000
Champhering Machine	Worm Gear	2	250,000	500,000
Cylindric Grinding	Worm Shaft	1	800,000	800,000
Internal Grinder	gears	1	800,000	800,000
Hob cutters	Worm Wheel Cutting	1	1,500,000	1,500,000
TOTAL COST OF INDIAN MACHINES IN Rs.				9,400,000

TAB 6.2 LIST OF IMPORTED MACHINES

MACHINES	COMPONENTS	Qty	UNIT PRICE	PRICE Rs.
SPM Housing Boring	Housing 40-110	1	300,000	300,000
SPM Housing Machine	Housing 40-110	1	1,800,000	1,800,000
SPM Housing Tapping	Housing 40-110	1	1,800,000	1,800,000
SPM Milling/Drilling	Feet 50-150	1	2,400,000	2,400,000
CNC Turing	Housing 180	1	2,400,000	2,400,000
Machining Centre	Olivetti 500*500	1	2,400,000	2,400,000
Keyway Milling	Key Cutting	1	1,300,000	1,300,000
Hobbing Machine	DIA 500 mm Module 8	3	1,250,000	3,750,000
Worm Cutting	Worm Up To Size 110	1	2,400,000	2,400,000
Cylindric Grinding	Shaft	1	2,100,000	2,100,000
Bore Grinding Machine	Worm Shaft, gears	1	850,000	850,000
Worm Grinding	Worm Up To Size 110	1	1,350,000	1,350,000
Gear Grinder	Gear & Pinion	1	3,500,000	3,500,000
Lead Profile Check	Gear & Worms	1	3,000,000	3,000,000
Inspection Instr.		lot	600,000	600,000
TOTAL COST INCLUDING IMPORT/DUTY				29,950,000

6.3 Production Process

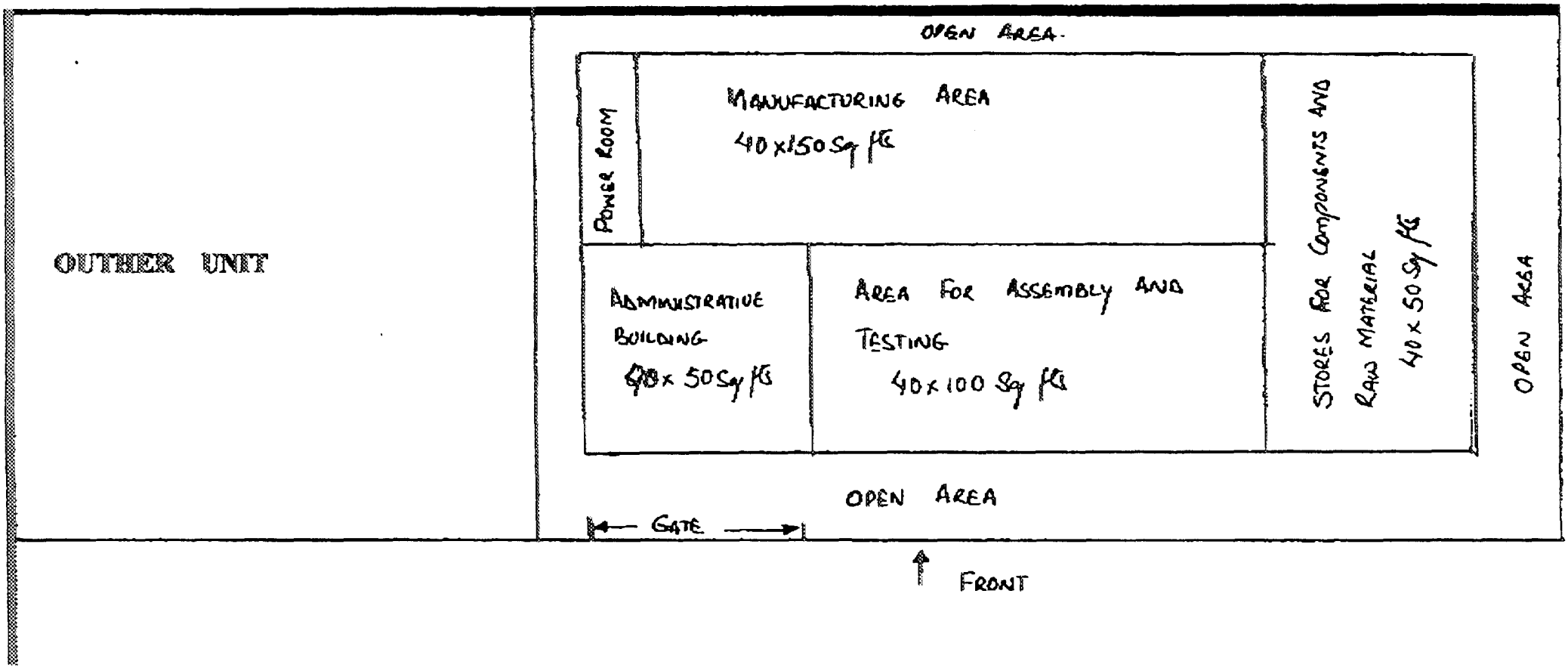
The processing cycle is comprised of component production, assembly and testing. The manufacturing of different types of gear boxes and geared motors involves the following process. First, gear blanks are procured depending on the design. The gear boxes could be forged, rolled bars or castings. Gear blanks are machined on the central lathe, CNC lathe or vertical boring mill, depending upon the size and accuracy required. The gear teeth are machined on the gear hobbing machine with high speed cutters. Holes, if any are machined as per design specifications on the milling or drilling machine. Keyways are machined on the milling or slotting machine or the broaching machine, depending on the quantity involved. The gears are then heat treated for greater wear resistance, resulting in longer life and greater strength in higher load carrying capacity. The gears are ground to improve the finish of the gear teeth profile and dimensional tolerance on the different types of grinding machines. The gears are then tested for different types of dimensional accuracy's which are carried out with the different types of testing machines.

The gears are subsequently stored until they are needed for assembly.

The housing is machined on the special purpose machine or on the CNC machine centre, depending upon the accuracy required and quantity involved. Drilling and tapping are done on the drilling machine. Covers are machined on the CNC turning centres and subsequent drilling is done on the drilling machine. The housing and covers are then inspected and kept in stores for later on to be assembled with gears.

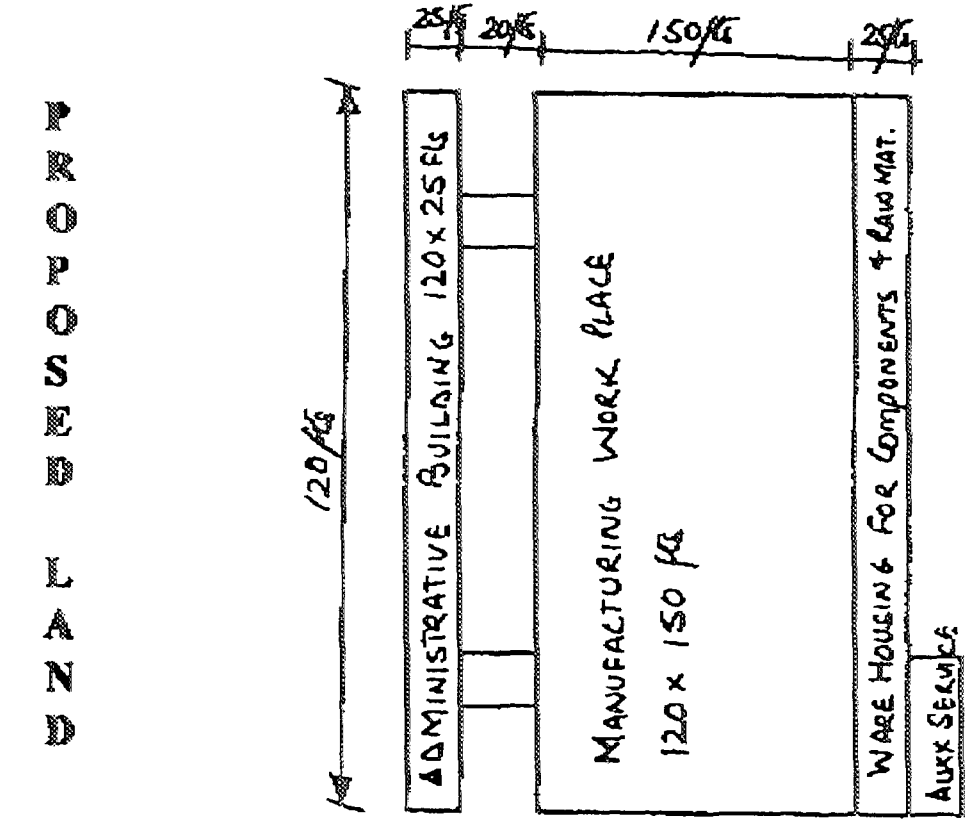
MAP 6.1

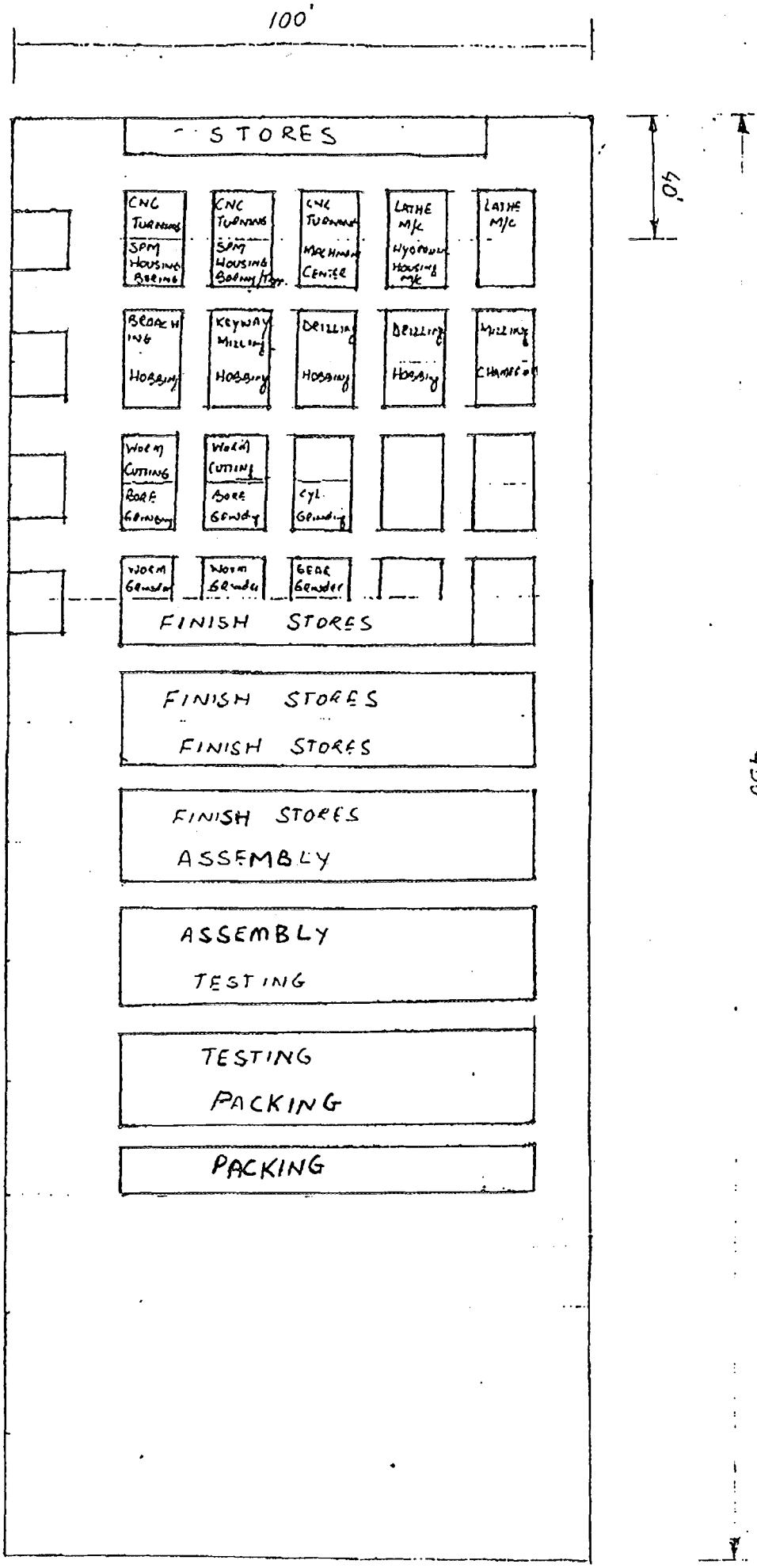
Map of land in Bhadurgarh Industrial area



MAP 6.2

Map of land next to our Trina Quebec plant





MAP 6.3

PROPOSED LAYOUT OF TRINA/STM

BHADURGARH

HARYANA

The gearboxes are then assembled utilising pneumatic press and tools and are tested for efficiency and load test on the testing machine.

6.4 Personnel Organisation Of Production Process

The required personnel needed for the production process will be organised as per the following tables (6.3 and 6.4) :

Table 6. 3 LIST OF OPERATORS REQUIRED FOR MACHINES

MACHINE	N of persons per shift	N of Shifts per day	Total N of Persons
1. Bandsaw machine	1	1	1
2. CNC Turning	1	2	2
3. CNC Turning	1	1	1
4. Lathe Machine	3	1	3
5. S.P.M. Housing Boring	1	1	1
6. S.P.M. Housing Machine/ S.P.M. Housing Tapping	1	2	2
7. S.P.M. Milling\Drill	1	1	1
8. Machining Centre	1	1	1
9. Drilling Centre	1	2	4
10. Broaching Slotting Machine	1	1	1
11. Keyway Milling	1	1	1
12. Hobbing Machine	1	2	2
13. Worm Cutting	1	2	2
14. Champering Machine	1	1	1
15. Cylindrical Grinding	2	1	2
16. Bore Grinding	2	1	2
17. Worm Grinding	1	2	1
18. Gear Grinder	2	1	2
19. Helpers	2	2	4
20. Fitters for Assembly	4	2	8
TOTAL NUMBER OF OPERATORS REQUIRED IN TWO SHIFTS			**42**

Tab 6.4 LIST OF OTHER PERSONS REQUIRED FOR MANUFACTURING

JOB	N of Persons per shift	N of Shifts per day	Total N of persons
1.Engineer Maintenance Mechanical	1	1	1
2. Engineer Maintenance Electrical	1	1	1
3. Engineer Manufacturing	1	2	2
4. Engineer Assembly	1	2	2
5. Engineer Quality	1	2	2
TOTAL NUMBER OF ENGINEERS REQUIRED IN TWO SHIFTS FOR MANUFACTURING			8

CHAPTER 7: ORGANISATION & HUMAN RESOURCES

7.1 Personnel Organisation

The company staff is divided between the Finance cum administration Department and the Operations Department. Both have their own director, directly responsible to the Managing Director. The Finance and Administration Department covers the account activities, the management of personnel and the general services. Account activities include all the tax, fiscal and customs procedures. The Finance and Administration Department accounts for 1/5 of people the total labour force and 23 % of the personnel cost.

Operations employees form the largest part of the staff and include the following areas of operations: Material, Engineering, Production, Quality and Marketing. The Materials Department deals with all the purchasing activities, storage of components and of finished goods as well as, packing and shipping. The Engineering Department deals mainly with the mechanical design. The Marketing Department includes also two sales engineers who are located in Coimbatore and Ahmedabad.
The organisational chart and Related Salaries are as follows:

Table 7.1 ORGANISATION AND HUMAN RESOURCES

TITLE		SALARY (Rs. per annum)
1.	Managing Director	300,000
1.1	Director Finance, ADM	250,000
1.2	Director Operations	250,000
1.1.1	Manager (Accounts)	144,000
1.1.2	Manager (personal)	120,000

.

MANAGER (ACCOUNTS)

QUALIFICATION	NUMBER	DAILY COST (Rs.)	ANNUAL COST (Rs.)
Accounts Officer	1	240	72,000
Taxation Officer	1	240	72,000
Custom Officer	1	240	72,000
Computer Operator	1	160	48,000
Executive	1	130	39,000

MANAGER (PERSONAL & ADM)

QUALIFICATION	NUMBER	DAILY COST (Rs.)	ANNUAL COST (Rs.)
Receptionist	1	160	48,000
Security Officer	8	80	192,000

DIRECTOR OPERATIONS

TITLE	SALARY (Rs. per annum)
1.2.1 Manager (Material)	200.000
1.2.2. Manager (Engineering)	150,000
1.2.3. Manager (Production)	225,000
1.2.4. Manager (Quality)	225,000
1.2.5. Manager (Marketing)	200,000

MANAGER (MATERIAL) (1.2.1)

QUALIFICATION	NUMBER	DAILY COST	ANNUAL COST (Rs)
Purchase Executive			
Raw Material	1	200	60,000
Tools/Gauges/Stores	1	200	60,000
Packing & Misc.	1	160	48,000
Stores Executive			
Raw Material	1	200	60,000
Stores	1	200	60,000
Packing & Shipping	1	160	48,000
TOTAL			336,000

MANAGER (ENGINEERING) (1.2.2.)

QUALIFICATION	NUMBER	DAILY COST (Rs.)	ANNUAL COST (Rs.)
Design Engineer (Product & New Dev.)	1	280	84,000
Engineer (Process & Tools)	1	240	72,000

GENERAL MANAGER (PRODUCTION) (1.2.3)

QUALIFICATION	NUMBER	DAILY COST (Rs.)	ANNUAL COST (Rs.)
Engineer Maintenance	1	280	84,000
Fitters	1	100	30,000
Helper	1	72	21,600
Engineer Turning & Machine Shop	1	160	48,000
Operators	6	100	180,000
Helpers	2	72	43,200
Operators	2	120	72,000

Helpers	1	72	21,600
Engineer Teeth Cutting	1	160	48,000
Operators	5	120	36,000
Helper	1	72	21,600
Engineer Heat Treatment	1	160	48,000
Engineer Grinding	1	160	48,000
Operators	6	120	216,000
Helper	1	72	21,600
Engineer Assembly & Testing	1	160	48,000
Fitters	8	80	192,000
Operator	1	120	36,000

MANAGER (MARKETING) (1.2.5)

QUALIFICATION	NUMBER	DAILY COST (Rs.)	ANNUAL COST (Rs.)
Ass. Manager (OEM)	1	320	96,000
Ass. Manager (Dealers)	1	320	96,000
Sales Engineer	4	240	288,000
Computer Operators	2	160	96,000

7.2 Training

In a period of two years time, the JV company should be completely autonomous in the production process and also have a technically qualified staff for commercial activities and after sales services.

The training program will take place over a span of two years and is related to the following area of operations and schedule:

1. Marketing and sales;
2. Assembling, testing and final inspection;
3. Training as per manufacturing process of components including training on imported machines.

A) TRAINING IN ITALY FOR THE FOLLOWING INDIAN STAFF MEMBERS

- production manager
- engineering manager
- design engineer
- material manager
- raw material purchase executive

This operation will take 2 weeks per man and is related to the general transfer of technical knowledge, design, procurement and selection of proper materials.

B) TRAINING IN INDIA FOR PRODUCTION PERSONNEL

B1) Training is dedicated to instructing and familiarising the staff in the specific use of imported machines.

This section of the training will mainly involve the employees of the Production Department (see 1.2.3).

B2) There will also be a general training of all personnel involved in the manufacturing process;

B3) Training is provided for employees in the assembly, testing, final inspection and quality control departments.

This part will involve all the technical experts of the Operation Department excluding the marketing sector (1.2.5).

B4) Training for servicing and maintenance. This part will involve local dealers and agents or their technicians.
Training operations will be initially conducted, then supervised for some time by an Italian technician, that in two years time will spend six months in the factory.

C) TRAINING IN INDIA OF MARKETING AND SALES STAFF

This part will be conducted entirely in India by an Italian salesman for an aggregate period of one month in two years time. It will involve all the local dealers and agents and all the staff of the Marketing Department (1.2.5).

7.3 Cost Of Training

COST ITEMS		COST OF TRAINING (million Italian Lira)
a)	ITALIAN STAFF	4
	LOCAL STAFF	1.5
	INTERNATIONAL TRAVELS	8
	LODGING AND BOARD	15

b)	ITALIAN STAFF	120
	LOCAL STAFF	100
	INTERNATIONAL TRAVELS	3
	LODGING AND BOARD	90

c)	ITALIAN STAFF	20
	LOCAL STAFF	6
	INTERNATIONAL TRAVELS	4
	LODGING AND BOARD	15
OTHER COSTS:		
Domestic travel of local staff & agents,		
boarding & lodging of local staff & agents		
Conference room		15
TOTAL		401,5

Table 7.2 TRAINING CHART

	ITALY	INDIA
TIME	JULY 96	SEPTEMBER 96 - JULY 98
ACTIVITY		
TECHNICAL TRAINING production manager engineering manager design engineer material manager raw material purchase executive	15 days	
PRODUCTION TRAINING all operation staff		six months
COMMERCIAL TRAINING all marketing staff		one month

CHAPTER 8: OVERHEAD COSTS

The following overhead costs (reported in Table X.4) have been considered:

- Factory Overhead costs
- Administrative Overhead costs
- Marketing Overhead costs.

FACTORY OVERHEAD COSTS

They include:

- factory supplies and utilities (as described in Chapter 4): assumed at about 2% of raw material costs;
- spare parts, repair and maintenance costs: assumed at about 1% and 2% of the initial costs of plant machinery, equipment and auxiliaries;
- insurance fees and other costs: assumed at about 10% of the building initial investment cost;
- wages for the manager of Operations and Production manager and others.

ADMINISTRATIVE OVERHEAD COSTS

They include:

- labour costs for personnel of the Administration Department personnel (see Chapter 7);
- cost of the Managing Director cost (see Chapter 7);
- office supplies and other costs.

MARKETING OVERHEAD COSTS

They include:

- labour costs, travel expenses and other costs
- advertising costs, office supplies and other costs.

CHAPTER 9: IMPLEMENTATION PLANNING AND BUDGETING

The implementation process has been divided in three main phases:

- Pre-investment phase;
- Investment phase, including the construction period and the pre-production and training period;
- Operational phase.

PRE-INVESTMENT PHASE

The pre-investment phase started in 1994; preliminary studies have been prepared which have been used as input data for the present feasibility study.

INVESTMENT PHASE

The investment phase will start at the beginning of 1996 with negotiations and contracting to secure financial asset and all construction activities. The construction period (see Chapters 5 and 6 for details) of the investment phase, will last a maximum of 9 months (probably beginning in April of 1996). The training period (see Chapter 7 for details) of the investment phase, will last a maximum of 6 months (in different period of 1996), and will include the following tasks: technical training in Italy for key production personnel:

- key production personnel will undertake technical training for JV personnel under the supervision of Italian technicians at the JV plant;
- pre-production trials and management training: starting in the second half of 1996, when the plant is almost ready for production, trials will be conducted with all the JV production personnel, with the purpose to also train the management in the field;
- marketing and commercial training: starting in the second half of 1996, key JV personnel will be trained in India and then will undergo a formation program (on technical and commercial aspects of the production) with the sales agents.

OPERATIONAL PHASE

The operational (production) phase will start after the of construction period with the commissioning of the plant and pre-production trail, as well as after a successful multi-functional training program. That is estimated for the beginning of 1997.

CHAPTER 10: FINANCIAL ANALYSIS AND INVESTMENT APPRAISAL

10.1 General Aspects

The following financial analysis has been carried out using the methodology recommended in the UNIDO Manual for the Preparation of Industrial Feasibility Studies. In accordance with this methodology, UNIDO COMFAR III Expert package has been used for the financial and economic calculations. The financial analysis has been carried out to evaluate the Indian Joint Venture, established as described in the present feasibility study, for the manufacturing and marketing of gear boxes and geared motors. By taking into consideration the required project input and output prices, risks and uncertainties, this study is aimed at clarifying the main issues of the business plan, calculating:

- the analysis of cost estimates for the project (already described in the previous Chapters of the study);
- the financial analysis, including sensitivity and break-even analyses.

In the appendix to this study, COMFAR printouts are given. All the cost and revenues are locally generated. The analysis is carried out in real terms, i..e. with zero inflation assumption. Therefore, a fixed exchange rate is assumed.

1 Indian Rupee (Rs) = 50 Italian Lira (ITL)

All financial calculations have been reported using million Italian Lira as the accounting currency. For the sake of understanding, the summary schedule has been proposed in both Italian Lira and Indian Rupees.

10.2 Analysis Method

The financial and economic evaluation has been conducted using the methodology which UNIDO recommends, as well as standard capital budgeting procedures. The future cash flows are forecasted and generated by the project over the estimated planning horizon of 15 years, and by the general experience of the Italian partners.

In determining the rate of discount to be used, the appropriate cost of funding was considered, calculating the weighted average cost of capital (WACC). This reflects both the risk involved in the Indian investment and the capital structure.[2]

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[2] The discount rate used for NPV calculation is the WACC, where the weights are based on the proportion of the firm's capital structure accounted for by each source of capital. This discount rate takes into account the time value of money, as well as the riskiness of the JV's cash flows.

WACC = %D * Rd * (1-t) + %E * Re
where Rd is the cost of debt and Re is the expected rate of return on partners' equities

Finally, COMFAR III Expert has been used to evaluate the present value of the JV's future cash flow discounted at the cost of capital.

10.3 Base Case Analysis

10.3.1 Initial Investment Costs

Initial investment costs are defined as the sum of fixed assets (fixed investment costs plus pre-production expenditures) and current assets (net working capital). These costs will be met during the construction phase foreseen for the 12 months of 1996.

Overall initial investment costs are estimated at 3,610 million Lit., of which 2,960 million Lit. is attributable to fixed investment costs , 450 million Lit. goes towards pre-production capital expenditures during the construction phase and the remaining 200 million Lit. as increase in net working capital. All assets allocated were considered as fixed investment costs.

FIXED INVESTMENT COSTS

- Land acquisition, site preparation and development;
- Civil engineering works and factory buildings construction;
- Plant machinery and equipment: all plant machinery and equipment needed for the project to operate;
- Auxiliaries and services facilities: including industrial auxiliary equipment, general purpose equipment (i.e.: computer, furniture, vehicles, various tools, etc.);
- Incorporated fixed assets: including technology acquisition cost;
- Contingencies: about 10% of the above mentioned costs.

PRE-PRODUCTION EXPENDITURES

- Pre-investment studies;
- Company formation costs, consultant fees and other costs;
- Training expenditures: technical (both in Italy and in India), commercial training and pre-production and management;
- Production trials, commissioning and start-up: including also supplies equivalent to the production of about at least 10 systems for each type;
- Contingencies: about 10% of the above mentioned costs;
- Interest on local and foreign loans accrued during construction phase (an average disbursement of the loan has been assumed, that induces half a year of interest).

In this case, we have assumed that the risk rate of discount is 17% for the Indian partner and 20% for the Italian. Therefore, we get **WACC=15.42% for the whole project and 18.50% for Equity.**

CURRENT ASSETS

They include: the initial inventory and a margin on working capital needed to start the production on January 1, 1997.
The initial inventory is defined as follows:

- raw materials: quantity needed for 30 days of production (1st year);
- factory supplies: quantity needed for 60 days of production (1st year)
- spare parts: quantity needed for 180 days of production.

In the present study, investment during the production phase has been considered, taking into account that to keep the plants in operation, each item (machinery, various equipment, auxiliary facilities) must be replaced at the appropriate time, according to the assumed depreciation rates. Depreciation rates were utilised according to Indian law (prescribing the minimum rate below which firms may not depreciate) and in accordance with the straight line method.

FIXED INVESTMENT COSTS	INVEST. OUTLAY	DEPRECIATION RATE %
Plant Machinery & Equip.	1,960,000	12.5
Buildings	200,000	5
Aux. and service facilities	150,000	20
Incorporated fixed assets	300,000	10
Pre-production expenditures	450,000	10

10.3.2 Working Capital Requirements

Net working capital requirements have been calculated in accordance with the expected minimum days of coverage (MDC) determined for the JV.

Item	MDC
Raw materials:	30
Utilities:	30
Spare parts:	180
Work in progress:	15
Finished products:	15
Accounts receivable:	30
Cash in hand:	15
Accounts payable:	30

10.3.3 Sources of Finance

It is assumed that the total amount of the investment will be financed by equity funds from the partners equal to the value of 1,500 million Lit and financed equally. The remaining 2,400 million Lit. will be financed by the following long term loans:

- a commercial loan up to 2,000 million Italian Lira
- an ECIP-4 contribution up to 400 million Italian Lira split into two parts: European Community support for training the JV personnel as an interest free loan equal to 200 million Italian Lira, plus an additional term loan at commericial conditions provided by a private bank equal to 200 million Italian Lira.

Indian Development Bank Loan (to be defined)	
Amount	40 million Rs. (2,000 million Lit)
Year of disbursement	1996
Amortisation type	Constant Principal
Amortisation period	8 years (plus 2 grace years)
Interest rate	15%

European Community Investment Partners Facility 4 (ECIP 4- European Community contribution)	
Amount	200 million Lit. (50% training and formation costs, including production trials and other pre-production costs corresponding to 4 million Rs.
Year of disbursement	1996
Amortisation type	
Amortisation period	
Interest rate	0%

European Community Investment Partners Facility 4 (ECIP 4- commercial bank contribution)	
Amount	200 million Lit. (50% training and formation costs, including production trials and other pre-production costs corresponding to 4 million Rs.
Year of disbursement	1996
Amortisation type	constant capital
Amortisation period	5 years
Interest rate	12%

10.3.4 Operational Phase

Production will start on January 1, 1997 and will last for 15 years. It has been assumed, according to the market analysis, the complete utilisation of the production capacity will occur in 5 years (2001). The considered production and sales program, with the assumption that all

the production of the year will be sold, foresees approximately the following utilisation rates (in terms of number of systems produced/sold):

Year	Sales Program
1997	53%
1998	65%
1999	76%
2000	88%
2001 -2011	100%

Five main typologies of products have been considered: these cover a wide range of technical characteristics and capabilities. The sale prices have been assumed in accordance with the market analysis; full prices have been considered from the first year of activity. Prices are inclusive of the sales taxes (16.5%) and of the sales direct costs. The direct sales costs (calculated as a total 12% of the sales revenues after taxes) considered are as follows:

- sales agents commission: 6%
- after sales costs (guarantee on goods) to be paid to the sales agent: 4%
- transportation (delivery) costs: 2%.

The revenues will be 100% in local currency.

10.3.5 Production Costs

There are five different types of products, all of them to be sold in India. The summary list is presented as follows:

Product	Yearly Capacity (100%)	Unit price (Lit).
RMI 50	16,500	10.3030
RMI 85	8,400	34.529
RMI 30	3,500	154.286
CB 85	5,400	50
AMP 60/3	5,400	53.703

Personnel costs are divided by categories as described below:

	Persons	Total (Lit.)
Managing Director	1	15,150,000
Finance Department	17	52,500,000
Operations	64	170,930,000

10.3.6 Income and Profit Taxes

Income taxes are calculated in accordance with the law in India: the tax rate is 40%. No tax holiday period has been considered for the JV. Taxes on profits distributed outside India (to the ordinary equity of the Italian partner of the JV) have been also considered: the tax rate is 25%.. A dividend policy was forecasted for the calculation of financial indicators over partneràs equity. However, it should be pointed out that the dividend policy is connected to the company's strategy, and therefore, cannot be defined in this Study.

10.4 Financial Analysis

The financial evaluation has been carried out assuming a basic referring configuration for the investment project, defined by the costs estimates summarised in the previous paragraphs.
The base version of the investment presents 0% of inflation rate. COMFAR printouts are given in the Appendix. Following are the main observations of the project:

- The Internal Rate of Return (IRR) of the investment is about 42%, which is 27 percentage points above the assumed average capital cost for the investment. This is to be considered very satisfactory. It is important to note that the average cost of capital (i.e. the discount rate to apply in the investment evaluation) has been assumed approximately equal to the interest rate of the principal loan required to finance the project (15.42%); this value correctly reflects the average cost of capital at the initial stage of the project.
- The Net Present Value (NPV) is about 131 million Rs. (6580 million ITL) and the payback period (dynamic) has been calculated as 5 years.
- The Cash Flow for Financial Planning schedule shows a positive cumulated cash flow since the first year, thus permitting the operations. As stated, a tentative dividend policy was inserted, thus distributing part of the cumulated cash, without affecting the overall positive availability of resources for the re-investment operations of the 5th and 8th years.
- The Net Income Statement schedule (please refer to the attached printouts) shows a positive net profit from the first year of operations. Furthermore, the operational margin reaches 25% of gross sales in the first year, then increasing up to about 30% in the year 2001, and remains constant until the end of the project life.
- The breakeven point is calculated around 51% of the total capacity in the first year of operations. The general trend decreases until reaching a steady state level of about 17% in the reference year 2008. The breakeven ratio diagram (including cost of finance) is provided in the appendix of COMFAR printouts. The first year of operation schedule (showing fixed plus variable costs and revenues vs. capacity) is included in the printouts.

10.5 Sensitivity Evaluation: Parametric Analysis

A parametric analysis was performed on the predicted sales volume in order to take into account the risk of market unpredictability in terms of supply and demand conditions. Parametric changes of +/- 10% were introduced in sales and operating expenditures on the base case while everything else was kept the same.

Utilising the parametric analysis tool of COMFAR III (please refer to the attached diagrams in the appendix), it has been calculated that :

- if the sales decrease by 10%, the estimated value of IRR decreases from 42% to 35%
- if sale revenues decrease by 25%, the IRR still remains higher then the requested hurdle rate of 15.4%, in fact reaching the level of 25%.
- if the increase of the operating expenditures is set at 10%, the IRR decreases to 28%, while forcing the increase of costs up to 18%, the final value of IRR=15% is reached.

Therefore, we can assume the project is resilient to fluctuation of more than 25% decrease in revenues, or up to 18% in operating costs increase10%.

10.6 Conclusions

The project analysed can be considered feasible from the economic and financial point of view, even in the most unfavourable condition. The economic results and the financial structure of the JV results ensures profitability.

ANNEX 1

COMFAR PRINTOUT

Base Case

SUMMARY SHEET

Project title: STM PROJECT - INDIA
Project description: BASIC VERSION, 0% INFLATION
Date and time: DECEMBER 1995

Project classification: New project
Joint-venture project

Construction phase: 1/1996 - 12/1996
Length: 1 years
Production phase: 1/1997 - 12/2011
Length: 15 periods

Accounting currency: Million Italian Lira
Units: Absolute
Reference currency:
Exchange rate:

INVESTMENT COSTS

	Total construction	Total production	Total investment
Total fixed investment costs	2,960.00	2,260.00	5,220.00
Total pre-production expenditures	450.00	0.00	450.00
Increase in net working capital	200.00	898.39	1,098.39
TOTAL INVESTMENT COSTS	3,610.00	3,158.39	6,768.39

SUMMARY SHEET

SOURCES OF FINANCE

	Total inflow
Equity capital	1,500.00
Long-term loans	2,400.00
Total short-term loans	544.20
TOTAL SOURCES OF FINANCE	4,444.20

INCOME AND COSTS, OPERATIONS

	First year 1997	Reference year 2000	Last year 2011
SALES REVENUE	5,291.11	8,864.70	10,109.30
Factory costs	2,815.80	4,626.46	5,290.60
Administrative overhead costs	22.00	22.00	22.00
OPERATING COSTS	2,837.80	4,648.46	5,312.60
Depreciation	386.25	386.25	286.25
Financial costs	324.00	287.48	0.00
TOTAL PRODUCTION COSTS	3,548.05	5,322.18	5,598.85
Marketing costs	707.00	1,136.00	1,285.00
COSTS OF PRODUCTS	4,255.05	6,458.18	6,883.85
Interest on short-term deposits	0.00	0.00	0.00
GROSS PROFIT FROM OPERATIONS	1,036.06	2,406.52	3,225.45
Extraordinary income	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00
GROSS PROFIT	1,036.06	2,406.52	3,225.45

SUMMARY SHEET

Investment allowances	0.00	0.00	0.00
TAXABLE PROFIT	1,036.06	2,406.52	3,225.45
Income (corporate) tax	414.43	962.61	1,290.18
NET PROFIT	621.64	1,443.91	1,935.27

RATIOS

Net present value	at 15.42 %	6,580.46
Internal rate of return on investment (IRR)	42.27 %	
Modified IRR on investment	42.27 %	
Internal rate of return on equity (IRRE)	79.21 %	
Modified IRRE on equity	79.21 %	

FIXED INVESTMENT COSTS - TOTAL
Million Italian Lira

	Total construction	Total production	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001
Land purchase	75.00	0.00	75.00	0.00	0.00	0.00	0.00	0.00
Site preparation and development	25.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00
Civil works, structures and buildings	200.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00
Plant machinery and equipment	1,960.00	1,960.00	1,960.00	0.00	0.00	0.00	0.00	0.00
Foreign Equipment -1	1,475.00	0.00	1,475.00	0.00	0.00	0.00	0.00	0.00
Foreign Equipment -2	0.00	1,475.00	0.00	0.00	0.00	0.00	0.00	0.00
Local Equipment -1	485.00	0.00	485.00	0.00	0.00	0.00	0.00	0.00
Local Equipment -2	0.00	485.00	0.00	0.00	0.00	0.00	0.00	0.00
Auxiliary and service plant equipment	150.00	300.00	150.00	0.00	0.00	0.00	0.00	150.00
Aux.Local Equip.-1	150.00	300.00	150.00	0.00	0.00	0.00	0.00	150.00
Environmental protection	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incorporated fixed assets (project overheads)	300.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00
Foreign Technology	300.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00
Contingencies	250.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00
Local Conting.	100.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00
Foreign Conting.	150.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00
TOTAL FIXED INVESTMENT COSTS	2,960.00	2,260.00	2,960.00	0.00	0.00	0.00	0.00	150.00
Foreign share (%)	65.03	65.27	65.03	0.00	0.00	0.00	0.00	0.00

FIXED INVESTMENT COSTS - TOTAL
Million Italian Lira

	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009
Land purchase	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site preparation and development	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Civil works, structures and buildings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plant machinery and equipment	0.00	0.00	1,960.00	0.00	0.00	0.00	0.00	0.00
Foreign Equipment -1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign Equipment -2	0.00	0.00	1,475.00	0.00	0.00	0.00	0.00	0.00
Local Equipment -1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local Equipment -2	0.00	0.00	485.00	0.00	0.00	0.00	0.00	0.00
Auxiliary and service plant equipment	0.00	0.00	0.00	0.00	0.00	150.00	0.00	0.00
Aux.Local Equip.-1	0.00	0.00	0.00	0.00	0.00	150.00	0.00	0.00
Environmental protection	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incorporated fixed assets (project overheads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign Technology	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Contingencies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local Conting.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign Conting.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL FIXED INVESTMENT COSTS	0.00	0.00	1,960.00	0.00	0.00	150.00	0.00	0.00
Foreign share (%)	0.00	0.00	75.26	0.00	0.00	0.00	0.00	0.00

FIXED INVESTMENT COSTS - TOTAL Million Italian Lira		
	Production 2010	Production 2011
Land purchase	0.00	0.00
Site preparation and development	0.00	0.00
Civil works, structures and buildings	0.00	0.00
Plant machinery and equipment	0.00	0.00
Foreign Equipment -1	0.00	0.00
Foreign Equipment -2	0.00	0.00
Local Equipment -1	0.00	0.00
Local Equipment -2	0.00	0.00
Auxiliary and service plant equipment	0.00	0.00
Aux.Local Equip.-1	0.00	0.00
Environmental protection	0.00	0.00
Incorporated fixed assets (project overheads)	0.00	0.00
Foreign Technology	0.00	0.00
Contingencies	0.00	0.00
Local Conting.	0.00	0.00
Foreign Conting.	0.00	0.00
TOTAL FIXED INVESTMENT COSTS	0.00	0.00
Foreign share (%)	0.00	0.00

PRE-PRODUCTION EXPENDITURES - TOTAL
Million Italian Lira

	Total construction	Total production	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001
Foreign PPE	115.00	0.00	115.00	0.00	0.00	0.00	0.00	0.00
Local PPE	335.00	0.00	335.00	0.00	0.00	0.00	0.00	0.00
Pre-production expenditures (net of interest)	450.00	0.00	450.00	0.00	0.00	0.00	0.00	0.00
Interest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL PRE-PRODUCTION EXPENDITURES	450.00	0.00	450.00	0.00	0.00	0.00	0.00	0.00
Foreign share (%)	25.56	0.00	25.56	0.00	0.00	0.00	0.00	0.00

PRE-PRODUCTION EXPENDITURES - TOTAL
Million Italian Lira

	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009
Foreign PPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local PPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pre-production expenditures (net of interest)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL PRE-PRODUCTION EXPENDITURES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign share (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PRE-PRODUCTION EXPENDITURES - TOTAL Million Italian Lira		
	Production 2010	Production 2011
Foreign PPE	0.00	0.00
Local PPE	0.00	0.00
Pre-production expenditures (net of interest)	0.00	0.00
Interest	0.00	0.00
TOTAL PRE-PRODUCTION EXPENDITURES	0.00	0.00
Foreign share (%)	0.00	0.00

NET WORKING CAPITAL REQUIREMENTS - TOTAL
Million Italian Lira

	Coefficient of turnover	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002
Total inventory	0.00	200.00	664.23	752.65	845.82	959.22	1,070.62	1,067.13
Accounts receivable	0.00	0.00	295.40	355.90	413.47	482.04	549.80	549.80
Cash-in-hand	24.00	0.00	16.64	17.14	17.69	18.11	18.50	18.48
CURRENT ASSETS	0.00	200.00	976.27	1,125.69	1,276.98	1,459.37	1,638.92	1,635.42
Current liabilities								
Accounts payable	0.00	0.00	310.04	348.74	406.54	476.36	544.00	536.83
TOTAL NET WORKING CAPITAL REQUIREMENTS	0.00	200.00	666.22	776.95	870.44	983.00	1,094.92	1,098.59
INCREASE IN NET WORKING CAPITAL	0.00	200.00	466.22	110.73	93.49	112.56	111.92	3.67
Foreign share (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NET WORKING CAPITAL REQUIREMENTS - TOTAL
Million Italian Lira

	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009	Production 2010
Total inventory	1,067.13	1,067.13	1,067.13	1,067.13	1,067.13	1,067.13	1,067.13	1,067.13
Accounts receivable	549.80	549.80	549.80	549.80	549.80	549.80	549.80	549.80
Cash-in-hand	18.48	18.48	18.48	18.48	18.48	18.48	18.48	18.48
CURRENT ASSETS	1,635.42	1,635.42	1,635.42	1,635.42	1,635.42	1,635.42	1,635.42	1,635.42
Current liabilities								
Accounts payable	537.02	537.02	537.02	537.02	537.02	537.02	537.02	537.02
TOTAL NET WORKING CAPITAL REQUIREMENTS	1,098.39	1,098.39	1,098.39	1,098.39	1,098.39	1,098.39	1,098.39	1,098.39
INCREASE IN NET WORKING CAPITAL	-0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign share (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NET WORKING CAPITAL REQUIREMENTS - TOTAL Million Italian Lira	
	Production 2011
Total inventory	1,067.13
Accounts receivable	549.80
Cash-in-hand	18.48
CURRENT ASSETS	1,635.42
Current liabilities	
Accounts payable	537.02
TOTAL NET WORKING CAPITAL REQUIREMENTS	1,098.39
INCREASE IN NET WORKING CAPITAL	0.00
Foreign share (%)	0.00

INVESTMENT COSTS - TOTAL
Million Italian Lira

	Total construction	Total production	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002
Total fixed investment costs	2,960.00	2,260.00	2,960.00	0.00	0.00	0.00	0.00	150.00	0.00
Total pre-production expenditures	450.00	0.00	450.00	0.00	0.00	0.00	0.00	0.00	0.00
Increase in net working capital	200.00	898.39	200.00	466.22	110.73	93.49	112.56	111.92	3.67
TOTAL INVESTMENT COSTS	3,610.00	3,158.39	3,610.00	466.22	110.73	93.49	112.56	261.92	3.67
Foreign share (%)	56.51	46.70	56.51	0.00	0.00	0.00	0.00	0.00	0.00

INVESTMENT COSTS - TOTAL
Million Italian Lira

	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011
Total fixed investment costs	0.00	1,960.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00
Total pre-production expenditures	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Increase in net working capital	-0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL INVESTMENT COSTS	-0.19	1,960.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00
Foreign share (%)	0.00	75.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ANNUAL COSTS OF PRODUCTS - TOTAL
Million Italian Lira

	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006
Raw materials	2,453.55	2,931.70	3,455.74	4,110.57	4,753.81	4,727.00	4,727.00	4,727.00	4,727.00	4,727.00
Factory supplies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utilities	59.97	69.57	79.89	87.85	95.31	95.00	95.00	95.00	95.00	95.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spare parts consumed	29.67	34.42	39.52	43.46	47.15	47.00	47.00	47.00	47.00	47.00
Repair, maintenance, material	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00
Royalties	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour	234.36	246.48	259.51	269.57	278.99	278.60	278.60	278.60	278.60	278.60
Labour overhead costs (taxes etc.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Factory overhead costs	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
FACTORY COSTS	2,920.55	3,425.16	3,977.66	4,654.45	5,318.27	5,290.60	5,290.60	5,290.60	5,290.60	5,290.60
Administrative overhead costs	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
OPERATING COSTS	2,942.55	3,447.16	3,999.66	4,676.45	5,340.27	5,312.60	5,312.60	5,312.60	5,312.60	5,312.60
Depreciation	386.25	386.25	386.25	386.25	386.25	386.25	386.25	386.25	386.25	386.25
Financial costs	324.00	324.00	320.40	287.48	245.18	202.88	160.58	121.88	84.38	46.88
TOTAL PRODUCTION COSTS	3,652.80	4,157.41	4,706.31	5,350.18	5,971.70	5,901.73	5,859.43	5,820.73	5,783.23	5,745.73
Direct marketing costs	707.00	848.00	985.00	1,136.00	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00
Marketing overhead costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COSTS OF PRODUCTS	4,359.80	5,005.41	5,691.31	6,486.18	7,256.70	7,186.73	7,144.43	7,105.73	7,068.23	7,030.73
Foreign share (%)	6.08	5.29	4.59	3.95	3.47	3.44	3.39	3.39	3.41	3.43
Variable share (%)	74.64	77.91	80.63	83.51	85.85	86.30	86.81	87.28	87.74	88.21

ANNUAL COSTS OF PRODUCTS - TOTAL
Million Italian Lira

	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011
Raw materials	4,727.00	4,727.00	4,727.00	4,727.00	4,727.00
Factory supplies	0.00	0.00	0.00	0.00	0.00
Utilities	95.00	95.00	95.00	95.00	95.00
Energy	0.00	0.00	0.00	0.00	0.00
Spare parts consumed	47.00	47.00	47.00	47.00	47.00
Repair, maintenance, material	43.00	43.00	43.00	43.00	43.00
Royalties	0.00	0.00	0.00	0.00	0.00
Labour	278.60	278.60	278.60	278.60	278.60
Labour overhead costs (taxes etc.)	0.00	0.00	0.00	0.00	0.00
Factory overhead costs	100.00	100.00	100.00	100.00	100.00
FACTORY COSTS	5,290.60	5,290.60	5,290.60	5,290.60	5,290.60
Administrative overhead costs	22.00	22.00	22.00	22.00	22.00
OPERATING COSTS	5,312.60	5,312.60	5,312.60	5,312.60	5,312.60
Depreciation	256.25	286.25	286.25	286.25	286.25
Financial costs	9.38	0.00	0.00	0.00	0.00
TOTAL PRODUCTION COSTS	5,578.23	5,598.85	5,598.85	5,598.85	5,598.85
Direct marketing costs	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00
Marketing overhead costs	0.00	0.00	0.00	0.00	0.00
COSTS OF PRODUCTS	6,863.23	6,883.85	6,883.85	6,883.85	6,883.85
Foreign share (%)	2.69	2.68	2.68	2.68	2.68
Variable share (%)	90.37	90.09	90.09	90.09	90.09

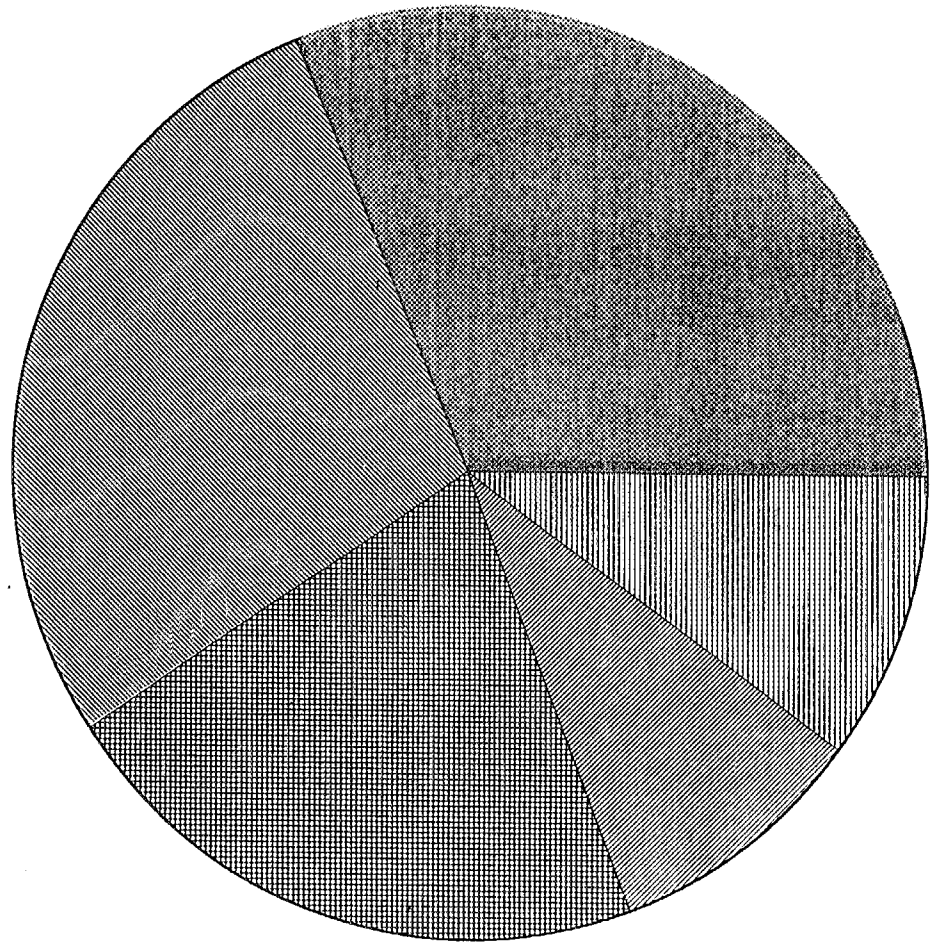
PRODUCTION AND SALES PROGRAMME - TOTAL
Million Italian Lira

	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007
Gross sales revenue	6,336.11	7,763.94	9,109.03	10,616.70	12,106.30	12,106.30	12,106.30	12,106.30	12,106.30	12,106.30	12,106.30
Less sales tax	1,045.00	1,279.00	1,503.00	1,752.00	1,997.00	1,997.00	1,997.00	1,997.00	1,997.00	1,997.00	1,997.00
Net sales revenue	5,291.11	6,484.94	7,606.03	8,864.70	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30
Subsidy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALES REVENUE	5,291.11	6,484.94	7,606.03	8,864.70	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30
Foreign share (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PRODUCTION AND SALES PROGRAMME - TOTAL
Million Italian Lira

	Production 2008	Production 2009	Production 2010	Production 2011
Gross sales revenue	12,106.30	12,107.35	12,106.30	12,106.30
Less sales tax	1,997.00	1,997.00	1,997.00	1,997.00
Net sales revenue	10,109.30	10,110.35	10,109.30	10,109.30
Subsidy	0.00	0.00	0.00	0.00
SALES REVENUE	10,109.30	10,110.35	10,109.30	10,109.30
Foreign share (%)	0.00	0.00	0.00	0.00

Share of Total Sales



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FINANCIAL FLOW - TOTAL
Million Italian Lira

	Total inflow	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003
Equity capital	1,500.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Long-term loans	2,400.00	2,400.00	0.00	-20.00	-165.00	-290.00	-490.00	-290.00	-270.00
TOTAL LONG-TERM FINANCE	3,900.00	3,900.00	0.00	-20.00	-165.00	-290.00	-490.00	-290.00	-270.00
Total short-term loans	544.20	0.00	310.04	38.69	57.80	69.83	67.64	-7.17	0.19
TOTAL FINANCIAL FLOW	4,444.20	3,900.00	310.04	18.69	-107.20	-220.17	-422.36	-297.17	-269.81
Foreign share (%)	25.88	29.49	0.00	-106.98	37.31	18.17	56.82	13.46	7.41

FINANCIAL FLOW - TOTAL
Million Italian Lira

	Production 2004	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011	Scrap 2012
Equity capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Long-term loans	-250.00	-250.00	-250.00	-125.00	0.00	0.00	0.00	0.00	0.00
TOTAL LONG-TERM FINANCE	-250.00	-250.00	-250.00	-125.00	0.00	0.00	0.00	0.00	0.00
Total short-term loans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-537.02
TOTAL FINANCIAL FLOW	-250.00	-250.00	-250.00	-125.00	0.00	0.00	0.00	0.00	-537.02
Foreign share (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CASH FLOW FOR FINANCIAL PLANNING - TOTAL
Million Italian Lira

	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004
TOTAL CASH INFLOW	3,900.00	5,601.15	6,523.63	7,663.83	8,934.53	10,176.94	10,109.30	10,109.49	10,109.30
Inflow funds	3,900.00	310.04	38.69	57.80	69.83	67.64	0.00	0.19	0.00
Inflow operation	0.00	5,291.11	6,484.94	7,606.03	8,864.70	10,109.30	10,109.30	10,109.30	10,109.30
Other income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OUTFLOW	3,610.00	5,556.80	6,087.65	7,303.53	8,662.06	9,678.52	9,139.94	9,103.59	11,392.41
Increase in fixed assets	3,410.00	0.00	0.00	0.00	0.00	150.00	0.00	0.00	1,960.00
Increase in current assets	200.00	776.27	149.42	151.29	182.39	179.56	-3.51	0.00	0.00
Operating costs	0.00	2,837.80	3,422.79	3,976.59	4,648.46	5,312.60	5,312.60	5,312.60	5,312.60
Marketing costs	0.00	707.00	848.00	985.00	1,136.00	1,285.00	1,285.00	1,285.00	1,285.00
Income (corporate) tax	0.00	414.43	601.56	775.12	962.61	1,152.11	1,169.03	1,185.95	1,201.43
Financial costs	0.00	324.00	324.00	320.40	287.48	245.18	202.88	160.58	121.88
Loan repayment	0.00	0.00	20.00	165.00	290.00	490.00	297.17	270.00	250.00
Dividends	0.00	497.31	721.87	930.14	1,155.13	864.08	876.77	889.46	1,261.50
Equity capital refund	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SURPLUS (DEFICIT)	290.00	44.36	435.99	360.29	272.47	498.42	969.36	1,005.91	-1,283.11
CUMULATIVE CASH BALANCE	290.00	334.36	770.34	1,130.64	1,403.11	1,901.52	2,870.88	3,876.79	2,593.68
Foreign surplus (deficit)	-890.00	-272.66	-404.94	-525.47	-633.16	-682.84	-46.00	-21.20	-1,475.00
Local surplus (deficit)	1,180.00	317.01	840.92	885.77	905.63	1,181.26	1,015.36	1,027.11	191.89
Foreign cumulative cash balance	-890.00	-1,162.66	-1,567.59	-2,093.06	-2,726.23	-3,409.07	-3,455.07	-3,476.27	-4,951.27
Local cumulative cash balance	1,180.00	1,497.01	2,337.94	3,223.70	4,129.33	5,310.59	6,325.95	7,353.05	7,544.95
Net flow of funds	3,900.00	-511.27	-1,027.18	-1,357.74	-1,662.78	-1,531.62	-1,376.82	-1,319.84	-1,633.38

CASH FLOW FOR FINANCIAL PLANNING - TOTAL
Million Italian Lira

	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011	Scrap 2012
TOTAL CASH INFLOW	10,109.30	10,109.30	10,109.30	10,109.30	10,110.35	10,109.30	10,109.30	2,041.67
Inflow funds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflow operation	10,109.30	10,109.30	10,109.30	10,109.30	10,110.35	10,109.30	10,109.30	0.00
Other income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,041.67
TOTAL CASH OUTFLOW	9,973.05	9,973.05	10,128.05	9,823.05	9,824.10	9,823.05	9,823.05	537.02
Increase in fixed assets	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00
Increase in current assets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operating costs	5,312.60	5,312.60	5,312.60	5,312.60	5,312.60	5,312.60	5,312.60	0.00
Marketing costs	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00	0.00
Income (corporate) tax	1,216.43	1,231.43	1,298.43	1,290.18	1,290.60	1,290.18	1,290.18	0.00
Financial costs	84.38	46.88	9.38	0.00	0.00	0.00	0.00	0.00
Loan repayment	250.00	250.00	125.00	0.00	0.00	0.00	0.00	537.02
Dividends	1,824.64	1,847.14	1,947.64	1,935.27	1,935.90	1,935.27	1,935.27	0.00
Equity capital refund	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SURPLUS (DEFICIT)	136.25	136.25	-18.75	286.25	286.25	286.25	286.25	1,504.64
CUMULATIVE CASH BALANCE	2,729.93	2,866.18	2,847.43	3,133.68	3,419.93	3,706.18	3,992.43	5,497.07
Foreign surplus (deficit)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local surplus (deficit)	136.25	136.25	-18.75	286.25	286.25	286.25	286.25	1,504.64
Foreign cumulative cash balance	-4,951.27	-4,951.27	-4,951.27	-4,951.27	-4,951.27	-4,951.27	-4,951.27	-4,951.27
Local cumulative cash balance	7,681.20	7,817.45	7,798.70	8,084.95	8,371.20	8,657.45	8,943.70	10,448.34
Net flow of funds	-2,159.02	-2,144.02	-2,082.02	-1,935.27	-1,935.90	-1,935.27	-1,935.27	-537.02

DISCOUNTED CASH FLOW - TOTAL CAPITAL INVESTED
Million Italian Lira

	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004
TOTAL CASH INFLOW	0.00	5,291.11	6,484.94	7,606.03	8,864.70	10,109.30	10,109.30	10,109.30	10,109.30
Inflow operation	0.00	5,291.11	6,484.94	7,606.03	8,864.70	10,109.30	10,109.30	10,109.30	10,109.30
Other income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OUTFLOW	3,610.00	4,425.44	4,983.08	5,830.19	6,859.63	8,011.63	7,770.30	7,783.35	9,759.03
Increase in fixed assets	3,410.00	0.00	0.00	0.00	0.00	150.00	0.00	0.00	1,960.00
Increase in net working capital	200.00	466.22	110.73	93.49	112.56	111.92	3.67	-0.19	0.00
Operating costs	0.00	2,837.80	3,422.79	3,976.59	4,648.46	5,312.60	5,312.60	5,312.60	5,312.60
Marketing costs	0.00	707.00	848.00	985.00	1,136.00	1,285.00	1,285.00	1,285.00	1,285.00
Income (corporate) tax	0.00	414.43	601.56	775.12	962.61	1,152.11	1,169.03	1,185.95	1,201.43
NET CASH FLOW	-3,610.00	865.67	1,501.86	1,775.84	2,005.07	2,097.67	2,339.00	2,325.94	350.27
CUMULATIVE NET CASH FLOW	-3,610.00	-2,744.33	-1,242.47	533.36	2,538.43	4,636.11	6,975.11	9,301.05	9,651.32
Net present value	-3,610.00	750.01	1,127.37	1,154.94	1,129.81	1,024.08	989.34	852.38	111.21
Cumulative net present value	-3,610.00	-2,859.99	-1,732.61	-577.67	552.14	1,576.21	2,565.55	3,417.93	3,529.14

NET PRESENT VALUE	at 15.42 %	6,580.46
INTERNAL RATE OF RETURN	42.27 %	
MODIFIED INTERNAL RATE OF RETURN	42.27 %	
NORMAL PAYBACK	at 0.00 %	4 years
DYNAMIC PAYBACK	at 15.42 %	5 years
NPV RATIO	1.32	

DISCOUNTED CASH FLOW - TOTAL CAPITAL INVESTED
Million Italian Lira

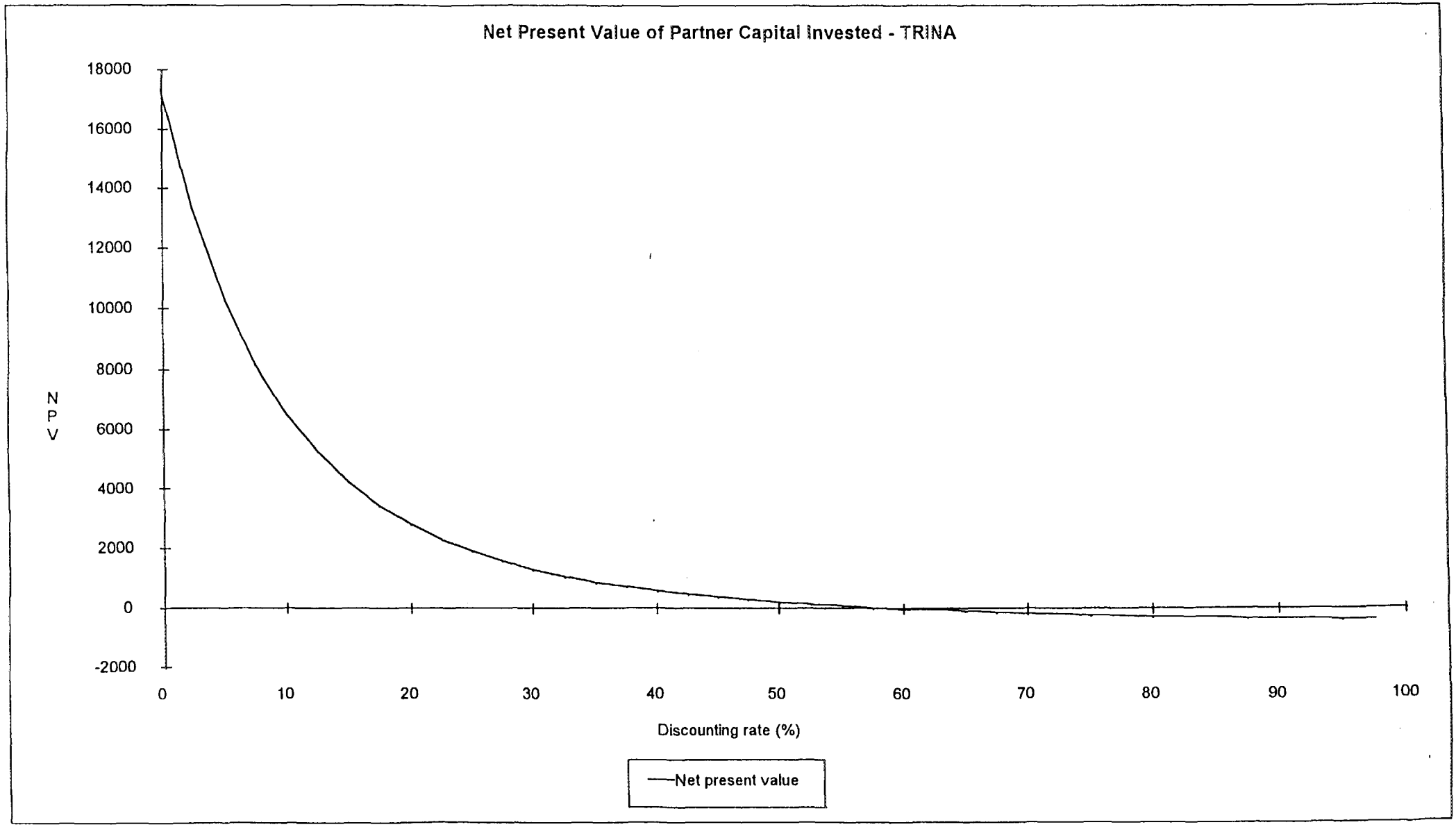
	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011	Scrap 2012
TOTAL CASH INFLOW	10,109.30	10,109.30	10,109.30	10,109.30	10,110.35	10,109.30	10,109.30	1,504.64
Inflow operation	10,109.30	10,109.30	10,109.30	10,109.30	10,110.35	10,109.30	10,109.30	0.00
Other income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,504.64
TOTAL CASH OUTFLOW	7,814.03	7,829.03	8,046.03	7,887.78	7,888.20	7,887.78	7,887.78	0.00
Increase in fixed assets	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00
Increase in net working capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operating costs	5,312.60	5,312.60	5,312.60	5,312.60	5,312.60	5,312.60	5,312.60	0.00
Marketing costs	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00	1,285.00	0.00
Income (corporate) tax	1,216.43	1,231.43	1,298.43	1,290.18	1,290.60	1,290.18	1,290.18	0.00
NET CASH FLOW	2,295.27	2,280.27	2,063.27	2,221.52	2,222.15	2,221.52	2,221.52	1,504.64
CUMULATIVE NET CASH FLOW	11,946.59	14,226.86	16,290.13	18,511.65	20,733.80	22,955.32	25,176.84	26,681.48
Net present value	631.40	543.47	426.05	397.45	344.44	298.34	258.48	151.68
Cumulative net present value	4,160.54	4,704.01	5,130.06	5,527.51	5,871.95	6,170.30	6,428.78	6,580.46
NET PRESENT VALUE								
INTERNAL RATE OF RETURN								
MODIFIED INTERNAL RATE OF RETURN								
NORMAL PAYBACK								
DYNAMIC PAYBACK								
NPV RATIO								

DISCOUNTED CASH FLOW - PARTNER EQUITY INVESTED - TRINA
Million Italian Lira

	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004
TOTAL CASH INFLOW	0.00	248.66	360.94	465.07	577.56	432.04	855.39	867.77	1,230.73
Dividends	0.00	248.66	360.94	465.07	577.56	432.04	855.39	867.77	1,230.73
Equity capital refund	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OUTFLOW	750.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity capital paid	750.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET CASH RETURN	-750.00	248.66	360.94	465.07	577.56	432.04	855.39	867.77	1,230.73
CUMULATIVE NET CASH RETURN	-750.00	-501.34	-140.41	324.66	902.23	1,334.27	2,189.65	3,057.42	4,288.16
Net present value	-750.00	212.53	263.67	290.38	308.22	197.06	333.46	289.14	350.49
Cumulative net present value	-750.00	-537.47	-273.81	16.57	324.79	521.85	855.31	1,144.45	1,494.94
NET PRESENT VALUE	at 17.00 %	3,562.03							
INTERNAL RATE OF RETURN	58.33 %								
MODIFIED INTERNAL RATE OF RETURN	58.33 %								
SHORT NET PRESENT VALUE	at 17.00 %	324.79	for 5 years						
NORMAL PAYBACK	at 0.00 %	4 years							
DYNAMIC PAYBACK	at 17.00 %	4 years							

DISCOUNTED CASH FLOW - PARTNER EQUITY INVESTED - TRINA
Million Italian Lira

	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011
TOTAL CASH INFLOW	1,780.14	1,802.09	1,900.14	1,888.07	1,888.68	1,888.07	1,888.07
Dividends	1,780.14	1,802.09	1,900.14	1,888.07	1,888.68	1,888.07	1,888.07
Equity capital refund	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OUTFLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity capital paid	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET CASH RETURN	1,780.14	1,802.09	1,900.14	1,888.07	1,888.68	1,888.07	1,888.07
CUMULATIVE NET CASH RETURN	6,068.30	7,870.39	9,770.53	11,658.60	13,547.28	15,435.35	17,323.42
Net present value	433.29	374.90	337.86	286.94	245.33	209.61	179.16
Cumulative net present value	1,928.23	2,303.13	2,641.00	2,927.93	3,173.26	3,382.87	3,562.03
NET PRESENT VALUE							
INTERNAL RATE OF RETURN							
MODIFIED INTERNAL RATE OF RETURN							
SHORT NET PRESENT VALUE							
NORMAL PAYBACK							
DYNAMIC PAYBACK							

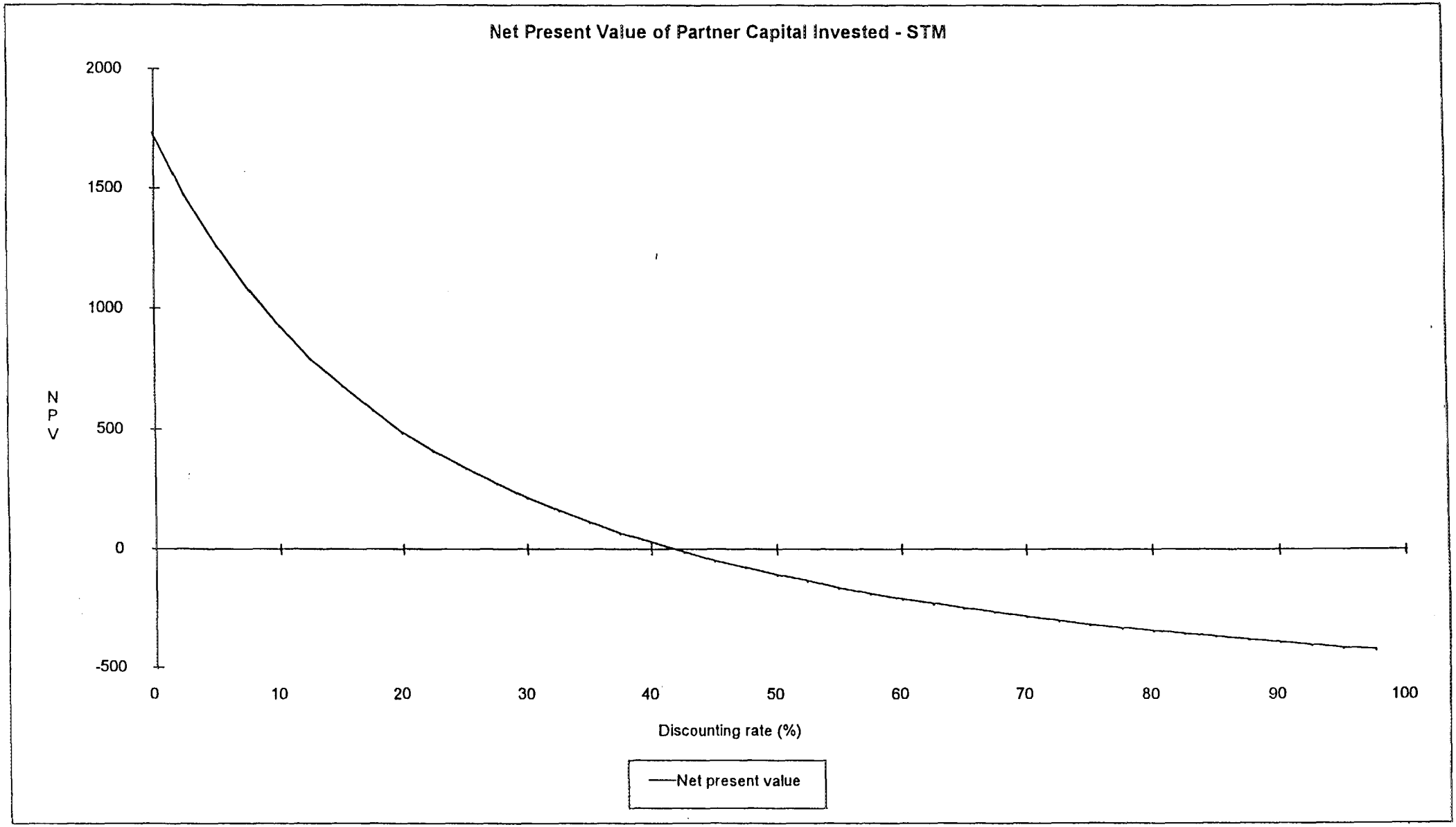

Net Present Value of Partner Capital Invested - TRINA
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
-2000
NPV
0
10
20
30
40
50
60
70
80
90
100
Discounting rate (%)
Net present value

DISCOUNTED CASH FLOW - PARTNER EQUITY INVESTED - STM
Million Italian Lira

	Construction 1996	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004
TOTAL CASH INFLOW	0.00	248.66	360.94	465.07	577.56	432.04	21.38	21.69	30.77
Dividends	0.00	248.66	360.94	465.07	577.56	432.04	21.38	21.69	30.77
Equity capital refund	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OUTFLOW	750.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity capital paid	750.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET CASH RETURN	-750.00	248.66	360.94	465.07	577.56	432.04	21.38	21.69	30.77
CUMULATIVE NET CASH RETURN	-750.00	-501.34	-140.41	324.66	902.23	1,334.27	1,355.65	1,377.35	1,408.11
Net present value	-750.00	207.21	250.65	269.14	278.53	173.63	7.16	6.05	7.16
Cumulative net present value	-750.00	-542.79	-292.14	-23.00	255.53	429.16	436.32	442.38	449.53
NET PRESENT VALUE	at 20.00 %	488.27							
INTERNAL RATE OF RETURN	41.71 %								
MODIFIED INTERNAL RATE OF RETURN	41.71 %								
SHORT NET PRESENT VALUE	at 20.00 %	255.53	for 5 years						
NORMAL PAYBACK	at 0.00 %	4 years							
DYNAMIC PAYBACK	at 20.00 %	5 years							

DISCOUNTED CASH FLOW - PARTNER EQUITY INVESTED - STM
Million Italian Lira

	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011
TOTAL CASH INFLOW	44.50	45.05	47.50	47.20	47.22	47.20	47.20
Dividends	44.50	45.05	47.50	47.20	47.22	47.20	47.20
Equity capital refund	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OUTFLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity capital paid	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET CASH RETURN	44.50	45.05	47.50	47.20	47.22	47.20	47.20
CUMULATIVE NET CASH RETURN	1,452.62	1,497.67	1,545.17	1,592.37	1,639.59	1,686.79	1,734.00
Net present value	8.63	7.28	6.39	5.29	4.41	3.68	3.06
Cumulative net present value	458.16	465.43	471.83	477.12	481.53	485.21	488.27
NET PRESENT VALUE INTERNAL RATE OF RETURN MODIFIED INTERNAL RATE OF RETURN							
SHORT NET PRESENT VALUE NORMAL PAYBACK DYNAMIC PAYBACK							


Net Present Value of Partner Capital Invested - STM
2000
1500
1000
500
0
-500
NPV
0
10
20
30
40
50
60
70
80
90
100
Discounting rate (%)
Net present value

NET INCOME STATEMENT
Million Italian Lira

	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006
Sales revenue	5,291.11	6,484.94	7,606.03	8,864.70	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30
Less variable costs	3,149.20	3,875.19	4,565.99	5,388.86	6,202.00	6,202.00	6,202.00	6,202.00	6,202.00	6,202.00
VARIABLE MARGIN	2,141.91	2,609.75	3,040.04	3,475.84	3,907.30	3,907.30	3,907.30	3,907.30	3,907.30	3,907.30
in % of sales revenue	40.48	40.24	39.97	39.21	38.65	38.65	38.65	38.65	38.65	38.65
Less fixed costs	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85
OPERATIONAL MARGIN	1,360.06	1,827.90	2,258.19	2,693.99	3,125.45	3,125.45	3,125.45	3,125.45	3,125.45	3,125.45
in % of sales revenue	25.70	28.19	29.69	30.39	30.92	30.92	30.92	30.92	30.92	30.92
Interest on short-term deposits	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial costs	324.00	324.00	320.40	287.48	245.18	202.88	160.58	121.88	84.38	46.88
GROSS PROFIT FROM OPERATIONS	1,036.06	1,503.90	1,937.79	2,406.52	2,880.27	2,922.57	2,964.87	3,003.57	3,041.07	3,078.57
in % of sales revenue	19.58	23.19	25.48	27.15	28.49	28.91	29.33	29.71	30.08	30.45
Extraordinary income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROSS PROFIT	1,036.06	1,503.90	1,937.79	2,406.52	2,880.27	2,922.57	2,964.87	3,003.57	3,041.07	3,078.57
Investment allowances	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TAXABLE PROFIT	1,036.06	1,503.90	1,937.79	2,406.52	2,880.27	2,922.57	2,964.87	3,003.57	3,041.07	3,078.57
Income (corporate) tax	414.43	601.56	775.12	962.61	1,152.11	1,169.03	1,185.95	1,201.43	1,216.43	1,231.43
NET PROFIT	621.64	902.34	1,162.68	1,443.91	1,728.16	1,753.54	1,778.92	1,802.14	1,824.64	1,847.14
in % of sales revenue	11.75	13.91	15.29	16.29	17.09	17.35	17.60	17.83	18.05	18.27
Dividends	497.31	721.87	930.14	1,155.13	864.08	876.77	889.46	1,261.50	1,824.64	1,847.14
RETAINED PROFIT	124.33	180.47	232.54	288.78	864.08	876.77	889.46	540.64	0.00	0.00
Ratios (%)										
Net profit to equity	41.44	60.16	77.51	96.26	115.21	116.90	118.59	120.14	121.64	123.14

NET INCOME STATEMENT
Million Italian Lira

	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011
Sales revenue	10,109.30	10,109.30	10,110.35	10,109.30	10,109.30
Less variable costs	6,202.00	6,202.00	6,202.00	6,202.00	6,202.00
VARIABLE MARGIN	3,907.30	3,907.30	3,908.35	3,907.30	3,907.30
in % of sales revenue	38.65	38.65	38.66	38.65	38.65
Less fixed costs	651.85	681.85	681.85	681.85	681.85
OPERATIONAL MARGIN	3,255.45	3,225.45	3,226.50	3,225.45	3,225.45
in % of sales revenue	32.20	31.91	31.91	31.91	31.91
Interest on short-term deposits	0.00	0.00	0.00	0.00	0.00
Financial costs	9.38	0.00	0.00	0.00	0.00
GROSS PROFIT FROM OPERATIONS	3,246.07	3,225.45	3,226.50	3,225.45	3,225.45
in % of sales revenue	32.11	31.91	31.91	31.91	31.91
Extraordinary income	0.00	0.00	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00	0.00	0.00
GROSS PROFIT	3,246.07	3,225.45	3,226.50	3,225.45	3,225.45
Investment allowances	0.00	0.00	0.00	0.00	0.00
TAXABLE PROFIT	3,246.07	3,225.45	3,226.50	3,225.45	3,225.45
Income (corporate) tax	1,298.43	1,290.18	1,290.60	1,290.18	1,290.18
NET PROFIT	1,947.64	1,935.27	1,935.90	1,935.27	1,935.27
in % of sales revenue	19.27	19.14	19.15	19.14	19.14
Dividends	1,947.64	1,935.27	1,935.90	1,935.27	1,935.27
RETAINED PROFIT	0.00	0.00	0.00	0.00	0.00
Ratios (%)					
Net profit to equity	129.84	129.02	129.06	129.02	129.02

NET INCOME STATEMENT
Million Italian Lira

	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006
Net profit to net worth	38.27	50.00	57.07	62.07	54.17	43.12	35.89	32.78	33.19	33.60
Net profit+interest to investment	23.20	29.29	34.65	39.41	42.39	42.00	41.63	29.07	28.84	28.62

NET INCOME STATEMENT
Million Italian Lira

	Production 2007	Production 2008	Production 2009	Production 2010	Production 2011
Net profit to net worth	35.43	35.21	35.22	35.21	35.21
Net profit+interest to investment	28.91	28.59	28.60	28.59	28.59

PROJECTED BALANCE SHEET
Million Italian Lira

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
TOTAL ASSETS	3,900.00	4,831.68	5,255.41	5,589.01	5,882.60	6,033.28	6,625.57	7,257.92	7,920.60	8,233.74	8,006.24	7,981.74
Total current assets	490.00	1,807.93	2,617.91	3,337.76	4,017.60	4,404.53	5,383.07	6,401.67	5,490.60	6,189.99	6,348.74	6,430.49
Total fixed assets, net of depreciation	3,410.00	3,023.75	2,637.50	2,251.25	1,865.00	1,628.75	1,242.50	856.25	2,430.00	2,043.75	1,657.50	1,551.25
Accumulated losses brought forward	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loss in current year	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 LIABILITIES	3,900.00	4,831.68	5,255.41	5,589.01	5,882.60	6,033.28	6,625.57	7,257.92	7,920.60	8,233.74	8,006.24	7,981.74
Total current liabilities	0.00	310.04	348.74	406.54	476.36	544.00	536.83	537.02	537.02	537.02	537.02	537.02
Total long-term loans	2,400.00	2,400.00	2,380.00	2,215.00	1,925.00	1,435.00	1,145.00	875.00	625.00	375.00	125.00	0.00
Total equity	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
Reserves, retained profit brought forward	0.00	0.00	124.33	304.80	537.33	826.11	1,690.19	2,566.97	3,456.43	3,997.07	3,997.07	3,997.07
Net profit after tax	0.00	621.64	902.34	1,162.68	1,443.91	1,728.16	1,753.54	1,778.92	1,802.14	1,824.64	1,847.14	1,947.64
Net worth	1,500.00	1,624.33	1,804.80	2,037.33	2,326.11	3,190.19	4,066.97	4,956.43	5,497.07	5,497.07	5,497.07	5,497.07
Ratios (%)												
Equity to total liabilities	38.46	31.05	28.54	26.84	25.50	24.86	22.64	20.67	18.94	18.22	18.74	18.79
Net worth to total liabilities	38.46	33.62	34.34	36.45	39.54	52.88	61.38	68.29	69.40	66.76	68.66	68.87
Long-term debt to net worth	1.60	1.48	1.32	1.09	0.83	0.45	0.28	0.18	0.11	0.07	0.02	0.00
Current assets to current liabilities	0.00	5.83	7.51	8.21	8.43	8.10	10.03	11.92	10.22	11.53	11.82	11.97

PROJECTED BALANCE SHEET
Million Italian Lira

	2008	2009	2010	2011
TOTAL ASSETS	7,969.37	7,970.00	7,969.37	7,969.37
Total current assets	6,704.37	6,991.25	7,276.87	7,563.12
Total fixed assets, net of depreciation	1,265.00	978.75	692.50	406.25
Accumulated losses brought forward	0.00	0.00	0.00	0.00
Loss in current year	0.00	0.00	0.00	0.00
TOTAL LIABILITIES	7,969.37	7,970.00	7,969.37	7,969.37
Total current liabilities	537.02	537.02	537.02	537.02
Total long-term loans	0.00	0.00	0.00	0.00
Total equity	1,500.00	1,500.00	1,500.00	1,500.00
Reserves, retained profit brought forward	3,997.07	3,997.07	3,997.07	3,997.07
Net profit after tax	1,935.27	1,935.90	1,935.27	1,935.27
Net worth	5,497.07	5,497.07	5,497.07	5,497.07
Ratios (%)				
Equity to total liabilities	18.82	18.82	18.82	18.82
Net worth to total liabilities	68.98	68.97	68.98	68.98
Long-term debt to net worth	0.00	0.00	0.00	0.00
Current assets to current liabilities	12.48	13.02	13.55	14.08

BREAK-EVEN ANALYSIS - TOTAL
Million Italian Lira

	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007
Sales revenue	5,291.11	6,484.94	7,606.03	8,864.70	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30	10,109.30
Variable costs	3,149.20	3,875.19	4,565.99	5,388.86	6,202.00	6,202.00	6,202.00	6,202.00	6,202.00	6,202.00	6,202.00
Variable margin	2,141.91	2,609.75	3,040.04	3,475.84	3,907.30	3,907.30	3,907.30	3,907.30	3,907.30	3,907.30	3,907.30
Variable margin ratio (%)	40.48	40.24	39.97	39.21	38.65	38.65	38.65	38.65	38.65	38.65	38.65
Including cost of finance											
Fixed costs	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85	651.85
Financial costs	324.00	324.00	320.40	287.48	245.18	202.88	160.58	121.88	84.38	46.88	9.38
Break-even sales value	2,731.75	2,747.91	2,757.77	2,727.18	2,657.21	2,547.76	2,438.32	2,338.19	2,241.17	2,144.15	1,710.78
Break-even ratio (%)	51.63	42.37	36.26	30.76	26.28	25.20	24.12	23.13	22.17	21.21	16.92
Fixed costs coverage ratio	1.94	2.36	2.76	3.25	3.80	3.97	4.15	4.32	4.51	4.71	5.91
Excluding cost of finance											
Fixed costs	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85	781.85	651.85
Break-even sales value	1,931.38	1,942.81	1,956.15	1,994.01	2,022.87	2,022.87	2,022.87	2,022.87	2,022.87	2,022.87	1,686.52
Break-even ratio (%)	36.50	29.96	25.72	22.49	20.01	20.01	20.01	20.01	20.01	20.01	16.68
Fixed costs coverage ratio	2.74	3.34	3.89	4.45	5.00	5.00	5.00	5.00	5.00	5.00	5.99

BREAK-EVEN ANALYSIS - TOTAL
Million Italian Lira

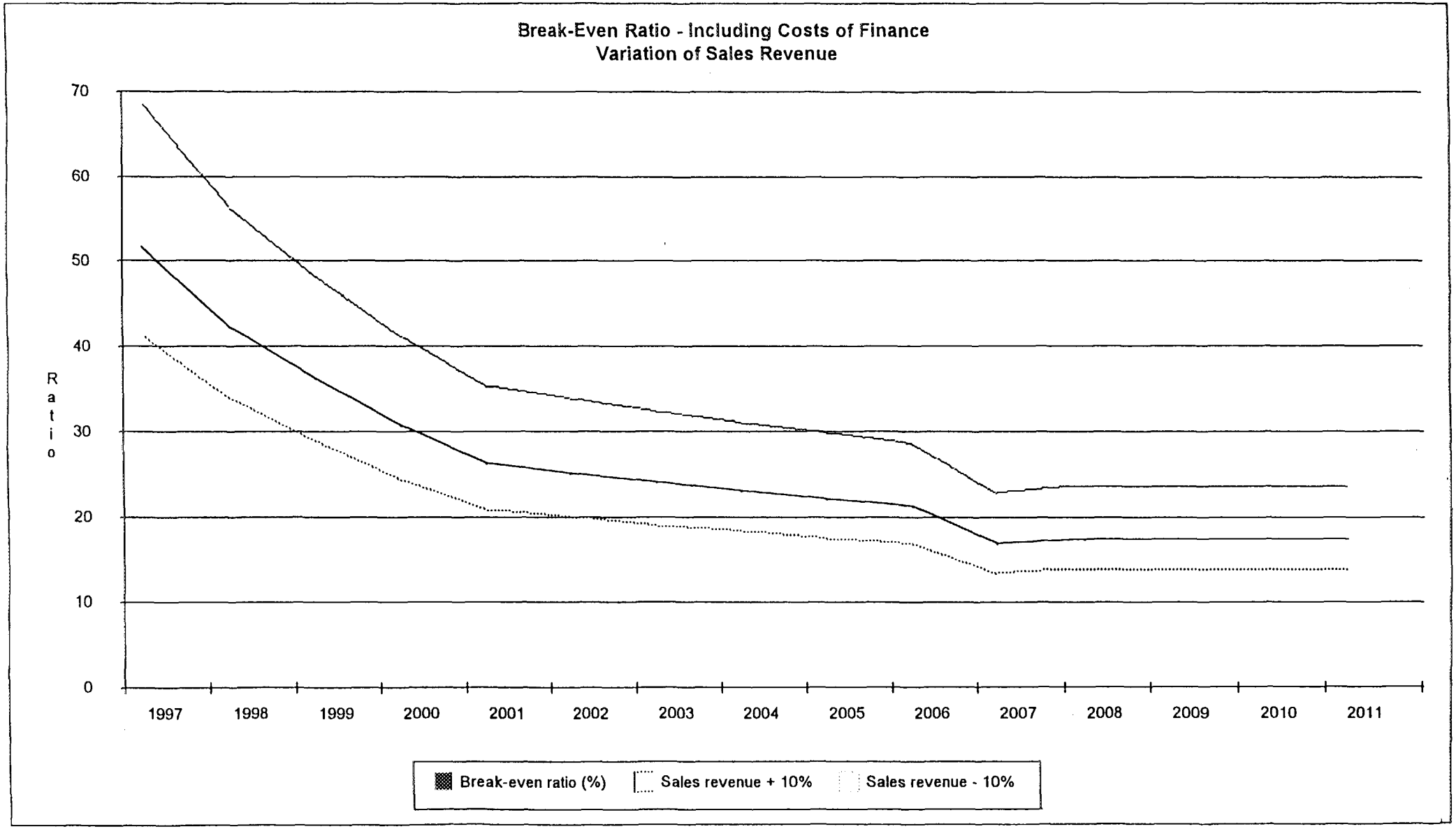
	Production 2008	Production 2009	Production 2010	Production 2011
Sales revenue	10,109.30	10,110.35	10,109.30	10,109.30
Variable costs	6,202.00	6,202.00	6,202.00	6,202.00
Variable margin	3,907.30	3,908.35	3,907.30	3,907.30
Variable margin ratio (%)	38.65	38.66	38.65	38.65
Including cost of finance				
Fixed costs	681.85	681.85	681.85	681.85
Financial costs	0.00	0.00	0.00	0.00
Break-even sales value	1,764.14	1,763.85	1,764.14	1,764.14
Break-even ratio (%)	17.45	17.45	17.45	17.45
Fixed costs coverage ratio	5.73	5.73	5.73	5.73
Excluding cost of finance				
Fixed costs	681.85	681.85	681.85	681.85
Break-even sales value	1,764.14	1,763.85	1,764.14	1,764.14
Break-even ratio (%)	17.45	17.45	17.45	17.45
Fixed costs coverage ratio	5.73	5.73	5.73	5.73

FINANCIAL RATIOS

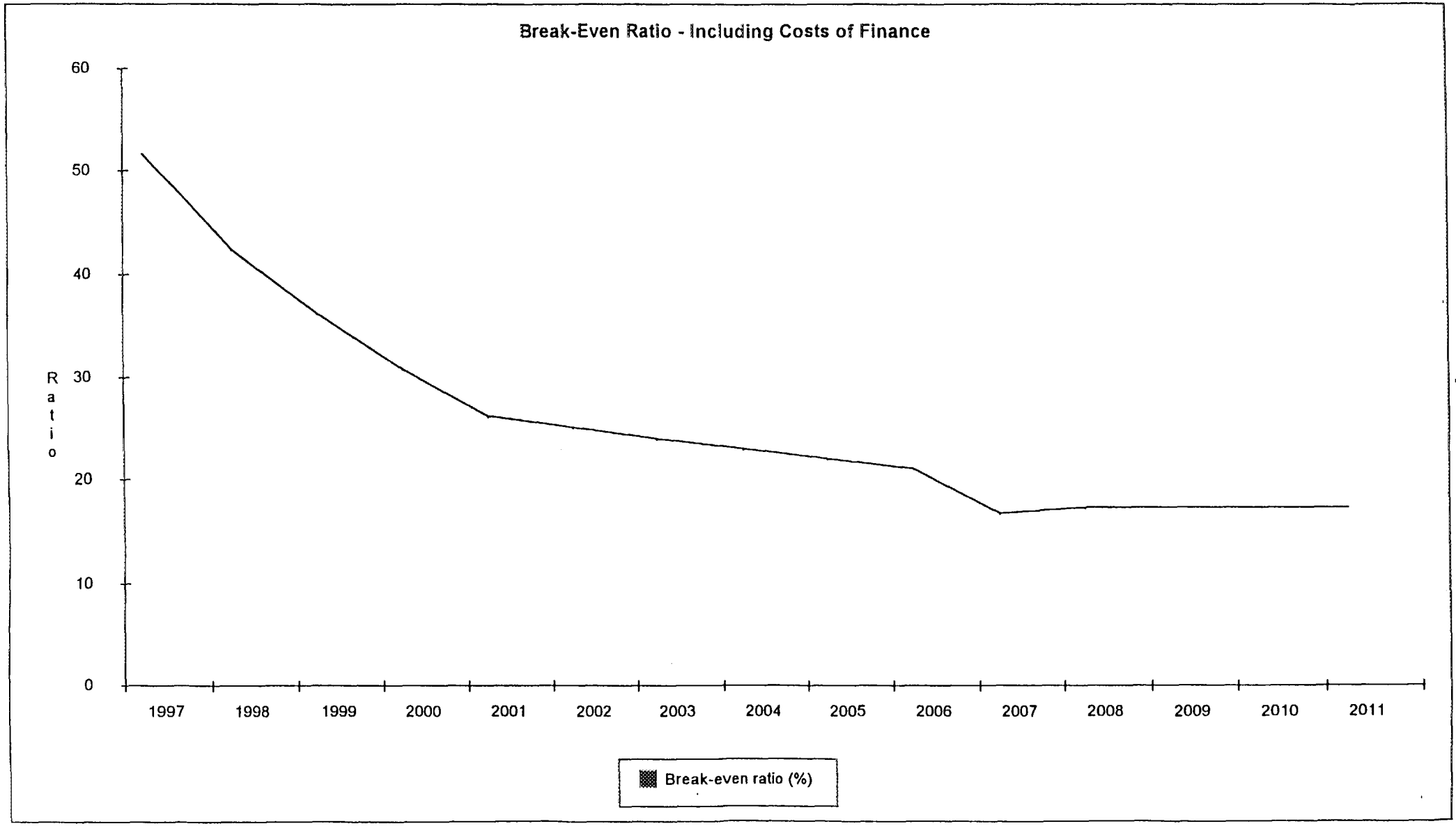
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Long-term debt to net worth	1.60	1.48	1.32	1.09	0.83	0.45	0.28	0.18	0.11	0.07	0.02	0.00	0.00	0.00	0.00	0.00
Current assets to current liabilities	0.00	5.83	7.51	8.21	8.43	8.10	10.03	11.92	10.22	11.53	11.82	11.97	12.48	13.02	13.55	14.08
Net cash flow to long-term debt	-1.50	0.36	0.63	0.80	1.04	1.46	2.04	2.66	0.56	6.12	18.24	0.00	0.00	0.00	0.00	0.00
Accounts receivable to accounts payable	0.00	0.95	1.02	1.02	1.01	1.01	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Net cash flow to long-term debt service	0.00	2.67	4.37	3.66	3.47	2.85	4.75	5.40	0.94	6.86	7.68	15.35	0.00	0.00	0.00	0.00

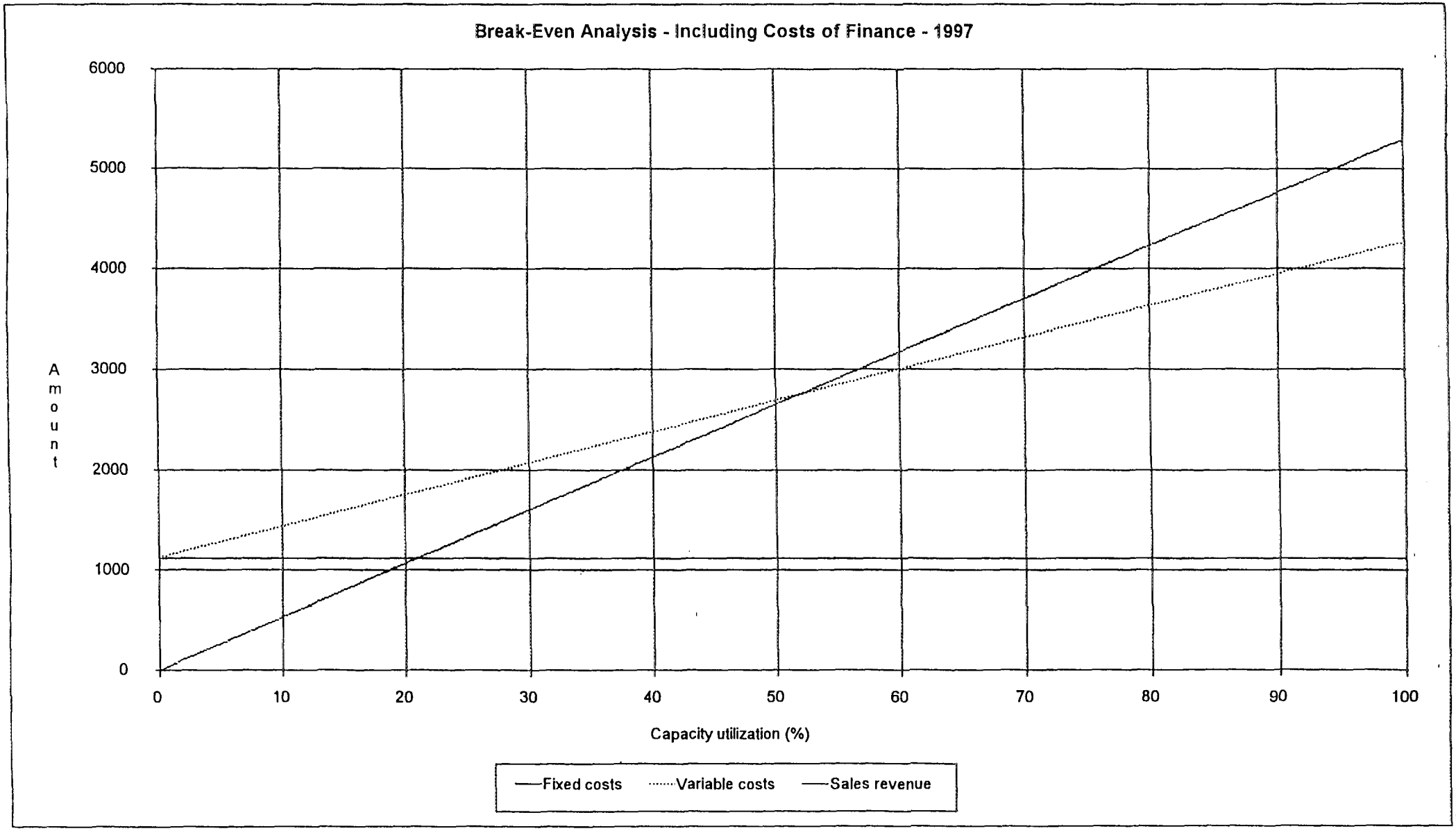
EFFICIENCY RATIOS

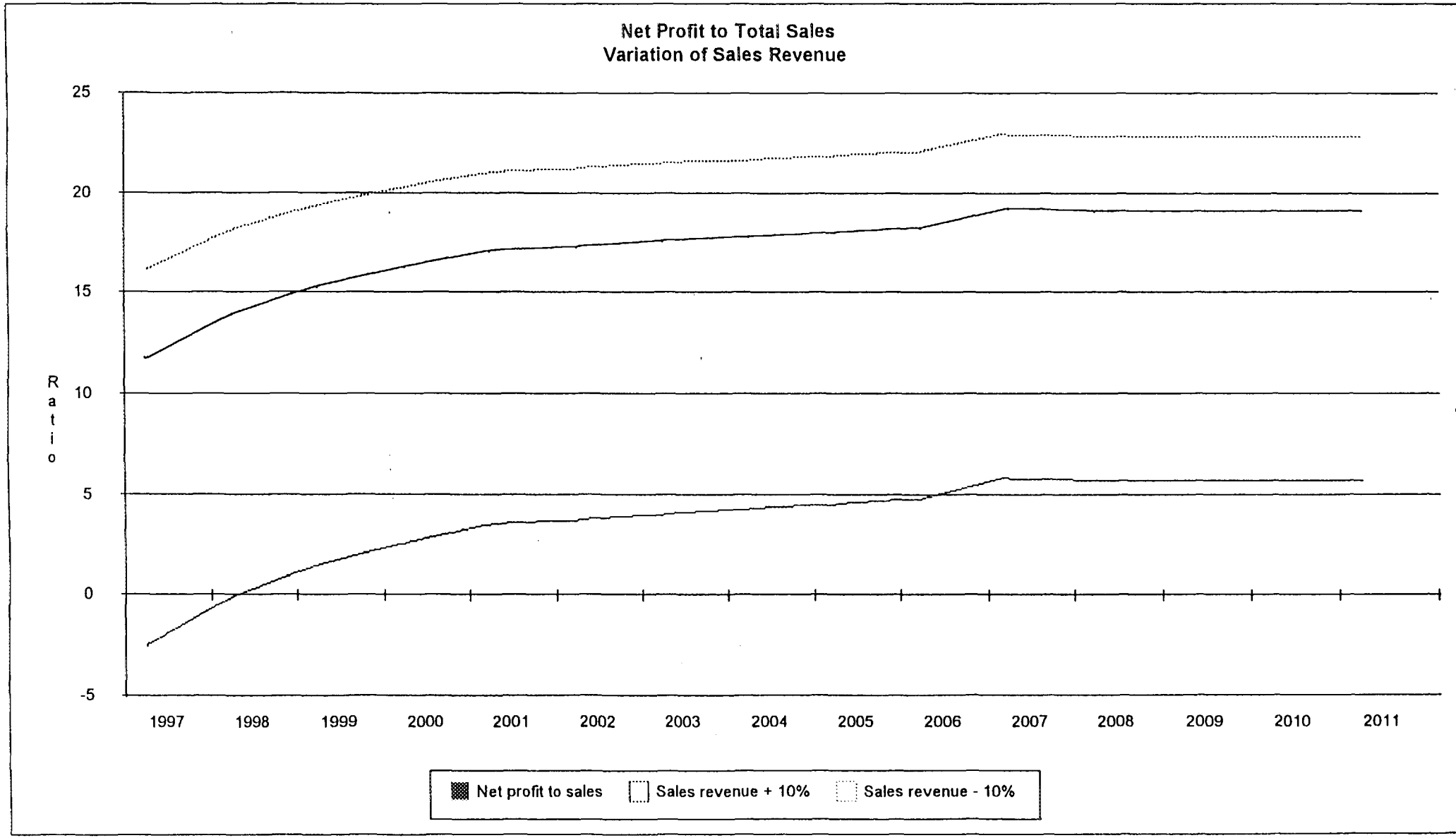
	Production 1997	Production 1998	Production 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007
Sales to total capital investment	1.30	1.55	1.78	2.02	2.17	2.17	2.17	1.53	1.53	1.53	1.49
Investment to personnel cost	17.62	17.03	16.53	16.32	16.71	16.72	16.72	23.76	23.76	23.76	24.29
Inventory to sales	0.13	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Net cash flow to total sales	0.16	0.23	0.23	0.23	0.21	0.23	0.23	0.03	0.23	0.23	0.20

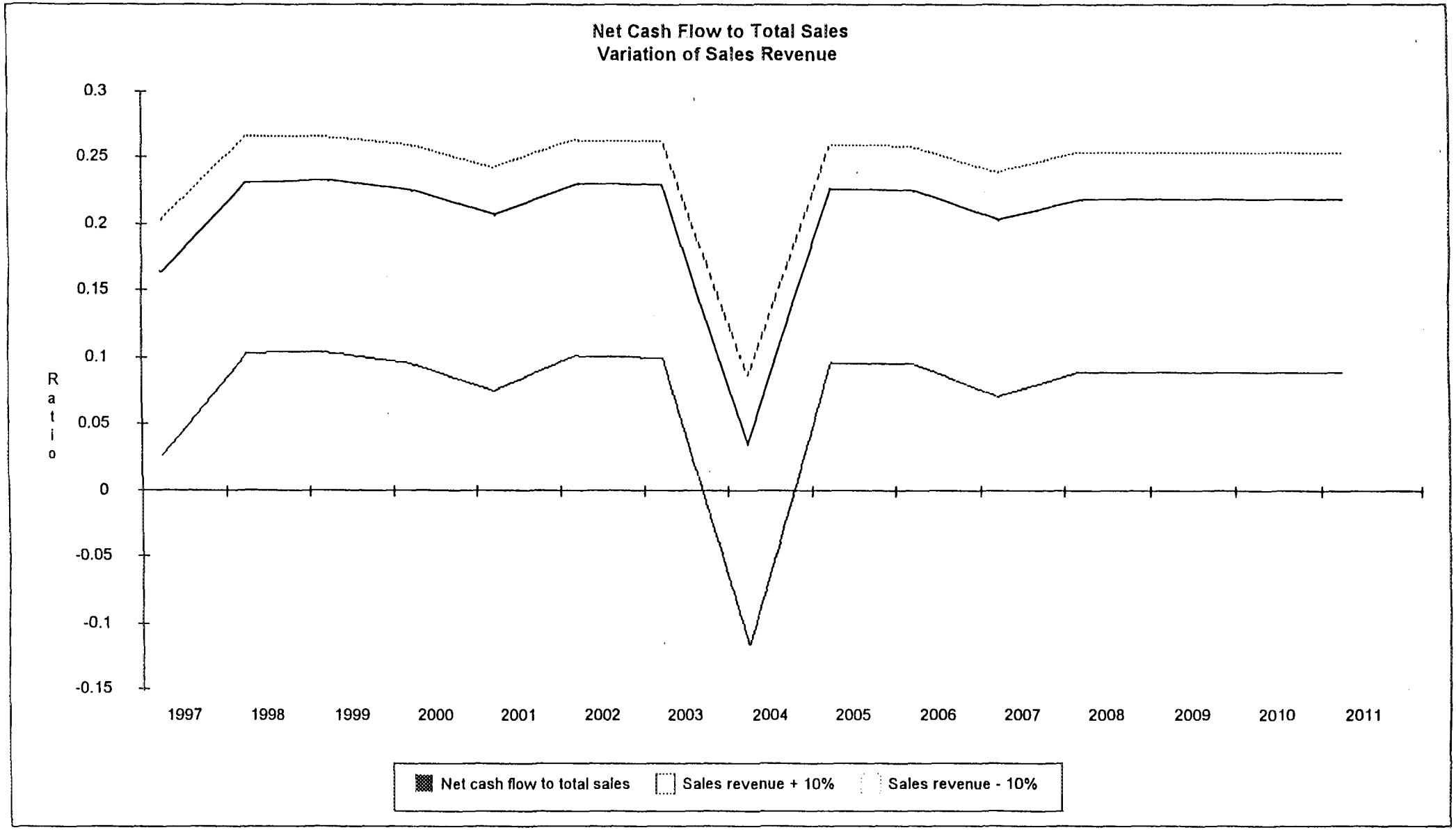

Break-Even Ratio - Including Costs of Finance
Variation of Sales Revenue
Ratio
70
60
50
40
30
20
10
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Break-even ratio (%)
Sales revenue + 10%
Sales revenue - 10%

EFFICIENCY RATIOS				
	Production 2008	Production 2009	Production 2010	Production 2011
Sales to total capital investment	1.49	1.49	1.49	1.49
Investment to personnel cost	24.29	24.29	24.29	24.29
Inventory to sales	0.11	0.11	0.11	0.11
Net cash flow to total sales	0.22	0.22	0.22	0.22


Break-Even Ratio - Including Costs of Finance
60
50
40
30
20
10
0
Ratio
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Break-even ratio (%)


Break-Even Analysis - Including Costs of Finance - 1997
Amount
6000
5000
4000
3000
2000
1000
0
0
10
20
30
40
50
60
70
80
90
100
Capacity utilization (%)
Fixed costs
Variable costs
Sales revenue

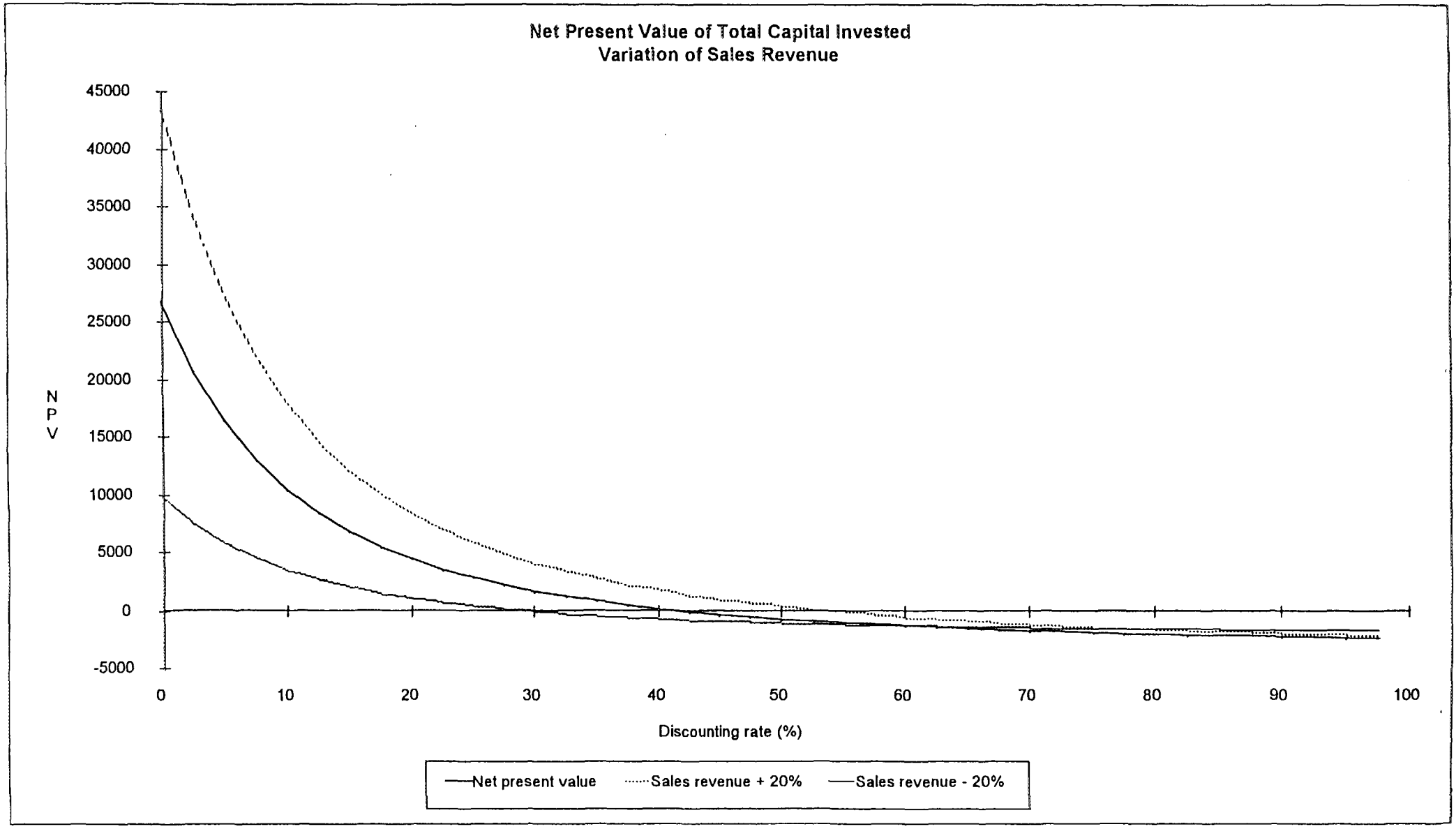

Net Profit to Total Sales
Variation of Sales Revenue
Ratio
25
20
15
10
5
0
-5
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Net profit to sales
Sales revenue + 10%
Sales revenue - 10%

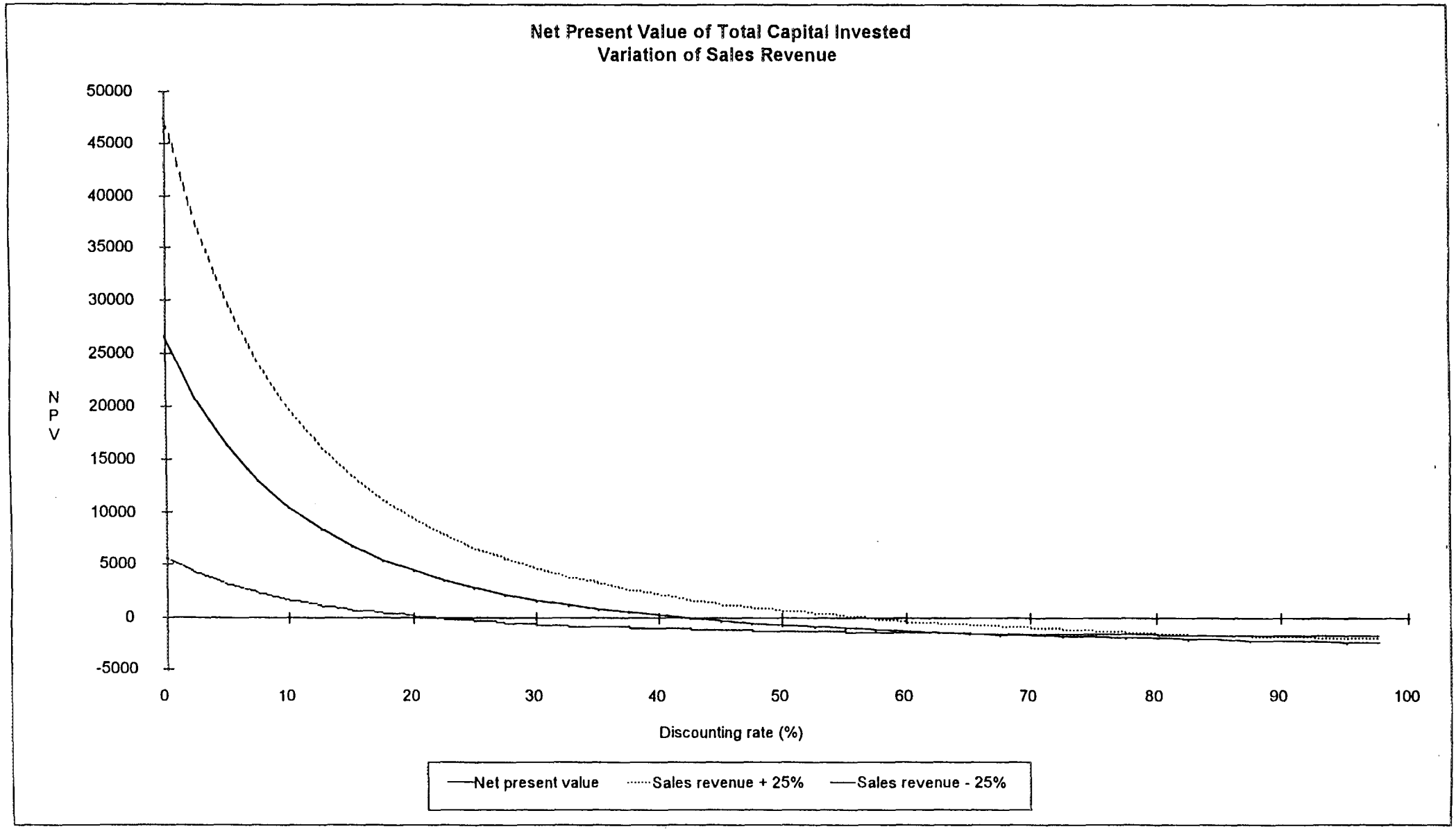

Net Cash Flow to Total Sales
Variation of Sales Revenue
Ratio
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Net cash flow to total sales
Sales revenue + 10%
Sales revenue - 10%

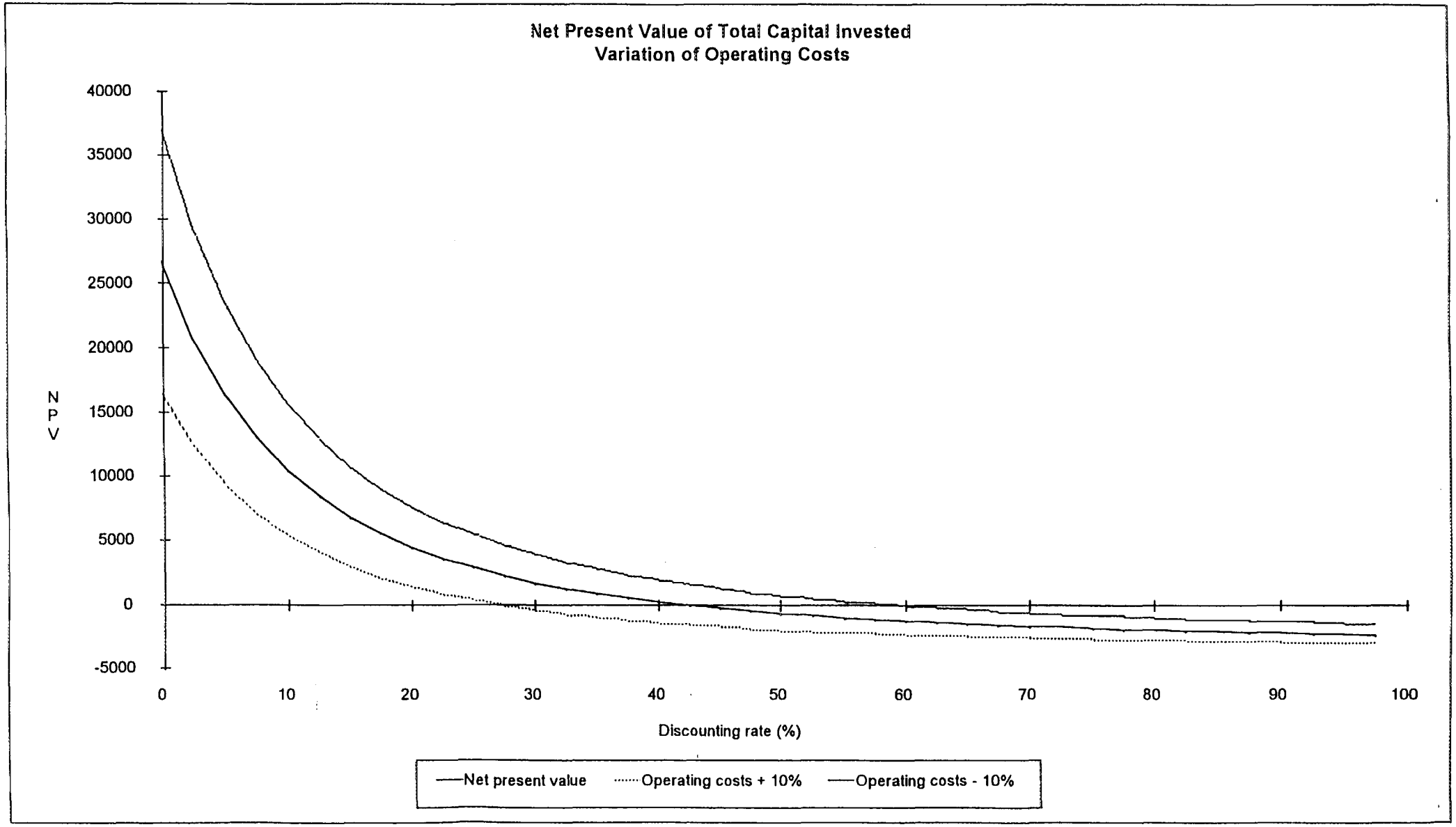
ANNEX 2

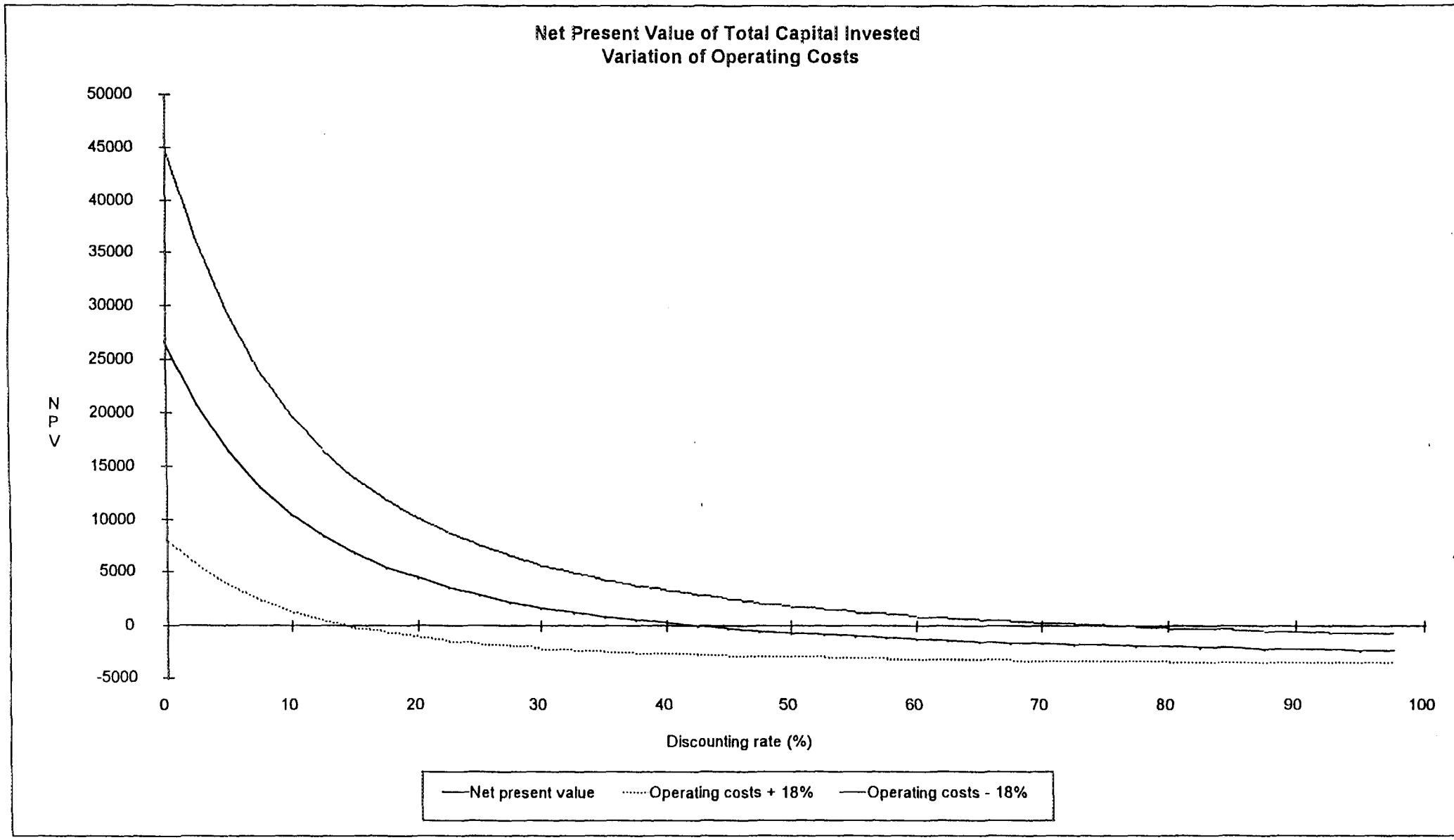
COMFAR PRINTOUT

Base Case - Parametric Analysis


Net Present Value of Total Capital Invested
Variation of Sales Revenue
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
-5000
N
P
V
0
10
20
30
40
50
60
70
80
90
100
Discounting rate (%)
Net present value
Sales revenue + 20%
Sales revenue - 20%


Net Present Value of Total Capital Invested
Variation of Sales Revenue
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
-5000
N
P
V
0
10
20
30
40
50
60
70
80
90
100
Discounting rate (%)
Net present value
Sales revenue + 25%
Sales revenue - 25%


Net Present Value of Total Capital Invested
Variation of Operating Costs
40000
35000
30000
25000
20000
15000
10000
5000
0
-5000
N
P
V
0
10
20
30
40
50
60
70
80
90
100
Discounting rate (%)
Net present value
Operating costs + 10%
Operating costs - 10%


Net Present Value of Total Capital Invested
Variation of Operating Costs
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
-5000
N
P
V
0
10
20
30
40
50
60
70
80
90
100
Discounting rate (%)
Net present value
Operating costs + 18%
Operating costs - 18%

ANNEX 3

COMFAR PRINTOUT

Summary in Indian Rupees

SUMMARY SHEET

Project title: STM PROJECT - INDIA
Project description: BASIC VERSION, 0% INFLATION
Date and time: DECEMBER 1995

Project classification: New project
Joint-venture project

Construction phase: 1/1996 - 12/1996
Length: 1 years
Production phase: 1/1997 - 12/2011
Length: 15 periods

Accounting currency: Million Indian Rupees
Units: Absolute
Reference currency:
Exchange rate:

INVESTMENT COSTS

	Total construction	Total production	Total investment
Total fixed investment costs	59.20	45.20	104.40
Total pre-production expenditures	9.00	0.00	9.00
Increase in net working capital	4.00	17.97	21.97
TOTAL INVESTMENT COSTS	72.20	63.17	135.37

SUMMARY SHEET

SOURCES OF FINANCE

	Total inflow
Equity capital	30.00
Long-term loans	48.00
Total short-term loans	10.88
TOTAL SOURCES OF FINANCE	88.88

INCOME AND COSTS, OPERATIONS

	First year 1997	Reference year 2004	Last year 2011
SALES REVENUE	105.82	202.19	202.19
Factory costs	56.32	105.81	105.81
Administrative overhead costs	0.44	0.44	0.44
OPERATING COSTS	56.76	106.25	106.25
Depreciation	7.73	7.72	5.73
Financial costs	6.48	2.44	0.00
TOTAL PRODUCTION COSTS	70.96	116.41	111.98
Marketing costs	14.14	25.70	25.70
COSTS OF PRODUCTS	85.10	142.11	137.68
Interest on short-term deposits	0.00	0.00	0.00
GROSS PROFIT FROM OPERATIONS	20.72	60.07	64.51
Extraordinary income	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00
GROSS PROFIT	20.72	60.07	64.51

SUMMARY SHEET

Investment allowances	0.00	0.00	0.00
TAXABLE PROFIT	20.72	60.07	64.51
Income (corporate) tax	8.29	24.03	25.80
NET PROFIT	12.43	36.04	38.71

RATIOS

Net present value	at 15.42 %	131.61
Internal rate of return on investment (IRR)	42.27 %	
Modified IRR on investment	42.27 %	
Internal rate of return on equity (IRRE)	79.21 %	
Modified IRRE on equity	79.21 %	

United Nations Industrial Development Organization
IPO Industrial Promotion Office

largo Domodossola, 1 - 20145 Milano Italy - tel. (39-2) 4815.522 fax (39-2) 4985.925