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CHAPTER II

COMPILING THE PROFIT AND LOSS ACCOUNT AND THE BALANCE SHEET

A very brief review of the flow of accounting information sufficed, but it is essential to have a more detailed understanding of the manner in which the information is drawn together in the Profit and Loss Account and the Balance Sheet.

1. Profit and Loss Account:

The account is also known as the "Revenue Account", and it summarises the manufacturing and trading activities of a concern over a given period. This period is always stated at the head of the account.

2. Balance Sheet:

The Balance Sheet, on the other hand, is a statement of assets and liabilities, and is a list of all the debit and credit balances on the books, after the Profit and Loss Account has been drawn up and balanced and shows the position at a given date. These balances are summarised to give a statement of the financial position of a concern at this date, which will coincide with the date on which the period covered by the Profit and Loss Account ends.

3. Trial Balance:

In keeping the books of account, all transactions are recorded in two separate accounts; for every receipt there is a donor and vice versa. The "donor" and "recipient" are in practice, always account headings. Accounts always receive on the left (debit) and give out on the right (credit). Thus a debit is always offset with a credit and the total of debits must always equal the total of credits. This is a simple explanation of double entry book-keeping.

"Taking out a trial balance" is a conventional term for the process of adding up both sides of the books and confirming that they are in fact equal, which is a check on the arithmetical accuracy of

book-keeping. Table 2 illustrates a very simple form of Trial Balance, which at this stage gives only a list of balances of entries in the books at a given date.

Table 2

Trial Balance of Sherkat Sahami Chrysler as at 29 Esfand, 1351

Account Ref.	Particulars	Debits Mill. Rials	Credits Mill. Rials
A	Purchases	10,000	
B	Stock	3,000	
C	Wages	8,000	
D	Sales		27,000
E	Rent and Rates	500	
F	Insurance	200	
G	Salaries	2,000	
H	Capital		4,000
I	Profit & Loss Appropriation		2,000
J	Creditors		1,000
K	Taxes owing		2,000
L	Plant and Machinery	6,000	
M	Debtors	3,000	
N	Cash and Bank Balances	1,300	
	Totals	36,000	36,000

The debits and credits of the Trial Balance having in fact balanced, it is possible to make certain adjustments to give these entries meaning. In Table 3, the figures in Table 2 have been adjusted for the reasons given opposite each adjusting entry, and at the same time the balance has been expanded into four columns. The first two columns contain entries relating to the Profit and Loss Account, and the last two are those which will appear in the Balance Sheet. It will be noted that all adjustments appear both as a credit and a debit, and in this way the balance is not disturbed.

Table 3

Adjusted Trial Balance of Sherkat Sahami Chrysler as at 29th Esfand, 1351

Profit & Loss & Bal. Sheet Ref.	Particulars	Notes Ref.	Profit & Loss Account		Balance Sheet	
			Dr. mil. Rls	Cr. mil. Rls	Dr. mill. Rls	Cr. mill. Rls
A	Materials purchased		10000			
A/1	Reserve for goods received included in stock, but invoices not received at 31/8/51	(a)	500			500
B	Stock and Work-in-Progress		3000			
B/1	Valuation of stock and work-in-progress as at 31/8/51	(b)		3500	3500	
C	Wages		8000			
C/1	Two days' accrued wages	(c)	100			100
D	Sales			27000		
E	Rent and Rates (Rls420 mil. net)		500			
E/1	Two months' rent and one month's rates paid in advance	(d)		80	80	
F	Insurance (Rls 100 mil. net)		200			
F/1	Six months' insurance paid in advance	(d)		100	100	
G	Salaries		2000			
H	Capital					4000
I	Profit & Loss Appropriation A/c					2000
J	Creditors					1000
K	Commissioners of Inland Revenue (for Tax owing)					2000
L	Plant and Machinery				8000	
L/1	10% depreciation on plant and machinery	(e)	800			800
M	Debtors				3000	
M/1	4% reserve for bad debts	(f)	120			120
N	Cash and Bank balances				1300	
			25220	30680	15980	10520
					25220	30680
					41200	41200

The effect on the Profit and Loss Account and Balance Sheet of the various adjustments illustrated is as follows:-

(a) Reserve for Goods Received, Included in Stock, but Invoice Not Received 29 Esfand - Rls. 500 Mill.

As this item has been included in the closing stock the effect will be to reduce the purchases by this amount, but as no invoice has been received the amount has never been included in purchases. Hence a "reserve" is made which is added to the purchases figure in the Profit & Loss Account and added to the creditors in the Balance Sheet. This reflects the true position, as the amount is actually owing to the supplier as the goods have been received. However, as the invoice has not been received the normal means of making the entries in the book was not available at the year end.

(b) Valuation of Stock and Work-in-Progress in Hand at 29 Esfand, 1351.

Looked at from the point of view of the Profit and Loss Account, this represents the cost of work carried out on making products which are not yet completed or sold so that the expenses shown in the Profit and Loss Account are reduced by this amount to arrive at the cost of the sales. From the Balance Sheet point of view, it represents the value of finished stock and work-in-progress in hand at the end of the year. Conversely, the stock and work-in-progress at the beginning of the year is taken out of the Balance Sheet and added to the expenses of the period in the Profit and Loss Account because the items in stock and work-in-progress at the start of the year will either have been sold or included again in the closing stock.

(c) Accrued Wages

Wages are normally paid in respect of a week ending Wednesday and it is seldom that the end of a wages week coincides with the end of the financial year. Thus it is necessary to reserve for any odd days of wages due between the end of the last wages week and the end of the company's financial year. This figure is added to the cost of wages in the Profit and Loss Account and is added to creditors in the Balance Sheet (i.e. it is the

amount owing to employees by the company). In practice, as wages are paid a week late, a whole week's as well as the odd days has to be reserved in this way.

(d) Rent, Rates and Insurance Paid in Advance

It is quite usual to pay insurance premiums and rates in advance so that at the end of the year a calculation is made of the amount paid in respect of the following year. This is carried forward and the charges shown in the original Trial Balance is reduced by this amount and is included on the asset side of the Balance Sheet next to the Debtors as "Payments in Advance" (because at the date of the Balance Sheet the amount is, in effect, owing to the company).

(e) Depreciation of Machinery

The depreciation written off will be shown as a charge in the Profit and Loss Account and will appear in the Balance Sheet as a deduction from the original cost. For fixed assets, the original cost, the depreciation written off to date and the written down value have to be shown in the Balance Sheet. Hence, the amount written off in any one year will not appear separately in the Balance Sheet but will be included with the total amount written off in previous years.

(f) 4% Reserve for Bad Debts

It is usual to review all the debts owing to the company (principally those shown in the Sales Ledger) at the end of the financial year. A reserve is calculated to cover any debts considered to be definitely bad or doubtful, i.e. debts outstanding for twelve months might be reserved for in full, debts nine months old at 50% of their value, etc. The first year this practice is adopted, the amount of the reserve is debited to the Profit and Loss Account and shown in the Balance Sheet as a deduction from Debtors. In subsequent years any bad debts incurred are written off against the reserve as they occur. At the end of the year the debts are again reviewed and the reserve is adjusted to the new figure considered necessary, the difference between the existing

figure and the new figure being charged to the Profit and Loss Account.

These are a few examples of the sort of adjustments that will have to be made at the end of the year, and in practice many more examples will occur.

4. Preparation of the Profit and Loss Account:

The Profit and Loss Account is prepared from the adjusted Trial Balance set out in Table 3, and appears in Table 4. Where there has been an adjustment in the original figure (i.e an adjustment to the balance shown in the Ledger), the total adjusted figure is entered into the Profit and Loss Account.

Table 4 is presented only to illustrate the flow of information from the Ledgers to the Trial Balance, then to the adjusted Trial Balance, and finally into the Profit and Loss Account. It does not include a comprehensive list of the expenses which would normally appear in a Profit and Loss Account, nor is it the only form in which the account may be presented. Some companies start the Profit and Loss Account with the opening Work-in-Progress on the left hand side and show the closing work in progress on the right hand side. However, whatever form the account takes, it should finish by showing the operating profit arising from normal operations. Income or expenses of an abnormal or non-operating character should be shown in a second "non-operating" section of the Profit and Loss Account, e.g. dividends from subsidiary companies and trade investments, capital losses written off, property rents less outgoings if not part of normal operating activity.

Table 4

Profit and Loss Account of Sherkat Sahami Chrysler
For the year ending 29 Esfand, 1351

Trial Balance Ref.		Mill. Rials	Trial Balance Ref.		Mill. Rials
A+A/1	Materials Purchased	10,500	D	Sales	27,000
C+C/1	Wages	8,100			
E-E/1	Rent and Rates	420			
F-F/1	Insurance	100			
G	Salaries	2,000			
L/1	Depreciation of Plant	800			
M/1	Bad Debts	120			
	Total expenses	22,040			
	Add Stock and work in progress 1 Farvardin 1351	3,000			
		25,040			
	Less Stock and work in progress 29 Esfand 1351	3,500			
	Cost of Sales	21,540			
	Trading Profit	5,460			
		27,000			27,000

5. **Profit and Loss Appropriation Account:**

There is a further division of the Profit and Loss Account, which is important to understand because, although it does not appear as a specific tabulation in the financial projections, the relevant figures must be estimated and included in the projections.

In the Profit and Loss Account in Table 4, a net profit of 5, 460 million Rials is shown, and this represents the trading profit for the year. This profit must be utilised in some way, and this is a matter of policy, whereas all the data building up into the Profit and Loss Account has been based on facts and commercial practice.

Table 5 illustrates the manner in which the profit is allocated in what is termed the Profit and Loss Appropriation Account. None of the figures, except the opening balance of 2000 million Rials (Reference I, in the Trial Balance) appears in the original Trial Balance. Provision must be made for tax, which at a later date, will have to be paid on the trading profits. Tax is not one of the elements of cost in running a business - the liability to tax only arises after the taxable profits, if any, have been earned. Taxation, therefore, is part of what happens to profits after they have arisen, and logically it appears in the Appropriation Account. In Table 5 an amount of 3000 million Rials is provided for taxation.

On the right hand side of the account the total of unappropriated balance of profits brought forward from previous years (2000 million Rials) and the trading profit for the year is 7460 million Rials. After deducting 3000 million Rials for tax there is 4460 million Rials left for the shareholders. Of this amount the Directors decide to place 1000 in the general reserve, which means that resources are being retained in the business to provide for future contingencies or expansion. Also the Directors decide to pay a dividend of 20% (i.e. 20% on the capital of 4000 million Rials) amounting to 800 million Rials. This leaves 2260 million Rials to be carried forward to the next year.

All these allocations, excepting tax, may be varied at the discretion of the Board, within the scope of the amount of profits available for distribution, and the compliance of the shareholders at the Annual General Meeting.

Table 5

Profit and Loss Appropriation Account

	Mill. Rials		Mill. Rials
Provision for taxation (on trading profit)	3000	Balance brought forward (Trial Balance Ref. I.)	2000
Transfer to General Reserve	1000	Trading profit for year	5460
Dividend - 20% (on capital)	800		
Balance carried forward	2660		
	7460		7460

6. **Preparation of Balance Sheet:**

Table 6 illustrates the Balance Sheet prepared from the figures entered on the adjusted Trial Balance (Table 3)

Conventionally liabilities (or credit balances) appear on the left, while the assets (or debit balances) appear on the right, which, it will be noted is the opposite to the convention of double entry book-keeping.

The figures in the Balance Sheet are transfers of those entries in the Trial Balance which have not already been used in the Profit and Loss Account.

Table 6

Balance Sheet of Sherkat Sahami Krysler
as at 29 Esfand, 1351.

Trial Bal. Ref.	Liabilities	Mill. Rials		Trial Bal. Ref.	Assets	Mill. Rials	
H	Capital		4000	L	Plant & Machinery	8000	
I	Profit & Loss Account	2000		L/1	Less Depreciation	800	7200
	Add net profit			B/1	Stock and Work-in-		
	for year as per				Progress 29 Esfand 1351		500
	Profit & Loss Account	5460	7460	M	Debtors	3000	
J	Creditors	1000		M/1	Less Reserve		
A/1	Accrued Purchases	500			For Bad Debts	120	2880
C/1	Accrued Wages	100	1600		Payments in Advance		
K	Tax		2000		Rent and Rates	80	
					Insurance	100	180
					Cash at Bank and in Hand		1300
			15060				15060

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Table 7 is the same Balance Sheet, but incorporates the extra entries resulting from the entries in the Profit and Loss Appropriation Account, and only the liabilities side is affected by these adjustments.

Table 7

Adjusted Balance Sheet as at 29 Esfand, 1351

Liabilities	Mill. Rials		Assets	Mill. Rials
Capital		4000	Plant	7200
General Reserve		1000	Stock	3500
Balance on Profit and Loss Appropriation Account		2600	Debtors	2880
			Payments in Advance	180
Provision for Future Tax		3000	Cash	1300
Creditors and Accruals	1600			
Proposed Dividend	800	2400		
Tax (owing for previous years)		2000		
		15060		15060

The logical order of the items appearing in the Balance Sheet is worthy of note, since they are presented in the order of importance to the shareholder. On the liabilities side the capital appears first followed by the Reserves and the Balance of un-appropriated Profit. The items which eventually have to be paid in cash follow. On the Assets side, the order is based on the relative liquidity of the assets, - those which are least easy to turn quickly into cash are placed first.

CHAPTER II

THE APPRECIATION OF FINAL ACCOUNTS

In Chapter 2, the flow of accounting information was traced from the books to the presentation of a simple final set of accounts in the established conventional form. The final accounts of an organisation, are usually more complex, and should show the following main items.

1. Every Balance Sheet must give a true and fair view of the state of affairs of the concern and, similarly, the Profit and Loss Account of the results of the year's trading.

2. Corresponding figures for the previous year must be given.

3. Fixed assets must be shown separately from current assets, and the aggregate amounts written off fixed assets disclosed.

4. Capital and revenue reserves, provisions and liabilities must be separately classified under appropriate headings, and movements into or out of these accounts shown each year.

5. Any investments held by a Company must be shown separately under quoted, unquoted and trade investments. In the case of investments quoted on a Stock Exchange, the market value as at the date of the Balance Sheet must also be shown.

6. If any liability of the Company is secured, this fact must be stated.

7. Details of taxation charged in the accounts must be given.

8. Investment income must be shown separately.

9. Any receipts of an unusual or non-recurring nature must be stated and not hidden in an overall figure of profits.

10. A note of Directors' remuneration, of whatever nature, must be shown, either incorporated in the accounts or as a note on the face of the accounts. Details of any loans to Directors must also be shown.

The Balance Sheet:

The Balance Sheet is a statement of a Company's wealth and of the claims on it's wealth by those lending money to the Company, including creditors, banks, debenture holders, and by the investors in the preference and equity shares.

The Balance Sheet is so named because it is on the one side a statement of assets, and on the other a statement of liabilities, which by definition must in total, be equal.

Tax authorities, creditors, debenture holders, and all external claimants have a first claim on the assets of a Company, and the remainder belongs to the shareholders. Preference shareholders have a prior claim over the ordinary chareholders.

The conventional form of Balance Sheet, illustrated in Example 1, in which the Assets are shown on the right side, and the Liabilities on the left side, has been replaced largely by a more informative presentation, although the old format is still used in some cases. Example 2, takes the figures provided in Example 1, and regroups them into the more usual and the more useful form.

The general layout of Example 2 is in the form of a simple statement, in which the important factors are more immediately apparent. The real capital employed is clearly seen to be $ 1,037,054 while the liquid position, that is, current assets less current liabilities is shown as $ 685,177.

Valuation of Assets:

Anything a business owns that has money value is an asset. The assets appearing on a Balance Sheet are classified as Fixed Assets, Current Assets, or Other Assets.

"Other Assets" are also described as intangible assets. Additionally a balance sheet may record trade investments.

Fixed Assets:

Fixed Assets are those required for long term use in a business, and they include land, buildings, plant, machinery, furniture, vehicles, etc. They are not intended for resale, and they are recorded in the Balance Sheet at their cost to the business, less depreciation. Infrequently they may be shown at a revaluation figure instead of at cost.

Goodwill is an exceptional item sometimes appearing as a Fixed Asset, and this represents the difference paid for a business as a going concern and it's net tangible worth. For example if 5 million Dollars were paid for a business as a going concern, and the assets less liabilities were only valued at 3 million Dollars, the goodwill would have cost 2 million Dollars. Goodwill is only shown in the Balance Sheet to the extent that it was actually purchased. It is more often recorded as an intangible asset.

Apart from goodwill, the method of valuation each year is the same in principle. Normally, land and freehold buildings do not wear out nor need replacement. Nevertheless, some concerns, notably banks, depreciate these items annually at some small rate. Plant and equipment do need periodical replacement and are depreciated at a larger annual rate. The value, therefore, of fixed assets on the Balance Sheet is normally the original cost or valuation at a given date, less the depreciation written off. The aggregate depreciation which has been written off the original value of the assets must be shown wherever possible. There is, however, a train of thought which has arisen as a result of the inflationary trend and which recognises that the above method of valuing fixed assets on the basis of historical cost is unreal. The object of depreciation is to provide funds for replacement of the asset. If the cost of replacement in the meantime has, say, trebled, the company will not have accumulated sufficient resources to provide the necessary funds if the normal basis of depreciating on historical cost is followed. This position is widely appreciated in industry and special reserves

cumulated to provide for this contingency. Some concerns even go to the lengths of revaluing all their fixed assets at current replacement costs and charge against their profits depreciation based on these written up values.

Current Assets:

Current Assets are cash and assets expected to be converted into cash during the normal accounting period of the company, generally one year. This includes those assets where the cash realised is normally re-invested in the same assets, for example stocks, trade debtors and cash. They also include investments quoted on the Stock Exchange, and Payments in Advance such as rents etc. However if stocks and accounts receivable are not expected to be converted into cash within a year, they should be treated as Fixed Assets.

A manufacturing concern is involved in the following stages:-

Item	Represented on Balance Sheet by	Basis of Valuation
1. Acquiring raw materials	Stores	Cost or market value, whichever the lower.
2. Employing labour and equipment in making the final product	Work in progress	Cost, plus a percentage to cover overheads.
3. Holding final products pending sale	Stocks	Cost as 2 above, or market value, whichever the lower.
4. Selling the product	Debtors	Balances on the sales ledgers less any reserves against bad debts.
5. Receiving cash from customers	Cash	Balances at banks, and petty cash floats.

The current assets are those represented in the second column of the above table. The accepted basis of valuation of each item is shown in the

third column and is consistent with normal commercial practice. Nevertheless, this basis of valuation may vary considerably between companies, but must not vary from one year to another within the same concern. Taxation and costs of raw materials are continually rising and companies are finding it increasingly difficult to finance replacement of stocks out of their own funds. They are forced, therefore, to find these funds from outside, either by borrowing from the banks or going to the public in the form of an issue of fresh shares, debentures or notes. Much of the increased profits shown by industry are not the result of increased trading or more efficient methods, but purely a windfall from selling stocks (after conversion into the final product) at an inflated price. If a deflationary period should ever take place, it can easily be seen that the direct converse will occur and companies find themselves heavily overcapitalised. The problem of deciding whether to find new finance by the temporary method of bank loans or by the permanent one of the issue of new shares involves, therefore, a judicious forecasting of the future.

Intangible Assets:

Intangible assets are not really assets, but consist of non-recurring expenditure in connection with goodwill, trademarks, patents, licencing agreements, capital issues or company formation, which it is customary not to charge against the profits of the year in which the expenditure was incurred. They are usually written off over a period of years, and until fully written off they appear as an asset in the Balance Sheet. As already discussed under "Fixed Assets", in certain circumstances goodwill is not written off. Long term expenditure on repairs may also appear as an intangible asset.

Trade Investments:

These are usually investments in subsidiary or associated companies, both equity and loan, normally shown at cost at the time of acquisition and therefore not informative as to their current value.

Liabilities:

Liabilities are debts owed by the business.

Current Liabilities:

Current Liabilities, that is liabilities which fall due within a year, include overdrafts and other short term loans, trade creditors, prospective dividend and interest payments. Also considered to be a part of current liabilities, are accrued liabilities such as taxation due on the profits of the current year but payable later, and accrued wages which must be accounted for when the last day of the accounting period does not agree with the last day of a pay period.

Long Term Liabilities:

Long Term Liabilities include loans or parts of loans not due for payment within a year, and debentures etc.

Contingent Liabilities:

Contingent Liabilities are not included in the Balance Sheet as part of the total liabilities, but are the subject of a footnote on the Balance Sheet. They are legal obligations to pay money in certain events, for example capital expenditure, or potential damages in a lawsuit.

Share Capital, etc.

Share Capital is a liability in the sense that the company, as an entity, has received the money from the shareholders, and therefore the shareholders have a claim on the company, and the company has a liability to repay the share-capital at some future date. The liabilities plus the share capital is equal to the total value of assets.

Share capital consists of:-

(a) Ordinary Shares at nominal value if fully paid up.

(b) Preference Shares at nominal value if fully paid up.

(c) Capital Reserves - capital profits arising from the issue of shares at a premium or from capital gains.

(d) Revenue Reserves - retained profit which may be distributed as dividend.

The Meaning of Capital:

Accountants use the word "Capital" in a number of senses. The term can be used when talking of the capital of a company either in terms of the shareholders' holdings, as represented by the issued capital, or by the issued capital plus reserves (other than specific reserves for specific contingencies) which are represented by the left-hand side of the Balance Sheet with the exception of actual liabilities to outsiders. The following definitions may assist in explaining the various shades of meaning:-

(i) Authorised Capital means the total amount which the enterprise is entitled by its constitution to raise by way of contributed capital.

(ii) Issued Capital is the amount of the authorised capital which has actually been raised to date.

(iii) Paid-Up Capital is the amount of the issued capital which has been contributed in money or money's worth to date. Only a portion of each shareholder's liability (e.g. 15/- out of £1 per share) may have been "called up".

(iv) Capital Reserves are reserves which are not available for distribution to the shareholder while the company continues to operate, e.g. premium on shares, profit on the sale of a fixed asset.

(v) Revenue Reserves, such as general reserve and unappropriated balance on Profit and Loss Account, are available for distribution to the shareholders.

(vi) Fixed Capital implies fixed assets.

(vii) Working Capital is the excess of current assets (i.e. stock, debtors and cash) over current liabilities (debts for material, services, tax due and not paid at the date of the Balance Sheet). This represents the resources available for carrying on operations.

(viii) Liquid Capital is the excess of current assets, other than stocks and work-in-progress, over current liabilities.

Appraising a Balance Sheet:

This section, considers the typical Balance Sheet as set out in it's alternative forms in Examples 1 and 2, and appraises the figures presented.

Fixed Assets:

It will be seen that $ 50,084 has been written off the plant and machinery out of an original cost of $ 127,016. At first sight this may seem adequate but it will be seen from the Profit and Loss Account that only $ 2,418 has been provided for the year and this includes amortisation of property. It appears that the Directors are only writing off the minimum amount and are not making any provision for the additonal cost of replacement.

However, it may be that the plant was acquired at a low value and that the real value is well in excess of the book value, as the total fixed assets are only about one third of the capital employed.

Included also is the cost of acquiring shares in subsidiary companies. In such circumstances, a consolidated Balance Sheet showing what assets and liabilities are represented by this figure must also be published. As this figure only amounts to $ 15,000, out of a total of $ 351,877, for the sake of simplicity the consolidated position will be ignored.

It will be seen that there is a figure of goodwill amounting to $ 22,913. Bearing in mind what has already been said on this subject, reference should be made to the figure of available profits for the year. This is $ 170,446 (i.e. $ 180,797 minus preference dividend of $10,351), which is 56% of the ordinary share capital. The real value of goodwill, therefore, would be considerably in excess of the book figure should the business be sold as a going concern and on the basis of current trading results.

Current Assets Less Current Liabilities:

The liquid position of the Company is very strong. The Government Bonds, due to be repaid in 1350, are the equivalent of cash, with

the added advantage of earning interest at $5^{3}/_{4}\%$ instead of about $4\frac{1}{2}\%$ which is the rate which would have been earned had this sum been on deposit account at the bank. The amount due from the subsidiary companies of $ 136,528 represents advances made to finance their activities. This is common practice, and the parent company is in effect acting as banker. Without reference to the consolidated Balance Sheet, it is not possible to see to what extent this sum is represented by current (or liquid) assets. It is a fair assumption, however, in a successful concern to look upon this item as liquid. After deducting the preference share capital of $ 268,855 it can be seen that each $ of ordinary share capital is represented by about $ 1.35 of net current assets ($ 685,177 - $ 268,855 ÷ $ 306,320), together with about $ 1.15 of fixed assets ($ 351,877 ÷ $ 306,320) at book value and some figure for goodwill which cannot easily be assessed. This total value of assets covering the ordinary shares could be compared with the Stock Exchange Value, if quoted.

Capital Reserves:

A part of a Company's payment of excess profits tax was refunded to them by the Government with the intention that the proceeds be used for capital purposes. The Government stipulated that the sum could not be used then or at any later date for dividend purposes, and it is therefore credited to a special Capital Reserves Account. It is not an item that is normally seen in current Balance Sheets.

Revenue Reserves and Surplus:

The figures under this heading represent accumulated undistributed profits. The taxation reserve represents the probable tax liability, based on the current trading profits but not payable until the 1st Farvardin, 1352. It is therefore, at the date of the accounts and in view of the existing method of calculating and collecting tax, not yet an actual liability and in certain circumstances might not even be payable. Nevertheless, provision has been made for the sum, as it arises as a result of the year's trading. This also is a reminder that the Inland Revenue's share is an appropriation of profits and not a charge against them.

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J. Goodwin

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The general reserve and balance on the Profit and Loss Account have been built up over a period of time by paying out in dividends only a portion each year of the profits earned. Undistributed profits are represented by an equivalent increase in the cash and other resources of the Company. A dividend is paid out in cash. If, therefore, 100% of the profits were paid out each year, there could be no additional resources available to finance any expansion of the business, nor to meet the increased costs of stock, etc, under current conditions. Any extra cash needed would then have to come from outside, either by way of a bank loan, or an issue of shares or debentures. As any well-run Company is always endeavouring to expand, it is only prudent financial policy to provide for this by creating reserves within the business. The activities of the Company can accordingly be built up from within by creating such reserves within the scope of the profits earned. In general, therefore, the greater the figure of reserves the sounder is the financial position of the Company and the greater is the backing for the ordinary shares.

Taken together, the capital and revenue reserves represent nearly 80% of the issued share capital which is an indication of a strong financial position.

Provisions:

These figures have been allocated out of profits to provide for the two specified contingencies. The money has not yet been spent on repairs and rehabilitation, but funds have in effect been provided for this expenditure when circumstances permit.

It must be realised that reserves mean nothing in themselves, but must always be interpreted in terms of the assets which they represent.

Summary:

To sum up, the Company appears to be in a strong position. Trading profits have increased by about one third on the previous year, the ordinary dividend is covered 5 - 6 times after provision

In fact, expansion has been financed by setting aside 80% of the issued capital and current assets exceed current liabilities by 3 : 1 which is a very high proportion. The only items which raise a doubt are the value of the shares in the subsidiary companies and the amounts due from the subsidiary companies and the amount of depreciation written off, but these considerations are outweighed by the other good features.

The Profit and Loss Account:

The Profit and Loss Account shown in Example 3 shows the net earnings arising during the year, and sets out the way in which this amount is distributed. Net earnings in this context means the income arising from running the business. It excludes any appreciation in the value of capital assets, and excludes any income deriving from the sale of capital assets, which are not normally regarded as being available for distribution as dividend.

The trading profit or operating profit before tax is entered on the right side of the account and other revenue income is shown separately. The trading profit is sometimes quoted before depreciation in which case depreciation will appear as a contra charge on the left side, and in other cases it is quoted after deduction of depreciation. Any expenses not previously deducted from the trading profit such as, Directors' fees, auditors' fees, and interest on debentures, also appear on the left side, to leave a net profit before tax available for distribution.

A Profit and Loss Account of the type shown in Example 3 provides little information about the way in which the Company is being operated and many companies now make public a much more informative account than may be required in law. To present fuller information and at the same time avoid having a too lengthy Profit and Loss Account, some companies prepare a separate "Statement of Cost of Goods Manufactured". The total cost of manufacturing is then transferred to the Profit and Loss Account as a single amount. These two accounts are shown in Examples 4 and 5. This is a clear and logical layout, providing detail in addition to the main totals.

The Appropriation Account:

The appropriation account starts with the net profit before tax on the right side, and any profit balance brought forward from the previous year is then added. This is the total amount available for distribution, which is set out on the left side and which must follow certain priorities.

First taxation must be provided for, but it should be noted that the amount provided is the amount due on the profits on the current years operations and payable in the subsequent year. The amount actually paid during the current year will be different, having accrued from the previous years operations. After meeting taxation, the distribution of the balance of the profit (if any) is at the discretion of the Board of Directors, although there are some well established priorities. Preference share dividends will normally have priority, followed by transfer to any reserve accounts, and finally the payment of a dividend to the ordinary shareholders. Any balance remaining after these appropriations will remain in the business and will be carried forward to the Appropriation Account for the following year.

The Use of Ratios in Final Accounts:

The subject of Ratio Analysis is dealt with elsewhere, and the use of ratios in the appreciation of final accounts is an obvious area of application. A series of comparative statistics combined with ratios is given in Example 6 and this gives a very good indication of the trend of a business over a period of several years.

The figures in a set of Final Accounts for a single year, if analysed, can also provide much information on the conduct of a business. A number of ratios additional to those calculated in example 6 are now calculated based on Examples 2 and 5.

The Current Ratio:

Using the figures from the Balance Sheet (Example 2), the current ratio would be:-

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{\$\ 977,615}{\$\ 292,438} = 3.3$$

A current ratio of 2 to 1 is generally considered to be acceptable, and a figure of 3.3 indicates a strong liquidity position.

The Acid-Test Ratio:

This ratio is more exacting than the current ratio, and is a measure of the immediate availability of cash to meet liabilities.

Using the figures from the Balance Sheet, (Example 2) the Acid-Test Ration would be:-

$$\frac{\text{Cash + Government Securities + Receivables}}{\text{Current Liabilities}} = \frac{\$96,756 + 150,375 + 232,045}{292,438}$$

$$= 1.6$$

An Acid-Test Ratio of 1 to 1 is considered to be satisfactory.

Average Collection Period:

$$\text{Sales per day} = \frac{\text{Net Sales}}{\text{Days in the accounting period}}$$

Using the sales figures from Example 5

$$\text{Sales per day} = \frac{734,271}{365} = \$\ 2,010$$

Using the Receivables figure from Example 2

$$\frac{\text{Receivables}}{\text{Average sales per day}} = \frac{232,045}{2010} = 115$$

The number of days sales Tied up in Receivables. = 115

Inventory Turnover:

$$\text{Inventory Turnover} = \frac{\text{Cost of goods sold}}{\text{Average Inventory}}$$

From Example 5

$$= \frac{637,671}{\frac{1}{2}(69,200 + 66,400)} = 9.4$$

The Company, during the year used up, through operatio
9.4 times the average inventory investment.

BALANCE SHEET AS AT 29TH ESFAND, 1349

1348 $	1348 $		Authorised $	Issued and Fully Paid $	$
		CAPITAL (in Shares of $1 each) -			
[illegible]		7 per cent Cumulative Preference Shares	300,000	268,855	
[illegible]		Ordinary Shares	400,000	106,320	
[illegible]175			$ 700,000		[illegible]75,175
		CAPITAL RESERVES -			
	62,410	Tax Refund		62,410	
81,106	18,696	Debenture Redemption Reserve Account		--	62,410
		REVENUE RESERVES AND SURPLUS -			
	180,000	General Reserve Account		250,000	
	55,727	Reserve for future Income Tax ..		74,042	
[illegible]	57,568	Profit and Loss (Appropriation) Account		66,[illegible]	390,230
					1,027,835
949,57[illegible]					
138,244		4½ per cent. First Mortgage Debenture Stock			-
		PROVISIONS			
	15,283	Deferred Repairs		5,303	
20,804	5,521	Rehabilitation Expenses		3,916	9,219
		CURRENT LIABILITIES -			
	16,343	Amount due to Subsidiary Company			
	150,136	Creditors and Accrued Expenses		178,120	
	1,650	Debenture Interest, less Tax			
	66,712	Current Taxation, 1349/50 ..		89,760	
	234,847			267,880	
		Dividends, less Tax -			
	5,175	Preference Dividend paid 1st Farvardin 1350		5,175	
252,658	12,636	Proposed Ordinary Dividend ..		18,375	892,436
$1,356,382					$1,329,492

Chairman and Managing Director,

Director

1348 $	1348 $		$	$
		FIXED ASSETS -		
		Freehold and Leasehold Property -		
	284,325	Partly at Cost and partly at Independent Valuation in 1335	285,135	
238,357	45,968	Less: Depreciation and Amortisation	18,[illegible]	[illegible]
		Plant and Machinery, Fixtures, Fittings, etc. -		
	115,321	At Cost or at Book Value at 1st [illegible] 1348, less Sales	127,016	
72,970	42,349	Less: Depreciation ..	[illegible],084	76,[illegible]
		Goodwill -		
38,897		At Cost, less amounts written off ..		22,[illegible]
350,230				[illegible]
		INVESTMENT -		
		5¾ per cent. Government Bond 1350 (Nominal $150,000 Market Value 29th Esfand, 1349)		150,[illegible]
		SUBSIDIARY COMPANIES -		
	15,284	Shares, at Cost	[illegible]	
192,095	176,811	Amounts due on Current Accounts ..	[illegible]	[illegible]
		CURRENT ASSETS -		
	128,595	Stock in Trade	196,[illegible]	
	$336,634	Work in Progress .. $[illegible],245		
174,140	162,494	Less: Amounts received on Account [illegible]	[illegible]	
	270,670	Sundry Debtors, Bills Receivable and Payments in Advance, less Reserve ..	232,04[illegible]	
614,057	242,852	Cash at Bank and in Hand	96,[illegible]	[illegible]
				$1,329,4[illegible]2

EXAMPLE 8

ABC MANUFACTURING COMPANY

BALANCE SHEET

1348		29th Esfand, 1349 Cost	Depreciation	Net
	Fixed Assets			
	At Cost, less Depreciation: -			
	Freehold and Leasehold Property	$ 285,135	$ 48,387	$ 236,748
	Plant and Machinery	127,016	50,084	76,932
	Goodwill	22,913	-	22,913
	Shares in Subsidiary Companies	15,284	-	15,284
		$ 450,348	$ 98,471	$ 351,877
	Current Assets			
	Stock in Trade and Work in Progress less received on account		$ 361,911	
	Sundry Debtors		232,045	
	Due from Subsidiary Companies		136,528	
	Investment - 5 3/4 Government Bonds 1350		150,375	
	Cash at Bank		96,756	
			$ 977,615	
	Less Current Liabilities			
	Creditors	$ 178,120		
	Current Taxation	89,768		
	Dividends Proposed	24,550	292,438	685,177
				$1,037,054
		Authorised	Issued Fully Paid	
	Represented by:-			
	Share Capital - 7% Cumulative Preference Shares	$ 300,000	$ 268,855	
	Ordinary Shares	400,000	306,320	$ 575,175
		$ 700,000		
	Capital Reserves - Excess Profits Tax		62,410	
	Revenue Reserves and Surplus			
	General Reserve	$ 250,000		
	Reserve for Future Taxation	74,042		
	Appropriation Account	66,208	390,250	
	Provisions			
	Deferred Repairs	5,303		
	Furnace Relining Expenses	2,916	9,219	461,879
				$ 1,037,054

EXAMPLE 3

PROFIT & LOSS ACCOUNT YEAR ENDED 28TH ESPAND, 1349

1948			1948			
$		$	$			$
8,276	DEPRECIATION OF PLANT, FIXTURES Etc.	8,177	177,057	TRADING PROFIT before deducting Charges per contra ..		233,394
8,424	DEPRECIATION AND AMORTISATION OF PROPERTY (see Note (a) below	2,418	906	INTEREST RECEIVABLE		734
1,000	DIRECTORS' FEES (see Note (b) below)	1,800				
420	AUDITORS' FEE	420				
8,007	DEBENTURE INTEREST	5,404				
150,836	BALANCE, being Profit for the Year	215,109				
$177,963		$234,128	$177,963			$234,128

APPROPRIATION ACCOUNT

$	$		$	$		$
		PROVISION FOR TAXATION ON PROFITS EARNED TO DATE		150,836	PROFIT FOR THE YEAR as shown by the above Account	215,109
				55,129	BALANCE brought forward from 1948	57,568
	13,774	Income Tax	75,927			
76,166	22,165	Profits Tax	30,816	106,743		
2,241		Transfer to Debenture Redemption Reserve Account		-		
55,000		TRANSFER TO GENERAL RESERVE ACCOUNT ..		70,000		
		DIVIDENDS (less Tax) for 1349, Paid and Proposed -				
	10,351	Preference Dividend	10,351			
22,987	12,636	Proposed Ordinary Dividend (7½ per cent	19,375	29,726		
				66,408		
57,568		BALANCE, as per Balance Sheet				
$213,963			$272,677	$213,963		$272,677

Note - (a) No Depreciation has been written off some of the Freehold Property as in the opinion of the Directors such provision is unnecessary.

(b) The remuneration of the Directors paid by the Company and the Subsidiaries was -

For Services as Directors	$ 1,800	
Management Remuneration	48,275	
	50,075	
Pension to former Director	5,325	

EXAMPLE 4

XYZ MANUFACTURING COMPANY

Statement of Cost of Goods Manufactured for the year ended 29 Esfand 1349

	$	$	$
Work in Progress 1st Farvardin, 1349			18,000
Raw Materials:			
Inventory, 1 Farvardin 1349		154,300	
Purchases		263,520	
Freight Inwards		9,400	
Total Cost of Materials		427,220	
Less Inventory 29 Esfand 1349		163,120	
Cost of Materials Used		264,100	
Direct Labour		150,650	
Manufacturing Overhead			
Indirect Labour	23,750		
Factory Heat, Light, Power	60,300		
Consumable stores	23,100		
Insurance, Local Taxes	8,100		
Depreciation of Buildings and Plant	26,471		
Total Manufacturing Overhead		241,021	
Total Manufacturing Costs			656,671
Total Work in Progress at 29 Esfand 1349			676,471
Less Work in Progress at 1 Farvardin 1349			43,000
Cost of Goods Manufactured			633,671

EXAMPLE 5

XYZ MANUFACTURING COMPANY

Profit and Loss Account for the year ended 29 Esfand, 1349

	$	$	$
Net Sales			738,271
Cost of Goods Sold:			
Finished Goods Inventory 1 Farvardin 1349		69,200	
Cost of Goods Manufactured (Example 4)		632,871	
Total Cost of Goods Manufactured		702,071	
Less Finished Goods Inventory 24 Esfand 1349		66,400	
Cost of Goods Sold			635,671
Gross Profit			96,600
Selling and Administrative Expenses:			
Selling Expenses:			
Sales Salaries and Commission	26,700		
Advertising Expenses	12,900		
Miscellaneous Selling Expenses	2,100		
Total Selling Expenses		41,700	
Administrative Expenses:			
Salaries	27,400		
Miscellaneous Administrative Expenses	4,900		
Total Administrative Expenses		32,300	
Total Selling and Administrative Expenses			73,900
Net Operating Profit			22,700
Other Revenue			15,300
Net Profit Before Tax			38,000
Estimated Tax			12,640
Net Profit After Tax			25,360

PROJECT EVALUATION

VOLUME 1

BASIC ACCOUNTING AND TAX LAW

EXAMPLE 6

APPROXIMATE COMPARATIVE STATISTICAL TABLE
(Including Subsidiary Companies)

	1338	1348	1348	1350	Percentage Increase Over 1338
Nominal ordinary stock	$ 900,000	$ 1,350,000	$ 1,350,000	$ 1,350,000	50%
Equity capital employed	$2,058,564	$ 5,521,184	$ 7,015,759	$ 7,482,354	263%
Gross turnover	$5,575,824	$12,478,502	$15,435,817	$15,721,213	182%
Depreciation	$ 82,701	$ 211,689	$ 229,977	$ 254,137	207%
Taxation	$ 997,141	$ 953,235	$ 974,287	$ 877,206	330%
Net profit for year before appropriation	$ 419,120	$ 892,700	$ 974,037	$ 783,866	86%
Percentage net profit (8) on equity capital (3)	20.3%	9.1%	8.6%	10.5%	
Percentage net profit (8) on gross turnover (2)	7.5%	4.7%	4.4%	5%	
Rate of ordinary dividend for $1 unit	.95	.15	.20	.25	
Gross ordinary dividend	$ 995,000	$ 202,500	$ 270,000	$ 337,500	
Percentage gross ordinary dividend(10)on equity capital(9)	10.9%	3.1%	3.8%	4.5%	
Percentage gross ordinary dividend(10)on equity turnover(3)	4.03%	1.62%	1.75%	2.15%	

APPROXIMATE PRODUCTION AND WAGES

		1338	1348	1348	1350	Percentage Inc. or Dec. Over 1338
Total turnover		$5,575,824	$12,478,502	$15,435,817	$15,721,213	182% inc.
Total vehicle invoiced deliveries	(quantity)	5,025	4,674	6,281	8,386	27% inc.
	(value)	$4,549,836	$ 9,583,467	$12,341,522	$12,558,829	176% inc.
Home	(quantity)	4,010	2,693	3,637	3,611	5% dec.
	(value)	$3,564,831	$ 5,689,082	$ 7,220,625	$ 8,236,804	131% inc.
Export	(quantity)	1,015	2,181	2,854	2,575	153% inc.
	(value)	$ 984,705	$ 3,894,485	$ 5,120,897	$ 4,320,025	339% inc.
Total annual wages on hourly rate		$1,103,665	$ 2,889,953	$ 2,975,517	$ 3,112,731	182 inc.
Number of Employees on hourly rate		5,989	8,285	8,057	7,788	30% inc.
Weekly earnings per employee on hourly rate		$ 8.50	$ 16.20	$ 17.00	$ 18.40	117% inc.
Turnover per $100 wages on hourly rate		$ 505	$ 431	$ 518	$ 505	-

CHAPTER IV

CAPITAL - SOURCES AND APPLICATION

A company raises funds by three main methods:-

(i) Issuing share capital.
(ii) Selling an "interest" in the company.
(iii) Borrowing, which takes many forms.

In project evaluation, which relates to new projects, it is usual to consider funds raised by the issue of shares and by borrowing, although the purchase of an interest may occur.

Shares:

Shares are the sections into which the capital of a company is divided. A shareholder has a share in a company, and the company possesses property but the shareholder has no property in the assets of the company. Primarily a share in a company is a piece of property which confers rights in relation to distributions of income and capital.

The nominal capital of a company may be divided into shares of four main types:-

(a) Preference shares
  (i) Cumulative Preference Shares
  (ii) Non-Cumulative Preference Shares
  (iii) Participating Preference Shares (Cumulative or Non-cumulative)
  (iv) Redeemable Preference Shares
(b) Ordinary Shares
(c) Deferred Shares
(d) Governors Shares

(a) **Preference Shares:-**

Preference shares confer on the holders, rights or privileges not enjoyed by the owners of other shares, and they may be preferential as to return of capital, or dividend or

both. Preference shares may be issued with or without voting powers, or with a power to vote under certain conditions e.g. when dividends are 2 years in arrears. When they are issued with the right to convert into ordinary shares at any time at the owners option, they are known as convertible preference shares.

(i) Cumulative Preference Shares:-

If dividends are not paid in any year on cumulative preference shares due to profits not being available, then they accumulate until profits are available and distributed to cover all outstanding dividends.

(ii) Non-Cumulative Preference Shares:-

If there is insufficient profit available in a particular year, the holders of non-cumulative preference shares lose their right to the dividend. They may or may not have participating rights.

(iii) Participating Preference Shares:-

The percentage dividend on preference shares is usually at a fixed rate, but the owner of a participating preference share would rank equally in any surplus of profits after the ordinary shareholders have received a stated rate of dividend on their shares. This type of share may be cumulative or non-cumulative.

(iv) Redeemable Preference Shares:

This type of share is of particular use to cover loans from institutional lending organisations. Redeemable preference shares may be redeemed at the option of the company, on a certain date or before a certain date.

(b) Ordinary Shares:-

The bulk of the company's capital is held by the ordinary shareholders, who are virtually the owners of the company. After

the payment of preference dividends, and subject to the rights of deferred shareholders, and to participating rights of preference shareholders, the remainder of the profits is owned by the ordinary shareholders.

(c) Deferred Shares:-

These shares are usually issued to promotors, their nominees, or vendors, and are intended to indicate their faith in the company. Usually the holders receive no dividends until the dividends on all other shares are paid in full. Accordingly some restriction on the dividends payable to ordinary shareholders is necessary. Also, this type of share may be deferred as to the return of capital on winding up, in addition to or ae an alternative to its being deferred as to dividends.

(d) Governor's Shares:-

Some companies, in which there are restrictions to the transfer of shares or the number of shareholders, issue a special class of share which may confer wide management powers on the holder.

Borrowings:

Funds are raised by:

(1) Trade Credits
(2) Unsecured Loans
(3) Secured Loans
(4) Discounting Bills of Exchange
(5) Discounting Debtors or Factoring

Item (4) and (5) relate to short term financing when the company is in operation.

Additionally, the use of assets may be acquired by renting, leasing or hiring instead of by borrowing and by purchase.

When a project is being formulated it is usual for all loans to be private, that is the public are not invited to lend money.

Private borrowing of a company is referred to as a loan, secured loan, or an overdraft when a bank provides funds. These terms mean much the same thing, the main distinction being whether the borrowing is secured or not.

In the case of public borrowings, these take many forms, and are usually offered to the public only when the company is well established.

(1) Trade Credits:-

Trade credits may take two forms. Firstly they may appear as a deferred payment for capital goods supplied, with payment by instalments over a period of 3 - 6 years. These credits are generally guaranteed to the supplier by a financial institution, for a percentage of the value of the goods supplied, this charge being borne by the company. The financial institution may also want a mortgage on the specific goods supplied under the credit. Secondly they may be revenue credits on goods supplied and appear as a current liability in the accounts.

(2) Unsecured Loans:-

It is not usual to obtain unsecured loans for a new venture, because of the obvious risks involved. An unsecured loan may be obtained directly from the sponsors of the project or the sponsors may guarantee a loan made by a bank, which from the point of view of the project is an unsecured loan.

(3) Secured Loans:-

To obtain a loan it is usually necessary to offer some security that in the event of failure of the company, the lender may expect to recover his loan. In the case of a medium or long term loan, this usually consists of a charge on the fixed assets of the company and a floating charge over the remainder in the form of a mortgage debenture, and the lender may additionally require a guarantee by the sponsors, jointly and severally, in their private capacities.

A bank may make a loan up to a fixed proportion of the value of stocks of raw material components and finished goods, - perhaps up to 80% of the value of the stocks. This is known as hypothecation of stocks.

4. Application of Capital:-

The application of capital to a new project takes the following general form:-

Cost of Project	1000 $	Means of Finance	1000 $
Land	90	Paid-up Capital	220
Building & Civil Works	85	Long Term Loan	180
Machinery including installation	165	Bank Borrowings	30
Vehicles	10		
Office Equipment & Furniture	10		
	360		
Preliminary Expenses	30		
	390		
Working Capital	40		
	430		430

There are, of course, many variations to this pattern but the basic points to note are:-

(i) The long term loan, which would be secured by a charge against the Fixed Assets, represents 50% of the tangible cost of Fixed Assets (40 - 60% is the usual range).

(ii) Bank borrowings, unsecured or secured against hypothecated stocks provide part of the working capital. It is specifically stated that the long term loan is for the purchase of buildings and machinery and that the bank borrowings provide a revolving credit for working capital.

(iii) The Government project evaluator is concerned with the type and ownership of shares, ordinary and preference, to ensure that

(a) The correct ratio of local to foreign equity ownership is maintained, at least until and if the shares are quoted on the stock exchange.

(b) The non-voting preference shares do not transfer the voting majority to foreign partners, in the event of non-payment of preference dividend.

(c) The cash flow in the early years of operation, may reasonably be expected to cover preference share dividends, which are a contingent liability.

CHAPTER V

DEPRECIATION, INADEQUACY, AND OBSOLESCENCE

Actual Depreciation:

Actual depreciation is the true loss of value of property, arising during service as determined by valuation experts. During periods of rapid inflation actual depreciation may result in an appreciation of the value.

Calculated Depreciation:

The calculated depreciation is obtained by using an assumed mathematical formula, to distribute the value of the property throughout it's average service life based on the life of similar property under similar conditions.

Inadequacy:

Inadequacy of assets arises from changed operating conditions, which render an asset unsuited for further service. The asset may still retain its depreciated value if sold. This does not include inadequacy resulting from technical innovation.

Obsolescence:

Obsolescence represents a reduction in the value of an asset due to an improvement in methods, machines, materials, processes, substitution of products, and cessation of demand.

Depletion:

Depletion is an annual allowance for eventual exhaustion of some natural resource such as a salt deposit, clay pit, limestone quarry, gas well, or oil well. Usually from the standpoint of income tax, the maximum depletion allowance is set by law.

The Accounting of Depreciation:

Depreciation is the amount written off an asset to provide for the fact that, as a result of use, the asset will wear out and need replacement. Usually at the end of its life, an asset will have some residual,

if only scrap value. Alternatively, developments may arise which will make the asset out of date before it has become worn out, and in order to continue trading it would be policy to replace the old asset with a new one, even though it has left several years of useful life.

It is not possible to be specific on rates of depreciation for various kinds of plant or machines, nor for a particular plant as a whole, but as a first step the assets could be classified into groups.

Land	Manufacturing Machinery
Buildings	Lathes
Frame	Drills
Sheet Iron	Presses
Brick	Spindles
Brick and Concrete	Looms etc.
Building equipment	Patterns and Dies
Power Machinery	etc.

After the various items of assets have been classified, each item should be carefully considered, and a best estimate made of the individual rates of depreciation.

There are a number of methods of apportioning the depreciation of which the straight line method is the simplest and most usual. If the scrap value is ignored, the annual rate of depreciation is obtained by dividing the estimated length of life of the unit in years into 100.

A second method is known as the "Double Declining Balance" method. In this method a rate which is double the straight line rate is applied to the undepreciated balance at the end of each year.

A third method, which is more commonly used in the U.S.A. is known as the "sum of digits" method, in which the depreciation for each year is specified as a fraction of the total investment. The fraction is the number of years of remaining project life divided by the sum of the years elapsed at the end of each year of the projects total life. With a life of 10 years the depreciation for the first year would be:

$$\frac{10}{10+9+8+7+6+5+4+3+2+1} = \frac{10}{55} = 18.1\%$$

The total depreciation for the ten years is:

$$\frac{10}{55}+\frac{9}{55}+\frac{8}{55}+\frac{7}{55}+\frac{6}{55}+\frac{5}{55}+\frac{4}{55}+\frac{3}{55}+\frac{2}{55}+\frac{1}{55}=\frac{55}{55}=100\%$$

A fourth method is to apply a depreciation rate to the reducing balance using the formula:

$$r = 1 - \sqrt[n]{\frac{s}{c}}$$

r = the required percentage
n = the number of years
s = the net salvage value
c = the cost

In the example which follows, n = 10, s = 1 and c = 500

$$r = 1 - \sqrt[10]{\frac{1}{500}}$$

$$r = 46.3\ \%$$

PROJECT EVALUATION

VOLUME I

BASIC ACCOUNTING

There are many aspects of project evaluation which necessitate an understanding of basic accounting principles. In particular the financial projections set out in a feasibility study, and the published financial statements of operating companies, must be examined and analysed by project evaluators.

While accounting is a specialised function, it is desirable for all concerned with project evaluation to understand the principles on which accounting documents are based. This volume is written with a minimum of accounting terms to permit non-accountants to acquire an introductory knowledge of the subject.

Chapters X, XI, and XII are reproduced in total from the Ministry of Economy publication, - "Industrial Guide to Iran", to enable the evaluator to have this information readily to hand.

It should be noted, however that Government revenue figures quoted in these three chapters are subject to amendment, as are the Government disbursement figures quoted in Chapter XIII.

Volume 2 is concerned with technical and financial studies; Volume 3 critically analyses a feasibility study as a case study, and Volume 4 deals with economic evaluation at the operational level.

Comparative Effect of Depreciation Formulas:

	(1) 10% Straight Line	(2) 20% on Declining Balance	(3) Sum of Digits	(4) 46.3% Reducing Balance
Year to 29 Esfand 1349				
Cost	500	500	500	500
Depreciation	50	100	91 ($10/55$)	221
Year to 29 Esfand 1350	450	400	409	269
Depreciation	50	80	82 ($9/55$)	125
Year to 29 Esfand 1351	400	320	327	144
Depreciation	50	64	73 ($8/55$)	67
Year to 29 Esfand 1352	350	256	254	77
Depreciation	50	51	64 ($7/55$)	36
Year to 29 Esfand 1353	300	205	190	41
Depreciation	50	41	55 ($6/55$)	19
Year to 29 Esfand 1354	250	164	135	22
Depreciation	50	33	45 ($5/55$)	10
Year to 29 Esfand 1355	200	131	90	12
Depreciation	50	26	36 ($4/55$)	6
Year to 29 Esfand 1356	150	105	54	6
Depreciation	50	21	27 ($3/55$)	3
Year to 29 Esfand 1357	100	84	27	3
Depreciation	50	17	18 ($2/55$)	1
Year to 29 Esfand 1358	50	67	9	2
Depreciation	50	13	9 ($1/55$)	1
Residual value	0	54	0	1

The effect of applying these four formulea has been tabulated for comparison purposes.

In project evaluation, and for the purpose of calculating the "break-even" point it is always the "straight line" calculation which is used, but most taxation laws provide for depreciation rates, or "wear and tear allowances" as a percentage of the written down value.

Taxation rates rarely coincide with those used commercially, and consequently two sets of depreciation and plant records are often maintained, - one for tax purposes and another for the business. The rates allowed for taxation are almost always less than those necessary for prudent business, and this explains why taxable profits usually exceed the business profits.

In conditions of rapid inflation, the depreciation formulas outlined will not cover for replacement of plant and equipment.

CHAPTER VI

CLASSIFICATION AND DEFINITION OF COST ACCOUNTS

A wide field of study exists in the accounting activities of estimating costs, collecting historical costs, and controlling costs, but this is a specialist function with which the project evaluator is only indirectly concerned. However, the evaluator should be familiar with the more usual terms employed in costing, the manner in which costs are classified, and the basis of their calculation. Some of the more common terms are defined in Appendix VI/3.

In Chapter III, the cost or valuation of stores, work-in-progress and stocks of finished goods, which appear in the Balance Sheet as a part of the current assets, have been discussed, and a broad classification of costs as they might appear in the Profit and Loss Account is provided in Examples 4 and 5 at the end of Chapter III. Although there is a wide variation in the detailed classification of cost accounts, the broader divisions follow conventional patterns, and it is useful to know the typical types of accounts which go into the main groupings.

Costs Classification:

Since in project evaluation we are more concerned with costs as they appear in the annual financial accounts, than in the detailed build up of cost accounts, it is more convenient to work from the financial accounts back to the cost structure.

For accounting purposes, expenditures are of two major types: Capital expenditures and revenue expenditures. Capital expenditures are those which result in a charge to an asset account and revenue expenditures are those which are incurred in earning revenue. Capital expenditures are also known as capital costs, and in project evaluation we are concerned with the estimation of capital costs, but in this Chapter we are dealing only with revenue costs.

Although there has been considerable controversy on the most suitable break-down of costs of an industrial enterprise, it is almost universal practice to make three main functional divisions, - production, sales, and administration, with sometimes a fourth division, - finance. If the classifications used in Example 5, Chapter III are put into chart form, the relationship of the individual cost items to the total cost structure becomes clearer, and this appears in Appendix VI/1.

The individual cost items appearing in the Profit and Loss Account are necessarily a summary of many separate accounts and the main classifications are now expanded to provide a better definition still maintaining the functional pattern of the classification.

Selling Expenses:-

1. Direct Selling Expenses.

   All direct expenses of salesmen, sales offices, sales supervision, and associated services.

2. Advertising and Sales Promotion:

   Advertising, sales promotion, publicity, educational and market development activity.

3. Transportation:

   Transport charges on goods outwards, returned sales, local deliveries, maintenance and operation of outwards transport facilities.

4. Storage and Handling:

   The cost of storage, and handling of finished goods beyond the point of production.

5. Credit and Collection:

   The cost of maintaining a credit and collection department, cost of accounts receivable records, collection costs, loss on bad debts.

6. **Financial** Expense:

Cash discounts **on sales.**

7. **General** Selling Expense:

The cost of **sales accounts,** market **research, the selling** share of **administration expense, all other expenses.**

Administration Expenses:-

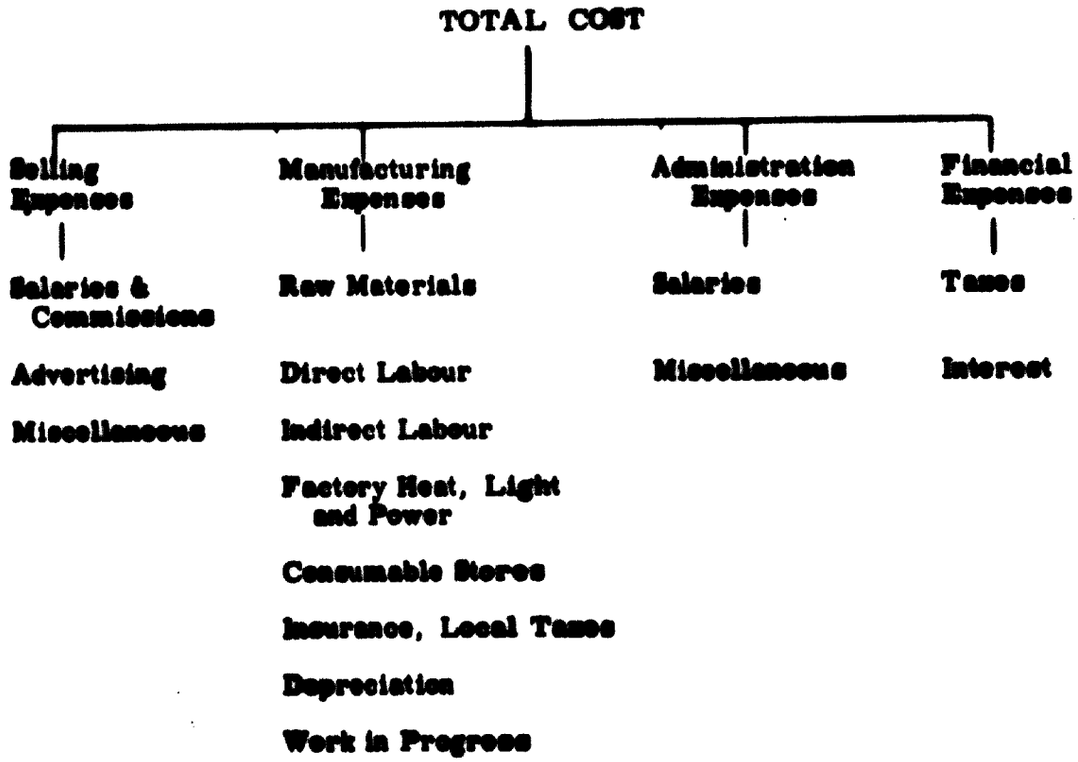
1. Executive **salaries**
2. Office salaries
3. Travelling **expenses**
4. Legal and **professional services**
5. Telephone, **telegraph**
6. Printing and **stationery**
7. Postage
8. Rent, light, **heat**
9. Subscriptions **etc.**
10. Donations
11. Insurance
12. Depreciation on **office** equipment
13. Repairs to **office equipment**
14. Experimental **and development expenses**
15. Miscellaneous **expenses.**

Manufacturing Expenses:-

In Appendix VI/1manufacturing expenses are classified into eight major categories, but **when a more** detailed **classification is required, the type of** industry under **consideration** largely **determines the break-down. Appendix VI/2sets out in chart form a typical industrial cost accounts classification,** and **it will be noted that costs which are directly proportional** to output **are distinguished** from **those which are not directly related** to output, **and this facilities subsequent profit analysis and break-even calculations.**

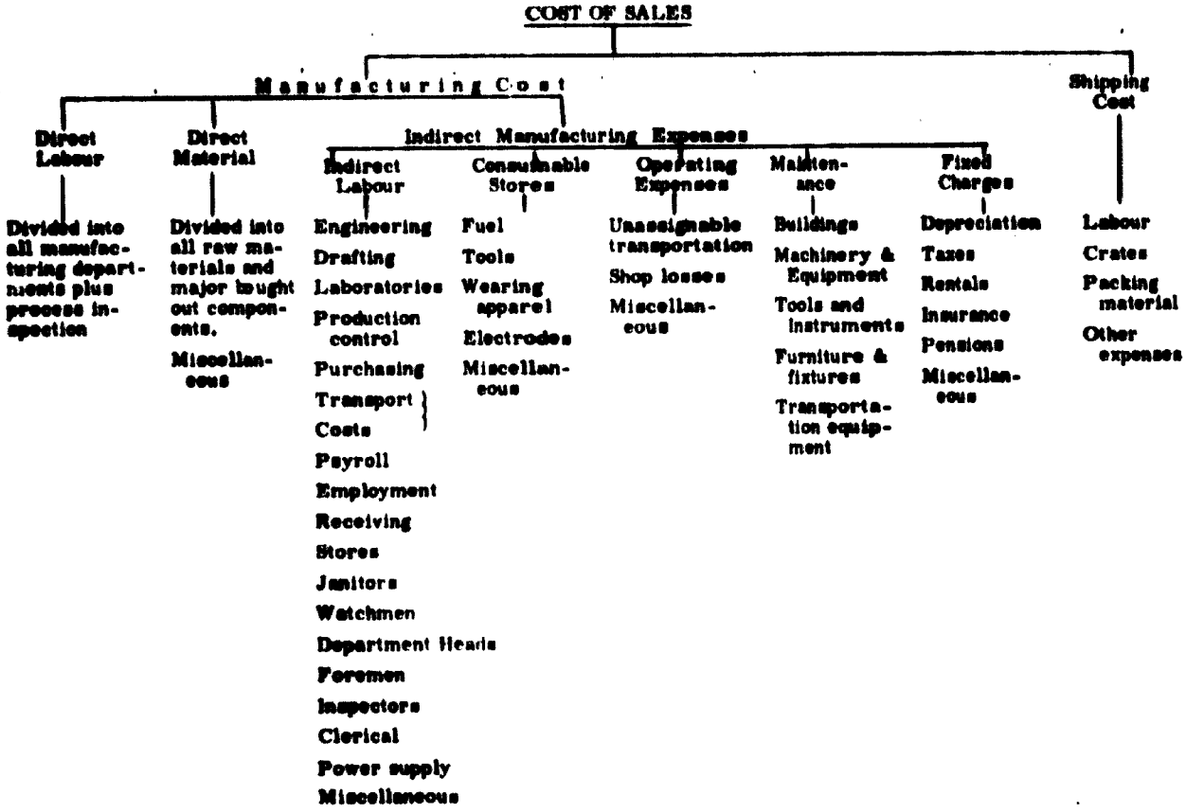
APPENDIX VI/1

COST STRUCTURE OF A MANUFACTURING ENTERPRISE



APPENDIX VI/2

TYPICAL FUNCTIONAL INDUSTRIAL COST ACCOUNTS STRUCTURE



APPENDIX VI/3

COSTING DEFINITIONS

Direct Labour

Labour expended in altering the composition, condition, conformation or construction of the product.

Direct Material

Material that forms part of the product.

Direct Expenses (or Charges or Purchases)

All items of cost other than materials and wages not forming part of the normal production overhead, that are incurred on specific products, production units or services.

Prime Cost

Those direct items of cost which, entering into and forming part of the product, are charged directly to the product i.e.:-

(a) Direct Material
(b) Direct Labour
(c) Direct Expense

Overheads

The cost of indirect material, indirect labour and indirect expense.

Overheads may be subdivided into:-

(a) Production overhead
(b) Selling overhead
(c) Distribution overhead
(d) Administration overhead.

The component items of overheads having been assembled under the above headings, the totals are then distributed in such a manner as will ensure their recovery in equitable proportions through each individual cost unit.

Overheads are sometimes referred to as burden, on cost, establishment charge, general expense and indirect expense.

(a) Production Overhead (also referred to as Factory Overhead and Works Overhead)

All indirect expenditure incurred by the factory from the receipt of the raw material until the finished product is placed in the warehouse ready for despatch.

(b) Selling Overhead

Includes all expenditure incurred in soliciting and securing orders, including advertising and publicity, also in the offices in corresponding with customers, in receiving and putting forward orders, in invoicing, in crediting returns and in keeping sales ledgers.

(c) Distribution Overhead:

Expenditure incurred on the product and its containers from the time it is placed in the warehouse ready for despatch until it reaches its final destination, including all outward transport, inward transport of returned empties, etc., cost of maintaining outlying sales depots, and the receipt, handling and reconditioning of returned empty packages.

(d) Administration Overhead

Expenditure incurred in formulating, directing and controlling the policy, organisation and operations of a business.

Indirect Labour

Labour expended which does not alter the composition, condition, conformation or construction of the product.

Indirect Material

Material which cannot be identified as part of the product.

Consumable Stores

Indirect material chargeable as overheads, e.g. lubricants, waste, canteen and ambulance supplies, etc.

Conversion Cost

The cost of converting raw materials into prepared materials of finished products, exclusive of the cost of raw materials.

Cost Unit

The quantity upon which cost can be conveniently allocated or determined.

Cost Allocation

The distribution of cost to units, processes, services or products in the proportions in which they have incurred it.

Works Departmental Overheads

Overheads that arise naturally within a works production department and that can be reasonably allocated to a department for the purpose of cost control, e.g. indirect labour, consumable stores, power, machine maintenance.

Works General Overheads

Overheads which cannot be charged to individual shops or departments for control. For working out costing rates, these overheads will either form a separate cost centre or may be apportioned on some arbitrary basis, e.g. gatekeepers and nightwatchmen might be included in Works General Overheads, or could be apportioned to various departments on the number of staff employed in each department.

CHAPTER 1.

THE FLOW OF ACCOUNTING INFORMATION

In project evaluation, we are not concerned directly with accounting routines, with operating costs and product cost, or with estimating as practised in an operating company. The flow of accounting information in the operating company is eventually collected into a useful form and appears in the "Profit and Loss Account" and the "Balance Sheet", or it is analysed for control purposes. The "Profit and Loss Account" is a statement showing the derivation of net earnings, and the "Balance Sheet" is a statement about the wealth of an organization.

When a project is evaluated, we estimate the operating costs, the project costs, and we estimate the projected "Profit and Loss Account" and the "Balance Sheet". In doing this, it is logical and expedient to follow the same basic accounting principles as used in an operating company, and it is therefore necessary to understand the relevant accounting methods.

The figures which appear in the financial accounts of an operating company pass through four stages, and the flow of information is depicted in Table 1.

All the information emanates from original documents, from which it is transferred into detailed records, the summated values are posted to the ledger accounts, and the ledger accounts are used to extract figures for the "Profit and Loss Account" and "Balance Sheet". The original documents consist of suppliers invoices, labour time records, and sales invoices, and a brief description follows of typical detail records, and ledger accounts used.

1. **Books of Prime Entry:**

These are the books in which the details of transactions are originally entered prior to posting the financial amounts into the books proper.

They consist of subsidiary Day Books in which details of all the daily purchases and sales are initially recorded. Periodically, say monthly, the totals are posted into, meaning entered

Excess Costs or Variances

This is a term used chiefly in connection with standard costing. It indicates any costs and above the planned or standard costs. For example, in the case of labour costs, waiting time, overtime extra, are typical examples. Material issued to replace scrap and the additional cost of paying a greater price than the standard prices are examples of material variances.

CHAPTER VII

THE COSTING OF LABOUR, MATERIALS, WORK IN PROGRESS AND OVERHEAD EXPENSES

1. Labour Costing

The main interest of the project evaluator in labour costing, is the basis of allocation to the classifications of direct labour and indirect labour.

The general definition of direct labour is that it is labour used in the actual production of a product. Indirect labour represents auxilliary work done in connection with product manufacture, that is it is an essential service to direct labour.

Indirect labour may be further classified into departmental overhead, and general factory overhead, which together constitute the total factory overhead.

The proper segregation and definition in the accounts of direct labour costs, is necessary because manufacturing overhead costs are usually applied as a percentage on direct labour costs.

In addition to the "works payroll", divided into departmental labour and each department subdivided into direct labour and indirect labour, there is usually a "staff payroll". The staff payroll is generally charged direct to appropriate overhead accounts, for example administration, sales, and factory overheads

Although almost all feasibility studies present the various labour and staff costs as the total requirements to meet the production/sales programme for any one year, the build up of these costs is from very detailed knowledge of process times. This is discussed in Volume 2 - Technical and Financial Studies".

There are two main costing methods, - job costing and process costing. In job costing all direct labour at any stage or

process is charged directly to the production batch or individual component, and from this a total direct labour time and cost is obtained. In process costing, the costs of each process over a day or a month are spread over the output of that process to arrive at a cost per ton or per gallon.

2. Material Costing

It is necessary to differentiate between direct material, bought-out components and consumable stores.

Direct material is material that directly enters into the composition of the product.

Bought out components are finished or semi-finished items which are bought from outside sources for incorporation into the product, such as castings for subsequent machining, or plastic components, or perhaps small items such as screws.

Consumable stores include those items which are used in the factory but do not appear in the product. Examples are, oils and greases, industrial clothing, petrol for internal transport units, cleaning materials, foundry sand, small tools etc.

In addition to the estimation of material quantities, and the pricing of those quantities, it is necessary to make an allowance for scrap or wastage.

3. Costing of Work in Progress

Work in progress consists of all unfinished work on the factory floor, and finished components in the finished parts store, sub-assemblies and assemblies through the various stages of production to the finished product. Finished products are not generally considered to be work in progress, but are classified as a separate division of stock. The value of work in progress is required for the Profit and Loss Account and Balance Sheet.

In some industries - cotton spinning is an example - it is simpler to count the work in progress on the shop floor and value it at the costing rates at each stage of manufacture than to keep detailed records in the books, in most engineering shops it would be almost impossible to count all the bits and pieces lying around the shop. In the inspection bays, in the progress stores and in the finished parts stores without stopping production for a day or two. Hence, detailed cost records are kept.

On the cost records will be recorded the material and bought out parts issued to the shops (and credited to the Stores Accounts) and the labour cost of the operations performed and paid for in wages each week. Out of the cost records is taken the total cost of the finished products as they are completed, leaving a balance representing the work in progress.

This sounds easy enough, but the difficulty is to know what the finished products do actually cost. The method of arriving at the value of the finished product will vary from business to business, but it is usual to adopt a conservative basis to avoid over-valuing the stock.

The question of the inclusion of overheads in Work in Progress is a matter on which various views are held. It is considered by some that Works Overheads only should be included, others include no overheads at all and in some cases all overheads are included. This depends on the policy of the Board. The important thing is to adopt a consistent policy.

When overheads are included in Work in Progress, the conventional method adopted is to compare the total overheads for the year with either the total of direct labour or the total of direct labour plus material, and express this as a percentage. This figure may come out to say 250% of which 50% represents selling costs, so 200% is added to the material and labour value

to arrive at the total figure of Work in Progress. The percentage added depends on the policy of Management, and is usually less than the total figure.

In some cases, usually process industries where the physical Work in Progress at each stage of production is known, the cumulative overhead costing rate for each process is used for valuation, and this may becomplex as in the leather tanning industry.

4. Costing of Overhead Expenses

Overheads may be defined as all the rest of a company's expenditure which cannot be classified as direct material, direct wages, or expenses attributable directly to a particular product, for example, heat, light, power, office salaries, sales commissions and indirect labour.

In Appendix VII/I a typical classification of overhead expenses is provided as a guide and, these have been grouped in the conventional manner. The first division of expenditure corresponds with the main functional divisions in the business organisation, and the degree of analysis depends on the size and complexity of the enterprise. A typical division might be:-

(a) Research and Development Expenses
(b) Works Expenses
(c) Administration Expenses
(d) Selling and Distribution Expenses.

(a) Research and Development Expenses:

These will consist of all expenditure connected with research, design and development of new products or projects and will normally be easy to define.

(b) Works Expenses:

Broadly, works overheads will contain all expenses of the department under the control of the Works Manager. In a medium or large size organisation it will be necessary to sub-divide these expenses between the secondary executives

responsible to the Works Manager. A typical sub-division is as follows: -

(i) Machine shop
(ii) Fitting shop
(iii) Assembly shops
(iv) Production Manager
(v) Works Engineer
(vi) Works general expenses.

(i), (ii) and (iii) Works Departmental Overheads

These consist of any expenditure that is directly attributable to the production shops and can be allocated on a reasonable basis. Where an item of expenditure is small in total and difficult to allocate without considerable work, it should be included in the general works overheads, e.g. heat treatment or similar process shops.

One item which is worth mentioning is the cost of inspection. In the ideal organisation the Chief Inspector should be responsible direct to the General Manager and therefore the expenses of his department should be treated as a separate main division, but it is often found in practice that he is responsible to the Works Manager. In the latter case the cost of inspectors' wages may be treated as part of the indirect labour cost charged to the department in which the work has been carried out.

(iv) Production Manager

A heading has been included for the Production Manager because in certain industries, such as aircraft, a large factory may employ up to 600 to 700 men on production control including storekeeping. In an organisation of this sort the major expenses of production control, such as salaries and wages, would be broken down by the individual departments such as Progress, Stores, Works Ordering. In a small company, it

would not generally be necessary to include a separate subdivision for the Production Manager, any expenses under his control being included in Works General Overheads.

(v) Works Engineer Expenses (and other services)

The works engineer is usually responsible for repairs and maintenance to plant, buildings and for site upkeep. He is often in charge of a large staff and incure considerable expenditure.

(vi) Works General Overheads

There will always be a number of expenses which cannot be allocated direct to departments such as expenses of gatekeepers and night-watchmen, salaries of Works Manager and staff, internal transport, etc. These expenses should be kept in a separate section. As already mentioned, there may be certain other items which although strictly attributable to production departments, are so difficult to allocate clerically that they will be included amongst the general overheads.

(c) Administration Expenses:

Administration overheads consist of all expenses incurred in the control and administration of an undertaking and will include salaries of the Accountant's Department, stationery, Directors' fees, etc. The degree of analysis usually depends on the size of the business and the number of secondary executives responsible to the financial or administrative director. Included in this group are certain financial expenses, such as bank interest, depreciation, audit fees, debenture interest. With the development in industry of personnel administration and welfare, it is quite usual to find that one of the major subdivisions includes all such expenditure, namely, the costs of the Personnel Department, canteen, sports club, medical services, etc.

(d) Selling and Distribution Expenses

This expenditure embraces all that needed for the distribution and selling of the products and arises from the time the product enters the Finished Store until it reaches the customer's hands. In large companies distribution expenses will be separated from selling expenses. A subdivision of selling expenses would be made between home and export sales and there may be a further breakdown by main classes of products where separate selling organisations exist, for example, in a company making aeroplanes and motor cars. Again, there may be a breakdown between separate territories in order that comparisions may be made, or where the proportion of overheads will vary because of the different characteristics of various territories.

APPENDIX VII/1

OVERHEAD EXPENSES
TYPICAL LIST OF ACCOUNTS KEPT IN THE NOMINAL LEDGER

	Name of Account	Analysis Headings Kept in Account
I	**RESEARCH & DEVELOPMENT**	
	Salaries & Wages	(i) Chief Designers & Assts. (ii) Drawing Office (iii) Office staff (iv) National Insurance.
	Drawing Office Materials	(i) Materials (ii) Stationery.
'A'	Office Establishment Charges	(i) Rent & Rates (ii) Heating & Lighting (iii) Maintenance & Cleaning (iv) Fire Insurance.
	Experimental Shop Wages	(i) Supervision (ii) Skilled operatives (iii) Unskilled operatives (iv) National Insurance (v) Holiday pay.
	" " Materials	(i) Direct Materials (ii) Stores.
	" " Expenses	(i) Power (ii) Machine Maintenance (iii) Rent & Rates (iv) Heating & Lighting (v) Building Maintenance (vi) Fire Ince. (vii) Depreciation of Machines.
II	**WORKS**	
	(a) Direct Shop Expenses	
'B'	Indirect Wages	(i) M/c Shop (ii) Fitters (iii) Assembly
	Holiday Pay	" " "
	National Insurance	" " "
	Power	" " "
	Loose Tools	" " "
	Consumable Stores	" " "
	Machinery Maintenance	" " "
	Depreciation of Machines	" " "
	Factory Estab. Charges - Machine Shop	(i) Rent & Rates (ii) Heating & Lighting (iii) Maintenance & Cleaning (iv) Fire Insurance.
	Factory Estab. Charges - Fitters	"
	Factory Estab. Charges - Assembly	"

APPENDIX VII/1
Continued

Name of Account	Analysis Headings Kept in Account
(b) General Works Expenses	
Salaries and Wages	(i) Works Manager & Staff (ii) Production Control (iii) Storekeeper.
Stationery Office Estab. Charges	(i) Rent & Rates (ii) Heating & Lighting (iii) Maintenance & Cleaning (iv) Fire Insurance.
'C' Tool Room Expenses	(i) Wages (ii) Materials (iii) Power (iv) Dep'n. of M/cs (v) Wages Estab. Charges
'D' Heat Treatment Shop Internal Transport General Expenses	(i) Wages (ii) Maintenance (iii) Dep'n. Analysed according to requirements.
(c) Works Engineers' Dept.	
Salaries and Wages	(i) Works Engineer & Office staff (ii) Fitters (iii) Electricians (iv) Joiners (v) Other operatives (vi) Night Watchmen (vii) Cleaners
Nat. Insce. & Holiday Pay	
Materials	(i) Special Purchases (ii) Machine Parts (iii) Small Items for Stores (iv) Contractors' Charges.
Works Estab. Charges	(i) Rent & Rates (ii) Heating & Lighting (iii) Maintenance & Cleaning (iv) Fire Insurance.
General Expenses	(i) Power (ii) Stationery (iii) Depreciation of Machines.
'E' Credit for recharge of Services	
III ADMINISTRATIVE AND FINANCIAL	
Salaries & Wages	(i) Managing Director & Assts. (ii) Chief Accountant's Dept. (iii) Buying Dept. (iv) Personnel and Welfare.
National Insurance	"
Stationery	"
Postage & Tele. Charges	"
Travelling & Entertaining	"
Car Expenses	"
General Expenses	"

TABLE 1

THE FLOW OF ACCOUNTING INFORMATION

FINANCIAL ENTRIES.			FINANCIAL ACCOUNTS
ORIGINAL DOCUMENTS →	DETAIL BOOKS →	NOMINAL LEDGER →	TRADING STATEMENT
Original documents from which the detail books are written up.	(Figures added up periodically, and thence posted in totals to Nominal Ledger Accounts.	("Private Ledger" "Central Ledger" "Expense Ledger" "Impersonal Ledger" etc.)	("Profit and Loss Account) i.e. the Ledger totals)
A RAW MATERIAL (Section of Nominal Ledger)			
Suppliers' invoices for raw materials received into stores. →	Purchased Day Book →	Raw Material Accounts →	"Raw Material Consumed" $1,000 (Total purchase, less total of closing stock per priced stock sheets = Total consumption).
B. LABOUR (a. Direct - b. Indirect) (Section of Nominal Ledger)			
Clock Cards →	Wages Sheets →	Direct Labour Accounts Totals (e.g. by departments or type of labour →	+ "Direct Labour" $2,000
C. OVERHEADS (Works) (Section of Nominal Ledger)			
Suppliers' invoices for work done, sundries, etc. →	Expense Day Book (Often combined with the Purchase Daybook in practice) →	Overhead expense Accounts (Indirect labour totals are entered in these sections) →	+ "Works Overheads" (in detail) $4,000
D. OVERHEADS (Admin. & Sales) (Total A - D = Expenditure) The cost of goods not yet sold (i.e. "stock of finished goods" whose value must of course be excluded when calculating the profit) can be found either by (i) counting and pricing the physical stock, or by (ii) deduction, calculating the cost of the goods which have been sold. (i.e. marking on the copy Sales Invoices the cost of each item sold; the total being the "cost of sales" for comparison with the "cost of goods manufactured", per the Ledger).			= "works cost of goods manufactured" = $7,000 - balace of goods sold" = $1,500 = works cost of goods sold = $5,500 + Administrative and sales overheads = $7,500 = Total cost of goods sold $13,000
SALES (= Receipts) (Section of Nominal Ledger)			
Copies of sales invoices sent out to customers →	Sales Day Book →	Sales Accounts →	"Total Sales" (Price of goods sold) $50,000
PROFIT (= the difference between Expenditure & Receipts)			= i.e. "Profit" = $37,000 (from which dividends, reserves, etc., will be deducted in due course)

APPENDIX VII/1
Continued

Name of Account	Analysis Headings Kept in Account
Office Estab. Charges - G.M. & Accts. Dept.	(i) Rent & Rates (ii) Heating & Lighting (iii) Maintenance & Cleaning (iv) Fire Insurance
Office Estab. Charges - Buyer	"
Office Estab. Charges - Personnel	"
Canteen Costs	(i) Food (ii) Wages (iii) Current Charges (iv) Utensils (v) Takings (credit)
Legal Charges	
Audit Fee	
Bank Charges	
Directors' Fees	
Discount Allowed	
Discount Received	
IV SELLING & DISTRIBUTION	
'F'(a) Selling	
Salaries	(i) Sales Manager & Asst. (ii) Head Office Clerical Staff (iii) Salesmen (iv) Branch Office staff (v) National Insurance
Salesmen's Commission	
Travelling Expenses	(i) Head Office (ii) Salesmen
Entertaining Expenses	" "
Car Expenses	(i) Head Office running costs (ii) H.O. Depreciation (iii) Salesmen's running costs (iv) Salesmen Depreciation.
Office Estab. Charges - Head Office	(i) Rent & Rates (ii) Heating & Lighting (iii) Maintenance & Cleaning (iv) Fire Insurance
Branch Offices	"
Postage & Telephone	(i) Head Office (ii) Branch Offices
General Expenses	(i) Head Office (ii) Branch Offices (iii) Salesmen.
Samples	
Advertising	
Bad Debts	

APPENDIX VII/1
Continued

Name of Account	Analysis Headings Kept in Account
(b) Distribution	
Warehouse Wages	(i) Storekeeping (ii) Packing (iii) Repairs to Cases (iv) National Insurance
Warehouse Estab. Charges	(i) Rent & Rates (ii) Heating & Lighting (iii) Maintenance & Cleaning (iv) Fire Insurance.
'G' Packing Cases, Packing Material	(i) Cost of Packing Cases (ii) Packing Cases charged to customers (credit) (iii) Packing Material
Transport Charges	(i) Lorry (ii) Rail (iii) Postage (iv) Recovered from customers (credit)

General Notes:-

1. This list is not inclusive, but represents typical overhead charges in a light engineering concern selling its products to the wholesale or retail trade.

2. Note the consistent pattern of analysis. The same headings are used throughout where applicable, e.g. it has been assumed that power is analysed to each department, but whereas it forms a separate account for the factory shops because of its importance, it is grouped in with General Expenses in the Works Engineers Department as the cost is only small.

Special Notes:

'A' Office establishment charges may be allocated, generally on the basis of area utilised, to sub-sections of research activities or to particular research projects.

'B' The further analysis of indirect wages would be shown on Labour Summaries by:-

(i) The various sections of the machine shop.

(iii) The various classes of indirect labour for each shop, e.g. setting, inspection, etc.

'C' The toolroom is treated as works financial overheads, because of the difficulty of analysing tooling costs direct to products. In factories, such as the motor car industry where tooling costs are heavy, they will be treated as a separate section of clerical costs so that the total for each new model can be ascertained and spread over the output.

'D' The heat treatment shop, though strictly a production shop, is treated as an overhead as the cost is usually not high and because of the difficulty of finding a satisfactory basis of allocating costs to products.

'E' It is assumed that plant and machinery maintenance and cleaning is carried out by the Works Engineers Department and the costs recharged to each department on the basis of the work done.

'F' The analysis of selling expenses is laid out to give the cost of head office and branch offices. There may also be a subsidiary analysis for each branch office and for each salesman's area if selling expenses are large, and it is desired to find a basis of apportioning selling overheads against each product.

'G' The cost of packing cases is now considerable and it is the usual practice to charge the cost to customers. The accounts must show the original cost and the amount recovered in order to control this factor.

CHAPTER VIII

PROFIT GRAPHS - BREAK-EVEN ANALYSIS

Cost Classifications:

Cost classifications in detail have been discussed in ChaptersVI and VII, but for the purpose of profit analysis, costs are classified into three groups - Fixed, Variable and Semi-variable.

Fixed Costs do not change with the level of business activity, and these include indirect labour, property insurance, property taxes, depreciation allowances, executive salaries etc. Variable costs vary directly with the business activity, - they tend to double if production is doubled, or drop to zero if there is no production, and they include direct labour and materials. Semi-variable costs change with the level of business activity but not in direct production, and an estimate is made of the fixed and variable elements, of each semi-variable cost. Supervision and office equipment are typical examples of semi-variable costs.

Cost-Volume - Profit-Analysis:

Cost-volume - profit analysis depends on the identification of the fixed and variable components of costs, and assumes that the variable costs are directly proportional to volume. Certain costs, for example, supervision may not have a linear relationship with volume, and therefore this type of analysis must be considered to be an estimate even when reliable historical cost breakdowns are available. In project evaluation where the analysis rests entirely on estimated profit projections, the analysis must be considered indicative only.

Cost - volume - profit analysis may be used to consider the effect of:

(a) Changes in fixed costs

(b) Changes in variable costs

(c) Changes in sales receipts due to changes in unit prices in volume.

(d) Changes in sales mix.

The analysis may relate to the total business of the company, or to a subdivision of the company or to the product where several products are sold. The break-even point is the level of sales at which sales revenue just cover costs with no profit and no loss.

The Concept of Cost Profit Analysis:

The concept of breakeven analysis is seen from the illustrated breakeven chart, in which the vertical scale represents sales revenue and costs in Dollars and the horizontal scale the units of putput. The profit plan vertical (broken line) is drawn through the 100,000 units point on the horizontal scale and the fixed cost line is drawn through the $ 2.3 million point on the vertical scale. The total cost line intercepts the profit plan vertical at $ 4.4 million and the sales line intercepts at $ 5.0 million.

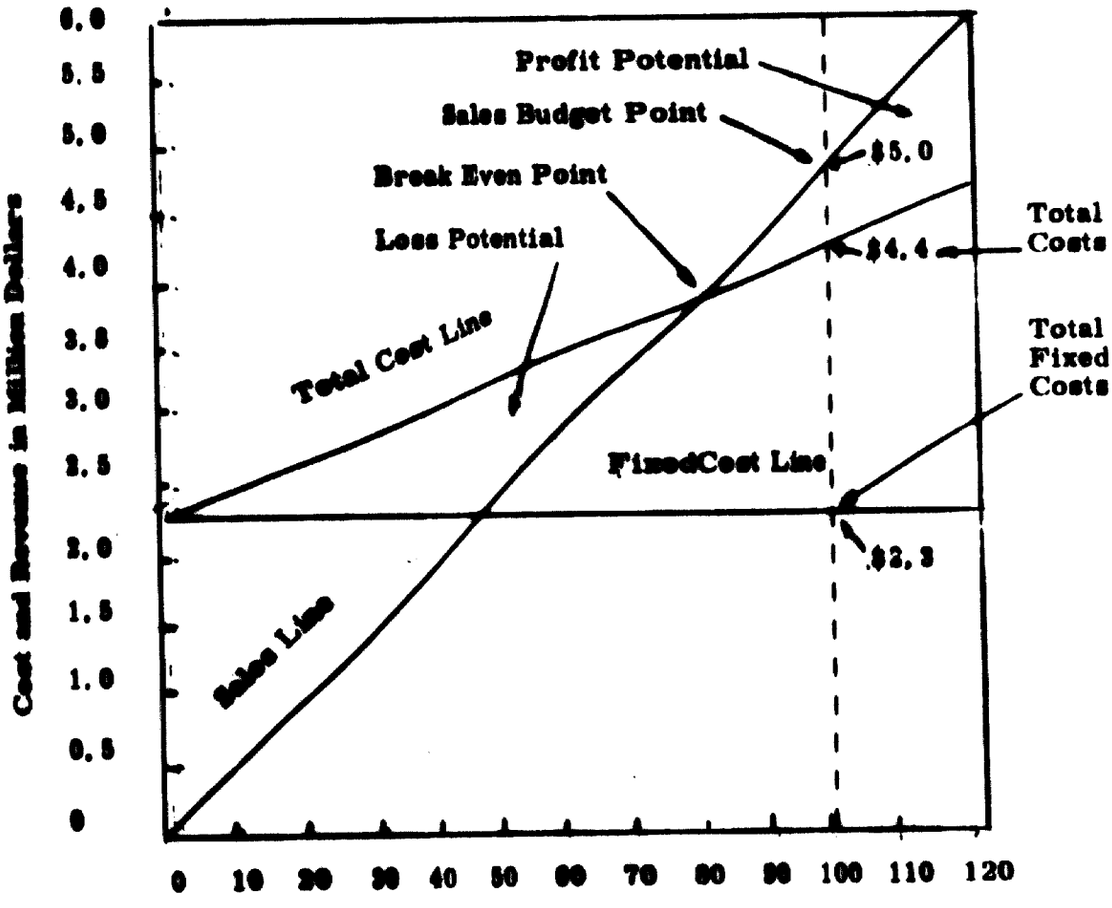
The point at which the sales and total cost lines intersect is the breakeven point ($ 3.75 million). To the right of the breakeven point, profit potential is indicated and to the left, loss potential is indicated.

BREAKEVEN CHART OF ABC COMPANY

Budgeted Profit

	Fixed	Variable	
Budgeted Sales (100,000 units @ $50)			$5,000,000
Budgeted Costs:			
Direct Material		725,000	
Direct Labour		825,000	
Factory Overhead	900,000	250,000	
Administrative Expenses	800,000	75,000	
Sales Expenses	600,000	225,000	
	$2,300,000	$2,100,000	$4,400,000
			$ 600,000

(Production Capacity = 120,000 units)



Breakeven Formulas:

It is not necessary to construct a breakeven chart since, once all costs have been classified as fixed or variable, the breakeven point can be calculated from the formula:-

$$\text{Breakeven volume} = \frac{\text{Total fixed costs}}{\text{Selling price - variable cost per unit}}$$

$$= \frac{2,300,000}{50 - 21} = 80000 \text{units}$$

Another way of calculating the breakeven point in terms of sales revenue is as follows:-

$$\text{Breakeven volume} = \frac{\text{Total Fixed Costs}}{1 - \frac{\text{Variable Costs}}{\text{Corresponding Sales}}}$$

$$= \frac{2,300,000}{1 - \frac{2,100,000}{5,000,000}} = \frac{2.3}{1 - .42}$$

$$= \$ \text{ 4 million}$$

$$\text{The number of units} = \frac{4,000,000}{50} = 80000 \text{units}$$

Changes in the Breakeven Point:

In the example, profits depend solely on sales volume. It was assumed that the unit selling price would remain at $ 50 and that the cost pattern would remain unchanged.

But if we are able to reduce the fixed costs the breakeven point would be lowered, and a reduction in variable costs would also lower the breakeven point. If the sales price were to be raised or lowered this too would raise or lower the breakeven point .

In actual company operations, all the variables may change at the same time, and a completely new analysis must be made to arrive at the breakeven point. In project evaluation, it is useful to calculate the effect of a reduction in selling price on the breakeven point or a change in costs resulting from an increase in material cost, as a measure of the sensitivity of the project to these changes.

CHAPTER IX

GLOSSARY OF ACCOUNTING TERMS

N.B. The following notes are by way of explanation and are not intended to lay down any definition of any word. Some of the terms described might be thought superfluous but, as this glossary is for reference only, they have been included.

ACCRUALS. Provision made for the future payment of a present expense e.g. for a proportion of rent payable at the end of a Quarter.

ADVANCE PAYMENTS. Payments which have had to be made before the expense is incurred e.g. rent in advance.

AMORTISATION. The process of reducing over a fixed period of years the book value of an asset, e.g. a premium on a lease, the period of which is fixed. Amortisation is a form of depreciation (q.v.) the word being used mainly where the period is fixed or the asset may not be replaced.

ANNUAL RETURN. A statutory return to the Registrar of Companies (in the U.K.) of the Company's shareholders, Directors etc. made up to fourteen days after the Annual General Meeting. Public Companies and Private Not Exempt (q.v.) Companies must attach a copy of the accounts presented to that General Meeting.

APPRECIATION. The amount by which an asset is revalued above cost or book value.

APPROPRIATION ACCOUNT. That part of the Profit and Loss Account (q.v.) which deals with the distribution of profits in dividends, taxation and reserves (q.v.)

ARTICLES OF ASSOCIATION. The Articles form the constitution of any Company and regulate the principles of the relations between the Directors and Shareholders of the Company.

ASSESSABLE PROFITS. Taxable Profits - See Profits.

ASSETS:

CURRENT ASSETS. Those assets which are or should be readily realisable - i.e. Cash, Debtors, Stock, Marketable Investments etc. They also include Prepayments (q.v.) which, although not readily realisable, would in any case have required to be paid soon.

FICTITIOUS ASSETS. Another name for Intangible Assets - see below.

FIXED ASSETS. Assets for earning income and not primarily for sale, e.g. land, buildings, plant, transport vehicles, patents or trade investments etc. (q.v.)

FLOATING ASSETS. Another name for Current Assets - see above.

INTANGIBLE ASSETS. Expenditure incurred in the past but which, instead of being then charged against profits, has been capitalised (q.v.) and not yet written off, e.g. Preliminary and Formation Expenses (q.v.) or past losses.

LIQUID ASSETS. Cash or other assets which can readily be converted to cash.

NET ASSETS (NET WORTH). The value (as assessed for Balance Sheet purposes but not necessarily the true value) of all assets less current liabilities. Therefore, by implication, the assessed break-up value of all share capital and accumulated profits.

AUDITORS. Professional accountants appointed by Shareholders to check that the published accounts conform to the Companies Act and to ensure that there is a proper Internal Check (q.v.). Auditors do not usually originate the figures, but check that they are within the range which constitutes a fair and true picture.

AUTHORISED CAPITAL. See Capital.

BAD DEBTS, PROVISION FOR. The amount which the Directors think prudent to set aside to counter-balance amounts due from debtors who might not pay. This may be an approximate provision as

into, the ledger, although cash book entries would probably be made daily, Also Personal Ledgers in which is recorded purchases and sales which have not been paid for in cash, and cannot therefore be entered in the Cash Book.

2. Purchase Ledgers, Sales Ledgers:

These are the ledgers in which are recorded the names of suppliers and the names of sales customers respectively. There are many of these ledgers, which are usually kept in alphabetical order.

3. Private Ledger:

This ledger contains the more confidential accounts, e.g., the Profit and Loss Accounts, Directors' Salaries Accounts, Entertainment Expenses etc.

4. Nominal Ledger:

The Nominal Ledger is sometimes called the Impersonal Ledger or the General Ledger, and it contains all the accounts not separately kept in the Personal or Private Ledgers, e.g. Monthly Sales, Rent, Rates, Buildings, Plant and Wages.

5. Cash Books:

These books normally deal with cheques only, but they may be ruled in two columns to distinguish cash receipts and payments from cheque transactions.

6. Petty Cash Book:

This is used for recording minor transactions e.g. purchasing stamps, IOU loans etc.

6. Cost Ledger:

This ledger may be part of the Nominal Ledger or it may be kept in parallel with it. It is generally used to analyse the cost of production by departments or products.

against approximate total probable Bad Debts, or specific provisions against specific debts.

BALANCE. The excess of entries to one side of a Ledger Account (q.v.) over those on the other.

BALANCE SHEET. A summary of the assets, liabilities and capital of the Company. A Balance Sheet should be sent each year to every shareholder. While a Balance Sheet states the capital position at a certain date, its counterpart, the Profit and Loss Account (q.v.) covers a period to that date.

CONSOLIDATED BALANCE SHEET. The combined Balance Sheet of a Holding Company and its Subsidiaries.

BATCH COSTING. The process of allocating costs to each production batch.

BEARER BOND. See Bond.

BIN CARD. A card on or near a stores bin recording ins and outs and balance in hand.

BOARD. Board of Directors - The Directors collectively of a Company. Public Boards (e.g. Steel Board, Coal Board) - Bodies set up by the Government under a constitution.

BOND. (a) An undertaking to pay a debt.
(b) (Hence) Bearer Bonds - Documents which give the bearer (i.e. anyone who presents the bonds) the right to the capital and interest of the investment or debenture which they represent. Issued principally by foreign governments, seldom by British Companies.

BONUS SHARES. Shares issued by a Company to its existing shareholders gratis mainly out of undistributed profits. The issue is made in proportion to existing holdings e.g. Company with $1,000,000 Ordinary Shares may make '1 for 1' bonus share distribution using half its profit of $2,000,000. The effect is psychological rather than financial.

BOOK VALUE. See Value.

BUDGET. A composition of reasonably attainable future figures of any of the Company's activities (cf estimate, forecast, target). A flexible budget lays down a predetermined method of applying budget figures to varying output or other circumstances.

BUDGETARY CONTROL. The process of controlling expenditure by using comparisons between budget and actual figures.

CAPITAL - as a NOUN. Generally the money employed in a business; hence more specifically the money put into a Company by its shareholders. This may, therefore, refer to:-

CAPITAL EMPLOYED. The original and subsequent capital and borrowings plus accumulated profits which have not been distributed and relates to any business - Company partnership or one man.-

SHARE CAPITAL. The amount of capital put up by shareholders or credited to them and relates to a Company only.

AUTHORISED CAPITAL. The total share capital which a Company is allowed under its Memorandum to issue and on which it has paid Capital Stamp Duty (q. v.)

ISSUED CAPITAL. The total nominal value of shares issued to shareholders in return for money or assets contributed by them. (Note - Some of the money contributed by shareholders may have been treated as a Share Premium (q. v.)

PAID-UP CAPITAL. The amount of issued capital which has been contributed in money or money's worth to date.

UNPAID CAPITAL. Where $1 shares are 25 cents paid, the Company can call up 75 cents per share which is unpaid.

LIQUID CAPITAL. The excess of Liquid Assets (q. v.) over Current Liabilities.

WORKING CAPITAL. The excess of all current assets (i. e. stock, work in progress, debtors, marketable investments and cash) over current liabilities, (i. e. debts for material and services, tax then due and

not paid at the date of the Balance Sheet etc.). This represents the resources available for carrying on operations.

CAPITAL - as an ADJECTIVE. This has a long-term rather than a temporary significance.

CAPITAL EXPENDITURE. Expenditure which increases the earning power of the business (including the purchase of assets for replacement) while Revenue Expenditure maintains the existing earning power.

CAPITAL GAINS. Gains which arise from the sale of capital assets and cannot be treated as distributable profits (q. v.) but could be a part of a capital distribution.

CAPITAL LOSSES. Losses which arise from the sale of capital or Fixed Assets (q. v.) and cannot normally be treated as a charge on the current profits or the year for tax purpose, but would rightly be provided for before distributing dividends.

CAPITAL RESERVE. See Reserves.

CAPITAL REDEMPTION RESERVE FUND. A reserve provided out of distributable profits for the redemption of Redeemable Preference Shares (q. v.), and which cannot be utilised for subsequent payment of dividend.

CAPITAL STAMP DUTY. Duty of 50 P per £100 payable by a Company when it creates Authorised Capital (q. v.) (in the U. K.).

CAPITALIZE. To treat as being of a long-term benefit rather than of temporary significance. See Capital.

CHARGEABLE EXPENSES. Expenses which may rightly be charged against profits (usually concerning tax).

CHARGE (Noun). A security given to a creditor or lender whereby the Company can continue to deal with its assets while the creditor may regard them as security for his debt.

FIXED CHARGE. Security on certain specified fixed assets, no property in which can be passed without the consent of the lender.

FLOATING CHARGE. Security on current and other assets (q, v.) which may still be dealt with freely by the borrower.

COMPANY. A limited liability company.

PRIVATE COMPANY. A company which may not have more than 50 shareholders (excluding employees) and must not invite subscription (in the U, K.).

EXEMPT PRIVATE COMPANY. A private company none of the shareholders of which are nominees of other companies and which, therefore, need not deposit its accounts with the Government (in the U, K.)

PUBLIC COMPANY. A company which may invite the public to subscribe. See Prospectus.

CONSOLIDATED BALANCE SHEET. See Balance Sheet.

CONSUMABLE STORES. Stocks of materials, tools etc. used for maintaining assets or for any production processes but not incorporated in the article sold.

CONTINGENT LIABILITIES. The amount which would only become due in some event which is not certain, e.g. an amount guaranteed or the uncalled liability on partly paid shares (q.v.). See Liabilities.

CONTRA ENTRY. One of two compensating entries made on opposite sides of a book of account, e.g. where a cheque is received and another cheque drawn in order to pass on money received without posting (q.v.) to the ledger.

CONTROL ACCOUNT. A General Ledger account to which are posted totals of all detail postings to a subsidiary ledger so that the balance on the control account equals the sum of balances in the subsidiary ledger, thus simplifying balancing, e.g. Sales Ledger control accounts show total sales (Dr.) and cash received therefrom (Cr.)

CONTROLLING COMPANY. A company which holds shares with more than half the voting rights in a subsidiary company, thereby having effective control.

CONVERSION COST. The cost of converting raw materials into prepared materials or finished products, exclusive of the cost of raw materials.

CORPORATION. Any body which the law regards as a legal entity apart from the individuals comprising it. Public Boards (q.v.), municipalities and companies are corporations, but not partnerships.

COST. The sum of money, as calculated for a particular purpose, needed to obtain or replace an article. (The cost might properly be differently calculated for some other purpose, e.g. cost may refer to the cost of making the article in the past, of replacing it, or of manufacturing it under a specific set of circumstances). Cost may be calculated to include only certain aspects of cost, namely:-
PRIME COST - Cost of Labour and Materials
WORKS COST - Prime Cost plus Works Overheads
MANUFACTURING COST - Works Cost plus some General Overheads
SELLING COST - Manufacturing Cost plus Selling Overheads.
See also Standard Cost and Excess Cost.

COST ALLOCATION. The distribution of cost (Labour, Materials and/or Overheads etc.) to units, processes, services or products in the proportions in which cost has been incurred.

COST CENTRE. A convenient division of an organisation for cost-finding purposes. 'A convenient peg on which to hand costs'.

COST UNIT. The unit upon which cost can be conveniently allocated or determined e.g. weight, machine-hour, number of articles or hour (or minute) per standard,

CREDIT (Cr.) - As a NOUN. Either in the normal sense of giving credit, (i.e. allowing a debtor to delay payment) or in the sense of an item credited (see below) in the books of account. These entries may be remembered by the mnemonic 'CLIP' - Credits are Liabilities, Income or Profits (of the Company in whose books they are credits). Cf. Debit.

CREDIT - As a VERB. To make an accounting entry on the right-hand side of a book of account.

CREDIT CONTROL. The process of deciding how much credit to allow to debtors.

CREDITORS. Those to whom money is owing by a business or used loosely, the sum total of money currently owed by the Company.

CURRENT ASSETS. See Assets.

CURRENT LIABILITIES. Debts now payable or soon due,

DAY BOOK. A chronological record of purchases or sales, usually with analysis columns.

DAY WORK. Work which is paid for by the day irrespective of output (cf. Piecework).

DEBENTURE. A deed giving, as security for a loan, rights over some or all of the Company's property. Also used loosely for Debenture Stock (q. v.)

DEBENTURE STOCKS. Debenture stocks rank, for payment of capital and interest, before share capital of which they are not part. They give to their holders additional security of capital (and sometimes of interest) by giving rights over all assets in precedence to ordinary creditors or to shareholders. Debenture stocks may be redeemable or irredeemable (perpetual) and may also be described as mortgage debenture where the Debenture Trust Deed is secured by a mortgage on land. There may also be first and second debentures which give the holders primary or secondary rights respectively.

DEBIT (Dr.) - As a NOUN. An entry on the left-hand side of a book of account relating to items which may be memorised by the letters 'DEAL' - Debits are Expenses Assets or Losses. Cf. Credit.

DEBIT - As a VERB. To make an accounting entry on the left-hand side of a book of account.

DEBTORS. Those from whom amounts are now receivable or soon due. Also used loosely as a sum total due from debtors.

DEFERRED LIABILITIES. Amounts payable on some future date but are not due for immediate payment. See Liabilities.

DEFERRED SHARES. Shares which are, by the Articles of a Company, only entitled to capital repayment and/or income when certain prior shares have been satisfied. See Shares.

DEPRECIATION. The process of recognition of the lessening earning power of an asset by reducing its book value (q. v.) and so setting aside funds for the replacement of the asset. See also Wear and Tear and Obsolescence.

DIRECTOR-CONTROLLED COMPANY. A company of which the Directors collectively hold shares carrying the majority of the voting rights.

DIRECT COSTS. Direct Labour plus Direct Materials (and occasionally other direct expenses (q. v.).

DIRECT LABOUR. Labour expended in altering the composition, condition, conformation or construction of the product.

DIRECT MATERIAL. Material that forms part of the product.

DIRECT EXPENSES. A term sometimes used for those overheads which can be specifically allocated to products.

DISTRIBUTABLE PROFITS. See Profit.

DIVIDEND

(a) A variable payment made to shareholders, payable out of distributable profits on the recommendation of the Board and at the discretion of the General Meeting, priority being given to 1st and 2nd Preference, Preferred Ordinary and Deferred dividends (in that order) where there are different classes of share so described. Interim dividends are sometimes paid at the discretion of the Directors to be confirmed by General Meeting, cf. Interest (q. v.)

(b) A distribution of net assets in a bankruptcy or liquidation.

DOUBLE ENTRY. The process whereby both aspects of any transaction are recorded e.g. the receipt of cash from a debtor implies that cash has increased and debtors have diminished.

EQUITY (Capital). Ordinary or deferred shares whose dividends or capital repayments are variable in accordance with the prosperity of the Company.

EXCESS COSTS. Those costs which are either avoidable or which represent an excess above standard cost (q.v.)

EXEMPT PRIVATE COMPANY. See Company.

F.I.F.O. See under Value.

FICTIOUS ASSETS. See Assets.

FINANCIAL YEAR. Any period, usually but not necessarily twelve months, for which published accounts are presented to the shareholders.

FISCAL YEAR. The Tax Year ending 5th April (in U.K.)

FIXED ASSETS. See Assets.

FIXED CHARGE. See Charge.

FIXED OVERHEADS. See Overheads.

FLOATING ASSETS. See Assets.

FLOATING CHARGE. See Charge.

FORECAST. Assessment of probable future figures.

FORMATION EXPENSES. The cost of forming a company, i.e. legal charges for drawing up Memorandum and Articles and Capital Stamp Duty.

FUND. A sum of money set aside for a specific purpose.

GOODS RECEIVED NOTE. The internal notification of the arrival of goods. Usually there are several copies which are used for (e.g.):

(i) Passing goods into stores

(ii) Informing store records.
(iii) Informing the Buying Department
(iv) Informing Planning or Progress Department
(v) Informing Accounts Department for checking with invoices.

GOODWILL. The excess of the market value of the business over its net tangible value. This item only appears in accounts where a going concern has been bought by a company at a price which as a result of past profits exceeds the net value of the tangible asset.

GROSS PROFIT. See Profit.

GUARANTEE. See below.

GUARANTY. (Frequently but wrongly spelt 'guarantee') A promise by a guarantor to answer for the default of a guarantee. Where there is more than one guarantor it may be a 'joint and several' guaranty because the guarantors are each and all liable.

HOLDING COMPANY. A company which holds shares carrying more than half the voting rights of a subsidiary company.

HYPOTHECATION. A Charge (q.v.) as security for a debt on property which remains in the possession of a debtor.

IMPERSONAL ACCOUNT. An account in a ledger dealing with an impersonal aspect of the business, e.g. an expense, asset, gain or loss, as opposed to debts due to or from an outside company or person such as a debtor or creditor. cf. Personal Accounts. See under Ledger.

IMPERSONAL LEDGER. See Ledger.

IMPREST SYSTEM. A method applied usually to the keeping of cash, whereby the cashier is started with a fixed sum and at the end of each period the exact amount of his disbursements for the period are refunded to him, thus bringing the balance in hand to the original figure with which he started. The system can also be used for stocks.

INCOME NOTES. A form of repayable loan obtained by a company on the basis that the income of the company will be devoted to interest and redemption of the loan. The terms of issue vary widely according to the circumstances. In general they are junior to debentures and senior to preference shares. They are becoming more common because they save capital stamp duty and interest payments on income notes are not treated as distribution for purposes of profits tax.

INITIAL ALLOWANCE. The amount sometimes allowed for tax purposes to be written off plant in addition to normal Wear and Tear (q.v.)

INTEREST. A fixed periodic payment on borrowed money, cf. dividend.

INTERNAL CHECK. A system for preventing fraud or error except by collusion, the basis being that all the work must tie in with that of some other person or at some other stage. It is a cardinal principle of all accounting systems, particularly those dealing with cash.

INDIRECT EXPENSES. See Overheads.

INDIRECT LABOUR. See Labour.

INDIRECT MATERIAL. Material which cannot be identified as part of the product, e.g. rags, tools, oil etc.),

INVENTORY. A transatlantic word for stock also used in Britain to imply a list of articles, e.g. household inventory.

ISSUED CAPITAL. See Capital.

JOB COSTING. The process of allocating costs to each job by recording all labour and materials against the jobs done, with an appropriate addition for overheads.

JOURNAL. Originally a record in chronological order showing both aspects of a transaction. Now mostly confined to Sales Journals and Purchase Journals (also called Day Books q.v.) which list sales and purchases

The "Profit and Loss Account" and the "Balance Sheet" is merely a useful and conventional way of presenting the information collected through these briefly described accounting routines. However, it is the way in which the information is presented that is of importance to the project evaluator, and in particular the breakdown of operating costs.

Further, when the project eventually goes into production, the financial accounts will be prepared in the same conventional way, and a direct comparison will be possible between the projected financial performance and the actual results achieved.

with analysis columns. Still sometimes used to record transfers between one ledger account and another and to summarise and collect transfers relating to ledger control accounts.

LABOUR. The sum total of weekly works wages, divided into:-

DIRECT LABOUR. The amount expended altering the composition, condition, conformation or construction of a product.

INDIRECT LABOUR. The composition etc. of the product is not altered.

LEDGER. (Derived from the old Dutch 'leggen' - to lie). A collection under various Personal or Impersonal headings of all the transactions which affect those headings. See Personal Account, Impersonal Account. It may consist of bound books, loose leaf books, machine posted cards or punched cards and it may be either in one volume or, for convenience, sub-divided into:-

GENERAL LEDGER. The main ledger usually containing all impersonal accounts and also control accounts (q.v.) for other subsidiary ledgers such as Purchase or Sales Ledger.

IMPERSONAL OR NOMINAL LEDGER. Contains Impersonal Accounts (q.v.). Sometimes kept separate from the General Ledger.

PRIVATE LEDGER. Section of General Ledger containing those accounts which are kept confidential.

PERSONAL LEDGER. This contains Personal Accounts (q.v.) including suppliers and customers.

BOUGHT LEDGER OR PURCHASES LEDGER. Those ledger accounts which record all accounts with suppliers.

SALES LEDGER. Records of accounts with customers.

SHARE LEDGER. A record showing how much of the share capital is held by each shareholder.

STORES LEDGER. An account of the quantity and value of items in stores.

LIABILITIES. All debts due by the Company. These may be:-

CURRENT LIABILITIES. Liabilities now payable or soon due.

DEFERRED LIABILITIES. Those payable at some future date.

CONTINGENT LIABILITIES. Liabilities payable in some possible future event.

L.I.F.O. See under Value.

LIEN. A right to hold property of another as security for a debt, e.g. luggage for hotel bill.

LIMITED COMPANY. See Company.

LIMITED PARTNERSHIP. A partnership (q.v.) in which the liability of some (but never all) partners is limited.

LIQUID ASSETS. See Assets.

LYING TIME. The interval between the end of the wages and the time of payment.

MATERIAL.

DIRECT MATERIAL. Material which forms part of the product.

INDIRECT MATERIAL. Material which cannot be identified as part of the product.

MEMORANDUM OF ASSOCIATION. Part of the constitution of the company which gives its relations with outside bodies and deals mainly with the objects for which the company is promoted and which cannot normally be varied. Printed in a booklet with the Articles (q.v.).

MORTGAGE. A bond relating to land (or other property) given as a security for a debt.

MINUTES. A record of certain decisions of e.g. Board Meetings or General Meetings which must by law be minuted, but minutes do not normally represent a summary of all matters discussed or decided.

NET ASSETS. See Assets.

NET PROFIT. See Profit.

NOMINAL CAPITAL. Authorised Capital - See Capital.

NOMINAL LEDGER. See Ledger.

OBSOLESCENCE. The process whereby plant becomes out of date rather than wears out, hence the amount whereby the asset value is adjusted on account of this process.

ONCOST. The ratio (sometimes expressed as % of labour) or other method of charging overhead costs (q. v.). Sometimes (loosely) used in the same sense as overheads.

ORDINARY SHARES. That part of the share capital which has no preferential rights to capital or income but which frequently acquires rights to all capital or income after satisfying Preference Shares (q. v.).

OVERHEADS. Overheads consist of Indirect Material, Indirect Labour and Indirect Expense and may be sub-divided into:-

ADMINISTRATION OVERHEADS. Expenditure incurred in formulating, directing and controlling the policy, organisation and operations of a business.

PRODUCTION OVERHEADS (Also referred to as Factory Overheads or Works Overheads). Expenditure in the factory from receipt of raw material until product is ready for despatch.

SELLING OVERHEADS. Expenditure in securing orders, including publicity, sales, correspondence etc. Sometimes also includes Distribution Overheads.

DISTRIBUTION OVERHEADS. Expenditure incurred on despatch to final destination, including returned empties, cost of outlying depots etc.

The component items of overheads having been assembled under the above headings, the totals are then distributed in such a manner as will ensure their recovery in equitable proportions through each individual cost unit. Overheads are sometimes divided into Fixed

(those which do not vary substantially with output) and Variable. Overheads are sometimes referred to as burden, establishment charge, general expense and indirect expense. 'Oncost' (q.v.) is sometimes used loosely as synonymous, but should strictly refer to the ratio rather than the amount.

PAID-UP CAPITAL. See Capital.

PARTICIPATING PREFERENCE SHARE. See Preference Shares.

PARTNERSHIP. The relationship between persons working in common for profit, hence, the group of persons. A partnership is not a separate legal entity and, unlike a Company, implies unlimited liability for all partners except certain partners in a Limited Partnership.

PARTLY PAID SHARES. Shares on which only a part of the nominal value has yet been paid by the shareholder. They are common in the initial stages of many companies but a permanent feature of some old concerns especially banks and insurance companies. The holder of a partly paid share may in certain circumstances have to pay the un-paid portion of the nominal value of his shares.

PAYROLL. A list of employees and the wages (less deductions) which they receive in a week.

PERSONAL ACCOUNTS. A summary in the Ledger of all transactions that have taken place with another company, firm or person, cf. Impersonal Accounts.

PETTY CASH. Ready money as opposed to bank balance.

PIECEWORK. Where wages consist of a sum of money for each unit of output (cf. Daywork, Timework).

POSTING. The act of transferring from a book of original entry, the other aspect of the account, e.g. in a ledger. See also Writing Up.

PLANT REPLACEMENT RESERVE. See Reserves.

PREFERENCE SHARES. Shares issued by a company giving preferential rights, sometimes to capital and usually to a fixed rate of dividend.

CUMULATIVE PREFERENCE SHARES. Cumulative Preference Shares provide that this dividend must be paid up to date before any dividend is paid to junior stocks.

REDEEMABLE PREFERENCE SHARES. These shares may be redeemed at the company's option.

PARTICIPATING PREFERENCE SHARES. These are entitled to a preferential rate of interest after which they participate further in profits in some ratio to the dividend paid on junior stocks.

PRELIMINARY EXPENSES. Formation expenses (q.v.) and other expenses in the early stage of a company; sometimes capitalised to be written off later. Not allowable as an expense for tax purposes.

PREPAYMENTS. Payments made before the expense is incurred, e.g. rent in advance.

PRIME COST. Direct Materials plus Direct Labour.

PRIOR CHARGES. Generally used of debts, e.g. debentures, mortgages etc., which take precedence. It may also be used for other forms of expenditure which take precedence.

PRIVATE COMPANY. See Company.

PRIVATE LEDGER. See Ledger.

PROCESS COSTING. A method of costing (especially of bulk materials) by which production costs are progressively built up process by process.

PROFIT. The estimated trading gain over a period as assessed for a particular purpose. This may be calculated at a number of stages, as set out in the following example:-

Sales		360,000
Less Prime Costs	200,000	
Decrease in Stock Value (or add increase)	10,000	210,000
Manufacturing Profit		150,000
Less Works or Manufacturing Overheads (excluding General Overheads)		50,000
Trading Profit		100,000
Less Expenses e.g. Directors' Fees, Interest etc.		4,000
Taxable Profit (adjusted for income tax or profits tax etc.)		96,000
Less Tax on Profits		80,000
Profit after tax		16,000
Add Profit brought forward from previous year(s)		4,000
Distributable Profit after tax		20,000
Less Dividends, amounts transferred to general reserves etc.		15,000
Profit carried forward (sometimes called 'Surplus' or 'Appropriation Account balance'		$5,000

Notes: 1. The items above Trading Profit are not normally published

2. The Taxable Profit is usually arrived at in a separate computation.

The expressions 'Gross Profit' and 'Net Profit' are frequently used to imply the profit respectively before and after any stage, the particular stage concerned being very much dependent upon the context. Net Profit for instance may mean net after deduction of certain expenses or, quite frequently, net after tax.

PROFIT AND LOSS ACCOUNT. (Sometimes referred to as 'Revenue Account' or, particularly in non-trading concerns, 'Income and Expenditure Account'). A statement of sources of income and expenditure as prepared in appropriate detail for a particular purpose, e.g. different details for Directors and shareholders. This may be divided into a series of sections corresponding to the stages of the profit as shown above, namely,

MANUFACTURING ACCOUNT - that which arrives at manufacturing profit.

TRADING ACCOUNT - the next stage down to trading profit.

PROFIT AND LOSS ACCOUNT - the next stage down to taxable profit

APPROPRIATION ACCOUNT - showing the manner in which the taxable profit for the year, together with any undistributable profit of previous years, are appropriated for dividends (past or proposed), transfers to reserve, and taxation.

PROFITS TAX. A tax levied on company profits.

PROSPECTUS. An invitation to the public to take up shares in a public company.

PROVISIONS. Sums set aside, when drawing up accounts, to meet specific liabilities or diminution of assets the amount of which cannot be determined with substantial accuracy. (If the amount is known, the liability is treated as a creditor, cf. Reserves (q.v.) i.e. amounts set aside for general purposes or in excess of estimated requirements.) To summarise this distinction:-

Provision for diminution of assets Known liability of unknown amount	- Provision
Known liability of known amount	- Creditor
Excess above reasonable provision Unknown liability of unknown amount	- Reserves

REAL PROPERTY. Ownership of land and of buildings thereon.

REGISTERED OFFICE. The office to which all communications may be addressed, but not necessarily the main place of business or the factory. The name must be outside the registered office.

REGISTRAR. A person who is responsible for maintaining the share register which records shareholdings, and does all matters connected therewith, e.g. sending out dividend warrants. (Done in small companies by the Secretary, but a separate office in large companies.)

REQUISITION. A stores requisition is an authorised request for items from stores (hence the form on which it is written). The word is also used in the sense of a buying requisite.

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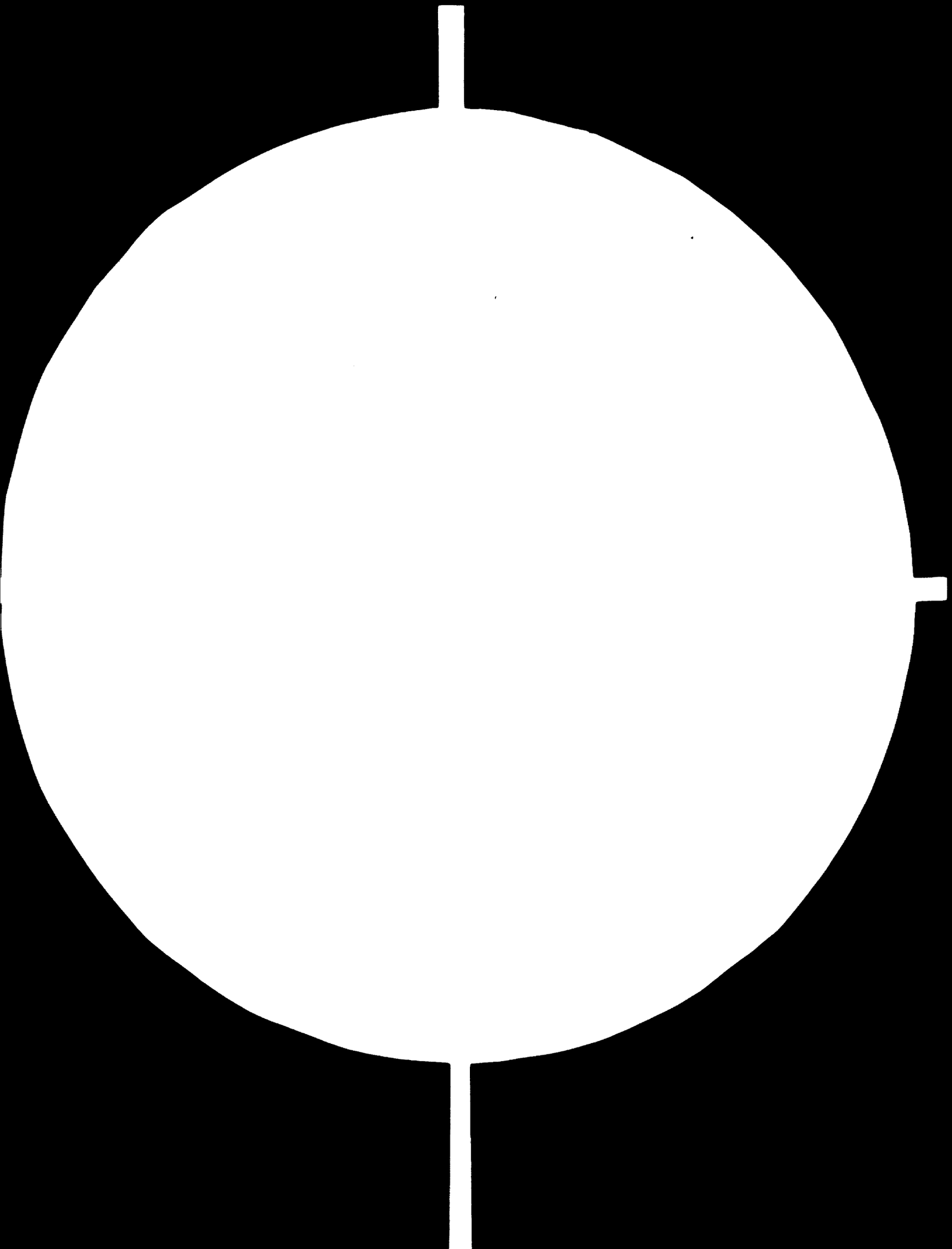

accordance with the Law Governing the Registration of Companies of 1931. The law and regulations issued thereunder provide the manner of registration and the documents and information which must accompany an application for registration.

The following are the applicable registration fees:

1. Up to 2,000,000 Rials for each 10,000 Rials, 75 Rials with a minimum charge of 500 Rials.

2. Up to 4,000,000 Rials. The second 2,000,000 Rials, for each 10,000 Rials, 45 Rials.

3. Up to 7,000,000 Rials. The additional 3,000,000 Rials, for each 10,000 Rials, 30 Rials.

4. Up to 10,000,000 Rials. The additional 3,000,000 Rials for each 10,000 Rials, 15 Rials.

5. Up to 100,000,000 Rials. The additional 90,000,000 Rials, for each 10,000 Rials, 10 Rials.

6. Between 100,000,000 Rials and 500,000,000 Rials a fixed amount of 100,000 Rials.

7. Above 500,000,000 Rials a fixed amount of 200,000 Rials.

Note: Any subsequent changes in the information submitted in the company registration application, will be subject to a fee of 1,000 Rials. Subsequent requests for additional capital authorisation above 500,000,000 Rials will be subject to the scale of charges as if it were a new application.

CHAPTER XI

TAX LAW IN IRAN

(Reprinted from "The Industrial Guide to Iran")

The basis for Iranian tax legislation is the Inland Revenue Act of 1967 which was effective March 21, 1967, the beginning of the Iranian year 1346. This Law supersedes the Iranian Income Tax Law of 1956 and its amendments.

Under the 1967 Act, Iranian nationals residing in Iran and Iranian corporations are subject to income tax on the whole of their income accrued in Iran or in a foreign country. Iranian nationals residing abroad, foreign nationals, and foreign corporations are subject to tax on the whole of their income or earnings accrued in Iran.

Taxes are assessed on the basis of the Iranian fiscal or calendar year, which begins March 21, or on the basis of a corporation's financial year.

Taxes on profits of oil companies operating in Iran are levied under separate legislation.

The 1967 Act specifies that corporations are taxed on their gross profits, less exemptions. Taxable income of all companies is subject to a basic company tax of 10%. In addition, there are further taxes on retained earnings and dividends which are withheld at the source.

In the application of further taxes on companies a distinction is made between 1) Government companies and limited partnerships with shares, and 2) all other companies. With respect to the former, dividends paid to registered shareholders are taxed 15% while retained earnings and dividends paid to unregistered shareholders are taxed at the following scale:

Dividend in Million Rls.	% Tax
20	25 %
20-40	30 %
40-60	35 %
60-80	40 %
80-100	45 %
100-200	50 %
more than 200	55 %

Dividends distributed to foreign shareholders or Iranian registered shareholders residing abroad are taxed at general income tax rates. Further taxes on the profits of all other companies, including joint stock companies are assessed at the general income tax rate.

Allowable deductible expenses include the following: the purchase price of goods resold, purchase price of materials used in goods or services sold; payroll wages and salaries, including fringe benefits, overhead expenses, including the premise entertainment expenses, royalties, duties and tax (other than income taxes), research and training expenditures, interest expense, tax reserves, reserves for bad debts, and losses. Deductions for depreciation are allowed at a fixed annual rate in accordance with a schedule published by the Ministry of Finance.

The general Income Tax Schedule is as follows:

Income in Rials*		Tax (percent)
Up to	400,000	15
Excess to	600,000	18
Excess to	800,000	20
Excess to	1,000,000	22
Excess to	2,000,000	24
Excess to	4,000,000	26
Excess to	6,000,000	28
Excess to	9,000,000	30
Excess to	12,000,000	35
Excess to	15,000,000	40
Excess to	20,000,000	45
Excess to	30,000,000	50
Excess to	50,000,000	55
Over	50,000,000	60

Separate tax treatment is accorded fees paid to contractors, architects, surveying and engineering firms. These firms are taxed at 5% of the value of the contract, provided its value exceeds Rls. 10 million, and the tax is deducted by the party entering into the contract with the contractor

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* $1.00 - Rials 67.50

at the time fees are paid. If part of the contract is subcontracted, the prime contractor is responsible for deducting an additional tax of $2\frac{1}{2}\%$ of the value of the portion subcontracted. If the entire contract is subcontracted the additional tax is 10% of the value of the contract.

Contractors' annual income is to be taxed initially at 12%. Once the Ministry of Finance establishes auditing procedures, contractors will then be taxed at general income tax rates. In addition to allowable expenses, half of the taxes withheld at the time fees were paid are deductible. This applies to contractors as well as subcontractors.

Foreign firms who enter into licensing arrangements or technical assistance contracts, or who grant film projection rights are subject to a tax ranging from 35% to 70% of their gross income. Regulations covering this tax are to be published by the Ministry of Finance.

- Tax Exemptions

There are a number of tax exemptions or concessions under the 1967 Act. They include the following:

A 25% to 100% exemption for five years determined by the importance, nature, and geographical location of the industry concerned, in accordance with a published schedule. For enterprises located outside principal cities, near the geographic boundries of the country, 100% exemption for eight to ten years may be given.

Profits from the export of Iranian goods are exempted from taxation for 5 years and in the case of industries located in cities near the geographic boundries of the country, tax exemption up to 10 years may be granted.

Profits from hotels and motels opened within 5 years from the effective date of the 1967 Act are exempted from taxation for 5 years after opening. The exemption applies for 25% of profits if the facility is within 50 kilometers of Tehran, and 100% outside 50 kilometers.

Income from lease of buildings within 50 kilometers of Tehran, constructed within one year from the effective date of the Act is exempted from tax for two years; if the building is constructed within two years, income is exempted for one year. Income from new buildings outside a 50 kilometer radius is exempted for three years.

15% of the taxable profit of companies eligible for quotation by the Stock Exchange Committee is tax exempt as long as shares of the company are quoted on the exchange.

Companies whose capital is divided exclusively into registered shares, whose shareholders shall exceed 100, with no shareholder holding more than 10% of the equity, are exempted from the 10% corporate tax.

Income of foreign firms derived from technical assistance for factory erection and mining development is exempt for one year following the commission of the factory or mine.

Any part of the taxable profit of an industrial undertaking earmarked for plant completion or extension is exempt from taxation provided a new plant license is obtained from the Ministry of Economy and provided the value is in excess of 5% of the fixed assets of the plant. The 1967 Act provides that exemptions granted for given periods under previous tax legislation remains in force until they expire.

- Personal Income Taxes

Taxes on wages and salaries are deducted by the employer. Income in kind, such as free housing (valued at 15% of the employee's main wage or salary) and a free personal motor vehicle (Rls. 5,000 per month) is also liable to tax.

Wages and salaries are taxed at 10% up to Rls. 300,000 of annual salary, less Rls. 60,000 standard deduction; at 15% on the amount

in excess of Rls. 300,000 up to Rls. 700,000; and thereafter in accordance with General Income Tax Schedule.

Other income is generally subject to taxation at General Income Tax Schedule rates. Retirement incomes and life insurance payments are exempted from taxation. Income of village residents from manual industries is excluded from taxation.

- Other Direct Taxes

The 1967 Act provides for a 3% surtax on any income other than salary, agricultural income, inheritance, or government corporation taxes, for payment to the town corporations concerned.

An additional surtax of Rls. 3 per Rls. 1000 assessment is also imposed on companies, corporations, and contractors for Chamber of Commerce and Higher Guilds Councils in the areas concerned.

- Penalties

The 1967 Act provides for fines and penalties in the event of late payment or nonpayment of taxes, as well as for false statements of facts.

CHAPTER XII

THE AMORTIZATION LAW OF IRAN

The amount or amounts that are to be dealt with in the Amortization Account for the amortization of factories, buildings, the machinery and equipment and all other materials, should be in accordance with the provisions of this Article.

CHAPTER ONE - Facilities common among the various industries

A. The electric power generating motors that are made use of in common industries are comprised of:

1.	Steam or gas turbines and their steam generators (turbo-alternator)	10%
2.	The generating motors and generators, the speed of which is either 375 revolutions per minute, or less	29%
3.	The generating motors and generators the speed of which is between 376 and up to 750 revolution per minute	30%
4.	The generating motors and generators the speed of which is more than 750 revolution per minute	40%
5.	The steam generator alone (water boiler)	15%
6.	Transformers and electrical switch boards	15%

N.B. In case the cooling towers, the water treatment fuel reservoirs and the pumping apparatus are purchased together with the electric generators, the amortization for them shall be calculated according to the rate of the generators, and in case they are to be calculated separately, the amortization shall be 20%.

B. The transportation and the lifts for the internal use of factories shall be:

1.	Lift	20%
2.	Telepheric line and its component parts together with various motor facilities	35%
3.	Facilities that operate with battery and compressed air	25%
C.	Compressors (compressed air equipment) and pneumatic machines	25%
D.	Equipment for cleaning and vacuum cleaners	50%
E.	Office furniture and equipment	25%

CHAPTER TWO - Metal Industry

1.	All kinds of presses and tool machines	17%
2.	Lathes (turner)	17½%
3.	Welding Machines (electrical)	17½%
4.	Foundry (both oil, electrical or coal-operated)	20%
5.	Equipment for canning, drum metal-printing and bottle capping	17½%
6.	Knife making machine, metal melting, corrugated metal sheets, razor-blades, file, and drills	17½%
7.	Machinery for making metallurgic products, i.e., pipes, profiles	17½%
8.	Machinery for making metallurgic products, non-iron, i.e. curtain rails, window and door belts, non-iron pipes, lamps, samovar luster, cookers, hand-stoves	17½%
9.	Machinery for making nails, nuts, needle, safety pins, springs, etc.	17½%
10.	Machinery for making iron sheets	17½%
11.	Machineryfor plated and galvanised, i.e. chromium plating, nickle plating etc.	17½%

12.	Machinery for manufacturing bicycles, motor-cycles etc.	17½%
13.	Machinery for manufacturing welding equipment	17½%
14.	Machinery for making metallic furniture, chair table, bus chairs	17½%
15.	Machinery for manufacturing refrigerators, coolers etc.	17½%
16.	Machinery for manufacturing transformers and switch boards	17½%
17.	Machinery for making moulds, dies etc.	17½%
18.	All other machineries, particularly metal-products that have not been mentioned above	17½%

CHAPTER THREE - Transportation Equipment

1.	Buses and trucks	25%
2.	Automobiles, large and small	25%
3.	Automobiles	35%
4.	Lorries, load-trucks	25%
5.	Motor-cycles	50%
N.B.	In case the above facilities remain at the disposal of the Mining Contractors, amortization shall be calculated at the rate of 20% over the above rates.	
6.	Motor-less boats (barges) small spare-parts, freight-boats (with motor), capacity 500 tons	20%
7.	Boats having motors, capacity 500 tons	14%
8.	Oil-tank boats	12%
9.	Motor-boats	25%
10.	Launches, small boats etc.	35%

CHAPTER FOUR - Constructional Machinery

1.	Machinery and equipment relating to road and airport building	

2. Machinery and equipment for the construction of ports.

3. Machinery and equipment for the building of dams.

4. Machinery for building construction.

5. Machinery for building cities.

Industrial graders, various types of tractors, scrapers, loaders, tunnel diggers, pumps, rollers, stone-crackers, filling machines, asphalting and relevant silo-making equipment, asphalt finishing machinery, vibrators, pounding machines, beton-reinforcing (under water) machines diving gears, temporary jetties, mixers, cranes, elevators, stone-carriers, dumpers, blockers, canal excavating machines, pipe-laying machines, pipe-welding and all other machineries that have not been covered above:

First year	40%
Second year	30%
Third year	20%
Fourth year	10%

N.B. Working tools as shovels, pick-axes, electric hammers, hand carrier, tarpauline, pipes, etc. shall be acceptable in the operating expenses accounts from the purchase date.

CHAPTER FIVE - Mining Machinery and Equipment

1. Condensing units for raising the standard of stone, by means of washing or any other process	25%
2. Rails, wagons, iron-pipes, locomotives	25%
3. Drilling equipment and excavating machines, including compressors, tractors, loaders, drilling, boring, mechanical shovels, stone-crushers, metal reservoirs and the like	25%

N.B. (1) Working tools as:

Shovels, pick-axes, hammers (both hand-worked and compressed), hand carrier, and the like, shall be acceptable in the operating expenses accounts from the date of their utilization.

RESERVES. Amounts, out of profits or other surplus funds, set aside for general purposes or in excess of calculated requirements for known liabilities. The expression should not be used for depreciation of assets or for provisions (q.v.) up to calculated requirements for known liabilities. The expression 'reserve' is frequently used loosely outside the above strict meaning.

CAPITAL RESERVE. Amounts set aside out of capital profits, e.g. profits on sales of fixed assets etc., or created out of profits or by capitalising general reserves, thus permanently setting aside profits to increase the assets of the business. Includes share premium reserves (q.v.). Capital reserves may not be used to pay dividends but might be paid as capital distribution to shareholders.

GENERAL RESERVE. Amounts set aside out of profits in order to strengthen the business rather than pay dividends. General reserves may be applied for any purpose. There is little effective difference between a general reserve and a profit and loss balance, other than the psychological effect of drawing upon general reserves. In the U.S.A. and Canada the corresponding amount is usually left in surplus account.

PLANT REPLACEMENT RESERVE. A reserve for the replacement of plant at a cost above its original cost.

SECRET RESERVE. The 'reserve' which arises or is created by undervaluing assets or over-stating liabilities, thereby showing in the Balance Sheet on excessively conservative or pessimistic view.

STOCK RESERVE. Reserves to cover possible future falls in stock values.

RESERVE FUND. Readily realisable investments or other assets earmarked for a corresponding reserve.

REVENUE. (a) Earnings as opposed to capital receipts.
(b) An abbreviation for the Commissioners of Inland Revenue (in U.K.)

REVENUE ACCOUNT. See Profit and Loss Account.

(2) Exploratory expenditures, and similar essential expenses relating to road construction, are liable to be amortized in accordance with certified vouchers or documents:

(a) Expenses pertaining to exploration and preliminary expenses up to the commencement of mining operations for a period of five years as of the operation date, are amortizable. In case it does not end in mining operations, the said expenditures shall be deemed as parts of the annual expenses.

(b) Expenditures relating to road construction for operation, and similarly expenses pertaining to the creation of main tunnels are amortizable as of the date of operation in proportion to the amount of mineral deposits to be assessed per ton. (Assessment of the amount of mineral deposits shall be made by the Department of Mining).

In case the operator, during the course of the mining operations, encounters a new mineral substance, and as a result of which, the quantity, from the point of view of type or amount, exceeds the amount of mineral deposits originally estimated, the expenditures referred to in this para, after previously amortized in proportion to the total amount at hand, shall be calculated accordingly.
(Assessment of the amount of mineral deposits shall be made by the Department of Mining).

(c) In case the mining operation rights are turned over to a second party, or it is turned over in partnership, or the owner transfers his rights to another company, as a partnership shares, the amount paid up to the person in question, or the sum deposited with the company as the share of the holder of the mining rights, shall be amortizable and is calculable in accordance with the quantity of the mineral deposits.

The mines that are transferred during the course of operations, the transferer is responsible to obtain a certificate from the Department of Mines for the existing deposits and turn it over to the transferee (buyer) so that it could serve as a means of amortization basis.

(d) The machinery, equipment, materials, tools etc. that may be transferred by the industrial and mining operator, their amortization by the new operator (transferee) in accordance with the outstanding amount that has not yet been amortized, shall be amortized on the basis of the provisions of this Article.

CHAPTER SIX - The Building and their Annextures that are Considered Parts of the Structure

1.	The factory foundations including the machinery installation halls, stores, factory offices, residential quarters for personnel, and labourers at plant sites, and similarly the installations and residential quarters for the labourers and personnel in the mining areas	10%
2.	All other buildings	7½%

N.B. Banks, and the institutions for the constructional amortization of which there exist special rules and regulations, shall be exempted from this Article, and be governed by the rules solely relating to themselves.

CHAPTER SEVEN - The Textile Industry (woolen, cotton, linen, jute, silk)

1.	Machinery for 1st stage spinning and weaving	16%
2.	Spinning machinery	16%
3.	Machinery for general weaving purposes	16%
4.	Machinery for textile whitening (polishing)	16%
5.	Machinery for dyeing, printing, finishing etc.	16%
6.	Machinery for packing	16%
7.	Machinery for spinning cocoons	16%

N.B. (1) There is no difference between the types of machines mentioned above from the amortization point of views, whether their raw material is natural or artificial.

(2) The weaving positively means here "woven fabrics" whether they are used as clothes or are utilized in all other industries, or principly there might be any other use for it.

8.	Motor-operated machinery for socks/stocking knitting	20%
9.	Machinery for embroidery work	20%
10.	Machinery for string making	16%

CHAPTER EIGHT - Plastic Industry

1.	Plastic making equipment, oil-cloth furnishing materials and relevant packing machinery	15%
2.	Rollers all types	40%
3.	Machinery for grammophone record manufacture	15%
N.B.	The costs of moulds are acceptable in the operation expenses accounts, from the date of utilization.	

CHAPTER NINE - Hygiene

1.	Machinery for soap manufacturing and packing thereof	15%
2.	Detergent manufacturing machines	16%
3.	Equipment for manufacture of essence, eau de cologne, and all kinds of cosmetics	15%
4.	Machinery for glycerine manufacture	16%
5.	Machinery for toothpaste manufacture	15%
6.	Machinery for pharmaceutical manufacture	16%
7.	Machinery for hygienic cotton and bandages manufacture	16%

CHAPTER TEN - The Oil Extracting Industry

1.	The oil extracting machinery and equipment are consistent of the following units:	
	(a) Silos, cleaning, linting, crushing, grading, mills, pressing and sifting eq.	18%
	(b) Centrifuges, discolouring hydrogenerators, sifters, smell-removers, packing, sizers, reservoirs	18%

CHAPTER ELEVEN - The Printing Industry

	The printing machines include the manufacture of ink, brushes, offset printing (ordinary), plastic and glass printing.	15%
	N.B. Printing types, engraving and plating are allowable for calculation in the operating expenditure accounts as of the date of utilization.	

CHAPTER TWELVE - The Sugar (loaf) Industry

1.	Machinery for the manufacture of loaf-sugar (sugar) from sugar beet and sugar cane	10%
2.	Sugar refinement machines	14%

CHAPTER THIRTEEN - The Building Material Industry

1.	Machinery for the manufacture of tiles & ceramic	17½%
2.	Machinery for brick making	15%
3.	Machinery for earthenwaring	15%
4.	Machinery for refractory-brick	15%
5.	Machinery for stone-cutting and polishing, stone grinding	10%
6.	Machinery for the manufacture of cement	12½%
7.	Machinery for the manufacture of plaster and lime-grinding	10%
8.	Machinery for the manufacture of pipes, sheets, all other building materials from cement and asbestos	10%
9.	Machinery for mosaic manufacture	10%

CHAPTER FOURTEEN - The Alcoholic and Beverage Industry

1.	Alcoholic extracting unit and its manufacture	12½%
2.	Beer manufacturing equipment	12½%
3.	Non-alcoholic beverage making (with or without sugar contents)	12½%

CHAPTER FIFTEEN - The Food Industry

1.	Machinery for pasteurized dairy products	12½%
2.	Machinery for ice-cream making	12½%
3.	Machinery for making chewing-gums, chocolates, sweets, toffee etc.	12½%
4.	Machinery for making bread, biscuits, and all kinds of pastries etc.	14½%

5.	Machinery for making conserves, sausages, compote and fruit-juice	12½%
6.	Machinery for making dried fruits	15%
7.	Machinery for making macaroni	12½%
8.	Machinery for flour-grinding, washing, sifting, and cleaning, weighing and loading of cases	12½%
Note:	The milling stones are admissible in the operating expenditure accounts from the date of utilization.	
9.	Machinery for rice-pounding	12½%
10.	Machinery for starch-making and glucose making	12½%
11.	Machinery for tea producing and packaging	12½%
12.	Machinery for making yeast	12½%

CHAPTER SIXTEEN - Chemical Industry

1.	Machinery for manufacturing acids (all kinds)	18%
2.	Machinery for manufacturing soda-caustic, natrium carbonate, and bi-carbonate etc.	18%
3.	Machinery for manufacturing chemical fertilizers:	
	a) Acid and ammonia section	18%
	b) Super phosphate and other sections	15%
4.	Machinery for manufacturing gas and capsules:	
	a) Machinery for gas and capsules	16%
	b) Special types of capsules, shipment of gas	30%
5.	Machinery for manufacture of mineral oil, i.e., grease, motor oil, and relevant refineries	18%
6.	Machinery for manufacture of artificial fibres, strings etc.	16%
7.	Machinery for manufacture of paints, oil polishing etc.	14%
8.	All types of equipment for making chemicals mentioned above	16%

9.	Shoe-polish manufacturing machines	10%
10.	Petrochemical machinery and manufacture of plastic raw material	12½%

CHAPTER SEVENTEEN - The Paper Industry

1.	Machinery for paper and card-board manufacture	12½%
2.	Machinery for carton and card-board boxes manufacture	12½%
3.	Machinery for paper-handkerchief, wallpaper, and decorating	10%
4.	Machinery for paper and card-board tumblers, and paraffin paper	10%
5.	Machinery for paper and packet cutting	10%
6.	Machinery for sand paper, and all types of industrial paper	10%

CHAPTER EIGHTEEN - The Electrical and Electronic Industry

1.	Machinery for manufacture of bergman pipes	12½%
2.	Machinery for manufacture of switches, wall-plugs, sockets, etc.	15%
3.	Machinery for manufacture of wires, wire-covering, cables etc.	15%
4.	Machinery for neon manufacture	15%
5.	Machinery for electric-lamp manufacture	12½%
6.	Machinery for making radios, television, tape-recorders, grammophone and assembly-units	15%

CHAPTER NINETEEN - The Rubber Industry

1.	Machinery for tyre and tube manufacture (for automobiles)	15%
2.	Machinery for making rubber-foam (rubber cushions)	15%
4.	Machinery for making rubber furnishings	15%
5.	Machinery for making sport gears and all rubber-made products	15%
6.	Machinery for making shoes, and rubber heels	15%

CHAPTER TWENTY - The Cooling Machines

1.	Machinery for ice-making	16%
2.	Machinery for cooling-stores, for storing food products, and clothing	16%

CHAPTER TWENTY ONE - The Tanning and Leather Industry

1.	Machinery for making leather	16%
2.	Machinery for maturing guts	16%
3.	Machinery for making "sammbour"	16%
4.	Machinery for making shoes and all kinds of leatherware	15%

CHAPTER TWENTY TWO - The Glass Industry

1.	Smelting furnaces and melting pots	35%
2.	Machinery for making glassware	20%
3.	Machinery for making crystals and glass utensils	20%
4.	Glass grinding and mirror making	20%

N.B. The relevant dies and moulds for making utensils and rollers are admissible in the operating expenses account as of the utilization date.

CHAPTER TWENTY-THREE - The Wood Industry

1.	Machinery for carpentry, i.e. saws, planes etc.	12½%
2.	Machinery for making 3-ply sheets, fibre and saturated wood	12½%
3.	Machinery for making "neopan" compressed wood, and wood covering	12½%
4.	Machinery for making shoe-moulds, and models	12½%
5.	Machinery for making wooden flooring	12½%
6.	Machinery for wooden furniture manufacture	12½%
7.	Machinery for making formica	15%

CHAPTER TWENTY-FOUR - The Water Installation

1. The Water Filtration Plant and reservoirs 18%
2. The pipe-line unit and all water transferring facilities 10%
3. Wells and water pumps with accessories 25%

CHAPTER TWENTY-FIVE - The Cinematograph Industry

1. The film-producing apparatuses
2. The Printing, developing and dubbing apparatus
3. The film apparatus and screening units
4. The license-fees for the imported films both the displaying and copying charges shall be admissible in the expenses account as under:

   a) In case the contract period for displaying the film is one year 100%

   b) In case the contract period for displaying the film is two years

   c) In case the contract period for displaying the film is more than two years

   And the remainder shall be equally admissible during the remaining period of the contract.

N.B.

1. The cost of the imported films, that are not displayed during the first year of the contract, shall be acceptable in the expenses accounted as outlined above, from the year of their display.
2. The above regulations (acceptance of the film costs in the expenses accounts) shall also include all those taxes that have to date not been specified.

CHAPTER TWENTY-SIX - Agriculture and Animal Husbandry

1. All types of tractors, seed spreaders, fertilizer flingers, discs, wheat threshers, trowellers, combines, machinery for digging and separating

	all types of products; and all other types of agricultural equipment:	
	1st year	50%
	2nd year	30%
	3rd year	20%
2.	Insecticidal machinery and accessories	20%
3.	Machinery for milking and all other equipment for slaughtering and animal husbandry	25%
4.	Machinery for incubation purposes	30%

CHAPTER TWENTY-SEVEN - The Coal Distillery

1.	Machinery and furnaces, and distilling equipment for distilling coal and coke	25%

CHAPTER TWENTY-EIGHT - Aeroplanes

1.	Passenger planes, transportation of goods, spraying and topography etc.	25%

CHAPTER TWENTY-NINE - Miscellaneous Industries

1.	Match-making machinery	15%
2.	Machinery for producing animal and fowl food	12½%
3.	Machinery for manufacturing pencils and fountain pens	15%
4.	Machinery for tearing gunny cloth	60%
5.	Machinery for zipper manufacturing	20%
6.	Machinery for carpet and dress washing	12½%
7.	Machinery for letter-type making, plate and engraving etc.	17½%
8.	Machinery for dress and corset making	15%
9.	Machinery for making tooth brushes, ordinary brushes etc.	20%

10.	Machinery for chinaware manufacture	17½%
11.	Machinery for auto-servicing and automobile painting	15%
12.	Machinery for making mantle-lamps	16%
13.	Machinery for cotton-ginning, baling, drying etc.	10%
14.	Machinery for making batteries (dry and wet)	17½%

N.B.

1. The hundred percent prices of the working tools and accessories that have been indicated in the notes of the above mentioned Chapters, and are allowed to be included in the operation expenditure accounts, are only permissible when they are utilized during the first six months of the fiscal year, otherwise 50% of the prices shall be admissible.

2. This tariff is applicable to those taxpayers, whose taxes are assessed on the basis of the Profit & Loss Accounts of their appropriate Registers and recorded from them accordingly, And this tariff does not apply to those taxpayers whose taxes are fixed.

3. With exception of the above items referred to in Note 2 of Chapter 25 relating to the Film Industry, the said regulations shall be applicable to the taxes from the year 1343 (1964) pertaining to the course of operations for 1342 (1963) and afterward.

SECRET RESERVE. See Reserve.

SHARE CAPITAL. See Capital.

SHARE CERTIFICATE. The piece of paper issued by a Company to a shareholder to record his holding.

SHAREHOLDER. One who owns any share in the Company. Legally called a Member.

SHARE PREMIUMS. The amount (in excess of the nominal value of shares) received from shareholders, and subsequently treated as a capital reserve (q.v.)

SHARES. A definite portion of the capital of a Company. These may be of various categories, some carrying a fixed interest, and ranking in priority for capital and/or income in the following order: Preference shares (q.v.). Preferred Ordinary shares, Ordinary shares, Deferred shares. See also Capital, Stock.

SINKING FUND. A fund established in order to build up money required at a future date for a known purpose, e.g. to redeem debentures due for repayment.

STANDARD COST. (Broadly). A pre-determined cost of a unit of output (or a process, product, or service) at an assessed effectiveness and level of output (See below). A standard cost may imply either a 'Basic Standard' (i.e. an unattainable minimum) or a Budgeted or Target Standard, or a (reasonably) Attainable Standard.

STANDARD COSTING (Basically). The process of applying standard costs (q.v.) to give a comparison between standard and actual. (By Extension). This basic principle is, or should be, extended wherever possible to provide, in addition to a simple comparison with actual costs, a fully integrated system of cost accounting incorporating budgetary control, and the analysis of excess costs by causes.
Note: Owing to considerable development of the uses of standard costing, and its widely different applications in various industries, the implications of the expression "standard cost(ing)" will depend on the theories and experience of those using it. Most modern

CHAPTER XIII

EXPORT PROMOTION

From the point of view of the Project Evaluator the effect of export promotion relates only to:

i. Concessions which reduce operating costs

ii. Refund of duties and taxes on imported material and components incorporated into the product.

iii. Direct payments made by the Government to the private producer as an additional incentive to export.

Concessions which reduce operating costs must be accounted for in the production cost calculations and in Iran these include reduced port charges, favourable credit facilities, elimination of Municipality Taxes, reduced freight rates and export guarantees.

The refund of duties and taxes on imported materials and components which have been incorporated into the products to be exported, is subject to change in those taxes from time to time, and the current rates are set out in a booklet in the Farsi language which is revised annually.

The 1973 rates of refund are tabulated in the booklet, under the following broad classifications, which, in the booklet, are broken down into more detail.

Section	Industry	Unit	Range of Refunds (Rials)
A	Textiles	kg	82 - 356
B	Metal products	unit	1548.75 - 3268.35
		kg	0.6 - 44.25
C	Plastics	kg	5.7 - 17.52
D	Automobiles	unit	5969 - 101582

E	Building materials	kg	2.8
F	Cellulose	kg	1.7 - 20.5
G	Glasswool	kg	2.65 - 11.0
H	Chemicals and Detergents	kg	3.85 - 5.1

Although the Government of Iran has made available funds for the payment of export bonuses for the export of industrial goods produced within the country, in the year 1973 no bonus payments were made. The scale of export bonuses for each domestic industrial product, when paid, is determined by the Council of Ministers on the basis of proposals made by the Ministry of Economy.

MINISTRY OF ECONOMY

Research Centre for Industrial and Trade Development

Tehran - Iran

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(2 of 4)

PROJECT EVALUATION

VOLUME 2

TECHNICAL AND FINANCIAL STUDIES

J. Goodwin

Tehran
January 1974

Printed by The Bureau of Statistics
Ministry of Economy
Government of Iran

LOOSE DATA SHEETS

No.	Subject	Date
1.	Unit Electric Power Cost	January 197
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

S.F. Project - IRA-16

Country : Iran

PROJECT EVALUATION

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UNIDO EXPERT IN PROJECT EVALUATION

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January 1974

PROJECT EVALUATION

VOLUME 2

TECHNICAL AND FINANCIAL STUDIES

Volume 1 presented the essential basic accounting techniques, necessary for an understanding of project evaluation and in Volume 2, the technical and financial studies are discussed.

A wide range of technologies are unavoidably included in this volume but this is the essence of project evaluation. The skills of the engineer, the cost accountant, the economist and the financial analyst are all brought together at this stage. It is of little value to proceed to even simple economic evaluations unless the basic construct of the project is known to be sound.

Volume 3 is a case study, where a feasibility study has been analysed critically, and it forms the basis of economic projections made in Volume 4.

Volume 4 deals with economic evaluation at the operational level.

PROJECT EVALUATION

VOLUME 2

TECHNICAL AND FINANCIAL STUDIES

CHAPTER I.

THE PREPARATION OF FEASIBILITY STUDIES

Introduction

The selection and financing of capital projects is a complex decision, and because of the high cost of error, it is a critical decision. A large plant of the wrong type or size, sited in the wrong position may be too costly to correct and indeed may terminate the project. At least it is likely to constrain the development of a company and limit profits.

Neglect to analyse capital projects, both large and small in both the public and private sectors, cumulatively will affect the rate of growth of a national economy. The quality of investment becomes of greater significance than the quantity of investment.

Modern analytical techniques bring together the skills of marketing, technology, law and financial projection, to evaluate the financial viability of a project.

The Scope and Objectives

General Principles

The primary objective is to select, on economic and managerial criteria, a course of action which can be defined sufficiently to allow a decision to be made and for money to be raised with the maximum confidence. For this purpose, both the technical feasibility and the financial viability of alternative engineering and commercial methods must be studied.

Logical analysis alone may not provide a complete answer to an investment problem since it is necessary to forecast future events with an acceptable degree of accuracy and certainty. This does not

invalidate the attempt to apply logic provided it results in a significantly better basis for making a decision. Some projects do not lend themselves to forecasting, for example pure research and products subject to unpredictable obsolescence.

The problems can be extremely complex, but often the complexities may be ignored either because they are not significant or because management policy may preclude certain economic alternatives. Finally, imagination is required in considering the potential of a project and a clear understanding of the risks involved.

Boundaries of the Study

Defining the boundaries of a study may be simple in the case of a manufacturing industry where a single product or a single range of products is planned but in other cases considerable ingenuity is required. Even so, the question of associated products or of integrating into the new factory the production of the required raw materials, or incorporating the end product of the factory into other products, must be considered.

As an example of associated products, if the project under consideration is a cement block making factory, the possibility of marketing ready mixed concrete should be studied. In the same course of business, it may be economic to establish a quarry to provide crushed rock for both plants and additionally to supply part of the local demand for crushed rocks. In the textile business there are four main processes, yarn spinning, cloth weaving, finishing-consisting mainly of bleaching, dyeing and printing, and finally garment manufacture. Any one of these may be viable singly or any consecutive two or more processes could be incorporated into a single factory.

In a larger context, a chemical production complex based on the production of caustic soda liquor and chlorine gives rise to a whole series of possible developments which individually in isolation may not be economic but together could be profitable. Included in these are fertilizers, explosives, soaps and detergents, glycerine, alcohol and paper pulp.

The public sector of national development presents similar problems often of a different magnitude. For example the original concept may be to provide irrigation to a certain land area which leads into a whole series of interelated studies, as depicted in the chart, shown on page 5.

If land is irrigated, the pattern of optimum crops will change, and fertilizers will be necessary. To provide irrigation there will be water conservation which has potential electric power generation, and with the availability of cheap electric power, the possibility arises of fostering special industries such as aluminium production. Water conservation could be the base of a fresh fish industry with supporting industries such as canning or freezing. And if fertilizer production is linked to the chemical industry complex previously mentioned, it is possible to extend such a study almost endlessly.

Since the study has yet to be made, choosing the boundary of a study cannot be other than an art. The study should not take too long nor should it cost too much or become less accurate because it is too extensive.

Making the Study

Overall Plan

A systematic approach to the carrying out of a study has been shown to be essential and the following consecutive steps should be taken.

systems cover all the extensions indicated above. Simpler systems, however, on account of the complexity of the trade or other circumstances, may contain none of these extensions but may be considered adequate by their authors.

STOCK. Either:-

(a) Stock in trade such as raw material stock, or finished stock. Also sometimes used generally to include work in progress.

(b) Stock as opposed to shares issued by a Company or public body, the distinction being that shares have distinctive numbers while stock can be issued to any amount where the multiple is in stock units, which are in effect shares without a distinctive number and must be fully paid.

STOCK UNITS. See Stock.

STOCK VALUATION. See Value.

STORES (a) Articles or products kept in stock.
(b) The place where stores are kept.

STORES LEDGER. See Ledger.

STORES RECORDS. A card, book or punched card etc. recording items in stores, withdrawals etc.

SUBSIDIARY COMPANY. A company of which shares carrying more than half the voting rights are held by a Holding Company (q.v.)

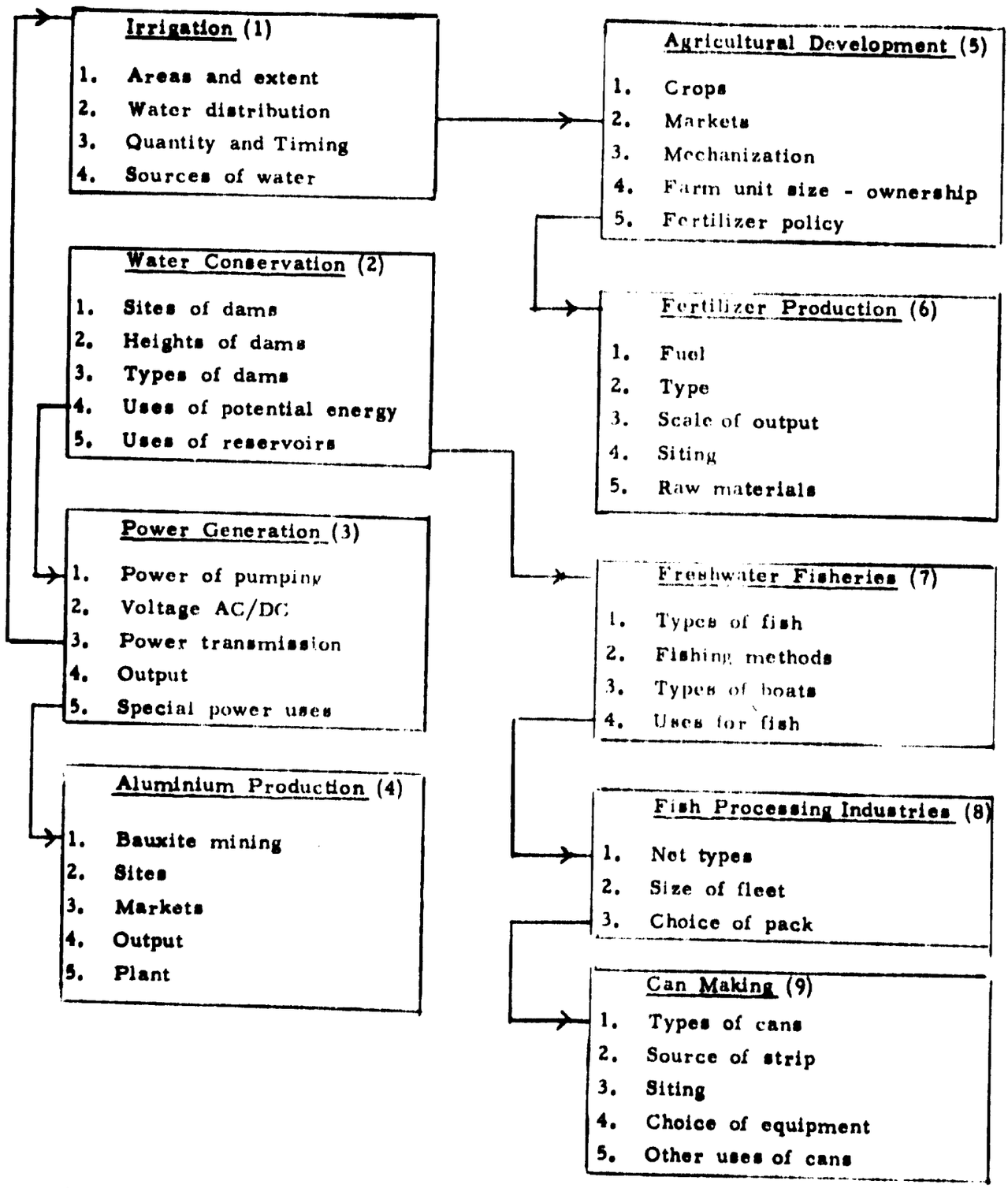
SURPLUS. (a) Anything above requirements; hence
(b) To undistributed or unallocated balance of profits.

SUSPENSE ACCOUNT. An account to which sums are transferred until some unknown factor becomes known.

TAXABLE PROFIT. See Profit.

TAX RESERVE CERTIFICATES (in the U.K.) Certificates issued by the Inland Revenue in multiples of £ 25 in return for payment of taxes in advance. They carry interest tax free.

1. Prepare the work programme
2. Undertake technical and economic studies
3. Select the optimum scheme
4. Develop the scheme
5. Prepare the report



A study of this type might possibly be limited to items 1 to 5 inclusive.

Preparation

At this stage, the concept of the study is still abstract and the object of careful preparation is to bring the study to a programme of work which defines the individual areas of study. All possible alternatives are examined, the technical and economic studies are defined as far as possible, the financial basis of selecting the optimum scheme is agreed, and the objectives of the final report are set out.

Although there is little to record in general about this preparatory stage, it is in practice a most important step, calling for maximum experience and original thought. For this reason the most senior staff are used to define the objects and boundaries of the study.

Technical and Economic Studies

The range of technical and economic studies is as extensive as the whole field of technology, but some rationalization and generalization is possible. Laterally across the whole range of projects, the studies will be concerned with site locations, transport, raw materials, plant, markets and profitability. As in all analytical study, the facts relating to each area of study are first collected, then analyzed technically and economically and the results of the study recorded in a report. The skills required to undertake this first group of studies are those of the economist, market researchers, and engineers and process men drawn from any technical field having a bearing on the study.

Some aspects of project location and transport may be considered as an example. Considerations of this type often occur, where existing transport facilities are inadequate and they may determine whether a project is feasible. Initial studies would include examination of all possible sites, probable annual output, and destinations of the finished product.

The type of transport to be employed will be decided on the basis of cost, this cost to include provision for depreciation and servicing of the capital invested in transport. Over a fixed distance the most economic form of transport becomes a function of the annual quantity to be moved passing perhaps from animal transport at low tonnages to road transport at medium tonnages and rail at higher tonnages. Over other distances the point of transition from one form of transport to another would change, as would occur if other routes are considered. Thus on the question of transport alone, sub-optimal decisions may be taken provided they are not affected by the results of other studies, but in the main optimisation of the project, transport costs must be considered along with all other aspects.

Where distribution of the product is to several markets, it is often useful to draw iso-costs assessing the total market within each iso-cost curve.

As an example of the approach to process considerations of a manufacturing operation, consider the deceptively simple telephone instrument. There are approximately 200 different parts in a telephone, requiring about 60 different machines to produce them. The first question to be decided is whether each part would be cheaper to produce locally to meet the relatively small domestic market or whether the same part, mass produced overseas, could be imported at a lower cost allowing for freight and reasonable import tariff. Firstly the type of machine is decided by the production engineers and the total number of machine operating hours calculated to produce the number of parts required to meet the market. The cost of production locally of each part is then calculated taking into account depreciation of the plant, and capital charges and this is compared with the similarly calculated cost overseas including freight and import tariffs. A number of calculations of this

type will allow a curve to be plotted which will indicate at what percentage plant utilisation it would pay to install a machine locally. Ignoring tariff protection, approximately a machine costing $7,500 would compete with British production if 65% utilised but a machine cost $75,000 would need to be 100% utilised to compete.

The assessment of the existing and future market demand and the sources of production competing to meet the demand are a subject for careful research and statistical method. Often limited historical information is available locally from official records of imports, exports and domestic manufacture, but it is usually necessary to establish more precise data by research study. Population statistics, movement of population, and changes in distribution of income allow some estimate of future demand but more important, account must be taken of the introduction of new products. It is sometimes useful to compare trends with overseas trends particularly in those countries having similar climatic conditions, and similar per capita income.

The techniques of market analysis are applicable to most activities from the provision of finance for industry to determining the future demand for steel or the trend in sales of household appliances.

The whole question of marketing should be thoroughly investigated as one of the component studies, considering the aspects of commercial policy, advertising, selling operations, product and market research and sales forecasts.

Optimisation

The first group of studies will have established the alternatives arising from the main technical and economic factors including process methods, size and location of project, handling

and transport methods. In a simple industry the development plan may be seen clearly from the studies but in more complex cases many possible feasible alternatives will have been presented during the initial studies. In some cases the alternative courses may number thousands necessitating the use of a computer to select the best scheme, and by this is meant the best percentage profit on capital invested at an acceptable level of output.

A high level of output may result in a loss resulting from higher transport costs and distances or enforced lower prices to meet competition.

In some cases maximum percentage return on capital employed may not be the criteria for deciding on one scheme in preference to another. An investment company with enough investment opportunities to absorb all its available capital would select the scheme which would provide the best average percentage return on its investments.

For example consider the following alternative schemes

	Capital	Profit	% Profit
Scheme 1	$500,000	$75,000	15
Scheme 2	$1,200,000	$156,000	13

If scheme 1 is adopted, there would be $700,000 available for investment at 9%, the average rate of return on the total investment of the company. The total profit on the total sum of $1.200,000 would then be $75,000 + $63,000, which represents an average of 11.5%. In these circumstances the company would probably choose Scheme 2 because it wuuld provide a return of 13% on the total amount of $1,200,000.

Maximum percentage return on capital invested may result in higher risks than an investment providing lower profits. The risk arises from the fact that all the studies made are only estimates, and if the distribution of doubt of the profitability of the whole scheme is computed and the frequency curve falls partially outside the profit region there could be undue risk.

The probability curves of the percentage return on risk or equity capital indicate a greater possibility of loss with a highly geared capital structure although there is a higher median percentage return on equity. Bankers are aware of this and they endeavour to limit their loans to industry to an amount approximately equal to the equity capital.

Finally, there is the need to assess the relative merits of a scheme in both the short and the long term for which purpose discounted cash flow techniques are used. In this method present and future profits, capital expenditures, depreciation, residual value of assets and further capital (loan and equity) acquisitions are discounted to give a present day value. This type of calculation is important when a project is to be developed in phases, and provides a logical answer to questions of "how much expansion - when?".

Develop the Selected Scheme

Extent of Development of the Plan

At this stage the details of the selected scheme should be developed only to a limited extent, but the detail must be adequate to allow:-

(i) Estimation of a reasonably accurate capital cost

(ii) Estimation of a reasonably accurate profit and cash flow

(iii) A fair description of the project to assist implementation of the plan, and to assist Government and banks to make their own assessment of the project.

(iv) The preparation of a master plan up to the production stage.

CHAPTER II

MARKET ANALYSIS

This chapter is intended to present a short concise review of some of the most important factors relating to marketing. There are three interelated factors which the project evaluator must consider together.

(i) The total market demand and the product selling price

(ii) The share of the market it is planned to obtain and the organization and method by which the new project will achieve the planned sales.

(iii) The cost of selling

The total market demand and the product selling price are derived from market research. The share of the market it is planned to obtain relates directly to the marketing organization it is proposed to establish and this in turn determines the cost of selling.

There is a balance to be achieved in the product design, the product cost and selling price, the distribution channels and the promotion methods to be employed.

It is convenient to look at the marketing problem under the following four headings:

(i) Product decisions
(ii) Marketing channel decisions
(iii) Price decisions
(iv) Promotion decisions

These decisions are considered from the point of view of the project evaluator rather than from that of the entrepreneur, although the two are not dissimilar.

Product Decisions

(a) Design

Will the design of the proposed locally made product, as compared with the existing imported product, be less efficient or less attractive, equal to, or better than the imported product? Does it compare favourably with alternative products either imported or locally made?

(b) Is packaging important?

(c) Research into product design should be avoided if possible when introducing a new technology, and full use should be made of foreign expertise. There may be exceptions to this, for example the preparation of an industrial product from indigenous materials, or in the field of consumer goods, - womens clothing.

(d) Would the product be easy or difficult for competitors to copy? When would the effects of this competition arise? Are any acquired patents soundly based or can they be easily side-stepped?

(e) Is the proposed product likely to have rapid market acceptance or will sales only slowly increase? A radically new product may invoke market resistance.

(f) Demand estimating

TAX YEAR. (in the U.K.) The year ending 5th April, e.g. 1972/73 = 365 days to 5th April 1973.

TIME WORK. Where a person is paid on time spent irrespective of output (cf. piecework).

TRADE INVESTMENTS. Investments made for purposes of trading as opposed to the investment of surplus funds.

TRADING ACCOUNT. See Profit and Loss Account.

TRANSFER.

SHARE TRANSFERS. The documents recording the transfer of a share in a company from one holder to another.

LEDGER TRANSFERS. The transfer of an amount between one ledger account and another. (In theory these are put through a Journal but in practice the Journal is frequently omitted).

TRIAL BALANCE. A list of debit or credit balances from ledger accounts, cash book etc., extracted to test arithmetical accuracy and as a step to preparing accounts.

TURNOVER. The total money value of business handled during a stated period. Principally used for purposes of comparative ratios.

UNCALLED CAPITAL. The total sum which a company may call upon its shareholders to pay up on partly paid shares (q.v.)

UNCALLED LIABILITY. The sum which might have to be paid in respect of uncalled capital on partly paid shares held. This sum must be stated in a Balance Sheet as a Contingent Liability (q.v.) of the holder of such shares.

VALUE OR VALUATION. The value set against an asset for accounting purposes.

BOOK VALUE. The value at which an asset is recorded in the books. Usually either the original cost or the cost reduced by depreciation (q.v.). Sometimes assets are revalued above or below their former book value.

F.I.F.O. (Abbreviation for First In, First Out, sometimes written FIFO). The basis of stock valuation which assumes that the oldest stock is used first so that stock is valued at the price of the latest deliveries.

Where a project is to make products to substitute products currently imported, the current market demand will be well known, but the future demand may depend on:-

- industrial expansion
- price
- consumer income distribution

Marketing Channel Decisions

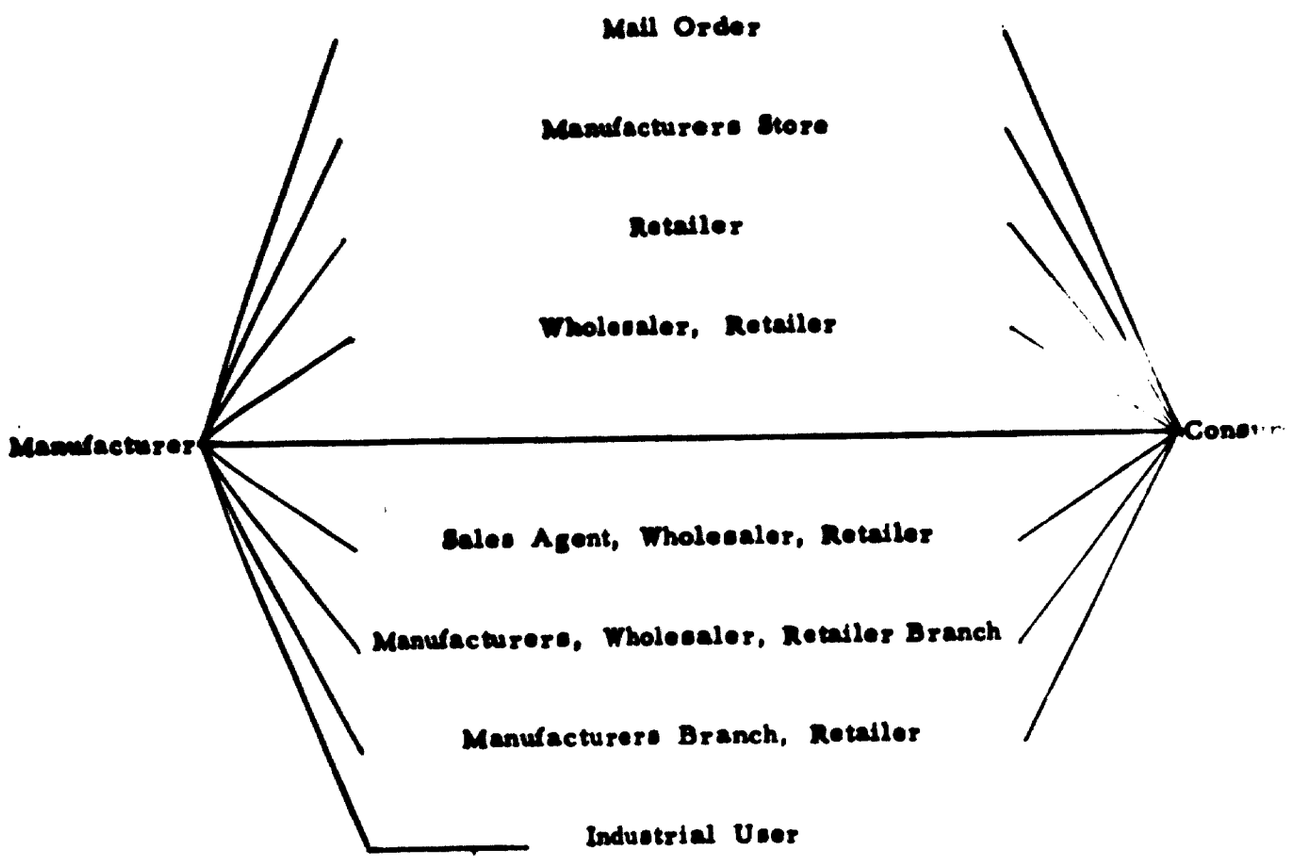
It is imperative, at the outset, for a broad decision to be made on the marketing channels to be used, because this has a major bearing on the price structure of the product. A distinction has to be made between the flow of goods and the flow of transactions, because where brokers are used for financing, they do not physically handle the products.

Existing channels, particularly for goods currently imported, may be indirectly financed by the importer or wholesaler, who may provide credit for the goods he supplies for periods of up to 9-12 months. If in these circumstances the new project proposes not to use important/wholesalers and to sell direct to retailers, this would certainly reduce the price of the product to the user, but the project would need to provide capital to cushion the effect of the withdrawal of credit previously provided by the importer/wholesaler.

The use of sole sales agents working on the basis of commission is a matter which should be checked by the project evaluator. An excessive sales commission can jeopardise the profitability of an enterprise.

The normal marketing channels available to the manufacturer are shown in the following chart.

MANUFACTURERS MARKETING CHANNELS



Price Decisions

Price decisions are based mainly on economic concepts, but there are other factors which must be taken into account.

Pricing may involve administrative complications in that the subordinates freedom in setting prices is necessarily limited, and further, in periods of intense competition salesmen expert pressure to reduce prices. The evaluation of the importance of moral judgement on competitors behaviour relative to price-cutting and the areas where the law impinges on pricing are both important factors.

Competitor's Behaviour

Competitors reactions to price changes follow a pattern of price-leadership, effective collusion, limited collusion or chaotic competition. The factors determining the pattern are the number and size of companies operating within the industry, product differences, industry demand, size and type of buyers, marketing channels, cost conditions, geographical distribution of the market, law, number of products, and the internal organization of the company.

When establishing a new project, consideration must be given to the potential competition, and the following factors are of importance:

1. How easy and cheap it would be for another competitive plant to be established.
2. How much potential competitors could learn about the profitability of the project.
3. The degree of product acceptance.
4. Any particular merchandising reasons which would attract others to set up a competitive plant.

5. The size of the buyers, the concentration of the buyers, and whether they are technically informed.

Demand

Although the project evaluator is concerned primarily with company demand, consideration must be given to industry demand and the price elasticity of industry demand. Elasticity is a measure of the relation between the relative change of the determinant and the relative change in sales. An approximate numerical statement of the concept in terms of price is:

$$\text{Price Elasticity} = \frac{\text{Per cent change in sales}}{\text{Per cent change in price}}$$

The following generalized factors contribute to the price elasticity of demand.

(1) Whether the product is a luxury or necessity

(2) Whether substitutes are available

(3) Importance of the product in the buyers expenditure

(4) The level in the structure of distribution

(5) The extent to which the product can be stored

(6) If the product is used in further production, the elasticity of the end product, and the importance of the product in the manufacture of the end product.

Depending on the product, price elasticity can change in a relatively short period of time and therefore, from the point of view of project evaluation, demand forecasts based on price elasticity must be treated with reservation.

There are three main methods of estimating the effect of price on sales - experimental, buyer interviewing, and analysis of historical time series data.

The experimental method is suited to measuring the effect of price change on consumer goods, and is effected by taking two comparable markets and noting the effect of price change in one of them. A number of control and experimental markets are actually used, to provide a statistical average.

The buyer interviewing method which consists of asking buyers what their reactions would be to price changes, has limitations, but would provide supplementary information.

The third method, time series analysis, has perhaps been the most used. Price and sales data at different time periods are used, to arrive at a price-sales relationship by using the least squares principle employed in regression analysis.

The cost of production, calculated for a range of production levels, will provide the basis for estimating the annual profits. The entrepreneur will seek to maximize the long term profits and although a lower price may increase the sales volume, it may also reduce the profit. There is an optimum price for maximizing profits and a corresponding optimum plant output.

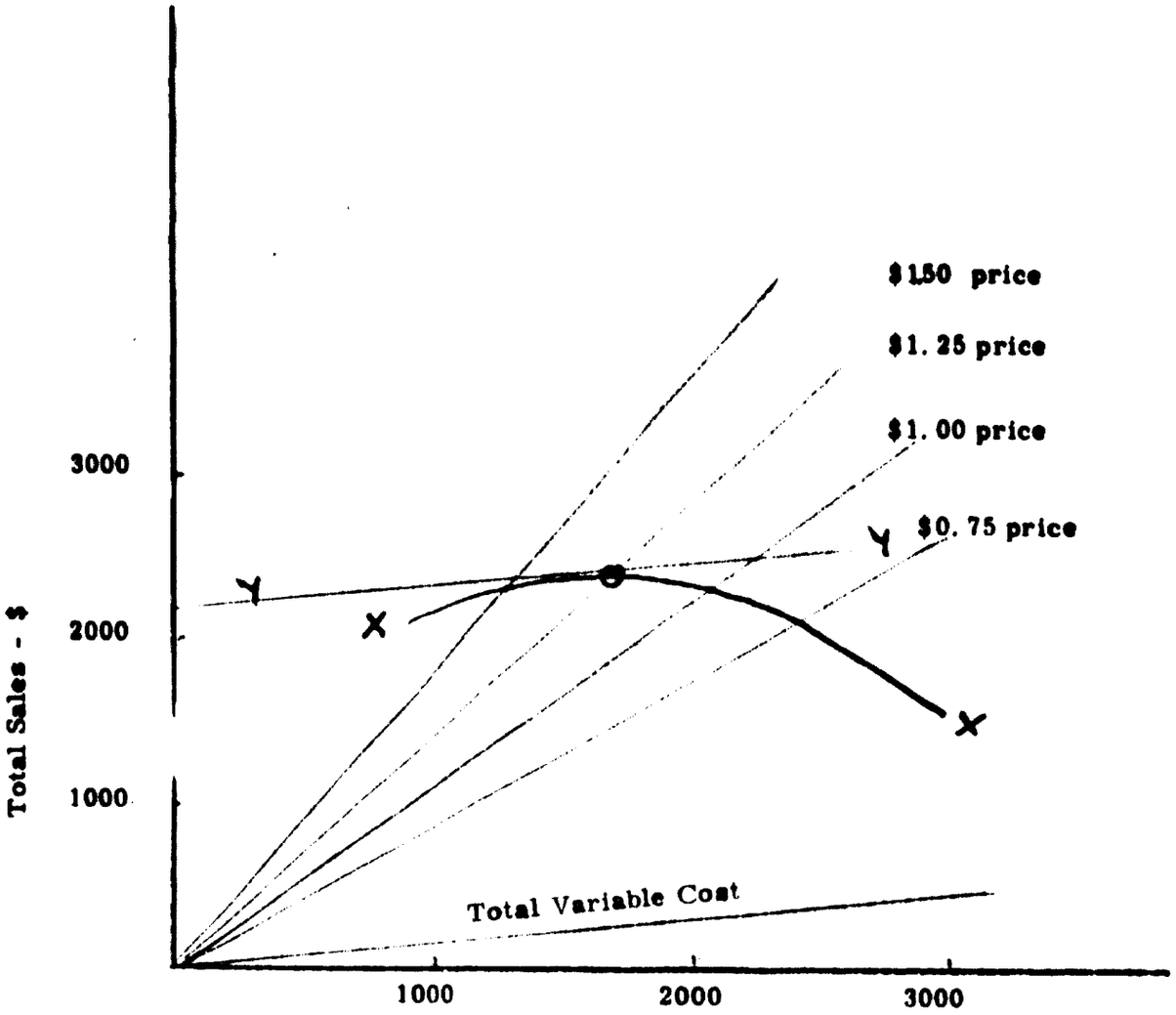
In the typical price - sales chart four lines are drawn connecting total sales value with total physical sales corresponding to the four unit prices under consideration. Curve XX is drawn through the points representing the volume of sales at the four experimental prices. The total variable cost is plotted and curve YY is drawn parallel to the total variable cost curve at a tangent to curve XX. This gives the optimum point on curve XX at which profits are maximized corresponding to a unit price at $1.25.

The same conclusion would have been reached by calculating the contribution to profit at each price level.

Sales $	- Fixed Costs	- Variable Costs	= Contribution to Profits

Finally, the amount of distribution discounts, quantity discounts and cash discounts, must be considered in the price structure

PRICE-SALES RELATIONSHIP



Curve XX is drawn through the points representing the volume of sales at the experimental prices.

Curve YY is drawn parallel to the total variable cost curve.

Promotion Decisions

Promotion is any action taken to stimulate sales by providing information to prospective buyers. The two areas of promotion are advertising and personal selling, although not all expenditures which take place in these two fields are directly related to promotion.

Promotion is only a part of total marketing strategy, and promotion is only effective when the other aspects of marketing strategy are satisfactory. The ultimate point of sales buyer contact must be adequate and socially acceptable or promotion will not be successful.

A buyer receives information about a product from many sources other than through direct promotional expenditures. Experience with the product, discussions with others, newspaper editorials and magazine feature stories are but a few of the sources.

The problem is to measure the level of buyer information in a market and to allocate promotion funds accordingly. The techniques of market research may be used to determine the level of information existing in a market, but the extent of funds for promotion must be decided on a qualitative basis.

The division of the total amount allocated to promotion between advertising and personal selling is based on an assessment of the relative effectiveness of advertising as compared with personal selling on a unit cost basis.

The following table provides indicative ratios of advertising to selling expenditures by product, as recorded in the U.S.A.

	Ratio - Advertising - Personal Selling
Food Products	11 : 1
Grocery Products	2:1 to 3:1
Garden Equipment	1 : 1
Office Stationery	1 : 1
Domestic Boilers	1 : 1.5
Animal Feed	1 : 1.5
Roofing Materials	1 : 2
Domestic Electrical Equipment	1 : 2
Bedding	1 : 3
Insulation Material	1: 3.5
Kitchenware	1 : 4
Automobile Equipment	1 : 5
Womens Apparel	1 : 1 to 1 : 5
Paint	1 : 3 to 1 : 5
Farm Machinery	1 : 6
Flour	1 : 7 to 1 : 11
Industrial Equipment	1 : 11
Paper Specialties	1 : 11

The allocation of advertising expenditures constitutes from less than 1% of the sales value up to 15%, the highest grouping being soaps, cooking fats, cigarettes, cereals, drugs and medicines which range from 10% to 15%. There is a need to bring together specific data on this subject relating to Iranian conditions. Personal selling expenditure is generally allocated on the basis of the number of salesmen required to do the job, at least this is so at the feasibility study stage.

Market Research in Developing Countries

Reference has been made to the need for market research in all aspects of market analysis, and this function has particular application in demand estimating, to which reference has been made under "product decisions" and price elasticity of demand discussed under "price decisions".

In countries where, due to rapid development, per capita income is rising rapidly, the market studies must take into account the following:-

1. The planned sectoral rate of development and the actual past sectoral development.

2. Expected changes in income distribution.

3. The estimated population growth rate and movements of population.

4. Variations in preference or habit ethnic groups.

5. The effect of the overall and group increases in per capita income.

The availability of research reports in any of these areas should be recorded, but it should be noted that official statistics may be distorted by unclear customs classification, falsification of importers statements, or smuggling, and should be cross-checked.

L.I.F.O. The basis of stock valuation which assumes that the newest stock is used first.

MARKET VALUE. The sale value usually less selling costs.

NET VALUE. A value after making some deduction, the nature of which depends on the context.

REPLACEMENT VALUE. The sum at which an article can be replaced.

SALE VALUE. The sum for which it is considered an article could be sold.

STANDARD VALUE. The value based on any standard list, which may be based on standard costing.

VARIANCE. The difference between standard and actual cost.

WEAR AND TEAR. Used to denote the 'wear and tear' allowances which can be charged against profits for tax purposes in respect of depreciation (q.v.) of assets.

WORK IN PROGRESS. Material, and the labour and usually (but not always in practice) some overheads expended thereon, between the raw material stage and the finished product stage. Hence, used loosely for the value of work in progress.

WORKING CAPITAL. See Capital.

WRITE DOWN. The process of reducing the book value (q.v.) of an asset.

WRITE OFF. The process of eliminating entirely any book value of an asset.

WRITE UP.

(a) The process of entering an original book of account, cf. posting (q.v.)

(b) The process of re-assessing a book value (q.v.) to a higher figure.

It is necessary to compile for comparison purposes the sources of similar data for other countries. It would be useful in Iran to have access to industrial statistics relative to countries having some similarity of industrial development, for example, Spain and Australia. But in the field of agriculture, Australia and Israel would provide useful comparisons. Contacts should be made to facilitate collection of this data.

It is often valuable to have country-wide market surveys in special product groups by expert personnel, for example textiles or machine-made furniture.

Opinion surveys to sound out the opinions of importers, wholesalers, retailers and consumers are perhaps unreliable, but unreliable as they may be, in the absence of reliable statistics, opinion surveys may be the only source of information.

Experiments in which the market is tested by a limited quantity of the actual product to be manufactured, are useful but particular regard must be paid to repeat users as distinct from initial users.

All techniques of market research are concerned with the collection of data, and the logical inference of future trends based on the data collected. Often the data available does not extend over the period necessary to infer future trends with any degree of certainty. Time-series of ten years or more are desirable covering imports, exports, domestic capacities and production, consumption, population, national income and the price of the particular product under investigation. The inference of future trends must take into account the five overall influencing factors already mentioned, and special consideration must be given to changes in per capita income. This introduces the economic concept of elasticity of demand, for which an approximate numerical statement is:-

$$e = \text{Demand Elasticity} = \frac{\text{Per cent change in demand}}{\text{Per cent change in per capita income}}$$

The ratio between the increase in demand and the increase in per capita income gives the co-efficient of income elasticity of demand. It is a measure of the sensitivity of demand to changes in income, and for each 1% increase in per capita income, the demand for a particular commodity increases e%.

Where the changes are substantial, i.e. 5% or more, it is necessary to apply the more accurate logarithmic formula:-

$$e = \frac{\text{Log } Q_2 - \text{Log } Q_1}{\text{Log } Y_2 - \text{Log } Y_1}$$

where $Q_2 = k y_2^e$ During period 2

$Q_1 = k y_1^e$ During period 1

and Q = Demand
Y = Income per capita
k = A constant

A numerical example of the two calculations follows:

	Consumption Per Capita	Income Per Capita
Year 1347	10 units (100%)	$800 (100%)
Year 1351	14 units (140%)	$1000 (125%)

Approximately $e = \frac{140 - 100}{125 - 100} = 1.6$

Logarithmically $e = \frac{\text{Log } 140 - \text{Log } 100}{\text{Log } 125 - \text{Log } 100} = 1.51$

Thus if there is a planned increase of per capita income in real terms of 8% and a population increase of 2.5%, an annual increase in demand of (1.51 x 8) + 2.5 = 14.6% could be expected for this commodity. The value of e is not constant over time, and comparisons must be made with data from other countries to check at what per capita income level, the demand elasticity changes.

Further, demand will change with the price and a similar calculation must be made of price elasticity to be applied to demand over the time period under consideration.

In the absence of time series data, or as a check calculation, the co-efficient of income elasticity of demand may be calculated from the differences in consumption as between lower and higher income groups. This method has the advantage that it does not suffer from the disadvantage of possible substantial price changes as often experienced over the period of a time series.

Finally it is possible to extrapolate the trend from a curve of the historical trend, by deriving the equation to the curve, but this method too does not take account of other factors influencing demand, and must be checked.

All of the methods are subject to possible errors in basic statistics, or unsatisfied demand resulting from import controls, price controls, and rationing, or unsatisfied demand resulting from scarcity. The latter situation is characterized by high profits to manufacturers and importers.

It is essential that the method of arriving at future demand estimates be set out in detail.

Although in general the methods outlined are applicable to consumer goods, they are also applicable to intermediate goods and capital goods.

In the case of intermediate goods, the demand depends on the demand for the consumer goods into which the intermediate goods are incorporated, for example, ammonia may be used for manufacturing urea fertilizer, and other products, and the future use of fertilizer must be projected to calculate the ammonia required for this purpose. Capital goods must be subject to a detailed individual investigation, taking into account the demand of consumer and intermediate goods for the production of which the capital goods are used, the replacement of worn out or obsolete capital goods in use, the expansion plans of existing plants, and the sectoral development plans.

CHAPTER III

PRODUCTION TECHNOLOGY

Usually, but not always, the entrepreneur promoting a new industrial entreprise, is either already engaged in similar production activities, or forms a business association to provide the essential production technology. The assumption is that the most suitable technology will be acquired from some source and that it will be successfully transferred to the new country or location. But the person or organization providing the technology may fail to provide the most suitable technology for several possible reasons.

(1) His existing technology may be obsolete

(2) He may be interested mainly in profits arising from the sale and export of manufactured components to the new project.

(3) He may be interested mainly in profits arising from the sale of capital plant.

(4) In a few isolated cases he may not have access to the relative production technology.

The project evaluator must guard against these possibilities but in doing so he assumes the position of an appraiser over a wide field of technology. If an engineer specialist in the particular field of the the project under evaluation, is available, then this provides the necessary check. It may be necessary, in the case of a large project, to obtain the services of international specialist consultants. For example, where, perhaps due to some vested interest of the entrepreneur, it is deemed necessary to obtain an independent assessment of international quotations for a wide range of textile machinery.

In the case of smaller projects, where a specialist engineer is not available, the next most suitable person would be an engineer whose background includes experience in a diverse range of industries, such as might be within the scope of an experienced industrial engineer or a chemical engineer.

A comprehensive up-to-date library of production books and other publications, together with abstracting facilities, to which the project evaluator will need to refer, should be maintained.

It is rarely that a project evaluator is presented with one or more alternative projects to consider and generally he is concerned only with the question of whether the project as presented is the optimum possibility, and therefore he must formulate and analyze possible alternatives.

The feasibility study if assiduously carried out, as presented by an entrepreneur will be optimizing the benefits to the entrepreneur and while the optimization would normally be based on maximum profit after tax, the production processes selected would form a part of this decision. The question of overall optimization is considered in a later chapter.

The foreign entrepreneur in making decisions on the production processes to be employed will attempt to maximize profit to himself which is quite different to the maximizing of profits to the new local venture, or the achievement of the lowest cost structure.

Profits accruing to foreign entrepreneur	=	Dividends on shareholding in local company	+	Royalties patent fees etc.	+	Profit and overhead recovery on materials and parts to be supplied

But if the lowest cost structure is the main criteria, as it should be, if the production is to be competitive on the domestic market and exports are to be promoted, then normal economic considerations will decide the processes to be installed. It is not intended in this chapter to discuss the effects of protection applied to the importation of components or to finished products but to illustrate the type of calculation employed given an existing protection policy. Basically the problems arise because production in well established mass production facilities generally give a lower cost than smaller installations providing for a smaller local market.

The sub-optimal decision on processes to be employed may be complex as in steel production, and may relate todemand and economics of plant size, as experienced in chemical industries or less complex such as a decision to use a wet or dry process to produce cement. In the engineering production industry it may be a decision to includs, for example, facilities for fully automated elsctro-plating, or a decision to produce automotive gears.

If a group of machines is under consideration for the production of automotive gears, or if a single complex machine is to be considered such as a continuous bleaching and dying unit for the textile industry, the process engineers decide the most suitable unit(s) and calculate the machine operating hours to meet the estimated share of the market demand. The cost of production is then calculated taking into account depreciation and capital charges, and this is compared with similarly calculated costs for the imported article including freight and import tariffs. A number of calculations of this type will allow a curve to be plotted of percentage plant utilization against capital cost, which has general

application to machines having similar depreciation rates and labour complements. A typical curve of this type is shown in Appendix III/1.

Machine Utilisation and Plant Capacity

There are three types of production, -jobbing, batch, and continuous flow production, and the problems of machine utilisation and plant capacity differ in each case.

In a jobbing factory, that is a plant producing individual units on a non-repetitive basis, the average machine utilisation is more difficult to determine, and it is usual to organize the production load around two or three of the major machines, any one of which may constitute a "bottle-neck". A feasibility study for a jobbing factory must postulate the type of production to be undertaken and relate the market demand to the plant being installed, and therefore a planned plant utilisation is possible. However, the planned utilisation may perhaps never exceed 60% of normal plant capacity and the break-even point could be as low as 40%.

Batch production, in which consecutive batches of a single product or of several different products are fed through the factory, should be organised in considerable detail, allowing output to be achieved up to about 80% of normal plant capacity.

In continuous flow production, the degree of plant utilisation is limited by the time required to maintain the plant, and may reach 95% of the normal plant capacity.

Maximum plant capacity is defined in each case as the theoretical output capacity under ideal conditions which is never reached in practice. 'Normal' plant capacity is defined as the output likely to be obtained, with good organization and management, good maintenance, and making allowance for holidays.

When a new plant starts production, there is always a time-lag before the plant reaches 'normal' capacity due to many factors including the training of operatives, machine 'teething' problems, and management faults. The rate of build up of production must be estimated, and the annual production is expressed as a percentage of 'normal' production capacity. A development bank is continually estimating the production build-up of many eifferent industries and is also in a position to subsequently check the actual build up as compared with the estimated figures. The following examples are taken from actual studies.

	Production Year			
	1	2	3	4
Chemical Plant	75	100	100	100
Glucose Plant	75	83	100	100
Engine Filter Factory	63	83	96	100

It is usual to plan a new factory to meet an expected share of the market, but there are projects in which output could be limited by the market demand for several years, and in such cases the planned, output would not be based on the technical ability to reach normal output but on the expected sales.

Construction Schedule

All the financial projections are based on an assessment of the potential sales and the availability of production capacity to meet the sales during the specific years after production commences. It is

therefore necessary to formulate a construction schedule which is capable of implementation by the planned production date. Further, it is necessary to forecast the timing and extent of both local and foreign funds to meet the coets of construction as they arise. The financial analyst will use the construction schedule to plan the flow of incoming funds from all sources. Even where the entrepreneur has prepared both a construction schedule and a cash flow forecast it is necessary to check that the conetruction schedule is realistic and consistent with current local conditione.

The construction schedule may be presented as a series of dates for completion of the major construction phases, or as a bar chart, and rarely as a critical path network. However, in view of the importance of accurate forecasting of the construction schedule, the use of the critical path network is explained.

A typical bar chart for a new factory construction is shown in Appendix III/2, - it is a 'perfect' chart because it has been constructed from the critical path analysis. That is, the planned timing of each operation, provides for commencement and completion of each operation to meet the final operation date. But usually the pre-production bar chart prepared for a feasibility study is drawn only approximately without the help of a critical path analysis, and only later at the detailed planning stage is a network diagram prepared. If the amount of expenditure relating to each pre-production operation is entered on the bar chart, a detailed statement of cash outflows results, against which incoming funds can be matched.

To some extent the network diagram illustrated in Appendix III/3 is self explanatory, but it should be noted that the critical path, or minimum time to complete the project, occurs when the expected time

CHAPTER X

COMPANY STRUCTURE IN IRAN

Reprinted from "The Industrial Guide to Iran"

1. Policy on Foreign Ownership of Business Enterprises:

There are no laws or regulations which stipulate the amount of ownership a foreign firm may have in a business enterprise in Iran. In practice, however, the Iranian Government follows a policy of reserving the majority share-holding in an enterprise to Iranian parties. Thus, in general, foreign firms have less than 50% of the equity in a given venture.

With respect to the Iranian Government's policy on foreign investment in Iran, Prime Minister Hoveyda, on December 1, 1966, made the following statement in Parliament in response to a Member of Parliament who had enquired about the Government's policy on attracting foreign investment: "As to foreign investment, we consider this an important matter, and we are in favour of securing foreign credits within the possibilities of our future foreign exchange earnings. However, we insist on a minimum of 51% of Iranian investment in the (joint) companies."

Foreign companies and nationals may own or lease real property in Iran provided such property is for industrial or commercial use or for a personal residence. Foreigners, however, may not own agricultural lands and, under Article 24 of the Iranian Constitution, are barred from acquiring agricultural or mining concessions without the legislative authority of the Iranian Parliament.

Foreign firms must comply with the provisions of the Law Governing Registration of Companies of 1931, the Commercial Code of 1932, and of the Production and Exports Promotion Act of 1955. Pursuant to these laws, all companies, foreign, domestic, or mixed, are required to register for tax and regulatory purposes with the Department of Registration Companies of the Ministry of Justice. Individuals or

and the minimum time for completion of each operation are identical that is the two figures on the right of each circle are identical.

Plant Layout Diagram

To arrive at an estimate of the factory building cost, the approximate area must be deduced and for this purpose a simple diagrammatic plant layout should be prepared. Although this is intended primarily to arrive at approximate building areas, it also assists the project evaluator to understand the processes and plant being proposed. For example, a plant layout diagram, could clarify the extent of mechnization proposed in a fractional horse-power electric motor plant, or in the case of a brick plant, whether air drying or tunnel drying would be employed prior to firing. The evaluator must understand the physical aspects of the plant and processes and check that the overall building areas are reasonable. There are many examples of plant layout diagrams to be found in reports at the Ministry of Economy.

Flow Chart

A simple flow chart depicting the operations and products through the factory should be included in all industrial project feasibility studies. A typical flow chart is given in Appendix III/4. in this case for a beef packing unit.

Site Location

The main factors contributing to a decision on site location are:-

1. Product distribution costs (internal)
2. Raw material costs delivered to the factory
3. Exports
4. Availability of skilled labour
5. Availability of service - power, water, gas
6. Capital cost

The product distribution costs will change if the distribution pattern changes with time. Assuming the fourth and fifth items can be met, and that the capital cost does not vary greatly as between one location and another, the question of site location may become a matter of optimizing the total costs under items 1, 2 and 3, and in particular the optimization of total transport costs.

Of course, a tax incentive may be offered by the Government to attract industries to a particular area and then, from the point of view of the entrepreneur, the tax savings would have to be offset by any additional costs incurred as a result of choosing the site on other than techno-economic considerations.

An interesting study on site location appears in a Ministry of Economy report entitled- "The Iranian Fertilizer Industry" dated September 1973, to which reference should be made as a case study. It is products such as fertilizers, which are heavy and relatively low in unit cost, which provide problems of site location. The location of bricks and cement plants presents similar problems.

There are two useful techniques which find application in problems of site location, - graphical presentation of alternative modes of transport and the use of iso-cost curves.

Economics of Transport

At the early stages of a project, the site location, the proportion of products going to the home market and/or the export market, and the scale of output have yet to be decided, and an investigation into the economics of transport must first be undertaken as part of the overall studies leading to decisions on these matters. A typical situation would be the opening up of a new mineral deposit in a remote area where there is no existing transport service.

A transport study starts with a range of possible sites, a range of possible annual outputs, and a range of possible destinations. The alternative modes of transport to be considered might be to build a road, construct a railway, establish a camel or mule train, or to build an airfield.

A calculation is made in respect of a fixed distance, say between a particular site and particular desitnation, for a road transport system, of the capital and operating costs over a range of annual tonnages. The operating costs would include depreciation and an arbitrary return on the capital invested. Similar calculations can be made for a railway and other modes of transport, and all the operating costs can then be plotted against annual tonnage. In the example shown in Appendix III/5 a camel or mule train is cheaper for low tonnages, a road for medium tonnages and a railway for large tonnages.

Iso-Cost Curves

When distribution costs are high as in the cass of fertilizer or coal or electricity, it may be helpful to draw iso-costs surrounding areas which can be served by given distribution costs.

Appendix III/6, shows a hypothetical set of iso-cost curves such as might arise for the distribution of fertilizers from three production centres at Bandar Shahpour, Rasht and Mashad. The market demand within each distribution cost area would need to be studied separately.

Electrical Power

There are a number of terms relating to electric power supply which the project evaluator needs to know.

(1) Direct Current

A direct current is a flow of electrical energy in one direction, induced by a difference in voltage which itself remains more or less constant.

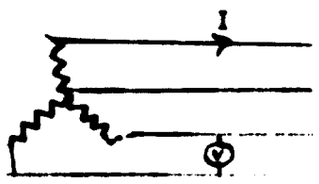
(2) Alternating Current

An alternating current is a flow of electrical energy which is rapidly changing direction, induced by a difference in voltage which itself is rapidly reversing.

(3) Rate of Use of Power

The practical unit of the rate of use of electrical power is the watt, which is equatable to mechanical horsepower.

With direct current	Rate of use of power	= Volts (V) X Amps (I)
With alternating current	Rate of use of power	= Volts (V) X Amps (I) x Power Factor (Cos ϕ)
With alternating current - three phase	Rate of use of power	= $\sqrt{3}$ V I Cos ϕ



where
V = Line voltage
I = Line current

One Horse Power = 746 watts

(4) Installed Capacity

A factory which uses electrical power at many points is said to have a certain total installed capacity expressed in kilowatts.

(5) Load Factor

In many factories, all the installed units comprising in total the installed capacity, do not operate constantly throughout the working hours of the factory, and the 'load factor' expresses this relationship.

Installed Capacity (kW) x Load Factor

= Average rate of use of power (kW)

(6) Measurement of Power Consumed Over Time

If an appliance uses electrical power at the rate of 1000 watts then in one hour the unit is said to consume one kilowatt-hour where a kilowatt = 1000 watts. This is written 1 kWH.

The term kVA is not a true expression of power consumed, unless the power factor happens to be unity and the voltage and current curves are then co-incident. This is explained more fully under the heading 'Power Factor'.

The total power consumption per working shift may be calculated from the expression:-

Installed Capacity (kW)	x	Load Factor	x	No. of hours Per Shift	=	Power Consumed Per Shift

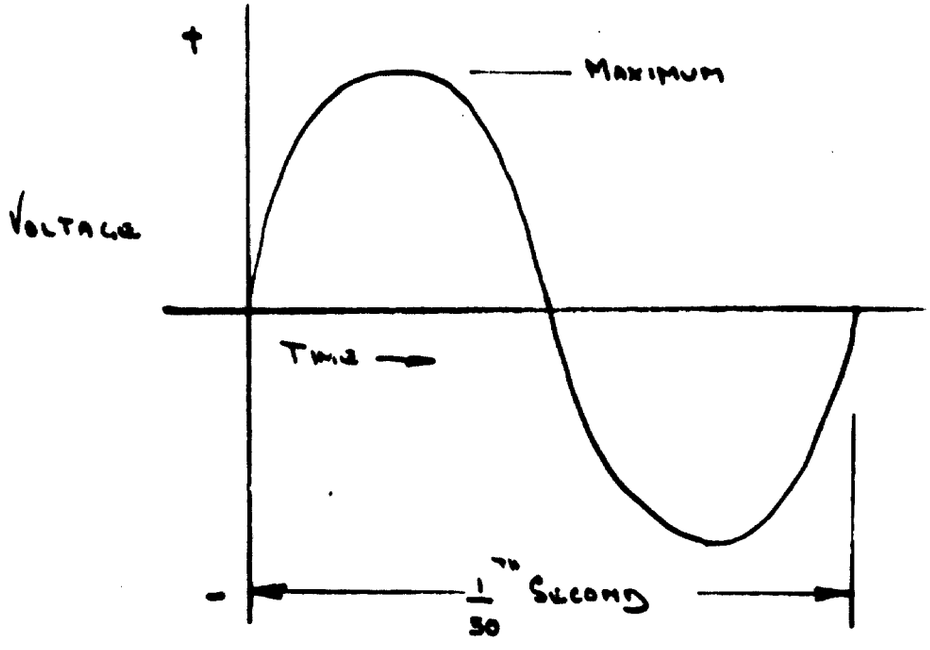
The total power consumption per annum:-

Power consumed per shift	x	No. of shifts	x	Working days per annum	=	Annual power consumption

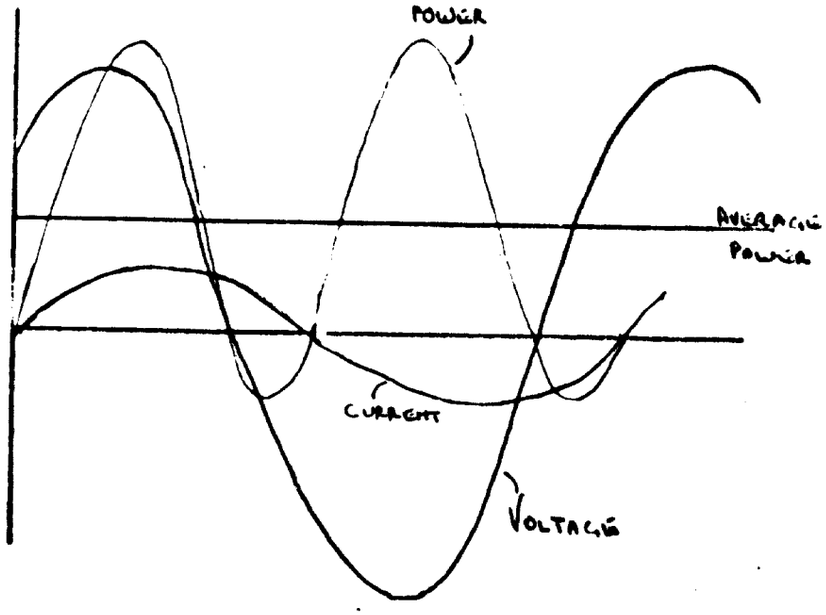
(7) **Power Factor**

In an alternating power circuit, the characteristics of the circuit, displace the relationship between the applied voltage and the resulting current. When a voltage is alternating it means that starting from zero voltage, it rises to a maximum in one direction, then reduces, passes through the zero point and then increases in the opposite direction to a maximum, and then reduces again until the zero point is again reached. This cycle is rapidly repeated, and in Iran, the power supply operates at 50 cycles of the type described, every second.

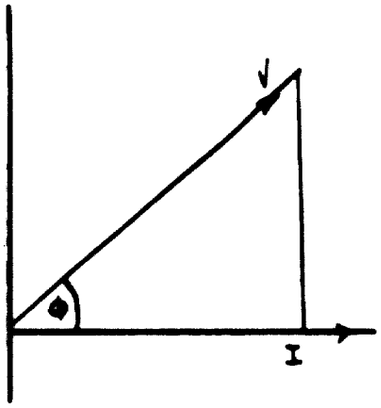
Because of the way in which electric power is generated, the rate of increase and decrease of the voltage varies and if a curve is plotted of voltage against time the curve is seen to be sinusoidal.



Now if this alternating voltage is applied to a circuit, perhaps for lighting or to drive an electric motor, the electrical characteristics of the circuit will determine whether the voltage and the induced current will reach their maximum together. In normal industrial applications the circuit characteristics are such that the current curve never leads the voltage curve - the curves are either coincident or more usually the current curve lags behind the voltage curve.



The values and phase relations of sine-wave currents and voltages may be represented by vectors, and both currents and voltages may be added in the same manner as vectors. To calculate power the current vector and the voltage vector are multiplied.



Power Component $V_1 = V \cos \phi$

in phase with the current vector I_1

Power $= V_1 I_1 \cos \phi$

Reactive Componsnt $= V_1 I_1 \sin \phi$

ϕ = Phase differencs between V and I

Cos ϕ is called the power factor, that is the factor by which VI must be multiplied to arrive at the average powsr. But to derive useful power equal to VI cos ϕ, ths equipment has to be designed for V I kVA and so the term kVA is used as a measurement of electrical loading but not electrical power.

A factory will have a power factor which is a resultant of all the individual loads, for example lighting alone would have a power factor of almost unity, electric motors .7 to .8 and perhaps the factory would havs an overall power factor of .85. These are indicative figures only.

Combining all Factors in a Numerical Example:-

Factory Installed Capacity	700 kVA
Power Factor	.85
Factory Installed kW	595 kW
Load Factor	.70
No. of operating Hours Per Shift	8
No. of Shifts per Day	2
Operating Days per Year	300

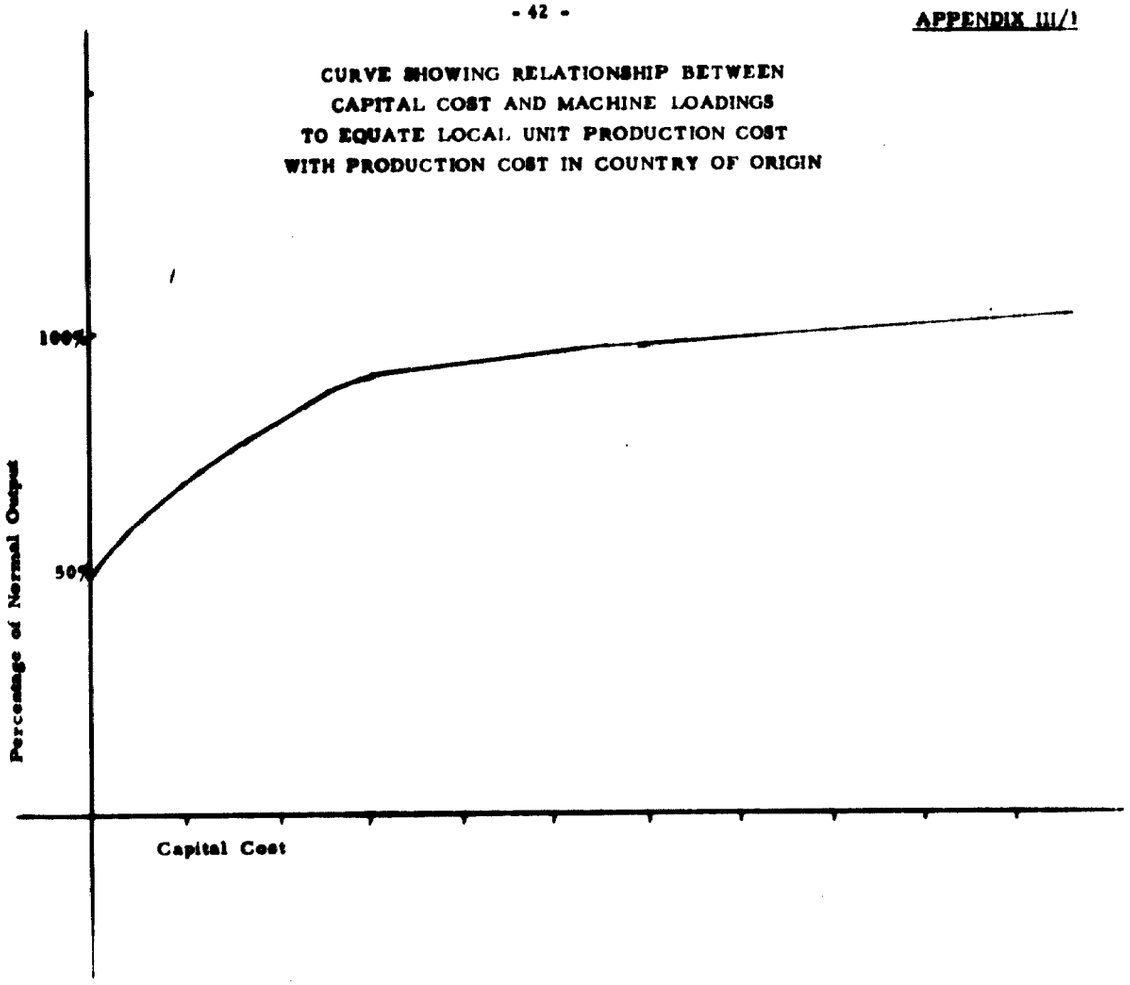
Total power consumed per annum

= 700 x .85 x .70 x 8 x 2 x 300

= 2,000,000 kWH per annum

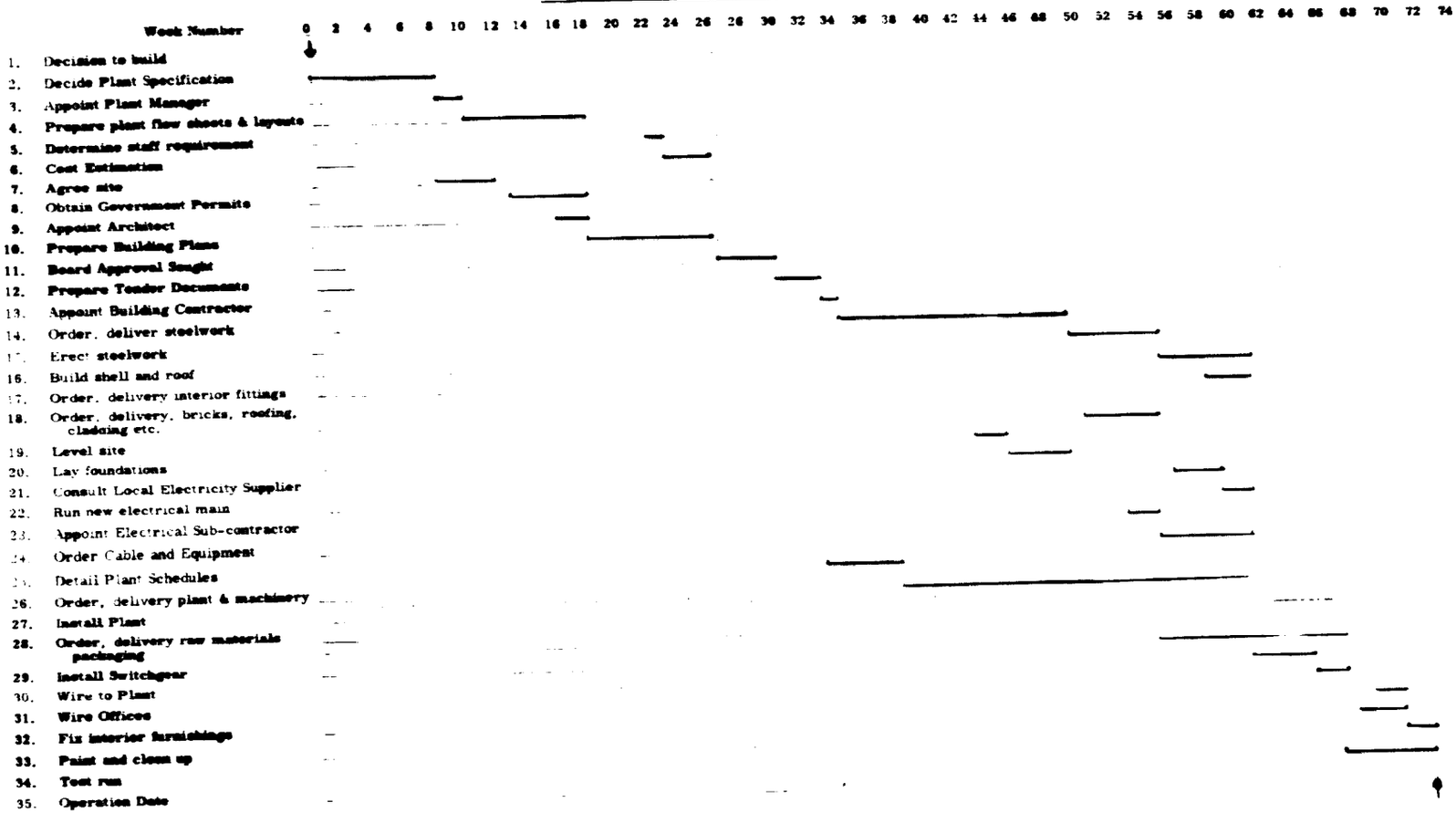
APPENDIX III/1

CURVE SHOWING RELATIONSHIP BETWEEN
CAPITAL COST AND MACHINE LOADINGS
TO EQUATE LOCAL UNIT PRODUCTION COST
WITH PRODUCTION COST IN COUNTRY OF ORIGIN



APPENDIX III/2

NEW FACTORY CONSTRUCTION - BAR CHART



business entities that fail to comply with the registration requirements are liable to prosecution and, if found guilty, may be fined and their future business activities prohibited.

2. Types of Business Organization:

The basic legislation covering the organization and operation of business entities, commission agents, brokers, attorneys, and other persons doing business as principal or agent is the Iranian Commercial Code, which became effective in 1932. Other subjects covered by the Code include instruments, bankruptcy, and trusteeship.

Types of Organization:

Business entities defined by the code are:

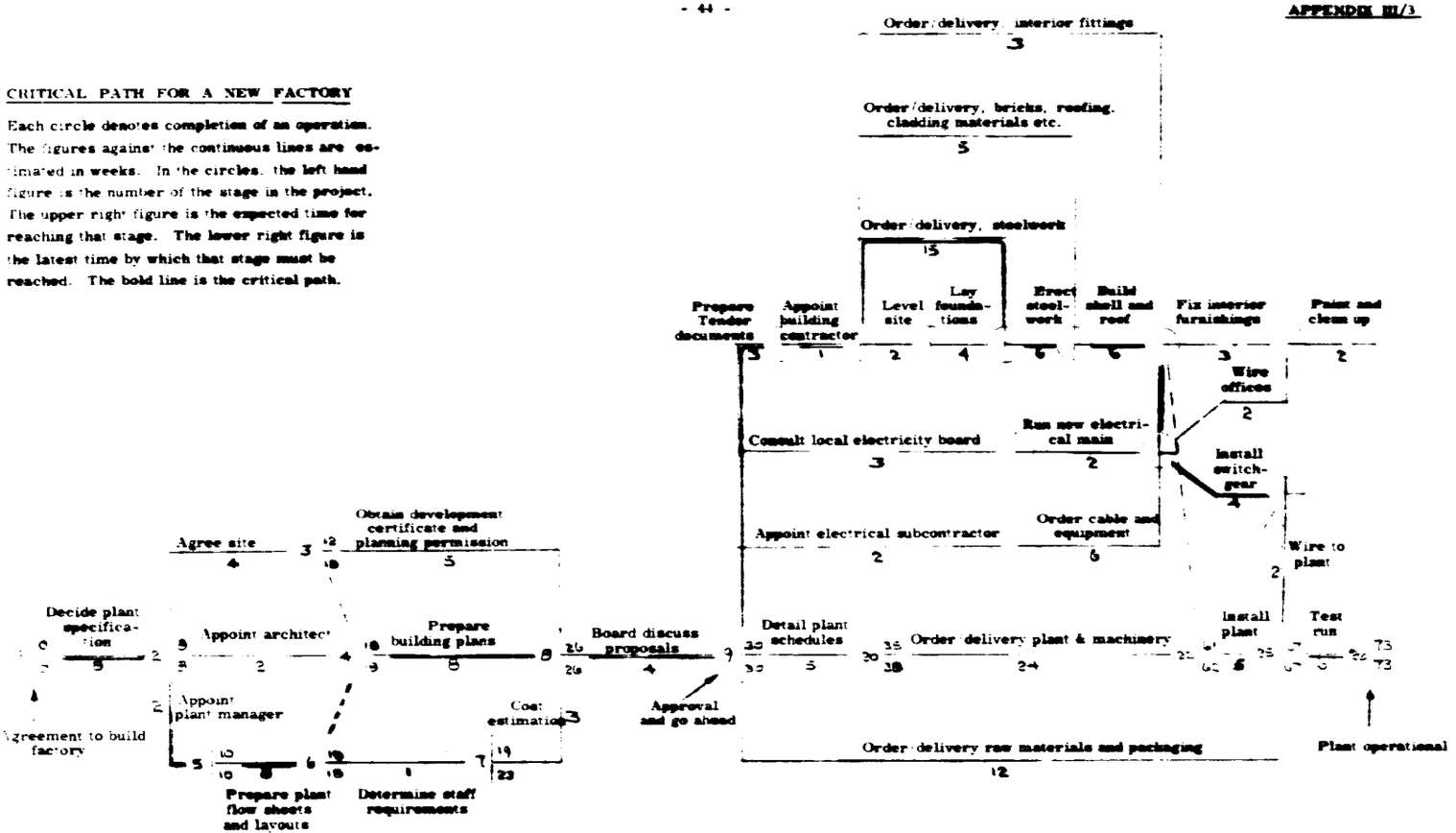
- Sherkat Sahami (joint stock company or corporation) - The capital of such a company is divided into shares, and the financial responsibility of the shareholders is limited to their holdings. The name of the company does not ordinarily include the names of any of the shareholders. Shares do not have to be issued in the name of the shareholders.

- Sherkat Ba Massouliat Mahdood (Limited liability company) - This is essentially a limited partnership of two or more persons. Each of the partners is financially liable for the amount of his contributions. The company's name does not ordinarily include the names of any of the partners.

- Sherkat Tazamoni (general partnership) - The partners in this type of business organization are jointly and severally liable to pay the obligations of the company if the partnership's assets are not sufficient to meet its obligations. The trade name of the company must include the term "general partnership" and the name of at least one of the partners.

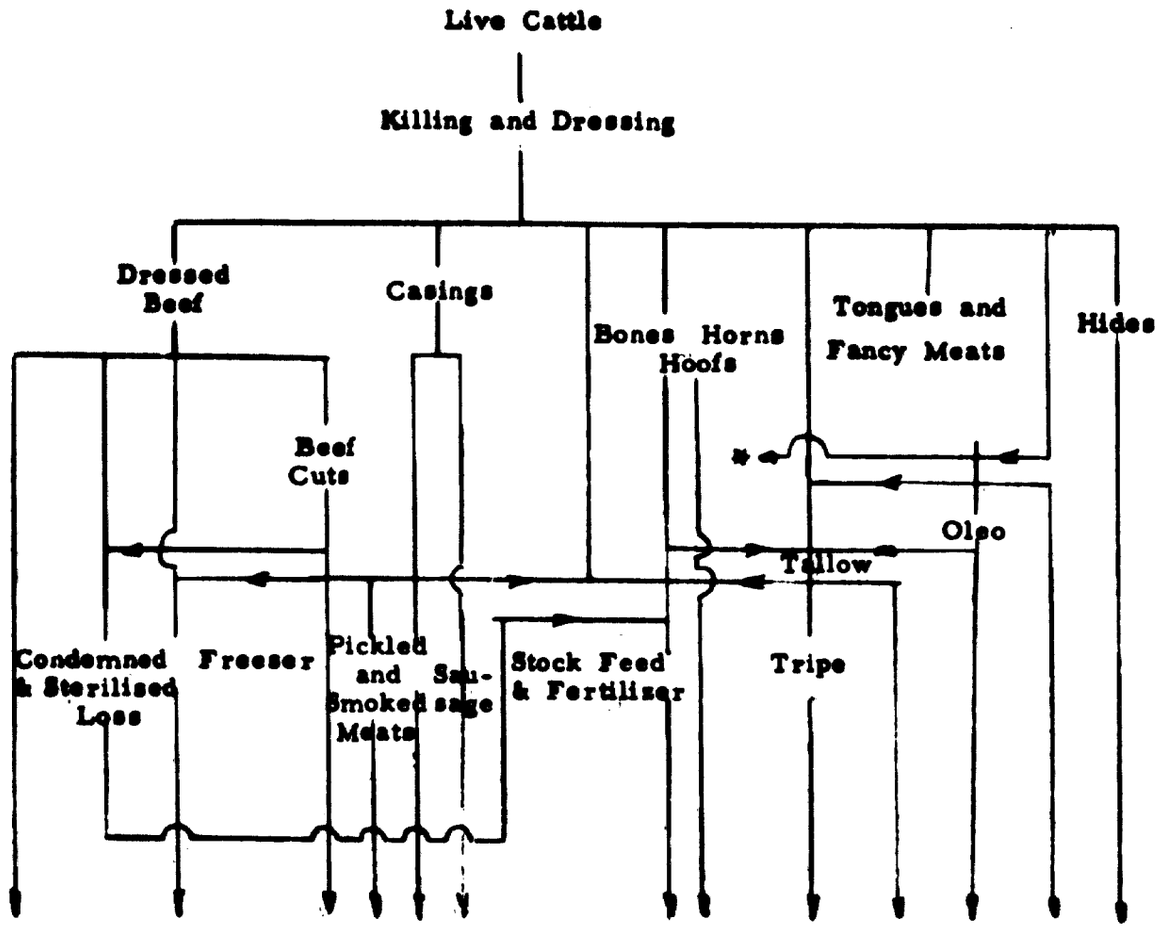
CRITICAL PATH FOR A NEW FACTORY

Each circle denotes completion of an operation. The figures against the continuous lines are estimated in weeks. In the circles, the left hand figure is the number of the stage in the project. The upper right figure is the expected time for reaching that stage. The lower right figure is the latest time by which that stage must be reached. The bold line is the critical path.



APPENDIX III/4

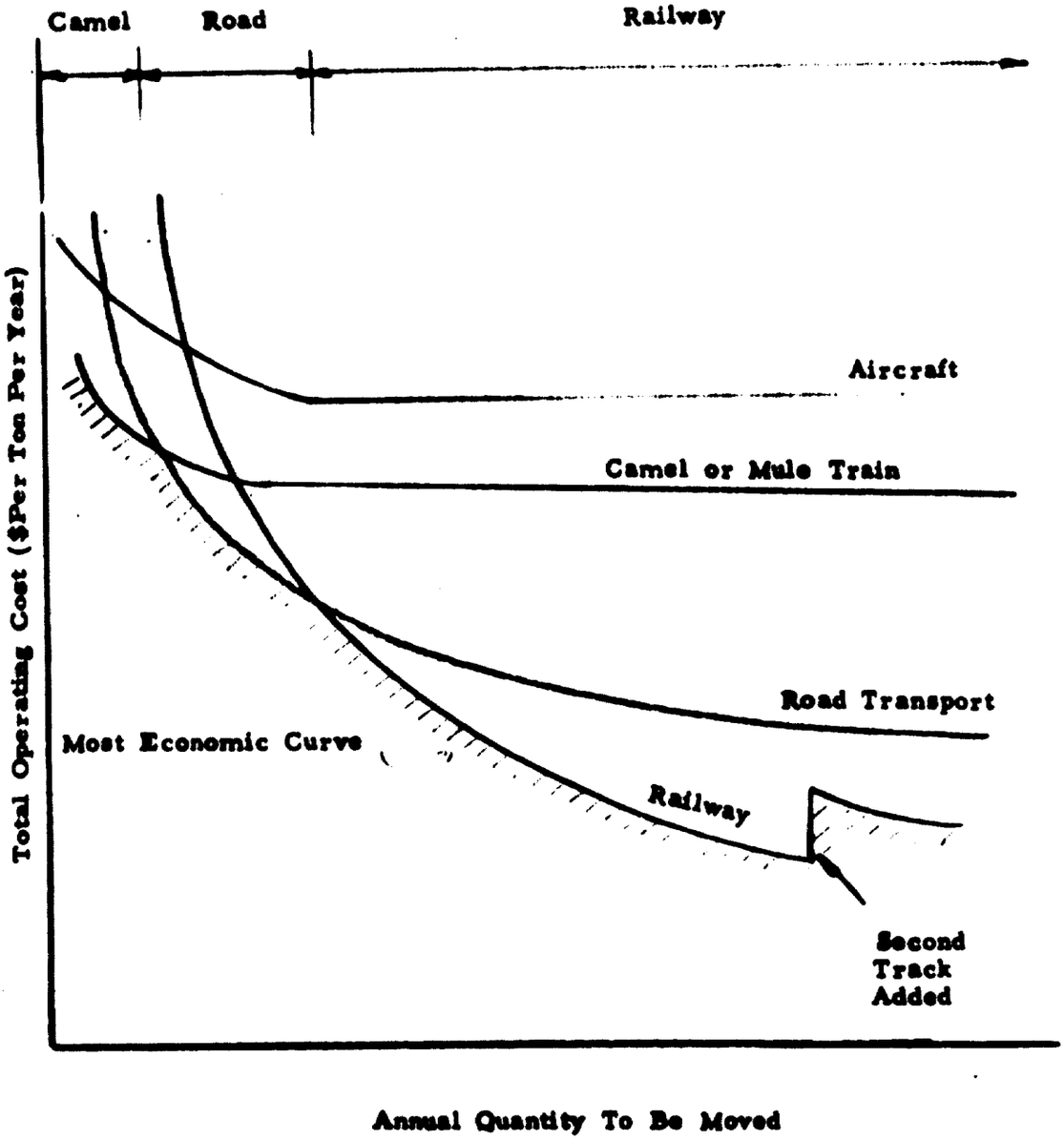
FLOW CHART FOR A BEEF PACKING FACTORY



* To - "Condemned and Sterilised Loss"

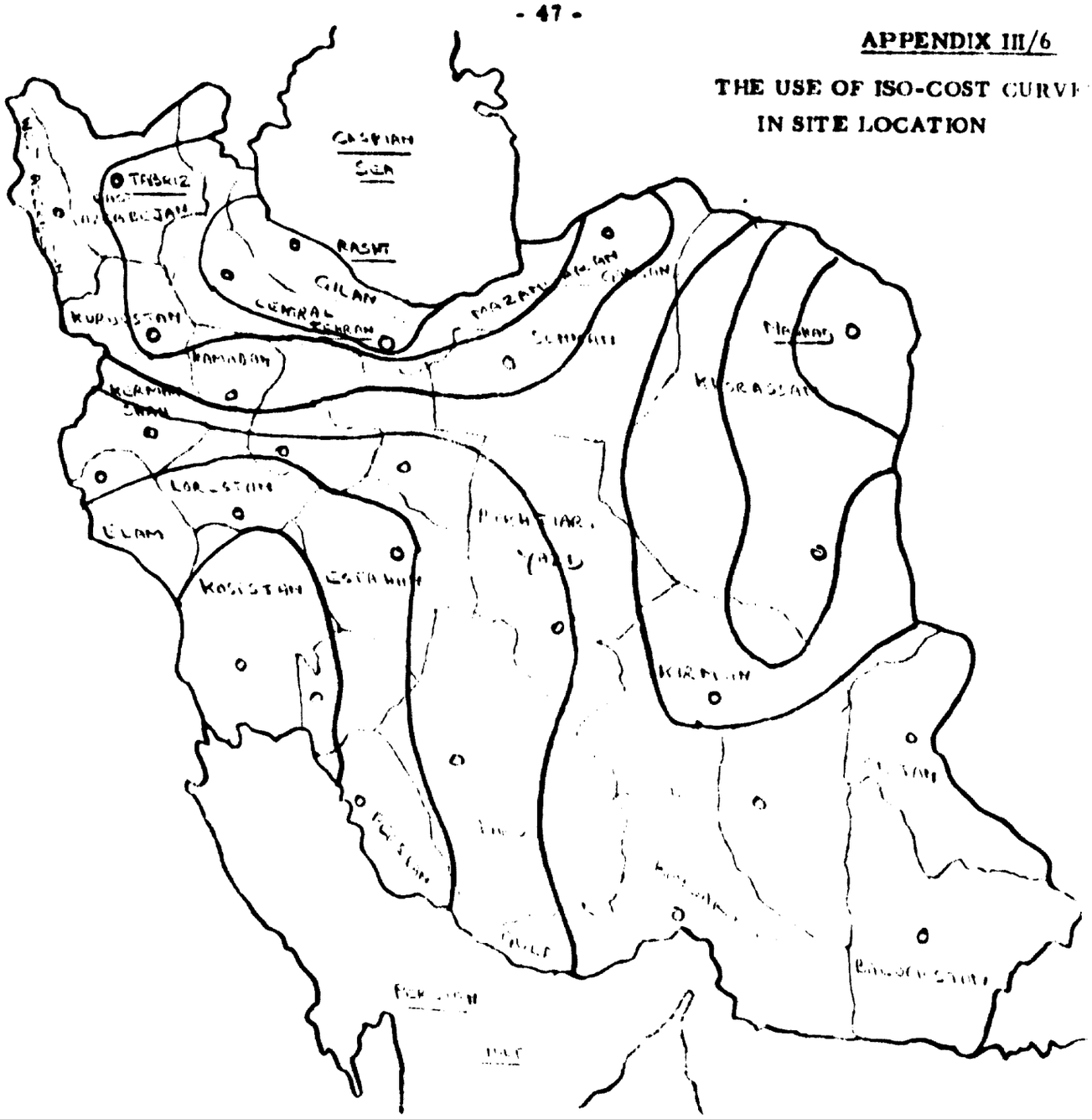
APPENDIX III/5

SELECTION OF TRANSPORT SYSTEM RELATIVE TO DEMAND LEVEL



APPENDIX III/6

THE USE OF ISO-COST CURVE IN SITE LOCATION



CHAPTER IV

CAPITAL COST ESTIMATES

It must be stressed that capital cost estimates are indeed estimates, and the object of a contingency additions expressed as a percentage of individual costs or groups of costs is to cover for omissions and possible under estimates.

During periods of rapid inflation, and bearing in mind the time lapse between the drawing up of a feasibility study and the payment for capital equipment eventually supplied to the project, special allowance may have to be made to cover this in addition to the contingency provision.

Each individual item of the capital cost estimate must indicate the foreign and local currency required. Included in the project appraisal check list provided in Chapter IX is a detailed schedule of items which should be included in a project capital cost estimate.

Land

The cost of land varies over a wide range depending on the locality, the current state of development of the infrastructure, contour of the land and demand. The current values of land should be the subject of a loose data sheet which may be updated.

Development expenses must be estimated in detail and must include site levelling if required and of particular importance is the need to accurately estimate the cost of piling where the ground characteristics and/or type of plant necessitates piling. Test boring of the ground may be an essential preliminary to a feasibility study.

Legal expenses and development taxes must be assessed.

Buildings

Factory buildings and administrative buildings are generally constructed to certain common specifications, for example, brick walls with saw-tooth roofs; steel framed, with portal roof and asbestos clad walls, etc. The height to the saves and the incidence of support columns are important aspects from the point of view of cost and unobstructed working space. The costs of building and building materials are continually changing but it is possible to establish appreximate costs for standard type constructions on the basis of Rials per square metre. Thess costs should be included in a loose-data sheet.

All site facilities external to the buildings are estimated separately. Buildings required to be air-conditioned should be designed for this purpose, and the air-conditioning not merely added as an after-thought.

Machinery

Where it is possible to have individual prices for plant units, these should be obtained, and some system of cross checking the prices should be established, perhaps by insisting on alternative quotations. Particular care should be exercised with regard to process plants where the technical characteristics may be difficult to judge. For example a turnkey chemical plant or a ceramics plant in which the tunnel kilns/driers constitute between one half and two thirds of the total plant cost, should not be accepted on the basis of a quotation from a single supplier.

In this section, it is only the capital cost of the machinery which is under consideration, not the technical suitability, and there is no better way of establishing costs than to obtain up-to-date competitive quotations.

In some cases, where only very approximate checks or estimates will suffice it may be possible to use curves of capital cost/plant capacity, and this infers the systematic collection of appropriate data. There are limitations to the use of published data of this kind, because there are wide variations in the ways that cost information is collected and classified. Further, capacity-cost data must be corrected to a base price level relative to a particular year to compensate for inflation.

Capacity-cost curves are generally exponential in form and may be represented by the general equation.

$$C = kQ^n$$

where C = Cost of a plant at the base year

Q = Plant capacity

k = A constant co-efficient relative to the product and production method

n = The exponent, usually between .6 and .7, but approaching 1.0 if capacity increases are made by duplication of production lines

From this it follows that :-

$$C_2 = C_1 \left(\frac{Q_2}{Q_1}\right)^n$$

where C_1 and Q_1 are the known cost and capacity

C_2 and Q_2 are the proposed cost and capacity

Such curves are only an approximation but in continuous process operations, they indicate clearly the advantage of large scale operations over small scale operations.

Engineering Fees

In setting up a new industrial project, engineering and planning expenses are incurred, which are an integral part of the cost of the project. These include the fees of consulting engineers, architects, contractors, process engineering, power engineering, water supply engineering and project engineering. These expenses should not be confused with royalties, management fees, or charges relating to patents, and the provision of assistance or advice on a continuing basis after production commences, which are revenue expenses.

Preliminary Expenses

Preliminary expenses which relate to the cost of establishing the company are also considered to be a part of the initial capital cost, and these include the fees of financial advisers, legal fees, accounting fees, company registration, share brokerage and commissions, stamp duties, printing costs etc.

Pre-Operational Expenses

Pre-operational expenses include all incidental expenses prior to the completion of production facilities, exclusive of those incurred in establishing the company and therefore included in "Preliminary Expenses". They include the following:-

Auditors Fees	Interest During Construction	Rents
Cables	Legal Fees	Salaries and Wages
Financial Charges	Light	Telephone
Directors Expenses	Maintenance and Repairs	Training Programme
Directors Expenses	Managing Directors	Travel Expenses
Entertainment	Office Supplies	Transportation
Financial Consultants	Postage and Telegrams	Taxation
Insurance	Printing and Stationery	Others

Plus an amount for contingency, less any income received e.g. from deposit accounts or rentals.

CHAPTER V

ESTIMATING OPERATING COSTS

In preparing a feasibility study for a new project it is necessary to estimate on an annual basis as accurately as possible, all the operating costs of the enterprise. These include:-

Raw Materials	Repairs and Maintenance
Bought out Components	Factory Overheads
Water, Fuel and Power	Administration Overheads
Consumable Stores	Selling Expenses
Labour	Royalties, Patents

It is important to understand that these costs are estimates subject to error, and that any subsequnt financial and/or economic computations which are based on them, will be subject to a similar margin of error. In fact after preparing the total best estimate it is desirable to show a cost contingency to cover for under-estimating.

An entrepreneur having experience of a similar production unit in another country, should have access to cost accounting records to facilitate the preparation of reliable estimates. An evaluator has to seek comparative information to check any costs presented in a feasibility study. It is usual for an engineer and an accountant to work together when preparing or checking estimated costs.

Judgement is required in determining which costs are likely to be most dominant, and therefore warrant detailed investigation, as compared with items of lesser significance.

All annual costs should be estimated to not more than three significant figurss, which is the limit of their accuracy.

The effsct of the operating level on costs must be taken into account, particularly in the early years before the plant output reaches full capacity, and this is deducsd from the categorization of costs into variable, fixed and semi-variable costs.

Variable costs, are those where the cost per year varies directly with the production rate, and these include raw materials, bought-out components, direct labour, packing materials.

Fixed costs are those where the total annual cost is not affected by production, such as depreciation, local taxes, insurance.

Semi-Variable costs, can generally be analysed into variable and fixed costs. Annual repair and maintenance costs, although increasing with increased production, do not have a linear relationship.

The basis of all costs presented should be set out in detail either in the body of the report or as an explanation of the Cost of Production statement.

In all cases, costs are more reliably derived from basic considerations supported by experience and knowledge of a similar industry, but often the project evaluator is not in a position to be critical of cost figures prssented to him. In these circumstances comparative cost and/or quantity ratios for as many projects as possible should be accumulated from all sources. The most reliable figures could be extracted from annual reports of operating companies, that is from annual reports of the more modern informativs type. The figures incorporated into the project appraisals of devslopmsnt banks, are of courss only estimates but thsy have been subject to fairly rigorous checks, and would provide some indication of cost ratios.

- Sherkat Mokhtalet Qei-Sahami (partially limited partnership) - In this partnership one or more of the partners assume unlimited liability for the obligations of the firm while the other partner (or partners) have limited liability. The expression "limited partnership" and the name of at least one of the partners with unlimited liability must be contained in the company's title.

- Sherkat Mokhtalet Sahami (limited partnership with shares) - Two or more partners have unlimited liability while the shareholders enjoy limited liability. The Persian title for this type of business organization must appear in the company name, and the name of at least one of the partners with unlimited liability must be included.

- Sherkat Nesbi - (proportional liability partnership) - Stocks in this limited liability partnership are held in proportion to the amount of capital contributed by each partner.

- Sherkat Taavoni Towlid va Masraf (cooperative association) - This type of organization is a cooperative formed by a number of craftsmen or businessmen engaged in a particular trade. It generally takes the form of a joint stock company, and the members' liability is limited to the extent of their respective shares in the association.

Organization of Foreign Firms:

The Sherkat Sahami (joint stock company) is the form of legal business entity most commonly used by foreign investors. Because Iranian law requires the participation of more than one legal person in the formation of a company, foreign firms are prohibited from establishing affiliated companies. These companies are considered branches of the foreign firm rather than independent entities.

Registration:

In order to do business in Iran, a firm must register with the Department of Registration of Companies of the Ministry of Justice, in

Feasibility studies prepared by entrepreneurs are also a possible source of cost ratios but the reliability of each study would have to be considered independently.

There is a need, therefore, to establish this kind of approximate cost data, and to expand it and continually update it.

Raw Materials

The value of raw materials is often a major part of the total production cost and it is essential to know how the annual cost of raw materials is derived, and in particular that the estimated material cost correlates directly with the sales programme. For example, from the point of view of the evaluator of a cable making plant it is useless to be told that 'X' tons of copper valued at 'A' will be used to manufacture 'Y' thousand metres of cable, valued a 'B'. It is not possible to correlate 'X' with 'Y', nor 'A' with 'B', and one suspects that figures are being presented in an attempt to justify a case for erecting a cable factory. Even though there may be a wide range of sizes and/or types of product, it is essential to estimate costs and sales income for a specific although perhaps arbitrary sales programme, which in total it is possible to relate to plant capacity.

In arriving at a unit product cost the quantity of the different raw materials required must be estimated and these quantities multiplied by the projected annual sales of the unit provide the total quantity of materials required. In most industries a percentage of the quantity of raw materials has to be added to cover for scrap.

The pricing of raw materials should include all delivery charges into the factory, and materials of appreciable total cost should be checked by obtaining alternative quotations. The problem arises as to what unit material prices should be used, say, over a five year projection, particularly during periods of rapid inflation, and in most evaluation work constant prices are assumed. This may be a loose assumption, but it is presumed that if material prices markedly change, then the sales price of the product will also change.

The advantageous prices of material and transport under bulk purchase arrangements should be considered where applicable.

In all cases it is necessary to differentiate between foreign and domestic expenditures, since the c.i.f. cost of imported materials is usually met in foreign currency.

Bought-Out Components

Much of what has been written about raw materials is equally applicable t. bought-out components.

But bought-out components, particularly those, which, because of design considerations, must be purchased from the foreign parent company, are an area of possible abuse. In the original total product cost, it is possible to reduce the price of those items it is proposed to manufacture locally and balance the total cost of components by increasing the price of imported items. In this way higher profits are maintained to the parent company on those items which will continue to be imported for some time. If components may be purchased competitively, this constraint does not arise.

The detailed list of bought out components, to be manufactured locally and to be imported, particularly the latter, must be closely scrutinised in relation to the immediate demand and the development of future demand. Does the proposal tend to perpetuate the importation of components, or the importation of certain allied products, which could be manufactured locally? The reasons for buying out certain components should be stated and the alternative costs of local production and relative capital investment considered.

It is difficult to obtain check prices for specialised components and the more positive approach is to challenge the need to import each and every component, so that importation is seen to be wholly justified.

Frequently a project is presented and evaluated on the vague statement that - "it is intended in the future to increase the proportion of local content". This is certainly an expression of intent, but what is required is a clear analysis of all the factors which influence the build-up of local content, and a tentative plan drawn up on a time scale.

Labour

In building up the operating costs, 'labour' means 'direct labour', that is labour costs which are directly proportional to output. Operating labour requirements are best arrived at by drawing up a complete schedule of labour requirements. In the case of process plants this must come from the plant suppliers and in the case of batch production, direct labour requirements are deduced from the individual operation times.

These figures should be reviewed by some one who has knowledge of the production unit under consideration.

Almost invariably, when bringing in new technology to a country, there will be a period when, as compared with similar well established production units overseas, the direct labour requirements are higher and output is less. If climatic conditions are similar and the diet of the workers adequate, then nothing less than a productivity equal to that of the productivity per worker on similar overseas plants should be targeted once the initial training period has been completed. But in adverse climates or working conditions or where the diet of the workers is inadequate, it may be necessary to plan for as much as double the overseas direct labour complement. It is not possible to give maximum human physical output in a temperature of 95°F with high humidity, especially with a low food intake. Further, a low labour productivity can and does result from managerial inexperience and poor organization, particularly in a new factory, and in-plant training of management is slower and more costly than operative training.

The following factors must be considered and accounted for:-

(a) The time to train operatives

(b) The period required for organization and management to become effective.

(c) Permanent or semi-permanent additional operatives required to offset adverse working conditions, as compared with similar overseas projects.

(a) and (b), are reflected in the proportion of 'normal output' expected to be achieved in the early years of operation, as discussed in Chapter III, Production Technology, and (c) is built into the schedule of direct labour requirements.

Imagination and flexibility are essential in estimating direct labour complements for a new project.

Operating labour cost is obtained by multiplying the estimated annual man-hours required by the average hourly rate for the area in which the factory is to be located. The average hourly rate should include payment for shift work and overtime premiums.

Other direct labour costs including taxes, social security, holiday pay, insurance and other fringe benefits, are all variable costs but they are estimated separately.

A schedule of labour rates should be prepared as a loose sheet for different categories of work in each geographical area.

Water, Fuel and Power

The three main factors concerned in the cases of water, fuel, and power are:-

(1) estimation of quantity needed

(2) checking that the necessary supplies will be available

(3) the estimated cost

Water

The cost of water may be little in some industries but in others, notably certain chemical products, the quantities essential to the process are high, and the availability of supply becomes of paramount importance. Where large quantitites of water are used, the possibility of re-cycling the water should be checked, and the capital cost of re-cycling should be accounted for.

The degree of pollution of the factory effluent should be checked.

The cost per 1000 gallons of water or per cubic metre in the geographical area of the project, will be necessary to complete the estimation of the cost of water consumed.

Fuel

Fuel includes all materials used for endothermic processes, and for heating of buildings, and will normally consist of oil, gas, coal, coke or wood. The heat quantity required for processes will normally be advised by the plant suppliers, either in terms of heat required per unit quantity of output or per hour. The medium of the heat exchange will also be stated as (a) steam or water at a specified temperature, (b) flue gases in contact with the product, and (c) indirect heating by flue gases.

In the case of oils, the oil specification may be important and particularly the sulphur content and viscosity. In all cases the calorific value of the fuel is expressed in calories per kilogram of the fuel, and this determines the quantity of fuel required.

$$\text{Total fuel required in kg. per hour} = \frac{\text{Total heat required per hour}}{\text{Calorific value of fuel} \times \text{Efficiency of heat exchange}}$$

The economy resulting from the bulk purchase of fuel may be significant.

Electric Power

The basis of arriving at the annual electric power consumption has been set out in Chapter III, - Production Technology, and in this section the calculation of cost is dealt with.

Annual Power Consumption	=	Installed Capacity kW	x	Load Factor	x	No. of Hours Per Shift	x	No. of Shifts Per Day	x	Working Days Per Annum

In Iran, the calculation of the actual average cost per unit of power consumed is relatively complicated, and unit rates differ in different locations. A numerical example of an electric power cost calculation is provided as a reference in an appendix to this chapter.

If average conditions are assumed and these are related to installed capacity, it is possible, for the purpose of estimating, to plot a curve of unit cost against plant operating hours based on a fixed scale of charges per unit. This will not vary significantly with installed capacity. If the unit rates increase by x%, approximately uniformly across the whole scale of charges, then the average unit value derived from the curve will increase by x%. A change in the consumption groupings would necessitate making a new curve. Since electric power tariffs are subject to change, this curve has been included as a loose sheet.

Consumable Stores

Consumable stores, include items used in the production processes which do not appear as an integral part of the product, and they include such items as handtools, working apparel, lubricating oils/greases, coolant, and electrodes. Generally the cost of consumable stores is not of significance in the total cost, since fuel has been considered as a separate item under the heading of "Water, Fuel and Power".

The value of consumable stores is better estimated from past records, and there is a need to build up reference data on this cost item. As an indication only, a figure of 5% of direct labour costs may be assumed.

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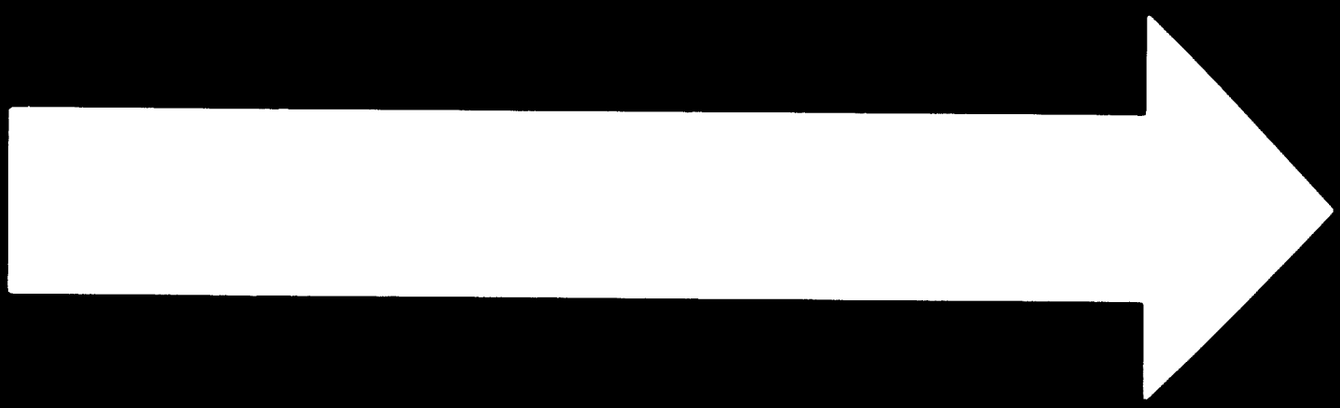

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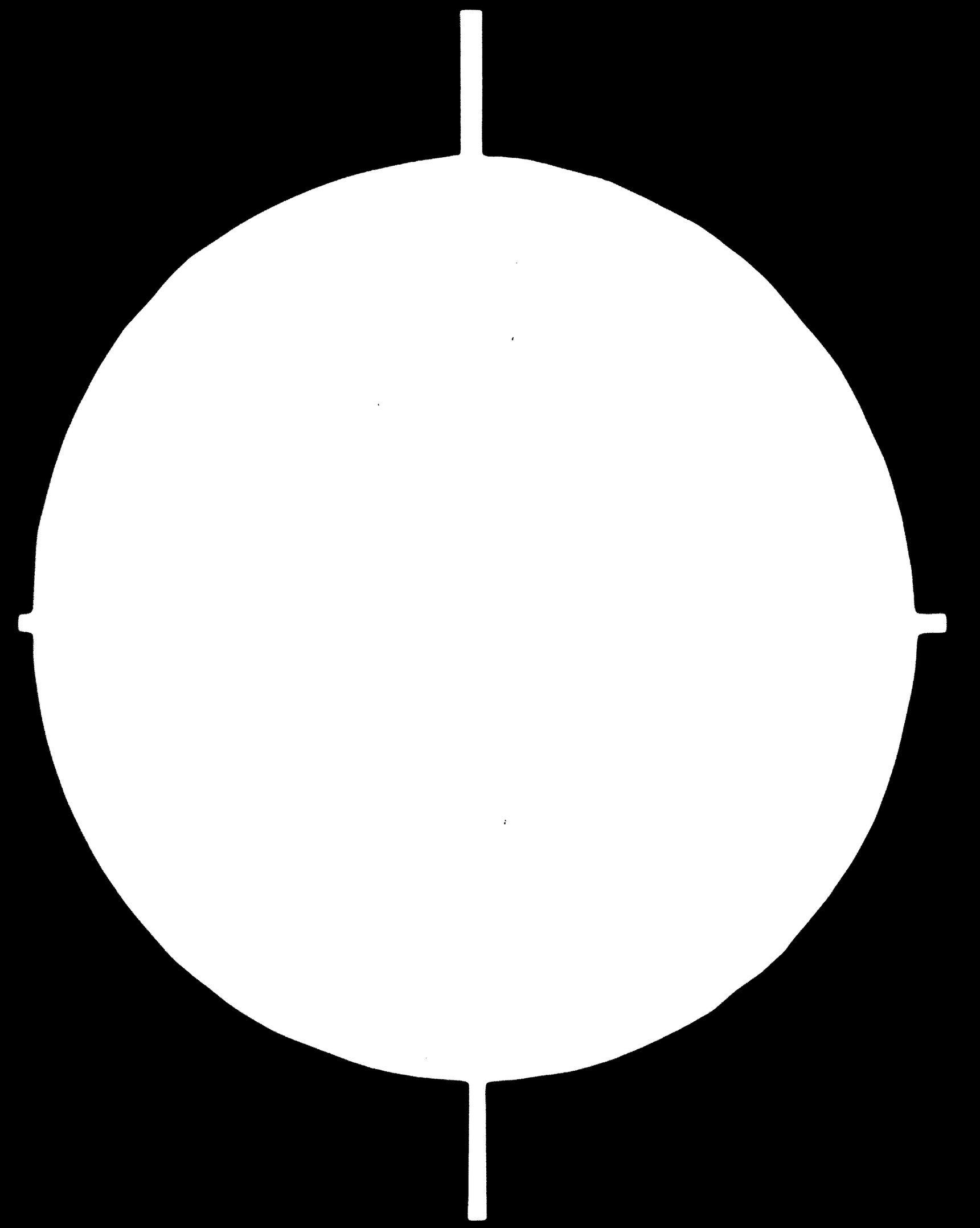


Operating Profit Before Interest (from Statement of Cash Accruals)		165
Share Capital	600	
Reserves & Surpluses	230	
	830	
Less Intangible Assets	9	
	821	
Plus Loan Capital	310	
Total Capital Employed (from Statement of Financial Positions)	1131	
% Profit Before Interest/Capital		$\frac{165}{1131} \times 100 = 14.6\%$

The next two percentages are self explanatory and they are the figures generally used to make a first check on the progress of an enterprise. Again using the 1978 projections:-

$$\frac{\text{Operating Profit After Interest (i)}}{\text{Sales (ii)}} = 100 \times \frac{138}{1560} = 8.9\%$$

(i) From statement of cash accruals

(ii) From production cost and profitability statement

$$\frac{\text{Net Profit (iii)}}{\text{Share Capital (iv)}} = 100 \times \frac{138}{600} = 23.0\%$$

(iii) From statement of cash accruals = net profit plus intangible assets written off

(iv) From statement of financial positions

The next two ratios are those used by bankers to gauge the projects capability of meeting the interest on the loan(s) and repayment of the principle amount.

The interest cover is the ratio of the gross profit to the interest accrued during the year under review. The debt service cover is the ratio of gross profit to the total of interest and principle repayments during the year under review. Using the 1978 projections:-

$$\text{Interest Cover} = \frac{\text{Gross Profit (i)}}{\text{Accrued Interest (ii)}} = \frac{249}{27} = 9.2$$

$$\text{Debt Service Cover} = \frac{\text{Gross Profit (i)}}{\text{Interest + Principle Repayments (iii)}} = \frac{249}{27+38} = 2.6$$

(i) from statement of cash accruals

(ii) from statement of cash flow

(iii) from statement of cash flow

3. <u>Cash Flow Statement</u>

The flow of cash for a typical new industrial venture has been illustrated diagrammatically in Appendix VI/1. The "Cash Flow Statement" illustrated in Appendix VI/4 is a year by year projection of cash inflow and outflow to and from the organisation, the difference between the two being adjusted in the difference between the opening and closing cash balances. It is clear that if there is to be a positive opening cash balance in each year which is obviously desirable, the total annual inflow of funds must be planned to exceed the total annual outflow of funds. This document must also cover the construction period before production commences, and in the example

presented all the expenditure on construction takes place within one year. Where construction takes a longer period, say two or three years, additional columns are provided for each year under construction. Where the cash position is difficult it is desirable to construct an additional cash flow statement on a quarterly basis in which each year is covered by four columns, and this is continued during the operating period until the projected cash position appears to be sound.

Considering first the lower half of the Cash Flow Statement it is noted that all the outgoing funds except dividends and bank borrowings are obligatory payments. The repayment of bank loans is normally discretionary although the bank has the power to recall loans if it so wishes. Dividends payable on ordinary shares are payable only at the discretion of the Board of Directors. Dividend on Preference Shares and Cumulative Preference Shares is also discretionary, although prolonged non-payment of dividends on Preference Shares may invoke voting rights for the Preference Shareholders, possibly resulting in a change of control of the company.

All the capital expenditure in fixed assets took place during the construction period but the investment in working capital increased over the first 2½ operating years as production built up to plant capacity. The increase in working capital is derived in the following way. From the "Statement of Financial Positions", the amount of working capital at the end of any one year is the summation of trade debtors and stocks less trade creditors. This, subtracted from the required working capital for the following year, gives the increase in working capital during the second year. Conversely, during a period of falling sales revenue, under good management, there would be a decrease in working capital, in which case this would provide an additional source of funds.

The decrease in the secured long term loan represents the repayment of the loan in accordance with the terms under which the loan was made. The projected profits made it possible for the financial analyst to provide for the repayment of the bank loan during 1976 and 1977.

It is at this point that the interest due to be paid in each year must be calculated - it is the total interest due on both the long term loan and the bank loan which reduces in amount as the loans are repaid. It now becomes possible to enter the calculated interest payments in the "Cost of Production and Profitability Statement" and the "Statement of Cash Accruals".

In 1977 it was possible to provide for a dividend of 10% on the equity shares and from this year onwards it is at the discretion of the Board of Directors to retain reserve capital in the business or increase dividend payments. In this example, no taxation payments are shown, because as a development project, the Government had allowed a 5 year tax free period.

Turning to the first half of the cash flow statement, the "Source of Funds" it is seen that, in the example, the whole of the share issue and the long term loan were expended on fixed assets during the construction stage. Profits are shown after depreciation but before interest and taxation, and reduced by the amount of intangible assets written off, and the latter shown as a separate item.

Depreciation has been calculated on a straight line basis, and it should be noted that the amounts shown also appear in the "Statement of Financial Positions". Intangible assets amounting to 45 million Rials included in the original capital cost have been written off in five equal amounts from 1975 to 1979 and these figures too appear in the "Statement of Financial Positions".

The original bank loan to finance working capital was taken during 1975 when production commenced, but it should be noted that bank borrowings represent only 33% of the value of stocks in 1975 and a lower proportion in subsequent years. It is not usual for commercial banks to lend money for working capital, in excess of 80% of the value of stocks.

There are three negotiable variables in the "Source of Funds", - the equity capital, the long term loan and the bank borrowings. The equity capital is subject to the limitation of the cash resources of the promoters (public share issues are not considered here). The long term loan is constrained by the security requirements of the lending institution which normally limit loans to a maximum of 50% - 60% of the value of fixed assets. This is not only a matter of security, but in practice, a higher proportion of loan capital on which interest charges must be paid, may constitute too heavy a burden of fixed charges on the business in the initial and often critical operating years. There is a similar constraint on bank borrowings which, again for reasons of security, are often limited to 80% of the total value of stocks. And as has been discussed, only two items of expenditure are discretionary and not obligatory - dividends and repayment of the bank loan. Between the five variables, the financial analyst constructs a projected cash flow which must satisfy the shareholders, and the loan institutions.

4. Statement of Financial Positions

The "Statement of Financial Positions" shown in Appendix VI/5 is the equivalent of a Balance Sheet in columnar form. Under the heading of Current Assets, closing cash balances are transferred

from the "Cash Flow Statement". Trade debtors and stocks, the latter including the value of stocks of raw materials, work in progress, and finished goods, have been estimated on a realistic and systematic basis for the particular industry. Normally, where production and sales are approximately equal it is the practice to relate all stocks and debtors to sales receipts. Trade creditors under the heading of current liabilities are estimated on a similar basis. A detailed calculation of these working capital calculations, divided into local, foreign and tax expenditures, is provided in the Volume 3 which provides a critical analysis of a feasibility study. The figures for bank borrowings are taken from the "Cash Flow Statement".

Total current assets less total current liabilities provide the net current assets figures.

Fixed assets cost 1050 and this together with the intangible assets of 45 represent the total capital expenditure of 1095 appearing in the "Cash Flow Statement". The depreciation recorded in the "Cash Flow Statement" is deducted each year from the value of fixed assets to provide the current book value of the fixed assets.

The value of the net current assets added to the value of fixed assets less accumulated depreciation gives the net tangible assets.

Each year, the figure of net tangible assets must balance with the total funds used in the business. The share capital, in the example remains unchanged throughout the period, and to this is added the accumulative unappropriated profits from the "Cash Accrual Statement, but described as "Reserves and Surpluses". This could now be described as "Total Shareholders Funds".

The value of intangible assets which could not be included with the tangible assets but nevertheless were paid for out of the total funds available, must be deducted but the amount to be deducted is reduced each year by the amount written off in the "Cash Flow Statement".

Finally the long term loan(s) are added, reduced each year by the amount repaid as shown in the "Cash Flow Statement", and this total of available funds must balance with the total value of net tangible assets. That portion of the long term loan due to be repaid in each year is deducted from the outstanding balance of the long term loan, and transferred under the heading of "Current Liabilities", because any payment due within one year is considered to be current and not long term.

Based on the annual figures developed in the "Statement of Financial Positions", the example provides three accounting control ratios, and the calculation of these for the year 1975 follows.

Current Assets/Current Liabilities : : 174/81 : : 2.1/1

Tangible Fixed Assets/Secured Loan:: 1068/500: : 2.1/1

Debt (i) / Equity (ii) : : $\frac{500}{1124}/\frac{624}{1124}$: : 44/56

(i) Debt in this ratio refers to the long term debt.

(ii) Equity includes reserves and surpluses i.e. shareholders total funds.

Internal Rate of Return

Calculation of the internal rate of return to the entrepreneur set out in Appendix VI/6, would not normally be made for any period of less than ten years, and here it is presented only to illustrate the method. First it is necessary to eliminate from the cash flow those items which are not relevant, which in this example means the share capital, the loan capital,

capital repayments, and dividends. The share capital and loan capital have been used to acquire resources, and the value of resources is taken into account as a negative value. The net profit after payment of interest and tax is available to the entrepreneur, together with amounts provided for depreciation and amortization. The use of these sums to repay loans, to establish reserves, or to pay dividends is merely an allocation of the surplus, and therefore they do not appear in the cash flow.

The residual value of the fixed assets at the end of the period have been taken as the depreciated value. A calculation based on the full life of the project would usually provide for the sale of plant at 5% of the initial purchase price with buildings and land at valuation. Net current assets at the end of any period are considered to be fully recoverable.

Target Internal Rate of Return

An entrepreneur will wish to obtain a rate of return on his investment commensurate with the degree of risk he believes to be associated with the project he seeks to establish. In any given economy, the overall economic and political stability will be common for all projects, but the foreign investor will consider the risks associated with one country as compared with another. In this section we are concerned only with the risks inherent in the project as they affect the target rate of return and not those associated with the overall economy.

The entrepreneur will establish if only mentally some scale of return relative to the risks he believes he may be taking, or perhaps some arbitrary risk rating method corresponding to a scale of minimum acceptable rates of return may have been established on a numerical basis.

The level and limits of this scale will vary from country to country, and for any particular country it can only be established by research. Essentially this is crude form of risk analysis.

The lending institution is not so concerned with this association of rate of return with risk, - its rate of interest is fixed but it is concerned with the risk associated with the ability of the project to repay the loan.

From the point of view of the economy, the financial rate of return to the entrepreneur is only one of many factors to be taken into consideration, and the risk taken by the economy is parallel to that taken by the lending institution, that is, that the project may fail and then the loss to the economy would be the resource inputs to the project and the annual contribution of the project to the Gross National Product.

If a Government, by policy, limits the rate of return to the entrepreneur, without regard to risk, then one of two consequences ensues:-

(a) The permissible rate of return may be set so high that the entrepreneur is satisfied with his return on projects of high risk.

(b) A low permissible rate of return may result in the entrepreneur avoiding high risk projects, either delaying development or promoting greater public investment in high risk projects.

The Application of Computers to Financial Forecasting

It is clear that the manual preparation of financial projections is time consuming although a skilled financial analyst, if provided with details of the estimated cost of production and profitability, will normally develop a set of financial projections in 2 to 3 days.

It would be necessary to de[illegible] the computer equations on the basis of fixed and variable costs, sales [illegible], interest, depreciation, amortization, and working capital, although if sensitivity analysis or risk analysis [illegible] to be programmed, individual variables such as material cost would have to be retained.

Once the factors contributing to the cash flow have been defined [illegible], it [illegible] possible to programme all subsequent computations to [illegible] cash balances, internal rate of return, net tangible assets, and control ratios etc. It should be [illegible] however that the algebraic solution of the rate of return does not provide a unique solution. Risk analysis is a logical step following the preparation of the equations.

If the cost built-up [illegible] to facilitate the separation of variables relating to economic evaluation criteria, then with additional factors, it becomes possible to compute economic control indices and, if required, introduce shadow prices. The [illegible] discussed in greater detail in Volume IV.

It is not the intention to deal with computer application in this volume [illegible] is meaningful when all the [illegible] constituting [illegible] and the resulting financial projections have been fully provided and understood.

Repairs and Maintenance

This heading covers the cost of repair labour and the cost of repair supplies and both must be estimated separately.

(i) Repair Labour

This includes the payments made to men engaged in maintenance and repair work. It does not include supervision of repair work, depreciation on repair service equipment, overhead expenses for the maintenance shop or indirect payroll costs. Cost records for existing plants are perhaps the only reliable source of information on repair labour costs. Attempts have been made to derive empirical formulae of the form:-

$$\text{Total Maintenance Cost} = K \sum_{0}^{n} (I_n \times t_n) + C$$

Where K = Constant

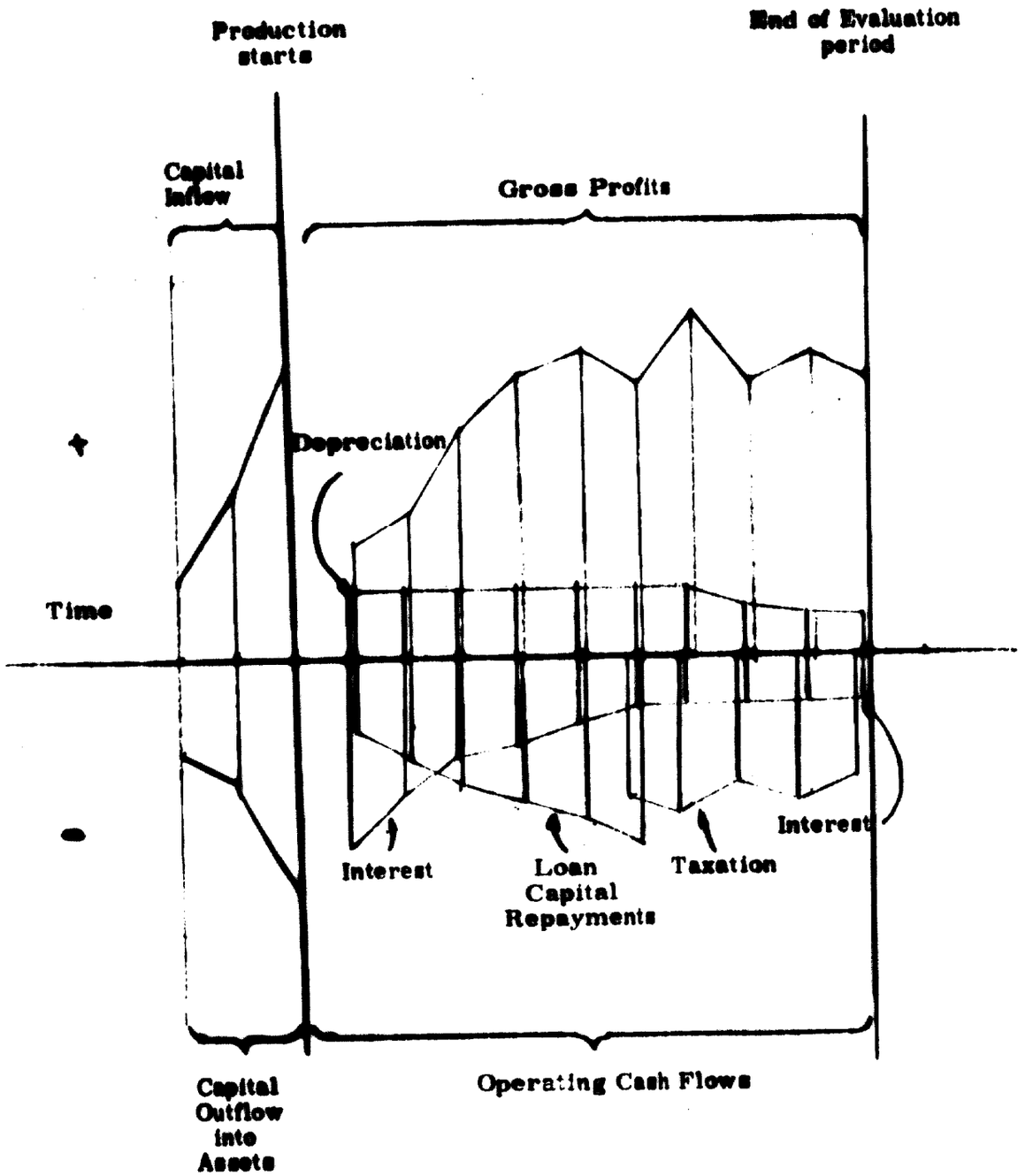
I_n = Capital investment in plant

t_n = Number of years installed

C = Constant

This general formula states that total maintenance cost has a linear relationship with the age of the plant, and it could have some use where statistics are available. Approximately 60% of the total maintenance cost is attributable to labour and 40% to materials.

DIAGRAMMATIC ILLUSTRATION OF CASH FLOW OF A NEW INDUSTRIAL VENTURE



APPENDIX VI/2

XYZ CHEMICAL COMPANY

ESTIMATED COST OF PRODUCTION AND PROFIT/LOSS STATEMENT

(In Million Rials)

Year ending 31st December	1975 (May-Dec.)	1976	1977	1978	1979
Production in tons	1,500	2,500	3,000	3,000	3,000
Percentage of rated capacity	75%	83-1/3%	100%	100%	100%
Raw materials	343	575	690	690	690
Labour	23	33	34	35	36
Water, fuel and power	60	100	120	120	120
Consumable stores	109	183	219	219	219
Repairs and maintenance	5	10	12	14	15
Factory overheads	17	27	29	31	33
Selling expenses	78	130	156	156	156
Administration overheads	27	40	44	46	48
Interest	30	43	32	27	21
Depreciation	55	84	84	84	84
	747	1,225	1,420	1,422	1,422
Sales	780	1,300	1,560	1,560	1,560
Operating profit	33	75	140	138	138

APPENDIX VI/3

XYZ CHEMICAL COMPANY

ESTIMATED STATEMENT OF PROFITABILITY AND CASH ACCRUALS

(In Million Rials)

Year ending 31st December	1975	1976	1977	1978	1979
Gross profit	118	202	256	249	249
Depreciation	53	84	84	84	84
Operating profit before interest	65	118	172	165	165
Interest	30	43	32	27	21
Operating profit after interest	35	75	140	138	144
Amount written off intangible assets	9	9	9	9	9
Net distributable profit	26	66	131	129	135
Ordinary dividend - 10%	-	-	60	60	60
Balance of unappropriated profit	26	66	71	69	75
Accumulative unappropriated profit	26	92	163	232	307
Net cash accruals	88	159	184	162	168
Operating profit before interest/total capital employed	5.8%	10.7%	15.3%	14.6%	14.6%
Operating profit after interest/sales	4.2%	5.5%	9.8%	8.9%	8.9%
Net profit/share capital	5.5%	12.5%	25.3%	25.0%	25.0%
Interest cover	3.9	4.7	8.0	9.2	11.6
Debt service cover	-	2.0	2.9	2.6	2.6

APPENDIX VI/4

XYZ CHEMICAL COMPANY

CASH FLOW STATEMENT

(In Million Rials)

	Construction Period Aug.1974-April 1975	1975 (May-Dec.)	1976	1977	1978 Operating Years	1979
Source of Funds						
Share Issue	600	-	-	-	-	-
Profit after depreciation but before interest and taxation	-	54	109	163	156	150
Depreciation	-	55	84	84	84	84
Intangible assets written off	-	9	9	9	9	9
Increase in secured long-term loan	500	-	-	-	-	-
Increase in bank borrowings for working capital	-	45	-	-	-	-
	1,100	163	202	256	249	243
Disposition of Funds						
Capital expenditure	1,095	-	-	-	-	-
Increase in working capital	4	129	82	42	1	1
Decrease in secured long-term loan	-	-	59	63	68	74
Decrease in bank borrowings for working capital	-	-	15	30	-	-
Interest	-	30	43	32	27	21
Dividends	-	-	-	60	60	60
	1,099	159	199	227	156	156
Opening balance of cash	-	1	5	8	37	130
Add/Deduct: Net Surplus/Deficit between source and disposition of funds	1	4	3	29	93	87
Closing balacne of cash	1	5	8	37	130	217

APPENDIX VI/5

XYZ CHEMICAL COMPANY

STATEMENT OF FINANCIAL POSITIONS

(In Million Rials)

Year ending 31st December	On completion of project and its operation underway					
	April 1975	1975	1976	1977	1978	1979
Current Assets						
Cash	1	5	8	37	130	277
Trade debtors	-	30	50	60	60	60
Stocks	37	136	221	264	265	266
Other current assets	3	3	5	6	6	6
	41	174	284	367	461	609
Less: Current Liabilities						
Trade creditors and bills payable	36	36	61	73	73	73
Bank borrowings	-	45	30	-	-	-
	36	81	91	73	73	73
Net Current Assets	5	93	193	294	388	476
Fixed Assets less accumulated depreciation	1,020	995	911	827	743	659
Net tangible assets	1,025	1,088	1,104	1,121	1,131	1,135
Represented by:						
Paid-up Capital	600	600	600	600	600	600
Reserves and surpluses	-	24	90	161	230	299
	600	624	690	761	830	899
Less: Intangible assets	45	36	27	18	9	-
	555	588	663	743	821	899
Long -Term Finance	470	500	441	378	310	236
	1,025	1,088	1,104	1,121	1,131	1,135
Current assets/Current liabilities	1.1:1	2.1:1	3.1:1	5.0:1	6.3:1	7.5:1
Tangible fixed assets/secured loan	2.1:1	2.1:1	2.1:1	2.2:1	2.4:1	2.8:1
Debt/Equity	45/55	44/56	39/61	33/67	27/73	21/79

APPENDIX VI/6

INTERNAL RATE OF RETURN TO THE ENTREPRENEUR

CASH FLOW STATEMENT

(In Million Rials)

	Construction Period 8/74 - 5/75	1975 May to Dec	1976	1977	1978	1979 Years
			Operating			
Source of Funds						
Profit after depreciation but before interest and taxation	-	54	109	163	156	150
Depreciation	-	55	84	84	84	84
Intangible assets written off	-	9	9	9	9	9
Fixed assets } residual	-	-	-	-	-	659
Net working capital } values	-	-	-	-	-	476
	-	118	202	256	249	1378
Disposition of Funds						
Capital expenditure (equity)	596	-	-	-	-	-
Increase in working capital	4	129	82	42	1	1
Interest	-	30	43	32	27	21
Residual debt repayment	-	-	-	-	-	236
	600	159	125	74	28	258
Net cash flow	(600)	(41)	77	182	221	1120

Discounted cash flow

Year		24%		23%	
74/75	(600)	1.000	(600)	1.000	(600)
75	(41)	.806	(33)	.813	(33)
76	77	.650	50	.661	51
77	182	.524	96	.537	98
78	221	.423	93	.437	97
79	1120	.341	382	.355	398
			(12)		11

Interpolating $23 + \frac{11}{23} = 23.5\%$

Approximate internal discount rate = 23.5%

CHAPTER VII

RATIO ANALYSIS

The use of ratios as a management tool has been developed to an advanced stage in the U.S.A., and ratios are so numerous that some classification is necessary.

A classification used in the United Kingdom is based on:-

1. Profitability
2. Cost Control
3. Capital and Liabilities
4. Assets
5. Investment Criteria

And to this should be added - "Banker's Loan Criteria"

With so many ratios available and in common use, it becomes a matter of selecting those ratios which specifically relate to the purpose in view. For example, for small operating industries, some 8 to 10 ratios from groups 1 to 4 might provide the required control information. Year by year ratios inside a particular company, expressed on a percentage basis would provide information of value mainly to that company. The preparation of Inter-Company Ratios is another extensive application of ratio analysis.

The financial ratios discussed in the following paragraphs are those often used as a guide by a financial institution, such as a development bank, to assess the security of it's loan and the ability of the borrower to meet interest and capital repayments. However, in general, the ratios are

an indication of the overall financial well-being of the company.

1. **Percentage Operating Profit After Interest to Sales**

This is a measure of the net operating profit, excluding any non-operating profit and any extra-ordinary debits or credits, after providing for interest but before taxation, expressed as a percentage of the sales value.

This percentage varies considerably as between different industries and an acceptable figure in one country may not be acceptable in another.

$$\frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 = \%$$

2. **Percentage Operating Profit After Interest To the Total Capital Employed**

This is a measure of the operating profit related to all funds employed, including paid-in capital, surplus and reserves, long term loans, and bank loans, that is, in relation to net tangible assets.

In general, the enterprise should earn enough to cover all operating costs including depreciation and leave a percentage return on the net tangible assets in excess of the bank's lending rate.

$$\frac{\text{Profit Before Interest and Tax}}{\text{Net Tangible Assets}} \times 100 = \%$$

3. **Percentage Net Profit Before Tax to the Equity Capital**

This ratio is usually quoted along with that of paragraph 1., and represents the percentage return, before taxation on the equity capital.

The percentage varies considerably as between different industries, and an acceptable figure in one country may not be acceptable in another.

$$\frac{\text{Operating Profit}}{\text{Equity Capital}} \times 100 = \%$$

4. **Debt Service Cover**

This is a measure of the financial strength of the enterprise and it's ability to meet debt repayment and interest payment out of funds accruing in the particular year.

From the profit before interest and taxation, taxation is deducted, and depreciation and other non-cash items are added to give the total funds available.

The interest and capital repayable are summated to give the total amount to be paid out.

$$\text{Debt Service Cover} = \frac{\text{Total Funds Available}}{(\text{Interest} + \text{Capital Repayment})}$$

A debt service cover of less than 2 x is considered to be a weak position.

5. **Current Assets : Current Liabilities**

The relationship of current assets to current liabilities measures the ability of an operating company to meet it's current obligations and indicates the strength of it's liquidity.

A ratio of not less than 2 : 1 is desirable, and this indicates that the value of the current assets could fall by 50% without danger to the liquidity position.

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = \text{Ratio}$$

6. **Tangible Fixed Assets to the Secured Loan**

This is a measure of the security charged against a long term loan and indicates the coverage on realization in the event of insolvency or liquidation of the enterprise. It is a ratio of considerable interest to the lender but is of less general interest than the ratio covered by paragraph 4. The value of fixed assets is taken as the depreciated value. Bankers like to see a ratio of 2 : 1 or more.

$$\frac{\text{Total Fixed Assets}}{\text{Term Loan}} = \text{Ratio}$$

7. **Debt : Equity Ratio**

The ratio of year end term debt obligations to the equity investment. The term debt and the equity are each expressed as a percentage of the total of equity and loan together.

$$\frac{\text{Term Debt}}{\text{Term Debt + Equity}} \times 100 \; : \; \frac{\text{Equity}}{\text{Term Debt + Equity}} \times 100$$

When a unit is operating at less than full capacity the following approximate relationship obtains:

% of Full Capacity	Maintenance Cost
100%	100%
75%	85%
50%	75%

(ii) Repair Materials

Repair materials include sundry items for machine repairs, including bearings, belts, etc., together with consumable items used in repair work such as welding materials.

Factory Overheads

Factory overheads are difficult to estimate and the check list provided in Volume I - "Basic Accounting", should be used to ensure that all relevant costs are included. It should be noted, however, that although it is normal in costing to include depreciation as an overhead expense, for the purpose of preparing financial projections, depreciation must be shown separately. Further, maintenance expenses are also shown as a separate item.

All factory overhead expenses including depreciation and maintenance may be divided, for the purpose of estimating, into charges related to investment cost and total labour cost. The total overhead may then be expressed as x% of the total labour cost (including direct labour, indirect labour, maintenance labour, supervision, loading, packing, shipping) plus y% of the investment cost.

A ratio of 50 : 50 at the commencement of operations is generally found to be a satisfactory capital structure.

The ratios for each particular purpose should be carefully considered and chosen to present just the control information required for that purpose.

CHAPTER VIII

SENSITIVITY ANALYSIS AND RISK ANALYSIS

The application of sensitivity analysis and risk analysis techniques to financial projections has not yet become a common practice in project evaluation. Assuming that no bias has been built into the capital estimates and that operating receipts and expenditures are "best estimates", it is almost certain that some estimates will be higher and some lower than the actuals when the project is implemented. The internal rate of return calculated from these "best estimates" represents one combination of estimates out of all possible combinations. But of course, the capital estimate may be high or low, the volume of sales uncertain, the sales receipts or costs subject to change, or even the project life may be doubtful.

If the variation of one of these items is considered in isolation, the internal rate of return can be recalculated for several values of the variable, and if a range of values for each variable is calculated, the number of calculations becomes an impossible task if performed manually. This is sensitivity analysis, - the sensitivity of the calculated internal rate of return to assumed changes in one or more of the variables from which the internal rate of return is calculated.

But one variable may possibly have a wide band of variation from the "best estimate", and another variable only a narrow band of variation, and this poses the problem of how to combine these ranges. Further it is more useful to know the probability that the internal rate of discount would fall within a specified range. This is risk analysis, - the combination of a number of probability distributions of several variables to provide a combined overall probability distribution.

Sensitivity Analysis

Sensitivity analysis has an application where the result of using single best estimates for each uncertain variable is considered to be unsatisfactory.

First, the uncertain variable parameters are listed and three estimates of each are made, - the highest, the best, and the lowest estimate. Then combining all the lowest estimates, the internal rate of return is calculated to provide an indication of the worst possible result, and if this shows the project to be risky, then it may be worthwhile to proceed to the next stage of the analysis.

Next, the internal rate of return is calculated, varying each parameter one at a time, while holding all the other variables at their best estimate value.

This indicates which are the main variables contributing to the performance of the project. A similar group of computations would indicate the effect of each variable on the financial rate of return.

A further check may be made by varying the best estimate by x%, one at a time, while holding the other variables at their best estimated value.

It is important however to correlate variables which would probably be correlated or partially correlated in practice. Positive correlation of variables means that the effect of the variation of one is increased by the variation of others, and negative variations compensate each other.

It would be a laborious task to undertake all these computations manually, and at a minimum it would be necessary to do the internal rate of return calculations by computer.

An initial understanding of the effect of individual variables may be obtained using a simplified equation which gives an approximate return in a single 'typical year'.

$$R = \frac{N\,(p - c)}{I} \cdot t$$

where R = Return on the average investment
N = Number of units sold
p = Average sale price per unit
c = The total of fixed and variable costs of production
t = The ratio of income after tax to income before tax
I = The average depreciated investment

(a) Sensitivity of Return to Price and Cost Changes

If the unit sales price changes from p_o to p, the other variables of the equation remaining unchanged, then:-

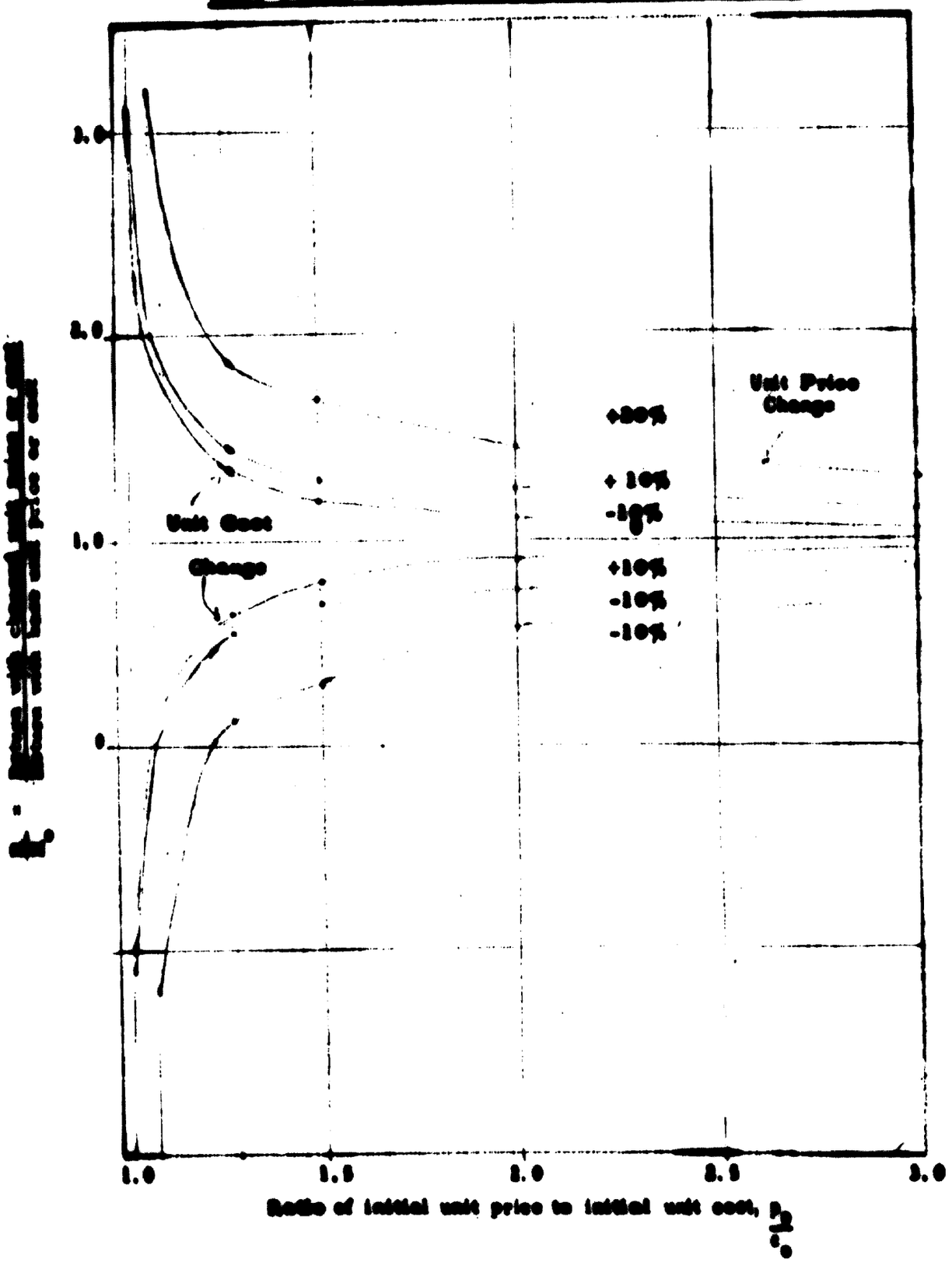
$$\frac{R}{R_o} = \frac{\frac{N(p-c)\,t}{I}}{\frac{N(p_o - c)t}{I}} = \frac{p - c}{p_o - c}$$

And if the price change ratio is separated out:-

$$\frac{R}{R_o} = \frac{p}{p_o}\left(\frac{\frac{p_o}{c}}{\frac{p_o}{c} - 1}\right) - \left(\frac{1}{\frac{p_o}{c} - 1}\right)$$

From which it is seen that in this simple case, the sensitivity of return to price change depends on the price-cost ratio, $\frac{p}{p_o}$, prior to the change, and this is illustrated graphically.

UNIT PRICE AND UNIT COST SENSITIVITY RETURN



(b) **Sensitivity of Return to Changes in Sales Volume**

The basic equation is modified to segregate fixed and variable costs.

$$R = \frac{N (p - c_v) - C_t}{I} .t$$

where c_v = the variable cost of a unit of sales

C_t = the total fixed operating cost

$$\frac{R}{R_o} = \frac{\frac{N (p - c_v) - C}{I} .t}{\frac{N_o (p - c_v) - C}{I} .t}$$

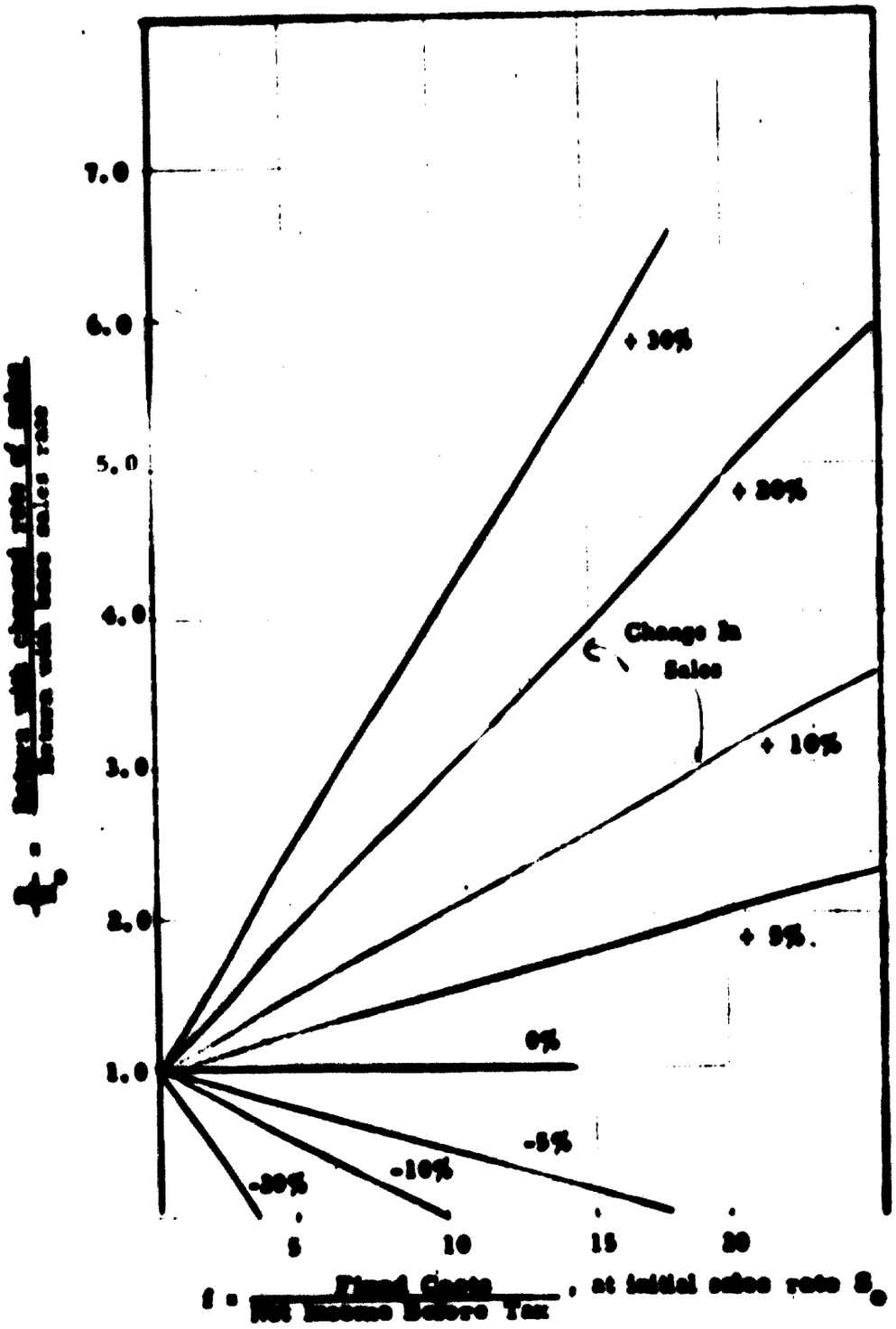
$$= \frac{N}{N_o} \left(1 + \frac{C}{N_o (p - c_v) - C}\right) - \left(\frac{C}{N_o (p - c_v) - C}\right)$$

For $\frac{C}{N_o (p - c_v) - C}$ substitute x

Then $\frac{R}{R_o} = \frac{N}{N_o} (1 + x) - x$

The sensitivity of return to changes in sales volume depends on the ratio of fixed costs to net income after tax prior to the change in sales.

SALES SENSITIVITY OF RETURN



(c) **Sensitivity of Return to Investment Changes**

The basic equation is modified to segregate the fixed costs which vary with investment and those which do not.

$$R = \frac{N(p - c_v) - (O_v + kI + \frac{2I}{n}) \cdot t}{I}$$

where O_v = fixed operating costs unrelated to investment

$\frac{2I}{n}$ = approximate annual straight line depreciation, treated as a fixed cost, where n is the years of project life, and I the average depreciated investment.

kI = other fixed operating costs directly related to investment, such as property taxes, insurance and fixed maintenance.

for $\frac{N(p - c_v) - O}{I_o(k + \frac{2}{n})}$ substitue y

$$\frac{R}{R_o} = \frac{I_o}{I} \left(\frac{y}{y - 1}\right) - \left(\frac{1}{y - 1}\right)$$

This equation, shown graphically, shows the sensitivity of return to investment over-runs or under-runs.

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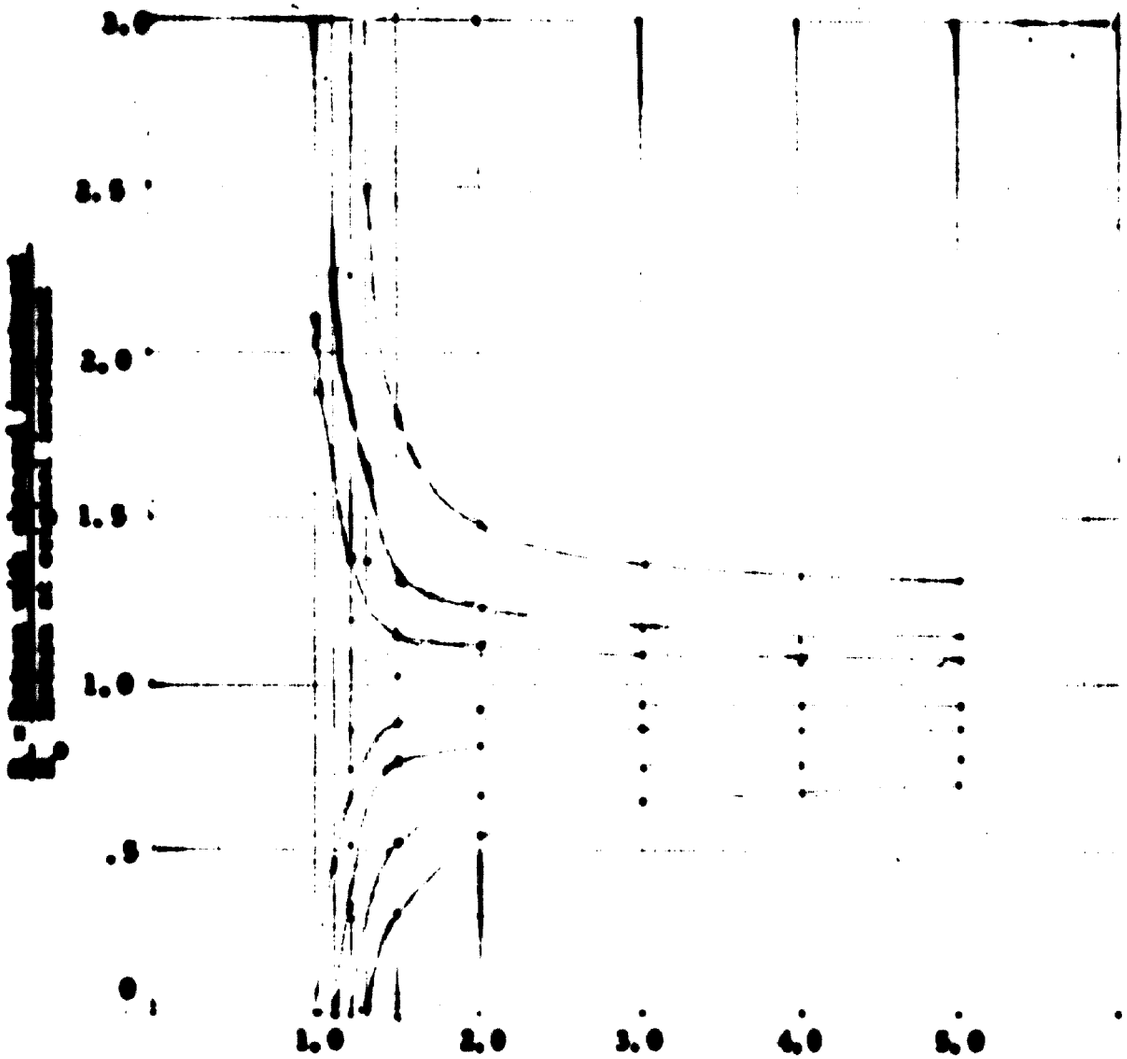


y = operating margin / investment related charges, at original investment

(d) Sensitivity of Return to Other Variables

(i) Working Life of the Plant

The internal rate of return of a project increases with its economic life, although the rate of increase reduces with time. Indications are that calculations of internal rate of return should be based on a 15 year life, by which time, in most cases, the figure becomes fairly stable, and therefore comparable as between one project and another. Of course, where a project, is known to have a shorter life than 15 years, the estimated life should be used.

This analysis does not lend itself to the projection of standard type curves based on ratios, but the effect of changes in the working life may be demonstrated by calculations for specific projects.

(ii) Capital Cost Variation

The effect of variations in investment has already been discussed, but if for a particular project the curve showing the variation due to project life has been projected, it becomes possible to calculate the difference to this curve arising from variations in the capital cost.

Over-run in the capital cost results in a decreased rate of return throughout the life of the project, and under-run an an increase in the rate of return.

Such ratios must be kept up-to-date but as an indication of the order of magnitude of the percentages, the following are given:

	% of Investment		% of Total Labour
Heavy chemical plants - large	1.5	+	45
Power plants	1.8	+	75
Electrochemical plants	2.5	+	45
Cement plants	3.0	+	50
Heavy chemical plants - small	4.0	+	45

Selling Expenses

The estimation of selling expenses is expressed as a percentage of the net sales value, or as a percentage of net manufacturing cost, but in different industries it shows wide variation. The only way to make a fair estimate of sales expenses is to decide the sales organisation, the advertising media and distribution channels, necessary to sell the projected share of the market. These can then be costed, and the individual costs aggregated. Additionally the cost of packing and warehousing must be included.

If the market study has been adequately done, then the sales policy will have been broadly established and the necessary organisation may be projected.

The financing of sales credit is a part of working capital, the interest charges on which are not charged to sales expenses, and therefore it is not classed as a sales expense.

(iii) Working Capital Variation

The working capital variation has a somewhat similar effect to that of capital cost variation over the life of the project, but it only becomes operative when production starts. A higher working capital reduces the internal rate of return, and a lower working capital increases the rate of return.

(iv) Sales Volume Variation

The sales sensitivity of return has already been analysed on a static basis, and the change in return due to changes in sales volume may be plotted over the life of the project, on the basis of sales being a fixed percentage of plant capacity.

Changes in sales volume are a major operating variable.

(v) Single Versus Multi-Stage Plant Development

Where the possibility of multi-stage development exists, to meet increasing sales over the years, it is always desirable to investigate the alternatives on the basis of internal rate of return. In general it is probable that multi-stage development would provide a higher internal rate of return.

Risk Analysis

Risk analysis in project evaluation, is not difficult if a computer is used, but is laborious otherwise.

The first step is to establish the main variables, for which purpose sensitivity calculations may possibly be useful. A subjective assessment is then made of the probability distributions for each of the selected main variables.

The probability distribution of individual variables should make the maximum use of information available and attempts to smooth out a distribution to make it more conformable with mathematical formulae may not be advantageous. There are various useful distributions, - the step rectangular, discrete, uniform, beta, trapezoidal, triangular and natural, all of which may have application. These have been depicted diagrammatically.

Finally a simulation is built up from the chosen parameters. Using a computer, random values for each of the parameters are generated, to compute the rates of return, and the process repeated to provide a sufficient number of values. The distribution of the rates of return thus computed provides an overall probability distribution.

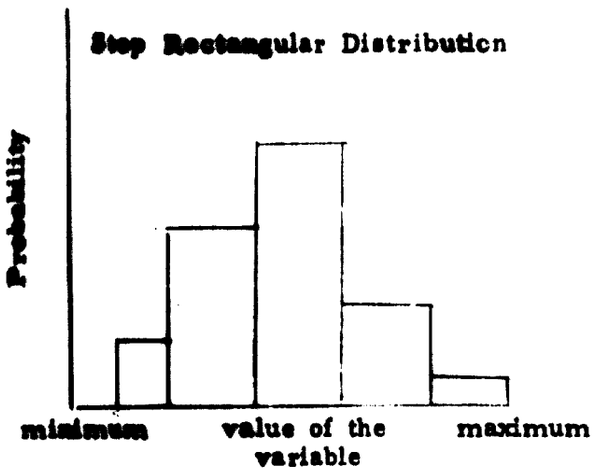
Such a curve, produced in this way, is the middle curve on the diagram, which depicts the percentage return on equity for a project in which the initial proportion of equity to fixed interest loans is 50 : 50. All the area under the curve is in the profit region and there is no undue risk.

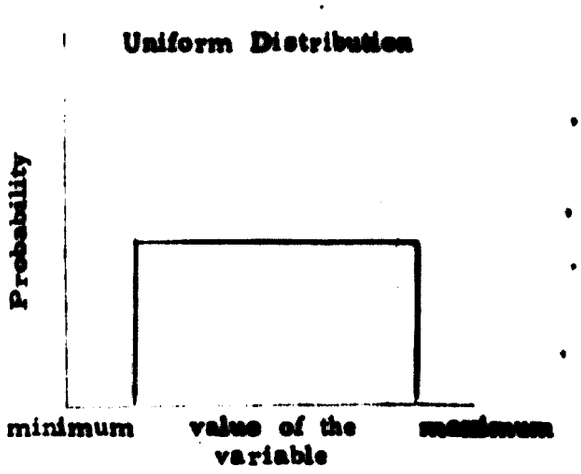
If some projects are sound with a modest profit, and others show greater risk with a higher median profit then a decision becomes more difficult.

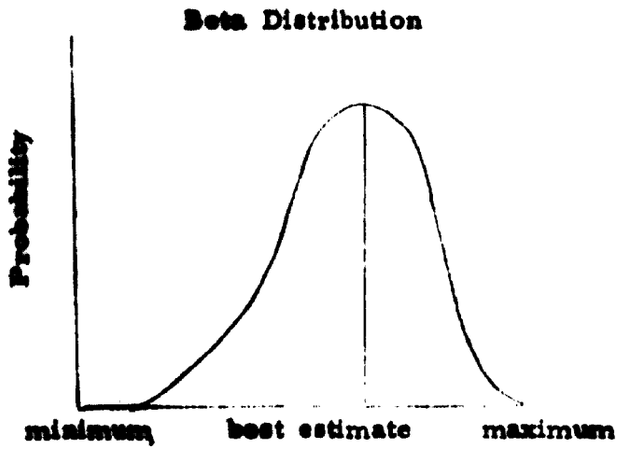
It is useful at this point to consider what would be the best ratio of ordinary to loan capital, from the point of view of the entrepreneur.

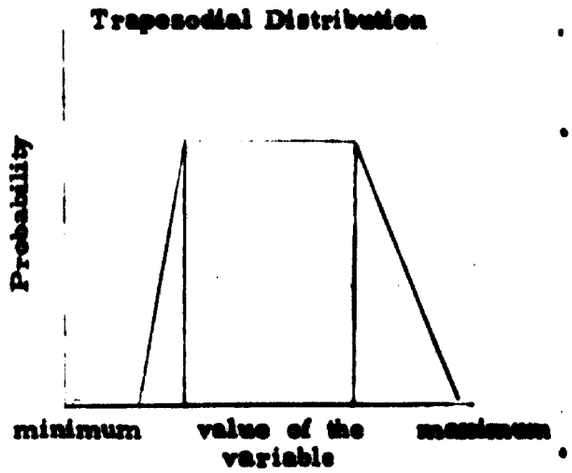
The diagram illustrates three probability curves, from which it is seen that the higher the gearing, the higher the expected profit, but the greater the risk of making a loss. In this example a 50 : 50 ratio appears to be reasonable. This is in conformity with the practical ratio established by many lending institutions of about 50 - 60% loan capital, which has been shown by cash flow analysis to be a reasonable risk from the point of view of the lending institutions.

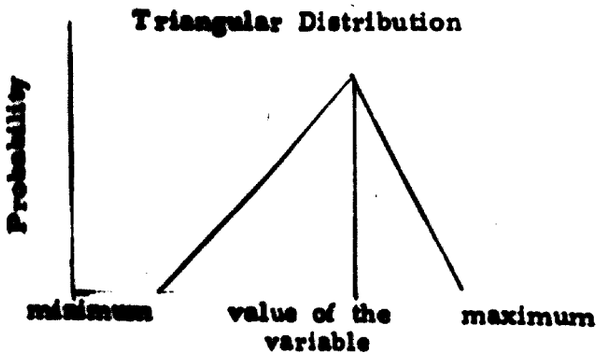
TYPICAL PROBABILITY DISTRIBUTIONS

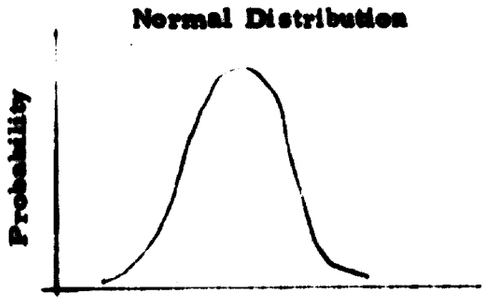












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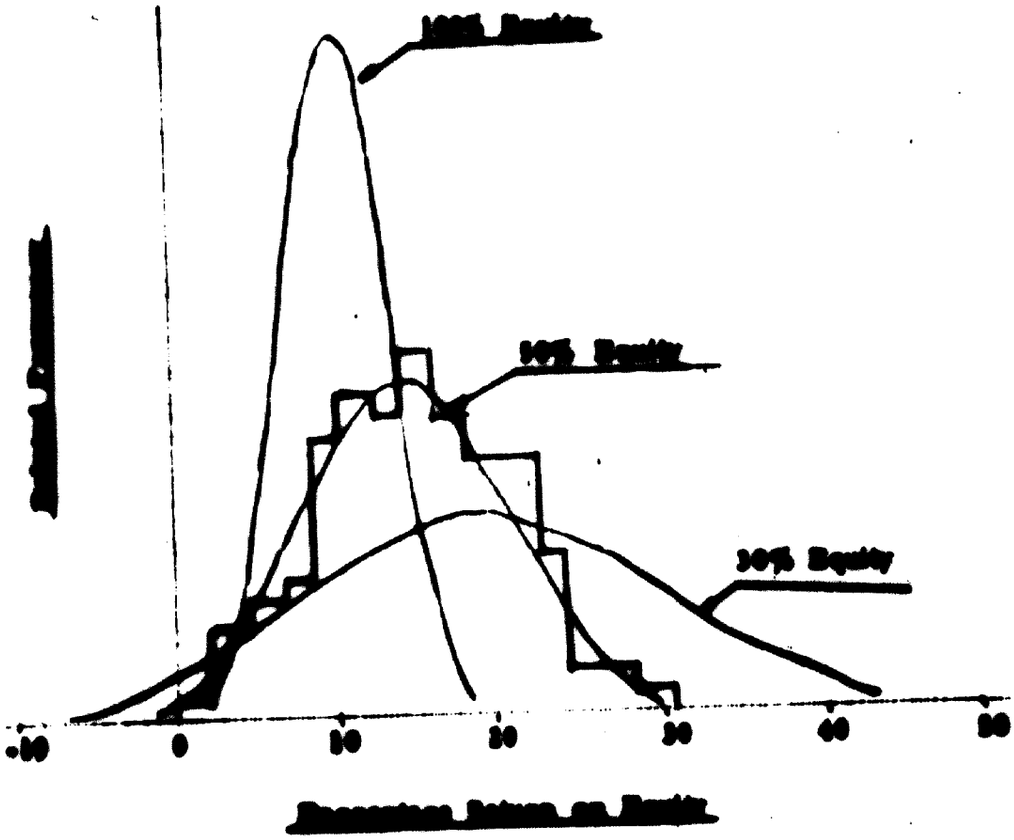

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CHAPTER IX

DISCOUNTING OF CASH FLOWS

The concept of discounting of cash flows stems from the generally accepted view that money received this year has a greater value than a similar amount of money received next year or in future years. Conversely a sum of money received in the future would have less numerical value to-day than the numerical value when received. In physical terms, the output from a project is more valuable now than a similar quantity in several years time.

Assuming $100 is invested at 10% compound interest, after 5 years it would be worth $161.051.

At the end of year	Interest	Total
0	0	100
1	10	110
2	11	121
3	12.1	133.1
4	13.31	146.41
5	14.641	161.051

But if $100 is deposited after 5 years have elapsed, it would currently be worth only $62.093.

At the end of year	Interest or Discount	Total
5	-	100,000
4	9,091	90,909
3	8,264	82,645
2	7,513	75,132
1	6,830	68,302
0	6,209	62,093

It is said that the present value of $100 discounted by 10% over 5 years is $62,093.

These two calculations relate to the situation in which the interest is added or the discount is deducted at the end of each succeeding year, and may be represented mathematically as follows.

10% Compound Interest $S = P\ (1 + r)^n$

10% Discount $P = S\ (1 + r)^{-n}$

If the capital sum (S) is assumed to be unity then the general expression for calculating discount indices becomes.

$$V_{n/r} = (1 + r)^{-n}$$

where

$V_{n/r}$ = the index applicable to the capital sum (S) over n years at r discount.

r = rate of discount

n = number of years discounted

The cash flow in money value at the end of year n multiplied by the index $V_{n/r}$, will give the present value of the cash flow if discounted at the rate, r.

Using this expression, a reference table of indices has been calculated, to three decimal places, which is sufficiently accurate when applied to estimated cash flows. There is no point in burdening the person calculating, with 6 figure tables which provide a false impression of close accuracy not possible in the cash flow estimates themselves.

Present Value

The present value of a sum available after a number of years have elapsed, is the calculated discounted value, at a pre-determined discount rate. The chosen discount rate may be the present rate at which money may be borrowed from the bank or it may be the minimum acceptable rate for a new investment.

The present net value of an investment, treats the investment as a negative sum against which annual cash flows are positive, (although an annual cash flow could be negative), all the values being discounted at the decided percentage. If the resulting net present value is negative the proposed investment is not financially favourable, but if it is positive, it is favourable.

This is quite adequate if a yes/no decision is to be taken on one unrelated investment but it does not provide a measurement of the relative merit of one investment as compared with another. If the present net value is divided by the amount of capital invested, this provides a ratio, and the higher the ratio, the more favourable the investment.

employed in social cost benefit analysis
The economic concept of "social discount rate"/is operated in exactly the same way as the arbitrary percentages employed, to arrive at the present net value, i.e. it is a discount rate.

Example

Year	Expenditure Flow (Million Rials)	Factor @ 12%	Present Value (Million Rials)
1	-8.3	.893	-7.41
2	-22.2	.797	-17.69
3	+7.9	.712	+5.62
4	+14.6	.636	+9.29
5	+18.9	.567	+10.72
6	+22.5	.507	+11.41
7	+24.0	.452	+10.85
8	+24.3	.404	+9.82
9	+26.0	.361	+9.39
10	+26.0	.322	+8.37
			50.37

The present worth of the capital investment discounted at 12% is 7.41 + 17.69 = 25.10, and the present net value is 50.37.

The ratio of investment to present net value is $\frac{50.37}{25.10} = 2.007$

In this example the value of assets at the end of the tenth year is assumed to be zero.

Internal Discount Rate

The internal discount rate is that rate, applied throughout the reference period, which would make the present net value equal to nil. The internal discount rate is not the percentage return on the investment, but it is the rate earned by the amount invested at any time. In this concept the amount invested reduces annually as all the positive cash flows accumulate. It is analogous to considering the whole of the capital as being borrowed with the annual cash income being paid in to reduce the borrowings. The internal

discount rate is then the rate of interest it would be possible to pay on the reducing balance, to allow the project to break-even.

The term internal discount rate is synonymous with several other terms, - yield, investors method, interest rate of return etc.-

The calculation of the internal discount rate is in the first instance by trial and error and then by linear interpolation.

Example

Year	Expenditure Flow Million Rials	Discount Factors For 45%	Discounted Flow at 45%	Discount Factors for 40%	Discounted Flow at 40%
1	- 8.3	.690	- 5.73	.714	-5.93
2	-22.2	.476	-10.57	.510	-11.32
3	+ 7.9	.328	+ 2.59	.364	+2.88
4	+14.6	.226	+ 3.30	.260	+3.80
5	+18.9	.156	+ 2.95	.186	+3.52
6	+22.5	.106	+ 2.39	.133	+3.00
7	+24.0	.074	+ 1.78	.095	+2.28
8	+24.3	.051	+ 1.24	.068	+1.65
9	+26.0	.035	+ .91	.048	+1.25
10	+26.0	.024	+ .62	.035	+ .91
			-16.30		-17.25
			+15.78		+19.29
			- .52		+2.04

$$40 + \left(\frac{2.04}{2.56} \times 5\right) - 43.98\%$$

In this example the value of assets at the end of the tenth year is assumed to be zero.

Administration Expenses

Administration expenses are expressed as a percentage of the net sales value, or as a percentage of net manufacturing cost. They include the cost of general management, accounting, purchasing, personnel administration, research and design and financial expenses (excluding interest). However, it is usual to estimate the personnel required for a new project as a basis for establishing the administration expenses.

Royalties, Patents

Initial payments for technical know-how in designing and installing a new plant are a part of the capital investment, as are single sum payments for patent rights. Where payments are made on a recurring basis, or on the basis of units of production, then this becomes an operating expense.

Royalties must not be allowed to become a burden on a project, and a figure of 1—5% of of the sales value is usual. The project evaluator must be prepared to oppose excessive royalty arrangements. The period of the royalty agreement should be between 5 and 10 years with option to renew, and provision should be included for the transfer of new designs and the results of research undertaken within the overseas organisation must be made available and included in the royalty payment.

Cost Contingencies

This is an arbitrary sum added to the estimated operating costs to cover for cost items inadvertently omitted. In developing countries, where generally new technologies are being introduced a figure of 3% is suggested.

In the example the discount calculations are shown for 45% and 40%, although in practice several calculations may have to be made before two results having opposite signs are found. The discount percentage to provide nil net value must lie between 40% (-.52) and 45% (+2.04) and assuming a linear relationship the figure works out to 43.98%. A further refinement would have been to calculate from the tables for 44%, and the net value would then have been + .02 and the discount rate interpolated between 44% and 45%, would be a little more accurate at 44.18%.

The Discounting Time Interval

It is possible to discount continuously as distinct from assuming that the annual cash flows are transferred in a single transaction. The view is held that the profit accrues throughout the year, which is true, but the cash flow month by month is far from consistent, and in fact some heavy outgoings, particularly loan repayments are made annually or bi-annually. There may be some projects where continuous discounting may approximate more closely to actual cash flow than the single annual transaction method, but it's general application is debatable. Tables of indices are available for continuous discounting based on the equation:-

$$V_{n/j} = \left(1 + \frac{j}{m}\right)^{-jn}$$

and when $m \longrightarrow \infty$ $\qquad V_{n/j} = e^{-jn}$

where $V_{n/j}$ = the index applicable to the capital sum(s) over n years at j discount.

j = rate of discount

n = number of years discounted

m = number of payments yearly

If we decide that continuous discounting ($m \rightarrow \infty$) is not applicable then we have to consider the number of times per year to assume that payments will be made. To a large extent, unless there are some special requirements, it is usual in project evaluation to assume a single annual payment, as being sufficiently accurate. This is conformable with financial practice in preparing financial projections to reflect the cash flow during a complete year, and the cash position at the end of a years interval. Also it is conformable with normal accounting practice which present the operating accounts on an annual basis.

Then there is the question whether the single cash flow should be assumed to take place at the beginning of the year, the middle of the year or the end of the year. The view is sometimes held that capital outflows (-) should be assumed to take place at the beginning of the year, while inflows (+) are assumed at the end of the year.

Since the capital investment is a relatively large negative amount and the discount factors are of high value an attempt should be made to forecast when the expenditures will be made in relation to the date of commencing production, and discounted accordingly. However, projected cash inflows, will in most cases, reflect the actual position sufficiently accurately if assumed to be concentrated at the end of the year. In fact, few projects achieve full output as early as projected.

In the example capital expenditures and cash receipts are both assumed to take place at the end of the year.

APPENDIX IX/1

DISCOUNTING TABLES

Discount tables to 3 decimal places

Equation : $V_{n/r} = (1 + r)^{-n}$

1 - 20 years

From 1% to 70% in steps of 1%

From 75% to 95% in steps of 5%

99%

APPENDIX IX/1 (Continued)

$$V_{n/r} = (1 + r)^{-n}$$

PERCENTAGE

YEAR	1	2	3	4	5	6	7	8	9	10
1	.991	.980	.971	.962	.952	.943	.935	.926	.917	.909
2	.980	.961	.943	.925	.907	.890	.873	.857	.842	.826
3	.971	.942	.915	.889	.864	.840	.816	.794	.772	.751
4	.961	.924	.888	.855	.823	.792	.763	.735	.708	.683
5	.951	.906	.863	.822	.784	.747	.713	.681	.650	.621
6	.942	.888	.837	.790	.746	.705	.666	.630	.596	.564
7	.933	.871	.813	.760	.711	.665	.623	.583	.547	.513
8	.923	.853	.789	.731	.677	.627	.582	.540	.502	.467
9	.914	.837	.766	.703	.645	.592	.544	.500	.460	.424
10	.905	.820	.744	.676	.614	.558	.508	.463	.422	.386
11	.896	.804	.722	.650	.585	.527	.475	.429	.388	.350
12	.887	.788	.701	.625	.557	.497	.444	.397	.355	.319
13	.879	.773	.681	.601	.530	.469	.415	.368	.326	.290
14	.870	.758	.661	.577	.505	.442	.388	.340	.299	.263
15	.861	.743	.642	.555	.481	.417	.362	.315	.275	.239
16	.853	.728	.623	.534	.458	.394	.339	.292	.252	.218
17	.844	.714	.605	.513	.436	.371	.317	.270	.231	.198
18	.836	.700	.587	.494	.416	.350	.296	.250	.212	.180
19	.828	.686	.570	.475	.396	.331	.277	.232	.194	.164
20	.820	.673	.554	.456	.377	.312	.258	.215	.178	.149

APPENDIX IX/1 (Continued)

$$V_{n/r} = (1 + r)^{-n}$$

PERCENTAGE

YEAR	11	12	13	14	15	16	17	18	19	20
1	.901	.893	.885	.877	.870	.862	.855	.847	.840	.833
2	.812	.797	.783	.769	.756	.743	.731	.718	.706	.694
3	.731	.712	.693	.675	.658	.641	.624	.609	.593	.579
4	.659	.636	.613	.592	.572	.552	.534	.516	.499	.482
5	.593	.567	.542	.519	.497	.476	.456	.437	.419	.402
6	.535	.507	.480	.456	.432	.410	.390	.370	.352	.335
7	.482	.452	.425	.400	.376	.354	.333	.314	.296	.279
8	.434	.404	.376	.351	.327	.305	.285	.266	.249	.233
9	.391	.361	.333	.308	.284	.263	.243	.225	.209	.194
10	.352	.322	.295	.270	.247	.227	.208	.191	.176	.162
11	.317	.287	.261	.237	.215	.195	.178	.162	.148	.135
12	.286	.257	.231	.208	.187	.168	.152	.137	.124	.112
13	.258	.229	.204	.182	.163	.145	.130	.118	.104	.093
14	.232	.205	.181	.160	.141	.125	.111	.099	.088	.078
15	.209	.183	.160	.140	.123	.108	.095	.084	.074	.065
16	.188	.163	.141	.123	.107	.093	.081	.071	.062	.054
17	.170	.146	.125	.108	.093	.080	.069	.060	.052	.045
18	.152	.130	.111	.095	.081	.069	.060	.051	.044	.038
19	.138	.116	.098	.083	.070	.060	.051	.043	.037	.031
20	.124	.104	.087	.073	.061	.051	.043	.037	.031	.026

APPENDIX IX/1 (Continued)

$$V_{n/r} = (1 + r)^{-n}$$

PERCENTAGE

YEAR	21	22	23	24	25	26	27	28	29	30
1	.826	.820	.813	.806	.800	.794	.787	.781	.775	.769
2	.683	.672	.661	.650	.640	.630	.620	.610	.601	.592
3	.564	.551	.537	.524	.512	.500	.488	.477	.466	.455
4	.467	.451	.437	.423	.410	.397	.384	.373	.361	.350
5	.386	.370	.355	.341	.328	.315	.303	.291	.280	.269
6	.319	.303	.289	.275	.262	.250	.238	.227	.217	.207
7	.263	.249	.235	.222	.210	.198	.188	.178	.168	.159
8	.218	.204	.191	.179	.168	.157	.148	.139	.130	.123
9	.180	.167	.155	.144	.134	.125	.116	.108	.101	.094
10	.149	.137	.126	.116	.107	.100	.092	.085	.078	.073
11	.123	.112	.103	.094	.086	.079	.072	.066	.061	.056
12	.102	.092	.083	.076	.069	.062	.057	.052	.047	.043
13	.084	.075	.069	.061	.055	.050	.045	.040	.037	.033
14	.070	.062	.055	.049	.044	.039	.035	.032	.028	.025
15	.057	.051	.045	.040	.035	.031	.028	.025	.022	.020
16	.047	.042	.036	.032	.028	.025	.022	.019	.017	.015
17	.039	.034	.030	.026	.023	.020	.017	.015	.013	.012
18	.032	.028	.024	.021	.018	.016	.014	.012	.010	.009
19	.027	.023	.020	.017	.014	.013	.011	.009	.008	.007
20	.022	.019	.016	.014	.012	.010	.008	.007	.006	.005

$$V_{n/r} = (1+r)^{-n}$$

PERCENTAGE

YEAR	31	32	33	34	35	36	37	38	39	40
1	.763	.758	.752	.746	.741	.735	.730	.725	.719	.714
2	.583	.574	.565	.557	.549	.541	.533	.525	.518	.510
3	.445	.435	.425	.416	.406	.398	.389	.381	.372	.364
4	.340	.329	.320	.310	.301	.292	.284	.276	.268	.260
5	.259	.250	.240	.231	.223	.215	.207	.200	.193	.186
6	.198	.189	.181	.173	.165	.158	.151	.145	.139	.133
7	.151	.143	.136	.129	.122	.116	.110	.105	.100	.095
8	.115	.108	.102	.096	.091	.085	.081	.076	.072	.068
9	.088	.083	.077	.072	.067	.063	.059	.055	.052	.048
10	.067	.062	.058	.054	.050	.046	.043	.040	.037	.035
11	.051	.047	.043	.040	.037	.034	.031	.029	.027	.025
12	.039	.036	.033	.030	.027	.025	.023	.021	.019	.018
13	.030	.027	.025	.022	.020	.018	.017	.015	.014	.013
14	.023	.021	.018	.016	.015	.014	.012	.011	.010	.009
15	.017	.016	.014	.012	.011	.010	.009	.008	.007	.006
16	.013	.012	.010	.009	.008	.007	.006	.006	.005	.005
17	.010	.009	.008	.007	.006	.005	.005	.004	.004	.003
18	.008	.007	.006	.005	.005	.004	.003	.003	.003	.002
19	.006	.005	.004	.004	.003	.003	.003	.002	.002	.002
20	.005	.004	.003	.003	.002	.002	.002	.002	.001	.001

$$V_{n/r} = (1 + r)^{-n}$$

PERCENTAGE

YEAR	41	42	43	44	45	46	47	48	49	50
1	.709	.704	.699	.694	.690	.685	.680	.676	.671	.667
2	.503	.496	.489	.482	.476	.469	.463	.457	.450	.444
3	.357	.349	.342	.335	.328	.321	.315	.308	.302	.296
4	.253	.246	.239	.233	.226	.220	.214	.208	.203	.198
5	.179	.173	.167	.162	.156	.151	.146	.141	.136	.132
6	.127	.122	.117	.112	.108	.103	.099	.095	.091	.088
7	.090	.086	.082	.078	.074	.071	.067	.064	.061	.059
8	.064	.061	.057	.054	.051	.048	.046	.043	.041	.039
9	.045	.043	.040	.038	.035	.033	.031	.029	.028	.026
10	.032	.030	.028	.026	.024	.023	.021	.020	.019	.017
11	.023	.021	.020	.018	.017	.016	.014	.013	.012	.012
12	.016	.015	.014	.013	.012	.011	.010	.009	.008	.008
13	.011	.010	.010	.009	.008	.007	.007	.006	.006	.005
14	.008	.007	.007	.006	.006	.005	.005	.004	.004	.003
15	.006	.005	.005	.004	.004	.003	.003	.003	.003	.002
16	.004	.004	.003	.003	.003	.002	.002	.002	.002	.002
17	.003	.003	.002	.002	.002	.002	.001	.001	.001	.001
18	.002	.002	.002	.001	.001	.001	.001	.001	.001	.001
19	.001	.001	.001	.001	.001	.001	.001	.001	.001	-
20	.001	.001	.001	.001	.001	.001	-	-	-	-

APPENDIX IX/1 (Continued)

$$V_{n/r} = (1 + r)^{-n}$$

PERCENTAGE

YEAR	51	52	53	54	55	56	57	58	59	60
1	.662	.658	.654	.649	.645	.641	.637	.633	.629	.625
2	.439	.433	.427	.422	.416	.411	.406	.401	.396	.391
3	.290	.285	.279	.274	.269	.263	.258	.254	.249	.244
4	.192	.187	.182	.178	.173	.169	.165	.160	.156	.153
5	.127	.123	.119	.115	.112	.108	.105	.102	.098	.095
6	.084	.081	.078	.075	.072	.069	.067	.064	.062	.060
7	.056	.053	.051	.049	.047	.044	.043	.041	.039	.037
8	.037	.035	.033	.032	.030	.029	.027	.026	.024	.023
9	.025	.023	.022	.021	.019	.018	.017	.016	.016	.015
10	.016	.015	.014	.013	.012	.012	.011	.010	.010	.009
11	.011	.010	.009	.009	.008	.008	.007	.007	.006	.006
12	.007	.007	.006	.006	.005	.005	.004	.004	.004	.004
13	.005	.004	.004	.004	.003	.003	.003	.003	.002	.002
14	.003	.003	.003	.002	.002	.002	.002	.002	.002	.001
15	.002	.002	.002	.002	.001	.001	.001	.001	.001	.001
16	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001
17	.001	.001	.001	.001	.001	.001	-	-	-	-
18	.001	.001	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-

APPENDIX IX/1 (Continued)

$$V_{n/r} = (1 + r)^{-n}$$

PERCENTAGE

YEAR	61	62	63	64	65	66	67	68	69	70
1	.621	.617	.613	.610	.606	.602	.599	.595	.592	.588
2	.386	.381	.376	.372	.367	.363	.359	.354	.350	.346
3	.240	.235	.231	.227	.223	.219	.215	.211	.207	.203
4	.149	.145	.142	.138	.135	.132	.129	.126	.123	.120
5	.092	.090	.087	.084	.082	.079	.077	.075	.073	.070
6	.057	.055	.053	.051	.050	.048	.048	.044	.043	.041
7	.035	.034	.033	.031	.030	.029	.028	.026	.025	.024
8	.022	.021	.020	.019	.018	.017	.017	.016	.015	.014
9	.014	.013	.013	.012	.011	.010	.010	.009	.009	.008
10	.009	.008	.008	.007	.007	.006	.006	.006	.005	.005
11	.005	.005	.005	.004	.004	.004	.004	.003	.003	.003
12	.003	.003	.003	.003	.002	.002	.002	.002	.002	.002
13	.002	.002	.002	.002	.001	.001	.001	.001	.001	.001
14	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001
15	.001	.001	.001	.001	.001	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-

APPENDIX V/1

NUMERICAL EXAMPLE OF ELECTRIC POWER COST CALCULATION

Agreed Contract Demand - 200 kW

Moving Monthly Average Maximum Consumption

First Month	1	180	
	2	185	
	3	185	
	4	160	(A) Average maximum monthly demand
	5	190	= 183.5 kW
	6	195	
	7	200	
	8	180	
	9	175	
Last Month	10	185	
		1835	

.6 of Maximum Monthly Consumption (Month 7) = .6 x 200 = 120 kW (B)

.6 of Contract Demand = .6 x 200 = 120 kW (C)

Cost of Demand

(Based on Teheran charges - 1973)

First 50 kW		5000 Rials
183.5 - 50 = 133.5	133.5 x 80 Rials	= 10680 Rials
		15680 Rials

APPENDIX IX/1 (Continued)

$$V_{n/r} = (1 + r)^{-n}$$

PERCENTAGE

YEAR	75	80	85	90	95	99
1	.571	.556	.541	.526	.513	.503
2	.327	.309	.292	.277	.263	.253
3	.187	.171	.158	.146	.135	.127
4	.107	.095	.085	.077	.069	.064
5	.061	.053	.046	.040	.035	.032
6	.035	.029	.025	.021	.018	.016
7	.020	.016	.013	.011	.009	.008
8	.011	.009	.007	.006	.005	.004
9	.007	.005	.004	.003	.002	.002
10	.004	.003	.002	.002	.001	.001
11	.002	.002	.001	.001	-	-
12	.001	.001	-	-	-	-
13	-	-	-	-	-	-
14	-	-	-	-	-	-
15	-	-	-	-	-	-
16	-	-	-	-	-	-
17	-	-	-	-	-	-
18	-	-	-	-	-	-
19	-	-	-	-	-	-
20	-	-	-	-	-	-

CHAPTER X

PROJECT APPRAISAL CHECK LIST

The information required by lending institutions to assist in the appraisal of a project has long been scheduled, and this is reproduced in full.

Although some of this information may not be required by the Ministry of Economy for the purpose of economic evaluation, particularly for smaller projects, it is worthy of note that Development Banks require entrepreneurs to furnish these details.

The Pro-Forma Financial Projections, would be prepared either by the entrepreneurs or by the Development Bank officers on the basis of data submitted by the entrepreneurs and checked by the Bank's officers.

PROJECT APPRAISAL CHECK LIST

I. General (Promoters, Company Status)

1. Name and address of applicant and relationship to project.
2. Type of corporate status (sole proprietorship, partnership, private limited company, public limited company). If applicant is one of a group of associate companies, give a brief description of the group and the applicant's relationship to it.
3. Names and addresses of bankers and their references on applicant.
4. Names, addresses of bankers to major investors and their relationship to one another. Names and addresses of officers in each bank best acquainted with the company and its project.
5. Whether the applicant's bankers have been authorised to furnish such information regarding financial background and credit worthiness as the Ministry may require.
6. Commercial references if any.

II. Background of an Existing Company

1. Brief history of existing business.
2. Final accounts for last 5 years and Directors' reports together with pro-forma Balance Sheet and if possible, Profit and Loss Accounts, if the last audited Balance Sheet is more than six months old.
3. Explanations for any abnormal items in the above accounts. Reasons for revaluation of assets, if any, along with a report on which such revaluation is based. For example (i) Land and buildings, (ii) Machinery and equipment. Are the above mortgaged/under legal charge? If so, details thereof.

4. Indicate whether financial statements submitted are audited. Name of auditors and scope of examination.
5. Present borrowings (showing amounts, period, source, security furnished, its value and rate of interest) including :-

   Outstanding debentures.

   Outstanding mortgages and other long-term debt.

   Outstanding bank borrowing and maximum limit.

   (Copies of all relevant documents mentioned above should be provided).
6. State and describe restrictions, if any, on the issuance of new debt or securities etc.
7. Depreciation policy (rate for each item).
8. Present position regarding income tax assessment. Indicate whether allowance is made for pioneer industry status in estimation.
9. State whether project is a pioneer project. If so obtain copy of certificates re conditions of issue.
10. Details of pending litigation either by or against the Company.
11. Details of contingency liabilities and capital commitments outstanding.
12. Comment past policy with respect to dividend by company.
13. Three copies of Memorandum and Articles of Association/ Partnership deeds etc.
14. Names of major shareholders and their respective holdings of ordinary and preference shares.

Project

III. Production

1. Nature of present and/or proposed business. Describe briefly background history of project.

2. What incentives give rise to the project.
3. Is project dependent upon completion of other projects yet to be completed e.g. for raw materials, parts, markets, etc.
4. Indicate whether project is dependent upon granting or renewing of a concession, franchise or other Government finance.
5. State whether project is for expansion, modernisation of existing or setting up new projects. Include comprehensive report on the expansion, modernisation or new project, bringing out all salient features viz :
reasons for undertaking project, benefits to be accrued.
6. Description of methods of production and processes etc. (with full details) for each product line. State whether there are other known, more advanced or efficient processes or methods and comment as to their potential competitive risk to the project.
7. Have the adopted method (s) of production and process (es) been proved efficient by experience under conditions comparable to the project? Comment.
8. Present and proposed rated capacity and normal expected production capacity for all product lines on same basis as below.
9. Indicate working of each product line as follows :-
   (a) for continuous working indicate normal working days in a year; hours of work per week;
   (b) for "shift" working, indicate number of shifts expected to run and number of days per year. Also maintenance down time etc.
10. Year by year percentages of productive capacity until normal production is reached. Also percentage of normal productive capacity of existing lines of production.

11. Indicate whether the new capacity will supplant or supplement the old.
12. Evaluate potentials for future expansion, indicating the principal factors limiting expansion in order of their importance. If project has been designed with a view towards future expansion when is the first expansion contemplated and by what capacity?
13. Known Government reactions to this project. Also any Government action, not heretofore mentioned, yet to be taken affecting this project e. g. tariff protection, pioneer status etc.
14. Quantity and relative importance of each of list of products under production or proposed to be produced. Give specifications, size and general uses of each of product line.
15. Describe and evaluate the importance of by products in terms of volume/value and discuss problems related to their disposal.
16. Decribe local content of product. Whether government regulations or commitments have been made regarding this.
17. Describe seasonality and factors determining seasonality of production and sale.
18. Layout of plant and flow sheet of processes.

IV. Location

1. Plant location and its suitability with regard to : -
   a) Suitability of process
   b) Raw materials
   c) Essential services like power, steam, fuel, water
   d) Market and sales outlet
   e) Labour
   f) Local regulations concerning pollution by smoke, dust, effluent etc.
   g) Geological or topographical conditions
   h) Transport

i) Any other consideration

j) Discuss the special locational advantages if any.

2. Nature of transport and communication facilities at site - whether suitable for bringing in raw materials and heavy machinery and taking out finished goods if items are bulky or heavy. Distance from nearest railway station (name) and port. Whether railway siding or jetty is existing or contemplated.
3. Whether any public-owned means of transport and communications is available. Describe terms of use.
4. Comment upon the general accessibility of project by various means of transport. Describe hazards/problems associated with nature of project.
5. Local and Government regulations for : -

   a) Smoke pollution

   b) Dust pollution

   c) Effluent discharge

   What methods or steps will be taken for the above and particularly for effluent disposal.

V. <u>Utilities</u>

1. Electric power requirements in terms of kilowatts per day. Prospective sources and whether any definite arrangements have been made for its availability and rate. Describe any standby facilities provided in case of breakdown in supply.
2. Fuel requirements, prospective sources and definite indications for its availability and rate. Adequancy of supply. Whether project is dependent upon a continuous supply, whether alternative source is readily available. Is project entirely dependent upon imported fuel supply ?
3. Water requirements in terms of imperial gallons per day and its rate per 1,000 gallons. Prospective sources

its availability and provision for water treatment.

4. Staff and labour housing, canteens and other social amenities available or expected to be provided by the factory.

VI. Raw Materials

1. Availability of raw materials : -
   Domestic and Imported :
   1) Estimated price and sources of supply
   2) The quantity and value by country of each to be imported.
   3) Import licensing position - whether import licence is required; if so whether it has been or is being obtained.
   4) Any exemption of import duty on any item of imported raw material.
   5) If applicant intends to supply own raw materials from its own farms, plantations, quarries, details on quantity and quality of raw materials supply and of any contract with a view to securing future supply. Comment on whether in long run, all raw material import can be replaced locally. Give time and name of substitute if any.
   6) Whether any contracts have been entered into for their purchase - terms of contract. Comment on reliability of supply.
   7) Comment on future and availability of raw materials locally and overseas.

VII. Plant Machinery

1. Whether competitive quotations were obtained prior to selection of suppliers for plant and machinery. A comparative statement showing the various quotations and reasons for final selection.

2. Report on major machinery suppliers and/or foreign collaborators and their experience in the line. Indicate their experience in setting up similar plants in similar conditions elsewhere.
3. Describe any proposed technical supervision contracts, if any, both corporate and individual. Identify and give qualifications and experience in each instance of those responsible for supervision/technical administration.
4. Separate lists showing individual items of plant (with corresponding cost) to be imported and purchased locally. Indicate status of design engineering, cost estimates etc.
5. For existing plants, indicate any serious deterioration or obsolescence and outline of any proposed plan for modernisation, rebuilding and relocating. Describe the compatibility of design, engineering and cost estimates etc.
6. Identify the source of such cost estimates and date of preparation.
7. Breakdown of plant and equipment costs into local/foreign and for foreign, each type of currency involved.
8. Whether plant and machinery will be exempted from import duty. If so, how much and whether such exemptions have been included in the foregoing cost estimates.
9. Whether any patent or licence arrangement is required for project or company. Outline the royalties to be paid, if any. Any infringement claimed known or anticipated.

VIII. Construction

1. Indicate probable time for completion of construction and commencement of production.
2. Schedule of construction by major items of work viz :
   a) Site preparation

b) Design
c) Placement of orders
d) Construction of building
e) Installation of plant
f) Trial or pilot production
g) Start of commercial production

3. Whether a "turnkey" project is envisaged or a general contractor will be responsible for design and engineering, construction, cost control and performance. If so, whether the contract has been arranged; general terms price escalation clause, guarantees, fees etc. Name and address of contractor.
4. If a project is not a turnkey project, describe how each category of work starting with design and engineering is to be handled, by whom and how over all responsibility is to be divided and over all costs controlled.
5. Extent to which construction and erection work will be performed departmentally or through contractors by inviting tenders.

IX. Cost of Project

1. Detailed break-up of the capital cost of the project on the following line, indicating expenditure :
   (i) already incurred.
   (a) in $
   (b) in $ equivalent of foreign exchange

   and

   (ii) to be incurred
   (a) in $
   (b) in $ equivalent of foreign exchange

Land including :
(i) Cost of land..... acres at $ ..... per acre.
(ii) Legal expenses
(iii) Taxes and expenses for basic improvements
(iv) Development expenses.

Cost of Energy

(Based on Teheran unit charges 1973)

(a) Basis of Calculation

Based on whichever value of A, B or C is maximum. In the example A = 183.5 is maximum.

First 90 hours @ 183.5 = 16515 kWh @ 1.6 Rials/Unit = 26424
Second 90 hours @ 183.5 = 16515 kWh @ 1.3 Rials/Unit = 21470
Third 180 hours @ 183.5 = 33030 kWh @ 1.0 Rials/Unit = 33030

Above 360 hours the rate would be .75 Rials/Unit

In the example, the power consumed was recorded as 45,000 units, and therefore the lower rate of .75 Rial was not reached.

(b) Actual Calculation

First 90 hours @ 183.5 = 16515 kWh @ 1.6 Rials/Unit = 26424
Second 90 hours @ 183.5 = 16515 kWh @ 1.3 Rials/Unit = 21470
45,000 - (16515 + 16515) = 11970 kWh @ 1.0 Rials/Unit = 11970

Cost of Energy 59864

Total Cost and Average Cost

Cost of Demand	15680 Rials
Cost of Energy	59864 Rials
	75544 Rials

Average Cost Per kWh = $\frac{75544}{45,000}$ = 1.68 Rials

Buildings (Productive) :

(i) *Factory and administrative buildings, godowns, silos and other civil works.

(ii) *Staff and labour housing, canteen etc.

(iii) Site facilities e. g. , wells, reservoirs, water mains, sewers, fencing, roads and outdoor lighting.

Indicate ownership or control of land. State whether areas is adequate for contemplated operation and future expansion.

Plant & Machinery :

(i) Imported F. O. B. costs of the main plant and auxiliaries including power plants, transformers, etc. if any. (Provision for escalation of price to be shown separately).

(ii) Insurance and freight.

(iii) Import duty.

(iv) Indigenous equipment. (Provision for escalation of price should be shown separately).

(v) Transportation charges to site on both imported and indigenous equipment.

(vi) Provision for distribution of power, cabling and lighting.

(vii) Spare parts for imported and indigenous equipment.

(viii) Erection charges including expenses and fees of foreign technicians.

Note : * Number and type of structures, built-up area, average height of each, stating cost per square foot or cubic foot - estimate for each structure should be given individually.

Miscellaneous fixed assets :

(i) Vehicles, furnitures, fixtures, etc.

(ii) Workshop and laboratory equipment.

(iii) Fire fighting equipment.

(iv) Effluent treatment and disposal plant.

(v) Water supplies, storage and treatment systems.

(vi) Railway siding.

Technical know-how/Consulting Engineering fees :

For construction of project or royalty for technical collaboration.

Intangible expenses :

(i) Patents

(ii) Licences

(iii) Payments for goodwill

(iv) Trade marks

(v) Trade names

(vi) Copyrights

(vii) Any other similar items

Preliminary expenses :

(i) Legal expenses

(ii) Brokerage

(iii) Commission

Pre-operative expenses up to the start of commercial production

(i) Promotion expenses

(ii) Working expenses

(iii) Expenses for training personnel

(iv) Interest on borrowings, guarantee charges, etc.

(v) Interest on deferred payments.

Interest during construction :

(to be capitalised and regarded as a capital cost of project).

Allowances for unforeseen costs :

(indicating basis of estimate).

Initial requirements of working capital :

(showing details of total requirements and arrangements made therefor).

X. Means of Financing

1. Sources of funds (already arrange or under negotiation) for the project requiring financial assistance should be shown date and existing/proposed terms of issue and of redemption under the following heads :

   (i) by issue of equity share capital.
   (ii) by issue of preference share capital (different types).
   (iii) by issue of secured debentures (different types).
   (iv) by mortagage loans.
   (v) by unsecured loans and deposits.
   (vi) by deferred payments to machinery suppliers.
   (vii) from internal resources
   (viii) from banks (maximum limit allowed).
   (ix) from Government subsidies and grants.
   (x) from other sources.

   (Source of funds for expenditure in $ and in foreign exchange should be shown separately).

2. Financial contribution by promoters, already incurred/to be incurred. (State proposed timing).
3. Financial contribution by foreign collaborators already incurred/ to be incurred.
4. Indicate how foreign exchange component is expected to be financed.
5. Security offered in respect of borrowings. (Details such as the basis of valuation of security to be given).
6. If company is existing, discuss any restriction on the issuance of new debt or equity.
7. Present and proposed capital structure. Names and addresses of shareholders. Ownership pattern of project.

8. Extent to which any capital contribution will be made in any form other than cash.
9. Details of other applications for financial assistance made in Iran or abroad. Comment upon future sources of additional investment capital if needed. Pro-forma balance sheets of the company as at date of completion of the project and each year until normal production (minimum of six years), who prepares the projections for the project. Equity debt : ratio both present and after completion of project.

XI. Labour

1. Estimate of numbers and category of managerial and technical personnel, skilled and unskilled labour. Outline their relative importance to project. Comment on their ready availability at site. Estimates of rates of pay for each category of labour, mandatory social services, pension assessments, severance allowance.
2. Outline housing and social amenities to be provided or provided for workers.
3. Outline allocation of labour on various operations.
4. What arrangements have been made for training of local personnel at home and abroad. Describe in detail such financing facilities under technical collaboration agreement.
5. Arrangements for foreign instruction, supervision etc, period and conditions contracted.
6. Comment upon management/labour relationship in the past and future. Will labour or unions have any ownership interest or voice in the management of project ?

XII. Market

1. Principle uses of each of product line existing or produced.
2. Company's sales of each product line for the past five years with yearly breakdown by volume and value into home

and export markets. For home market indicate source (s) of information. (To be answered by company which has established markets for products to be manufactured but currently imported).

3. Consumption of the commodity (or each of the commodities) in Iran in past 5 years with yearly breakdown into domestic, import, and apparent consumption. Indicate source (s) of information.
4. Projected quantity and value of sale of each product line proposed.
5. Percentage of production intended for home and export markets.
6. Present and future demand for the commodity/commodities broken down by sales intended for home and/or export markets. Basis on which such future demand is estimated.
7. Where production is mainly intended for export, the major prospective countries of imports, and their annual consumption for past 5 years and amount of indigenous production available. Indicate source (s) of information.
8. Regional scope of markets by home and foreign.
9. Main classes of buyers. Indicate names where possible.
10. State whether any special market studies have been commissioned or anticipated. Indicate timeliness of study and name of outside agency employed or to be employed.
11. Names of principal competitors, local and/or foreign in market and abroad. Nature of competition in prices, quality.
12. Current domestic prices (ex-factory) and import prices (CIF) of each of comparable and competitive commodity by brand name and/or country of origin.
13. Where commodity for export, the landed price of major competitors within and without major importing countries for which production is destined. List of wholesale and retail prices for major competitive brands/products at

home and abroad.

14. Wholesale and retail selling price - for home and for export markets.
    Include in calculation ex—factory cost of production, middleman margins, cost of packing and packaging, transportation from factory to point of sales, cif charges to each of major countries of import. Discuss any unusual distribution or sales problems peculiar to project e. g. high cost or delays in transportation, product deterioration, warehousing, servicing etc.
15. Are prices subject to Government or other control ? Do any Government measures affect sales ? e. g. licence, allocation or quantitative and price control; direct or indirect subsidisation, export duty.
16. Degree of protection afforded by import duties and by import quotas in home and export markets. The actual import tariffs for home market (preferential, non-preferential) and major countries of exports. Comment on the affect on the competitiveness of commodity due to such artificial restriction to free trade.
17. Percentage of prospective sale intended for home market and export. Advantages if any available from Government for export.
18. What are the special major comparative cost or other advantages of manufacturing in Iran vis-a-vis overseas, e. g. raw material, labour availability, transportation charges.
19. Expansion or new projects contemplated in the industry, aside from present project. Indicate output capacity of each if possible, if not, total capacity.
20. Company's output as percentage of present and prospective domestic production.
21. Existing and proposed methods of distribution at home and abroad. Describe in outline agency or other marketing arrangements for (i) home (ii) export markets. Where direct

selling is planned, outline sales organisation proposed. Where agency/marketing tie up, outline terms and conditions of managements viz : forward dated billings, consignment arrangements, any sale financing etc. tending to defer final realisation from company's sales. Indicate probable number of sales accounts, their character and expected credit worthiness.

22. Whether company's products or trade names already established within proposed market areas.
23. Probable period of receivable turnover.
24. Prospective place of the industry in the economy.

XIV. Cost of Production & Profitability

1. For details refer to Pro-forma Statement.
2. After the plant has been completed, at what percentage utilisation of capacity will it "break even" financially, i.e., will the total gross income including depreciation allowances be just sufficient to cover interest and amortisation on debt ? (Where the project is not a financially autonomous venture, but represents an addition to an existing enterprise, this question should be answered with respect to the total enterprise, including the new project).

XV. Technical Consultant

1. Details of arrangements and copy of contract for technical collaboration, if contemplated and also for training of local personnel.
2. Copy of technical report, if any. (Indicate date of preparation and by whom, name and address).

XVI Management

1. Names, addresses and nationality of proprietors/partners/

directors and promoters or sponsors of project; their relationship each to the other, if any; their financial standing, business connections, technical competence, and industrial experience.

2. Outline pattern of ownership of company, with reference to whether ownership will be vested in others than sponsors. Indicate foreign/local ownership or project and financial control of company. Name principal shareholders and indicate their respective holdings.
3. Indicate whether any direct or indirect Government sponsorship, control, ownership or financial interest in project.
4. Names of officers holding important posts, their qualifications and experience. Where officers on contracts, indicate terms and conditions of contracts.
5. Indicate type of management of project, describing in outline any proposed management contracts, corporate or individual, and give experience. If management/technical contracts, describe, identify and give qualifications and experience in each instance of those to be responsible for management.
6. Extent of foreign technical/managerial assistance needed on a temporary/permanent basis. Indicate whether measures have been, initiated to obtain above.
7. Name of managing agents/secretaries/treasurers. Copy of their agreements to be obtained.
8. Names of purchasing and sole selling agents. Copies of purchasing and sole selling agreement to be obtained.
9. Legal council - identify and give relevant qualification.
10. Policy of sponsors towards use of nationals in management positions in company.

COST OF THE PROJECT

Detailed break-up of the cost of project should be given on the following lines : -

	Already incurred	To be incurred		Total
	In Dollars or Dollar equivalent of foreign exchange	In Dollars	In Dollars equivalent of foreign exchange	Dollars and Dollar equivalent
a. Land for factory site -				
i) Cost of Acres @ $ per acre				
ii) Site development expenses (vis, roads, drainage, levelling, culverts, perimeter wall etc.)				
b. Land for cultivation or quarrying -				
i) Cost of Acres @ $ per acre				
ii) Development expenses on the same				
c Factory Building -				
i) Factory Building (including Work-shop, factory office and Laboratory)				
ii) Stores				
iii) Godown				
iv) Silos				
v) Administration Bldg.				
vi) Civil works (specify)				
vii) Housing for Staff				
viii) Other (specify)				
d. Plant and Machinery -				
i) Imported FOB cost of main machinery and auxiliaries in-				

	Already Incurred	To be incurred		Total
	In Dollars or Dollar equivalent of foreign exchange	In Dollars	In Dollars equivalent of foreign exchange	Dollars and Dollar equivalent
cluding power plant, transformer etc. if any				
ii) Provision for escalation of price and contingencies				
iii) Spare parts for imported equipment				
iv) Insurance and freight				
v) Import duty				
vi) Indigenous equipment including provision for escalation				
vii) Transportation charges to site on both imported and indigenous equipment				
viii) Provision for distribution of power, cabling and lighting				
ix) Erection charges (including expenses and fees of foreign erectors)				
e. Technical 'know-how' and engineering fees and expenses				
f. Railway siding				
g. Water supply, storage facilities and treatment				
h. Effluent treatment and disposal plant				
i. Workshop, laboratory and fire-fighting equipment				

CHAPTER VI

FINANCIAL PROJECTIONS

The financial projections for a new project bring together on a monetary basis all the separate studies comprising the feasibility study.

The object of preparing financial projections is to reveal the expected financial programme of the company over a period of time both year by year and cumulatively. The specification of the product or products has been determined, the market demand and sales prices decided, the production, administration and sales costs calculated, and the technical requirements of production established. The estimated fixed capital and approximate working capital requirements are known and a decision taken as to the source of funds.

A typical set of financial projections for an industrial project comprises the following documents:-

1. Estimated cost of production and profitability statement
2. Estimated statement of profitability and cash accruals
3. Cash flow statement
4. Statement of financial positions

1. Estimated Cost of Production and Profitability Statement

The "Estimated Cost of Production and Profitability Statement" an example of which is provided in Appendix VI/2 sets out on a year by year basis throughout the period of evaluation, the production costs, interest on capital borrowed, sales receipts, and derives the annual operating profits.

	Already incurred	To be incurred		Total
	In Dollars or Dollar equivalent of foreign exchange	In Dollars	In Dollars equivalent of foreign exchange	Dollars and Dollar equivalent
j. Miscellaneous fixed assets (e.g. vehicles, furniture and fixtures, etc.)				
k. Any special expenditure pertaining to the particular industry				
l. Preliminary expenses (legal expenses, brokerage, commission, etc. separately)				
m. Pre-operational expenses up to start of normal production -				
i) Promotion expenses				
ii) Working expenses				
iii) Expenses for training personnel				
iv) Interest on borrowings, guarantee charges, etc.				
n. Interest on deferred payments, if any (rate and total amount)				
o. Provision for contingencies (indicate basis of estimate)				
Capital cost of project				
p. Total working capital requirements				
Total cost of project				

NOTE : Details and/or supporting documents (in duplicate should be supplied for each item and particularly in connection with the following : -

1. **Buildings (item e. i. - v)**

Estimate for each structure should be given individually showing the basis of estimate number and type of structure.

Built-up area and average height, stating cost per sq. ft. or cu. ft.

2. **Housing (item c. vii)**

Number and type of structures, built-up area and cost per sq. ft.

3. **Imported and indigenous machinery (item d. i and vi)**

Copies or orders placed or quotations received from suppliers of plant and machinery should be enclosed.

4. **Working capital (item p.)**

Detailed break-up of total working capital estimate as follows : -

		$
_____	months' stock of raw materials and stores	
_____	months' value of works-in process	
_____	months' stock of finished goods	
_____	months' value of outstanding debtors	
_____	months' provision for working expenses (e. g. wages and salaries, transport charges, payment of utility services, and other operating expenses)	_____

LESS :

_____	months' trade credit available against purchase of raw materials and stores		
	Bank Borrowings	_____	_____
Net working capital requirements			$ _____

5. **State basis used in conversion to local currency**

MEANS OF FINANCING

	Local Finance		Overseas Finance (in Dollars equivalent of foreign exchange)		Total
	Existing	Proposed	Existing	Proposed	
	(i)	(ii)	(iii)	(iv)	
1) Ordinary share capital By Sponsors : By Others :					
2) Preference share capital By Sponsors : By Others :					
3) Secured debentures					
4) Secured long-term and medium-term loans					
5) Unsecured loans and deposits By Sponsors : By Others :					
6) Deferred payments (including interest) to machinery suppliers (less amounts due up to start of production)					
7) Internal cash accruals					
8) Bank borrowings for working capital					
9) Any other source					

The following details (together with supporting evidence wherever available) should be provided in connection with each of the above items separately :

In the case of an issue of shares or debentures, state their terms (rate of interest, date of redemption and any other rights attached) and indicate the arrangements made or to be made for the taking up and/or underwriting separately by various parties and institutions.

In the case of loans arranged or to be arranged indicate the source, nature of security, rate of interest, amortization schedule and any other special terms of such loans.

COST OF PRODUCTION AND PROFITABILITY

Detailed statement of estimated cost of production and profitability for each product line for each of the first five years of working should be provided as follows. In case of an expansion in an existing company, a similar statement should also be provided for the last three years and future estimates of cost of production and profits for existing lines and for the expansion should be shown separately for the ensuing five years.

PRODUCTION (Quantity) : -

(Production in the initial period should be assumed at a reasonable rate of utilisation of capacity, increasing gradually to attain estimated full capacity in subsequent years)

	Quantity required per unit of finished product	Total quantity required	Price at which it will be obtained	Cost per unit of finished product $	Total Cost $
1. Raw materials - (separately for each item of raw material) from company's own sources bought out					
2. Power-cost power bought out -cost of power generated internally					
3. Steam					
4. Fuel					
5. Water					
6. Direct labour					
7. Consumable stores					
8. Repairs and maintenance					
9. Factory supervision and overheads					
10. Administrative overheads (viz. office salaries, insurance, rent, travelling and other expenses, etc.)					
11. Selling expenses -					
a) Packing (indicate details)					
b) Outward freight					
c) Commission (indicate basis)					
d) Advertising and publicity					
12. Interest - (indicate rates)					
a) On bank borrowings for working capital					
b) On medium and long-term borrowings					
13. Depreciation - (rate should be given for all items)					
a) On plant and machinery					
b) On buildings					
c) On other assets					
14. Managing Agents/Managing Directors/Secretaries and Treasurers Remuneration (indicate basis)					
Cost of production					
Sales (indicate prices for each product line)					
Operating profit					

NOTES : Details and/or supporting documents should be supplied for each item particularly in connection with the following : -

(i) Source and rate of raw materials, power, steam, fuel

COST OF PRODUCTION AND PROFITABILITY (cont)

and water.

(21) Number of labourers and other personnel employed and the basis of the estimated cost (item 6 and 9)

(22) Details of calculations for interest and depreciation (items 12 and 13), and insurance premium (item 14)

(23) Basis for the selling prices assumed.

(24) Rated capacity for the revelant years.

(25) Factory supervision and overheads (item 9) and Administration Overheads (item 16).

PRO-FORMA CASH FLOW SHEET

Detailed statement of income and expenditure by half-yearly periods during construction and by annual periods thereafter until attainment of normal production

	CONSTRUCTION PERIOD						OPERATING YEARS				
	19.....		19.....		19.....		19.....	19.....	19.....	19.....	19.....
	I	II	I	II	I	II					
SOURCE OF FUNDS :											
Notes :											
a. 1) Share issue											
b. 2) Profit after depreciation and development rebate but before interest and taxation.											
b. a.c. 3) Depreciation provision for the year											
d. 4) Increase in secured medium and long term borrowings											
d. 5) Increase in unsecured loans and deposits											
6) Increase in Bank borrowings for working capital											
7) Increase in liabilities for deferred payments (including interest) to machinery suppliers											
8) Sales of fixed assets											
9) Sale of investments											
10) Other income (indicate details)											
TOTAL											
DISPOSITION OF FUNDS :											
e 1) Capital expenditure											
f 2) Increase in working capital											
g. 3) Decrease in secured medium and long-term borrowings											
g. 4) Decrease in unsecured loans and deposits											
5) Decrease in bank borrowings for working capital											
6) Decrease in liabilities for deferred payments (including interest) to machinery suppliers											
7) Increase in investments in other companies											
c. 8) Interest											
c. 9) Taxation											
10) Dividends											
11) Other expenditure (indicate details)											
TOTAL											
h. Opening Balance of cash in hand and at bank											
Net Surplus/Deficit - Add/deduct the net surplus/deficit between source and disposition of funds.											
Closing Balance of cash in hand and at bank											

(for Notes see page 146)

Notes on preparation of cash flow statement

This statement is intended to reveal the adequacy or otherwise of the flow of cash during the construction period and operating years of a project. It is a statement in which the figures to be inserted in each half-yearly or yearly column should not reflect the cumulative position but only the changes that have taken place during the period. Accordingly, it reflects the changes (increase or decrease) in the various items of a balance sheet and also incorporates the working results of each year. The upper half of the statement refers to the in-flow of cash during a particular period from various sources, capital and revenue (e.g. share capital and loans on the one hand and gross profit on the other) while the lower half relates to out-flow of cash during the same period for various purposes (capital expenditure, working capital, repayment of loans, interest charges, taxation and dividends).

The following notes should be taken into account when preparing the cash-flow statement :

a. Net proceeds of the share issue should be shown after deducting all preliminary expenses connected with the issue.

b. In the case of a new project (other than expansion in the same line) being taken up under the same company, the profit and depreciation figures relating to the existing unit and the new project should be shown separately.

c. Detached working of the figures shown should be provided.

d. Borrowings from each source should be shown separately.

e. Capital expenditure on a new project should be shown separately from normal replacement expenditure in the case of an existing company. The total of the figures relating to the project shown against this item should amount to the capital cost of the project

as shown in the earlier statement.

f. Increase in working capital requirements should be spread over the years during which the project is assumed to reach full production. For this purpose, the working capital for a particular period may be taken in proportion to the turnover assumed during that period. The total of figures relating to the project shown against this item should amount to the working capital requirement calculated as shown in the 'cost of project' statement (i.e. after deducting the provision of trade credit assumed, Bank Borrowings, if any).

g. Repayment of borrowings from various sources should be shown separately.

h. Starting with the opening cash and bank balance(nil in the case of a new company), the difference between the sources and disposition of funds (i.e. in-flow loss out-flow of cash) should be added or subtracted as the case may be, for arriving at the closing cash and bank balance. The latter would become the opening balance of the next period and the same procedure should be followed till the end of the period covered by the cash flow statement.

PRO-FORMA BALANCE SHEETS
(In thousands of Dollars)

	Estimated on completion of project and its operations underway	End of First Year	End of Second Year	End of Third Year	End of Fourth Year	End of Fifth Year
CURRENT ASSETS :						
Stocks - Raw materials						
Work in progress						
Finished goods						
Stores						
RECEIVABLES :						
Sundry Debit Balances						
Cash and bank balances						
LESS : CURRENT LIABILITIES :						
Trade creditors						
Other sundry creditors						
Provision for taxation						
Bank borrowings for working capital						
Unpaid dividends						
Net current assets						
FIXED ASSETS :						
Land and improvements						
Factory buildings						
Other buildings						
Plant and machinery						
Motor vehicles						
Office Equipment						
Furniture and fixtures						
Gross Fixed Assets						
LESS : DEPRECIATION TO-DATE						
Net fixed assets						
Total net fixed and current assets						
Carried forward						

Only the interest calculation has not been discussed elsewhere, and because at this stage in the preparation of the financial projections, the "Cash Flow Statement" has yet to be derived, the initial calculation of interest is approximated.

The derivation of the true interest figure will become clear from the "Cash Flow Statement".

This is the prime document from which stems all other financial projections, and great care is essential in it's preparation. It is best prepared by an engineer and an accountant working together.

2. Estimated Statement of Profitability and Cash Accruals

The "Estimated Statement of Profitability and Cash Accruals" depicted in Appendix VI/3 follows immediately from the "Profitability Statement, taking as its starting point the estimated gross profit inclusive of interest and depreciation. The statement, by successive deductions provides for depreciation, interest, taxation, writing off of intangible assets, and dividend appropriations, leaving a residual amount of profit left in the business. Net cash accruals, or the cash available to the project at the end of each operating year is the summation of the operating profit after providing for interest, and the depreciation provision. All these calculations are relative to each successive operating year considered in isolation.

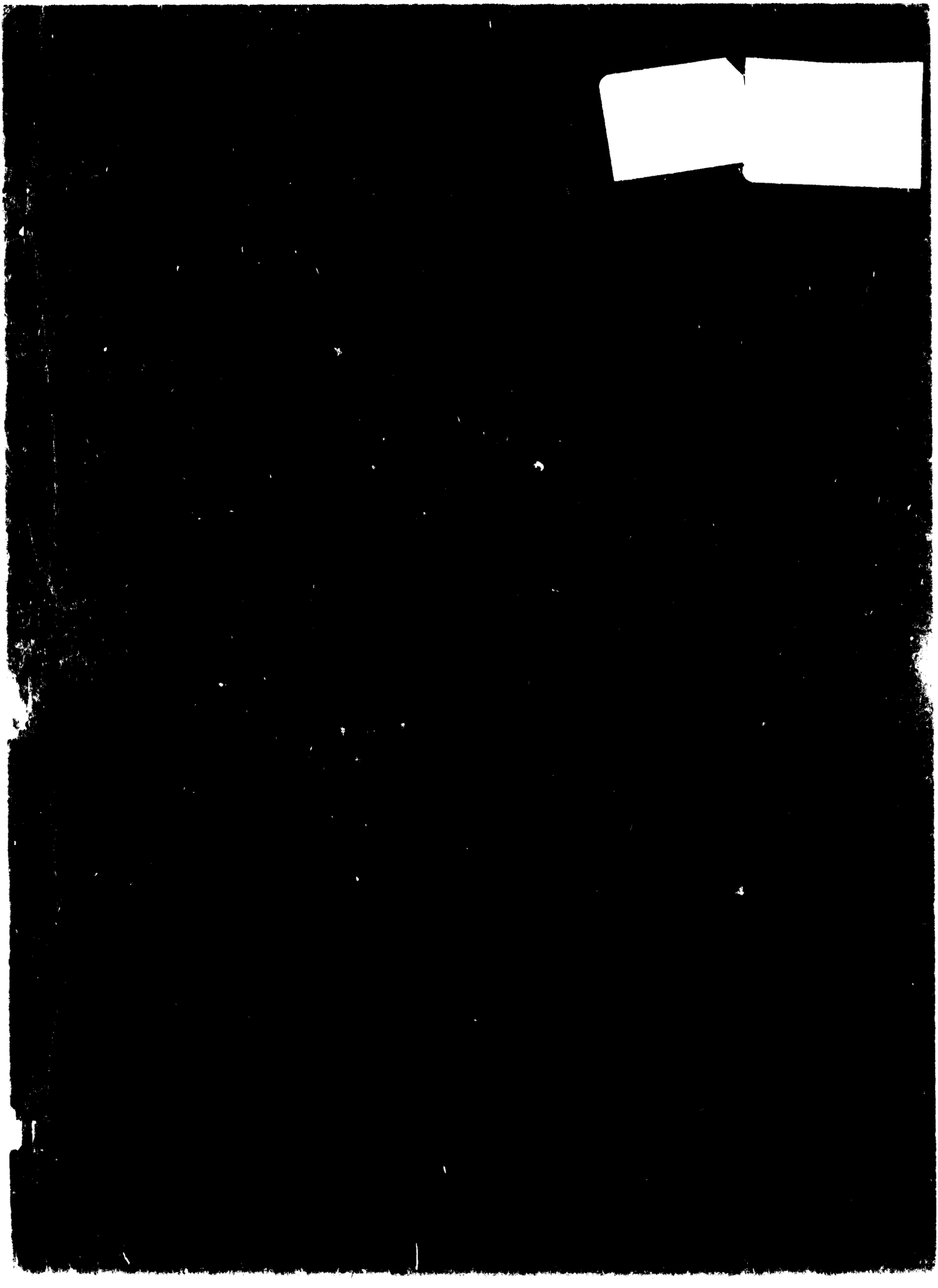
As in the original "Profitability Statement", this statement cannot be completed until the interest charges have been calculated.

The subject of ratio analysis is discussed in a later chapter, but it is useful to consider here, the ratios employed in the example provided. The first ratio gives the percentage operating profit before interest on the total capital employed. The total capital employed is the sum of the share capital and reserves and surpluses plus loan capital less any intangible assets. This is illustrated by taking the figures for the year 1978.

PRO-FORMA BALANCE SHEETS (cont.)
(In thousands of Dollars)

	Estimated on completion of project and its operations underway	End of First Year	End of Second Year	End of Third Year	End of Fourth Year	End of Fifth Year
Total net fixed and current assets brought forward						
INVESTMENTS :						
Trade investments						
Other investments						
OTHER ASSETS (specify)						
Total tangible assets						
DEDUCT :						
Debentures						
Long term loans (specify secured or unsecured)						
Development Bank						
Others (specify)						
Unsecured short term loans and deposits (specify)						
Net tangible assets						
REPRESENTED BY : -						
Ordinary share capital						
Preference share capital						
General reserves and surpluses						
LESS : Intangible assets						

NOTE : In the case of an expansion in an existing company, balance sheets for the last three years presented in the above manner should also be provided.



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

S.F. Project - IRA-16

Country : Iran

PROJECT EVALUATION

VOLUME 3

CASE STUDY - CRITICAL ANALYSIS OF A FEASIBILITY STUDY

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UNIDO EXPERT IN PROJECT EVALUATION

Teheran,
January 1974

PROJECT EVALUATION

VOLUME 3

CASE STUDY - CRITICAL ANALYSIS

OF A FEASIBILITY STUDY

Volume 1 presented the basic accounting techniques necessary for an understanding of Volume 2 in which the preparation of technical and financial studies were discussed

In this Volume an actual feasibility study, as submitted by an entrepreneur has been examined in some detail as an exercise in critical analysis of the information given. The project evaluator is rarely concerned with the preparation of feasibility studies, but he is often required to analyse and appraise studies prepared by others

Volume 4 deals with economic evaluation at the operational level.

[redacted] MANUFACTURING PROJECT - IRAN

CRITICAL ANALYSIS OF THE FEASIBILITY [redacted]

1. Capital Investment in Fixed Assets

The estimated capital requirements are set out on page 8 of the feasibility study. All the individual items listed should be checked as far as possible, at least to ascertain that there is no major error or omission. The following items are not adequately detailed to permit direct usage in the economic projections and assumptions have been made to illustrate the required break down of the figures.

(a) Installation Costs.

Normally the cost of installing foreign machinery is included in the purchase price of the machinery. It is assumed that in this case the estimated installation cost is divided into local and foreign expenditure in proportion to the cost of imported and local machinery and equipment.

1978 x [redacted] = 827 = Foreign Installation Costs

1978 x [redacted] = 328 = Local Installation Costs

The actual distribution of installation costs should be ascertained at an early stage if it is not clear from the feasibility study.

(b) Pre-Operational Costs.

These are treated quite differently to contingencies and should

not be consolidated as is done in the study. On pages 38 and 39 the total amount of 1,705,000 rials is broken down into 550,000 rial pre-operation expenses and 1,155,000 Rials for contingencies.

It is necessary to know the estimated proportion of pre-operational expenses incurred in foreign currencies and in local currency, but it is assumed for the purpose of this study that the distribution is 75% foreign and 25% local.

550 x .75 = 412 = Foreign Pre-operational Costs

550 x .25 = 138 = Local Pre-operational Costs

Pre-operational costs are usually considered to be an intangible asset, to be written off in the financial projections as and when cash is generated.

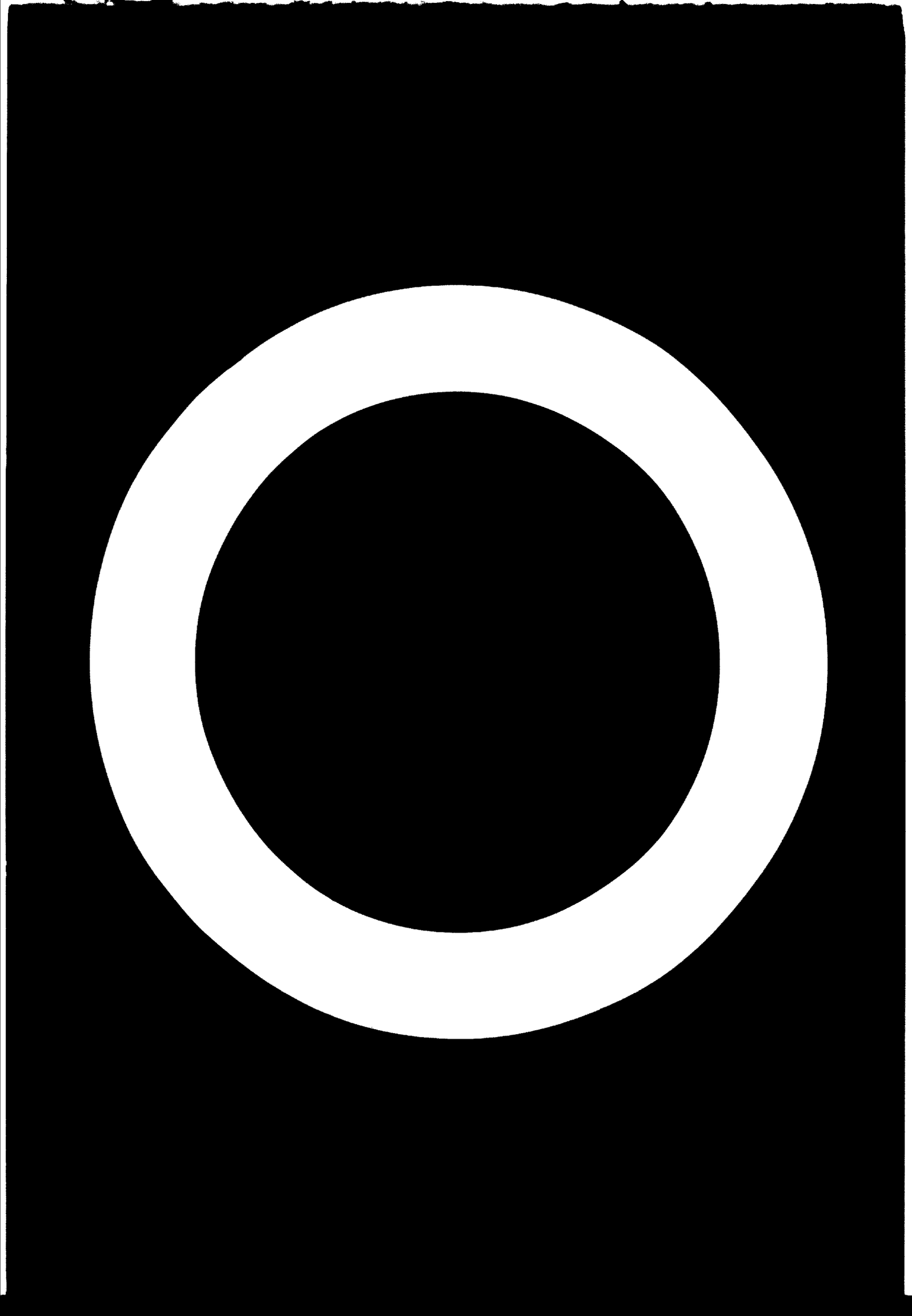
(c) Contingencies.

Contingencies are a provision to meet a rise in costs of the fixed assets or to meet omissions in the estimates. The capital funds must provide for contingencies, and in financial projections, it is assumed that the sum provided is disbursed on the capital assets, and therefore subject to depreciation. There is no justification for treating contingencies as an intangible asset as is done in the feasibility study.

In the economic projections, contingencies are assumed to be divided in proportion to foreign and local total expenditures.

[redacted] x 1155 = 817 = Foreign Contingencies

[redacted] x 1155 = 338 = Local Contingencies



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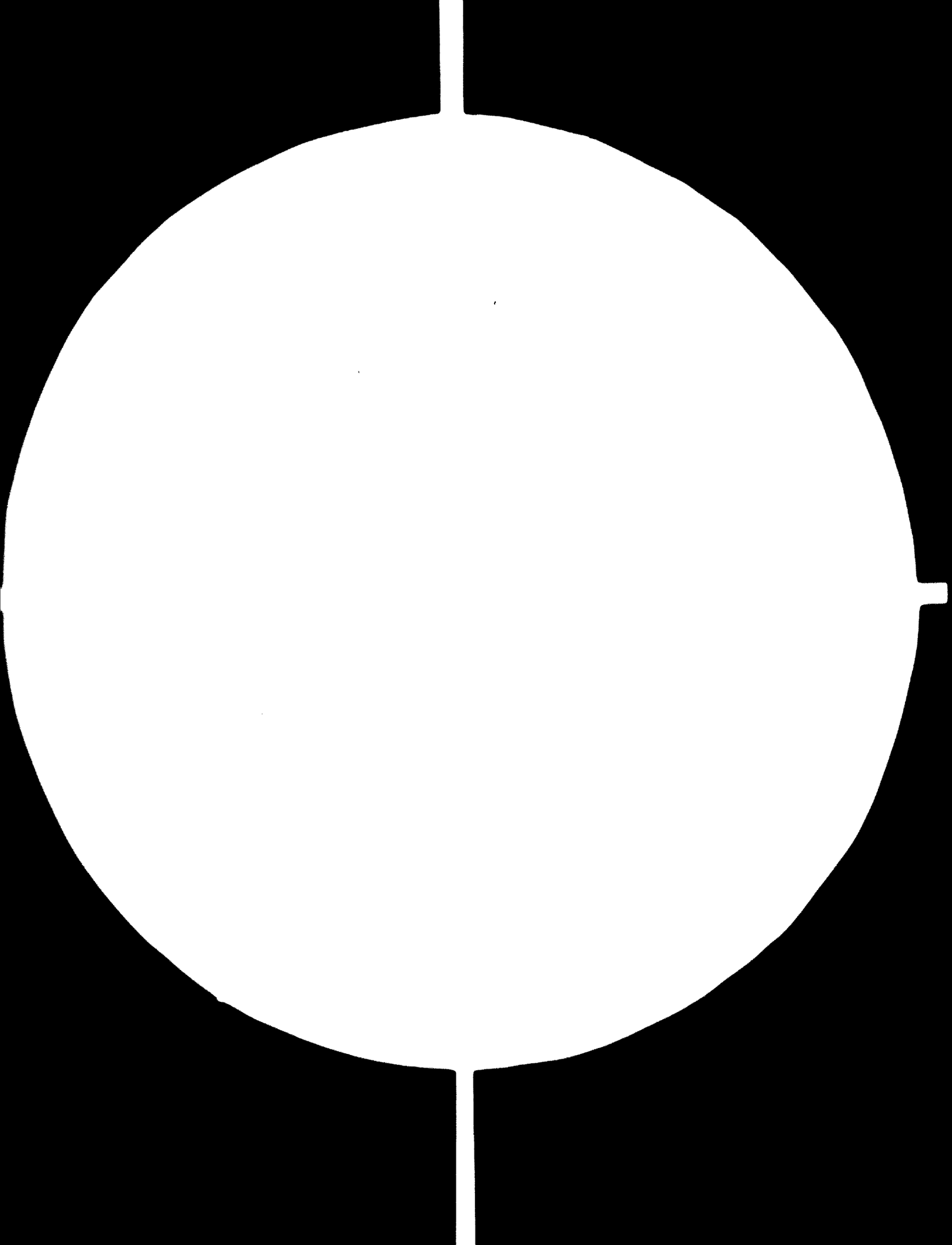


It appears that the project is under-financed by about 6.8 Million Rials and temporary finance will need to be arranged during 1968

8. Market Analysis

(a) Market Demand:

The market demand for oil and fuel filters in total is set out in pages 11-18 of the feasibility study. There are three main groupings covered by the study,

(i) Filters which the sponsor considers would not be economic to make in Iran

(ii) Filters which could be made in Iran

(iii) Filters currently being made in small workshops in Iran.

For the purpose of the economic projections the sponsors assessment of the total market has been accepted, but more precise information is required about filters in the first category.

(b) Pricing

On page 19, the study presents the price range of the filters to be manufactured in terms of cost, ex-factory price, and the proposed retail price. It also gives an average ex-factory price, but it does not state how the average has been calculated.

The sponsors trade classification of 146 different filters is listed in Annex 5, and this should have indicated the quantity

of each expected to be sold, the prices of each, and finally a weighted average price.

On page 18, the price range of imported filters is given in terms of retail price, wholesale price, C.I.F. price, and taxation, but an average, weighted or otherwise, is not quoted. There is, therefore, no direct comparison between the existing prices and the proposed prices for filters manufactured under the project.

A weighted average C.I.F. price per filter may be deduced from Annex 18, and from this and the quoted price ranges, an approximate proportioned average wholesale price and retail price can be obtained.

A weighted average ex-factory price per filter is given in Annex 6.2, and from this and the quoted price ranges, an approximate proportioned average retail price can be obtained

(i) Present Average Prices:

	C.I.F.	Tax	Wholesale	Retail
Fuel Filters	40-88	14.5-31.5	65-131	80-154
Oil Filters	40-60	14.5-21.5	65- 95	80-110

	Fuel Filters		Oil Filters	
	Low	High	Low	High
C.I.F.	40	88	40	60
Tax	14.5	31.5	14.5	21.5
Profit	10.5(26%)	11.5 (13%)	10.5(26%)	13.5(22%)
	65	131	65	95
Retail Mark up	15 (23%)	23(17%)	15(23%)	15(16%)
	80	154	80	110

Weighted Average CIF Prices

	Low	Weighted Average	High	
Fuel Filters	60	84.4*	88	Weighted Average Oil and Fuel
Oil Filters	60		90	

Proportioned Wholesale Prices

	Low	Proportioned Average	High.
Fuel Filters	68	86.8	101
Oil Filters	68		98

Proportioned Retail Prices

	Low	Proportioned Average	High.
Fuel Filters	89	104.1	124
Oil Filters	89		119

---

* Reduced From Ambox 16.

(ii) Future Average Prices

	Works Cost	Ex-Factory price	Retail price
Fuel Filters	37-68	46-84	58.97
Oil Filters	30-50	36-60	41-00
	+20%	+18%	

Weighted Average of Ex-Factory Prices

	low	Weighted Average	High	
Fuel Filters	46	68.4	84	
		51.8*		Weighted Average Oil and fuel
Oil Filters	36	40.8	60	

Proportioned Retail Prices

	low	Proportioned Average	High	
Fuel Filters	52	79.3	97	
		58.8		Weighted Average Oil and fuel
Oil Filters	41	46.4	60	

* Obtained from Annex G/2

4. Technical

The manufacturing process is adequately described but the construction period should be the subject of a bar chart so that the dates at which capital is required will be clear.

5. Financial

On page 36 it is stated that contingencies have been ascertained at 20% per annum, but contingencies if used are capital expenditure on fixed assets subject to depreciation rates. This has been adjusted in the economic projections.

Annex 6.2 has a minor error of calculation in that the stock adjustments are incorrect, and this error has been transferred to the forecasted income statement in Annex 15.

Annex 14 is not well prepared as has been discussed under "working capital". Additionally the last column of figures cannot possibly apply to any year beyond 1988.

Depreciation rates included in the financial projections are as follows together with the preferred rates

	Rate used in the feasibility study	Preferred Rates
Machinery	10%	10%
Tools dies	20%	20%
Buildings	5%	5%
Furniture	20%	10%
Vehicles	20%	20%

The difference between the depreciation rates in the study and the preferred rates is not great, and only a small adjustment has been made to the financial projections. In the capital estimate furniture and vehicles appear as a single figure and in this case adjustment of depreciation rates would not have been possible.

The actual financial projections are provided in Annexes 15, 16 and 17, and although these contain a number of minor discrepancies it was not necessary to re-draft them.

It should be noted however that due to loan repayment the figures for 1987 are not repeated exactly in subsequent years. Further in Annex, 17 the words "Total Current Liabilities" in the seventh line, should read "Total current Assets".

The calculations of foreign exchange saving given in Annex 18, relate to production whereas they should relate to sales.

FEASIBILITY STUDY

FILTER MANUFACTURING PROJECT

IRAN

TABLE OF CONTENTS

(Continued)

(Continued)

3. Investment in Working Capital

The manner in which working capital requirements is calculated in the feasibility study is not satisfactory in principle. On page 8 net working capital in 1352 is stated to be 10.1 million Rials, whereas it is shown that this figure should be 22.9 Million Rials .

Working capital involves investment in foreign and local supplies which are held in raw material stocks, work in progress, finished goods, receivables, and in plant and administration overhead expenses.

(a) Proportion of local to Foreign materials

The ratio of locally produced materials to imported materials derives from annexes 13.1 and 13.2 of the feasibility study

	Million Rials.	%
Local Materials	16.7	47.1
Foreign Materials:		
(i) C.I.F.	13.7	38.7
(ii) Duties/Taxes	3.885	11.0
(iii) Transport/ Handling	1.145	3.2
	35.45	100.0

(b) Proportion of Foreign Materials in Work-in-Progress

No provision is made in the feasibility study for the capital investment in work-in-progress, and for this purpose it is necessary to know the manufacturing time cycle. For the particular products to be manufactured this is assumed to be one month, and it

Filter Manufacturing Project for

LIST OF ANNEXES

(Continued)

1. INTRODUCTION

I. 1. Background

Following the extensive negotiations and discussions between the foreign entrepreneur and the Iranian promoters, it was agreed between the parties to work in close cooperation towards preparing a complete feasibility study for establishment of a modern Filter Manufacturing Project in Iran. The detailed feasibility study is based on information received from the Promoters, our experience in constructing similar plants in other countries, and visits made to Iran by our specialists.

I. 2. Objectives

The main aspects and objectives of the study are as follows:

- Analysis of the market demand for filters in the period 1349-1359.

- Comparison of ex-factory and retail prices of the manufacturing plant with retail, wholesale and CIF prices of imports.

- Projection of production capacity and program of the plant. The main objective would be to

adjust the production program spontaneously with the market demand.

- Maximum utilization of Iranian resources for the projected production program.

- Capital cost estimate and proposed method of financing.

- Technical know-how and engineering.

- Organization set up and personnel requirements

- Financial analysis.

- Economics benefits

II. [redacted]

II. 1. Conclusions

As will be seen from the findings of the study, it is entirely possible to meet all the objectives of the feasibility study. With the advent of indigenous car, agricultural machinery and industrial engine production in Iran, the requirements for this type of industry have increased and it is now most essential to establish a local filter manufacturing units (Feeder Industry) in this area in order to stablize local production and avoid continued dependence on imports.

This project envisages manufacture of filter elements for all kinds of vehicles and internal combustion engines as well as for certain types of industrial filters. The project has been designed in such a way that right from the start a high level of local content and added value is achieved. The production capacity of the plant is for a yearly output of 2,000,000 elements in the first stage.

The detailed market analysis of the study shows a growing rate of demand for filter elements in Iran in conjunction with the country's increase of vehicle and engine

population. Based on findings of the market analysis, an economic size plant for the manufacture of filter elements is justified.

Filter manufacturing is a light, labor intensive and clean operation. It is imperative that mass-production be realized for reasons of economical production.

A contract will be concluded between the foreign entrepreneur and the Iranian promoters for engineering licence, trade mark and quality control of filter elements according to the entrepreneurs standards.

We are confident and convinced that this project would, in addition to its economic benefits for the country, contribute in a substantial way towards the introduction of modern technologies. We also believe that the implementation of this project would be an important step for the establishment of infrastructure industries in Iran - including possibilities of export to neighboring and Middle Eastern countries.

II. 2. Capital Investment

	(In 1,000 Rls.)
Land	800
Site Improvements	500
Buildings	4,050
Machinery and Equipment:	
Import	9,108
Local	3,270
Installation	1,273
Auxiliary Facilities	1,300
Cars and Office Equipment	800
Engineering Fee	1,100
Pre-Operational and Contingencies	1,795
Total Fixed Cost	24,500
Net Working Capital (1352)	10,100
Total Capital Cost	34,600

II. 3. Financing

	(In 1,000 Rls.)
Capital	15,000
Long-Term Loan	15,000
Retained Reserves	4,600
Total Financing	34,600

II. 4. Assumptions

Yearly Production Capacity in two Shifts	2 Million Filters
Land	4,000 m^2
Buildings	900 m^2
Factory Workers	38
Factory Managerial Staff	5
Administrative Staff	17
General Manager	1
Royalty on Net Sales	3 %

III. MARKET ANALYSIS

is further assumed that all work-in-progress attracts, on average, one half of the works costs.

From annex 15 for the year 1352, the value of raw materials in the work-in-progress is $\frac{36.4}{12}$ = 2.96, and the works cost is $\frac{15.8}{24}$ = .63, so that the total value of the work in progress is 3.58 million Rials.

The foreign component of this amount is 38.7% of 2.96 = 1.14 and the tax content is 11.0% of 2.96 = .3 Million Rials.

(c) Proportion of foreign materials in finished stocks

The proportion of foreign materials to the value of finished stocks is derived from annex 14, 15 and 6.1.

According to annex 14, in 1352, 2 months stock of finished goods is valued at 8.5 million Rials, and this figure represents one sixth of the total works cost which appears as 50.8 million rials in annex 15. However, 50.8 million rials is the cost of all production in 1352, whereas it is normal to control stocks and to calculate their value is relation to sales and not to production. In Annex 6.1, the ratio of sales to production in 1352 is 1250: 1350, and therefore the investment in finished stocks would be $\frac{50.8}{6} \times \frac{1250}{1350}$ = 7.1 million rials. The foreign component of 7.1 is derived from annex 15 which gives the total value of materials for the year 1352 as 35.4 Million Rials. The total cost of materials in the stock of 2 months sales is $\frac{35.4}{6} \times \frac{1250}{1350}$ = 4.92 and the proportion of foreign materials is 4.92 x $\frac{38.7}{100}$ = 1.9 Million Rials

Sanction accounts for 1.9 x $\frac{11}{100}$ = .21 Million Rials

Transport and handling Costs 1.9 x $\frac{3.2}{100}$ = .061 Million Rials

If these three amounts are expressed as a percentage of the value of finished stocks, these may be applied directly to the calculations for subsequent years.

III. 1. Summary

The current annual consumption of filters in Iran is estimated at 2.3 million elements. The consumption is conservatively forecasted to increase at an average rates of 10% and 7% to about 3.8 million elements by 1354 and 5.3 million elements by 1359 respectively.

Present average retail prices of one fuel and one oil filter are approximately between Rls.80-154 and Rls.80-110 respectively. As for the prices of similar filters manufactured by the project, the ex-factory prices, including all costs and profits, have been liberally worked out for one fuel and one oil filter between Rls.45-84 and Rls.36-60 respectively. Therefore, the average retail price for one fuel filter and one oil filter has to be in the neighborhood of Rls.52-97 and Rls.41.69 respectively.

III. 2. Methodology

In order to forecast the market demand for filters in Iran, two completely different approaches have been adopted:

- Estimate of market demand on the basis of vehicle and engine population.

- Estimate of market demand on the basis of import and production of filters.

III. 3. Vehicle and Engine Population

The estimated populations of cars, commercial vehicles, tractors and combines, stationary engines and construction equipment for the years 1346-1349 are derived from the Government published figures for the year 1345 as in Annex 1 and 2. The technique employed is considered quite accurate and relatively conservative because we have taken into account local production, imports and scrapage due to wear and accident. Moreover, we have compared our estimated figures for the years 1346-1349 with those obtained from various private and Government sources and found them to be compatible and even more conservative.

As basis for our calculation of the filter demand in Iran, we summarize the results of Annexes 1 and 2 as under (in 1,000 units):

	1345	1346	1347	1348	1349
Passenger Cars	145.9	165.4	183.6	200.1	222.1
Buses & Mini Buses	12.3	14.7	15.1	15.5	17.3
Trucks	30.3	33.7	36.5	38.5	41.5
Vans	8.8	13.1	15.2	17.7	21
Tractors & Combines	15.1	17.7	20.4	23.4	27.0
Road Machinery	1.1	1.4	1.7	2.1	2.6
Stationary Engine	56.5	65.6	75.7	86.9	98.7

The above figures, of course, do not include military vehicles, engines and equipments. Also we have not included population of two and three wheels vehicles since accurate information could not be obtained for those which require change of filter elements. Based on our experience, these vehicles normally do not require filters.

III. 4. Filter Consumption

Based on recommendations of original equipment manufacturers, filter elements should be changed at regular interval and frequency depending on number of running hours or distance travelled. However, based on our experience owners normally change their filters at longer interval and lower frequency than the recommendations of manufacturers.

Therefore, we have based the " frequency of change" of filters for Iran's existing and future vehicles and engine population on a very conservative assumptions. Moreover, since consumption of air filters is small as compared to that of either oil or fuel filters, we have not included it in our calculation for the sake of fur - ther conservatism.

Consumption of oil and fuel filters, based on popula - tion of vehicles and engines for the years 1345-1349, are worked out in Annexes 3.1, 3.2, 4.1 and 4.2. The total consumption figures derived for the period 1345 - 1349 from the aforementioned Annexes are summarized in the following table (in 1000 units):

Year	Oil Filter	% Growth	Fuel Filter	% Growth
1345	1,031	-	495	-
1346	1,207	17	569	15
1347	1,341	11	691	10
1348	1,473	10	694	10
1349	1,651	12	773	11

III. 5. Imports and Production

Statistics for imported filter elements are not availa- ble since official publication of Foreign Trade Statistics

of Iran does not list imports of filter elements under a separate Tariff No. Nevertheless, we have been able to collect sufficient information from the major importers and retailers of filters for the years 1348 and 1349. Moreover, there exists a small number of primitive work-shops which produce low quality, easy change type filters with a limited quantity. Altogether, both imports and production for the year 1348 and 1349 are compiled for the purpose of comparison with our estimates. Following is the summary (in 1000 units):

	1348	1349
Oil Filter:		
Import	1,100	1,200
Production	330	400
Total Oil Filter	1,430	1,600
Fuel Filter:		
Import	590	660
Production	90	100
Total Fuel Filter	680	760

Comparison of consumption figures worked out from vehicle and engine population and from imports and

production indicates that the former methodology would be a more acceptable and accurate technique for projection of market demand. But, for the purpose of market demand forecast, we shall use the lower figures.

III. 6. Filter Demand

From the increasing trend in consumptions of oil and fuel filters in the period 1345-1349, it is evident that the average rate of growth has been more than 10% per year. However, for the purpose of this study, we assume a conservative average rate of growth of 10% and 7% to forecast the market demand for oil and fule filters for the periods 1350-1354 and 1355-1359 respectively as under (in 1000 units):

Year	Oil Filter	Fuel Filter
1349	1,600	760
1350	1,760	836
1351	1,936	920
1352	2,130	1,012

Year	Oil Filter	Fuel Filter
1353	2,343	1,113
1354	2,577	1,224
1355	2,757	1,310
1356	2,951	1,400
1357	3,157	1,498
1358	3,378	1,605
1359	3,615	1,717

Therefore, from the above table it is evident that the total demand for filters will rise from the present 2.3 million elements in 1349 to about 3.8 million by 1354 and to about 5.3 million by 1359. Since production of inferior quality, easy change type filters will be probably continued by the local small workshops and since special types of filters have to be imported due to higher cost of production if they were to be manufactured locally, we forecast Mann's share of the market in relation to the total demand after summing up the projections given above and rounding figures as under (in 1000 units):

Year	Oil Filter		Fuel Filter	
	Total Demand	Project's Share	Total Demand	Project's Share
1352	2,100	1,200	1,000	800
1353	2,300	1,500	1,100	900
1354	2,600	1,800	1,200	1,000
1355	2,800	2,100	1,300	1,100
1356	3,000	2,400	1,400	1,200
1357	3,200	2,700	1,500	1,300
1358	3,400	3,000	1,600	1,400
1359	3,600	3,300	1,700	1,500

III. 7. Price of Filter

Average price ranges for the types of filters to be manufactured by the project are given for similar imported ones as under (Rls./Element) :

Import	Oil Filter	Fuel Filter
Retail Price	80-110	80-154
Whole Sale Price	65-95	65-131
CIF Price	40-60	40-88
Tariffs, Taxes, etc.	14.5-21.5	14.5-31.5

Future average price ranges of the project output will be as under(Rls./Element):

Project	Oil Filter	Fuel Filter
Retail Price	41-69	52-97
Ex Factory Price	36-60	45-84
Cost Price	30-50	37-68

For the purpose of this study average ex factory prices have been assumed respectively at Rls. 36 to Rls. 60 for oil filters and at Rls. 45 to Rls. 84 for fule filters.

III. 8. Plant Capacity

According to the market analysis and projections of market demand for filters in Iran, the proposed plant has been designed with a production capacity of 2 million filters - based on 2 eight-hour shifts daily operation, 300 days per year. It is anticipated that the production will start in 1352 and gradually will reach full capacity. It should be noted that production at the start of operation will be lower than the estimated market demand due to large stock of imported filters. Moreover, production figures differ slightly from sales figures as necessary stocks of finished goods and work in process

have been provided for.

The plant has been designed in such a flexible way that production capacity could be increased with a minimum of investment. Furthermore, should the market demand increase more than the capacity of the plant in 2 shifts, a third shift could be introduced immediately to increase the production by 50% until such time when the necessary expansion is carried out.

III. 9. Production And Sales Program

Types of filter elements will basically consist of three categories: Cartridges, Plastisol and Spin-On. In turn, each category will comprise of several different types of elements which are considered essential in order to meet the actual demand requirements. A complete list of element types are presented in Annexes 5.1, 5.2 and 5.3.

On the basis of market analysis and the estimated market demand for filters in Iran, the production program for the first phase of the project is worked out in Annex

Foreign Component $\frac{1.0}{7.1} \times 100 = 28.7\%$

Tax Component $\frac{.21}{7.1} \times 100 = 3.0\%$

Transport and Handling $\frac{.021}{7.1} \times 100 = .3\%$

(c) **Receivables**

Receivables are of necessity accounted for at the full sales value of the products to agree with the sales accounts. The feasibility study in annex 14, assumes receivables to be 3 months sales.

The value of 3 months sales is derived from annex 16 which indicates a total sales value for 1982 of 65.0 Million Rials. Value of 3 months sales = $\frac{65.0}{4}$ = 16.25 Million Rials.

The amount of foreign materials included in the receivables is derived from annex 15, which gives the total value of materials as 35.4 Million Rials. The total cost of materials included in 3 months sales is

$$\frac{35.4}{4} \times \frac{1250}{1000} = 7.375 \text{ Million. Rials,}$$

and the proportion of foreign materials is

$$7.37 \times \frac{28.7}{100} = 2.05 \text{ Million Rials}$$

Taxation accounts for $2.05 \times \frac{11}{100} = .313$ Million Rials

Transport and handling costs $2.05 \times \frac{3.0}{100} = .061$ Million Rials

If these three amounts are expressed as a percentage of the value of sales, these may be applied directly to the calculations for subsequent years.

6.1. As is evident, production will start in 1358 and will reach full capacity in 1354. Sales forecasts in terms of number and value are given in Annex 6.2. It should be noted that the production and sales figures differ from each other because of the finished goods and work in process inventory which have to be provided for.

IV. TECHNICAL ASPECTS

IV. 1. Manufacturing Process

There are two methods of manufacturing filter elements: The Pre-Assembly Method is assembly before the curing of the filteration material. The After-Assembly Method is when the filteration material is cured prior to assembly. We recommend the After-Assembly Method as this requires less equipment and is also proved to be more suitable for mass production economies. The proposed Process Flow Diagram is given in Annex 7.

Filter elements are manufactured with different filteration media for specific applications. The exclusive entrepreneurs process is practically adaptable to the manufacture of any types of elements. Briefly, the manufacturing sequence of operations is described as under:

- A master roll of filter media is fed into the slitting machine to give a specific width for the particular filter to be produced.

- The prewarmed filter media is fed into the convoluting machine that indents grooves the length of the media and gathers the filter pack into a vertical position determined by the various pleat depths.

- The conveyorized curing oven receives the convoluted filter media in a continuous strip from the convoluting machine and introduces the required amount of heat allowing the resins to set and enabling the media to be handled during subsequent operations without damage. Both time and temperature depends on grade and condition of the media and daily climatic conditions plus quality scheduled for production.

- The convoluted and cured individual element packs from the curing oven are then moved to the side sealer for sealing the complete length of the pack. From the metal side sealer, packs are transferred to assemblers for assembly of element packs' inner and outer retainers.

- At this point, there is an off line part making operations. The inner and outer retaining materials, metal end caps or cardboard ends discs and center tubes are manufactured separately. These parts are then moved to the assembly operation.

- The element packs, end caps and retainer sub-assembly are brought to the end sealer. The element sub-assembly, after being dipped or a predetermined amount of plastisol

or phenolic resin adhesive is dispensed into the metal mold or end caps, is placed on the end sealer and through heat and pressure the end caps or plastisol or discs are affixed or bonded to the end of the element sub-assembly.

- The completed filter elements, prior to painting and printing, are tested and inspected to ensure a perfect seal between case, filteration media and end caps. The testing method is adaptable to the standard of any country (DIN, JIS, etc.)

- The tested elements are then painted, printed and packed for delivery to the finished goods warehouse.

IV. 2. Know-How

Technical know-how for an industry of this nature is considered essential. This is required not only to start the production with equipment of modern and efficient design, but also to ensure availability of latest know-how and improvements in this field. Advance research in recent years has resulted in new designs and product developments in this industry. Innovations of any nature

by the entrepreneur would always be available to the project with proper technical know-how agreement. Products of agreement would be all present and future products of the entrepreneur in the line of filter.

Apart from the technical know-how, the entrepreneur will undertake to render the following services.

- Planning of the entire production plant with a portion of machinery and equipment to be fabircated locally.

- Selection of the element types to be manufactured.

- Supply of drawings, process data, material specifications, drawings of parts or components of equipment and tools to be manufactured locally, etc.

- Deputation of specialists and supervisors for introducing the entrepreneur's process and technology.

- Training of Iranian personnel at all levels of operation.

Supervision of quality control of the filter elements according to the entrepreneur's standard and world-wide image connected with the name "XYZ FILTER".

IV. 3. Plant Location

With due considerations for good infrastructure, availability of labor, communications and off site facilities, it is imperative that only the site offered by an industrial estate or a developed town be considered for the requirements of the project as regards the plant location.

The Promoters have suggested two locations for the proposed plant: Ghazvin Industrial Estate and city of Rasht. We have visited both locations and found both to be proper for the projected plant. However, for the purpose of the Feasibility Study, Ghazvin is assumed for erection of the plant.

IV. 4. Plant Layout

The necessary layout for the proposed plant, taking

into account possible future expansion program, is given in Annex 8. The layout is based on the Process Flow which incorporates ease of material handling and movement in accordance with the entrepreneurs experience in setting up similar plants throughout the world.

IV. 5. Land

According to the plant layout given in Annex 8, the required land is about 4,000m2 for the project and future expansion purposes. The cost of land for the project is estimated at Rls. 800,000.

IV. 6. Site Improvements

Site improvements include possible grading, paving, roads, fences, parking and sewers. The estimated cost, considering the scope of the project, is Rls. 500,000.

IV. 7. Buildings

The projected buildings will cover a total floor area of about 990m2 consisting of main production hall, part

making shop, warehouses, laboratory and test room, social center, utiltiy room, offices and guard quar - ter. The type of buildings is proposed to be saw-tooth type with steel frame, brick walls and corrugated as - bestos roofings.

The total estimated costs of the buildings are based on unit costs which are summarized as under:

	Floor Area (m2)	Unit Cost (Rls/m2)	Total Cost (1000 Rls.)
Main Production Hall	350	4,500	1,575
Part Making & Maintenance Shop	80	4,500	360
Warehouses	240	3,500	845
Laboratory & Test Room	30	5,000	150
Social Center	150	5,000	750
Utility Room	40	4,000	160
Offices	80	5,000	400
Guard Quarter	30	3,500	105
Total	980		4,630

IV. 8. Machinery and Equipment

The proposed production facilities are categorized into two group:

- Element manufacturing machinery and equipment.

- Part making machinery and tools.

Certain items of manufacturing machinery are special entrepreneur's design. We have been convinced that some parts of these machines could be manufactured locally and, therefore, necessary drawings will be supplied accordingly. The remaining items have to be imported. In all, the main items are convoluting (Pleating) machine, curing oven, rotary end sealer and special test equipment for testing all in-coming materials, parts and filter elements.

Major items of part making line could be purchased and/or manufactured locally. Particularly all dies and tools are recommended to be made locally. For the manufacture of inner and outer retainers, metal end caps and components of spin-on filters, some general purpose mechanical equipment are required. The complete list of machines and equipment is given in Annex 9.

Foreign Component [illegible] x 100 = 17.84%

Tax Component [illegible] x 100 = 1.05 %

Transport and Handling [illegible] x 100 = .06 %

(e) **Suppliers Credits**

In Annex 14 suppliers credits are shown as being constant. at 10.7 Million Rials, whereas it is more logical to calculate them on a time basis. Further in Annexes 16 and 17 suppliers credits are combined with other short term credit, totalling 20.0 Million Rials, and the whole is assumed to be repaid during 1384, 1385, 1386 and 1387. Annex 14 does not agree with the financial projections given in Annexes 16 and 17. All companies have creditors and it essential to provide for them in the projections.

In the revised calculations of working capital it has been assumed that suppliers credits although relating to the supply of all raw materials, are credits in Rials. The nearest time period providing for approximately 10.7 Million Rials credit on raw materials is 3 months, and this figure has been used in calculating the value of suppliers credits. In practice 3 months credit on raw material supplies may not be forthcoming, and the normal trade practice should be ascertained

(f) **Working Capital Calculations**

For the purpose of economic projections the investment in working capital must be broken down into local investment, foreign investment and taxation, and this is achieved by applying the percentages derived in the preceding paragraphs, to the

The total cost of manufacturing machinery and equipment are based on our own actual quotation and also on the estimates made by the Promoters for the parts and equipment to be manufactured and/or to be purchased in Iran. In Annex 10, the detailed elements of costs are added in order to obtain the total factory delivered cost. Therefore, the total factory delivered cost of machinery and equipment is estimated at Rls. 12,372,000 of which Rls. 3,270,000 will be made locally and the balance Rls. 9,102,000 will be imported. Also, a sum of Rls. 1,273,000, or 10% of total factory delivered cost of machinery, is considered for installation costs.

IV. 9. Auxiliary Facilities

Water - Water is mainly required for the domestic use. We have provided for water pumps, tanks and distribution. Average daily consumption of water is estimated at 10 m3. We have estimated the total cost of water facilities at Rls. 200,000.

Electricity - The average electric power requirement of the project is estimated at 150 Kw. It is, therefore,

required to install a transformer load of 200 KVA for the purpose of the project. Also, high and low tension distribution board are needed. The total cost of electricity supply facilities is estimated at Rls. 600,000.

Compressed Air - One air compressor with a displacement of about 138 CFM at a volume efficiency of approximately 100 CFM @ 100 PSI is required. Also, air receiver tank with accessories with 1/6 total free air capacity of compressor would be needed. The total cost is estimated at Rls. 300,000.

LPG or Gas Oil - It is estimated that some 980 cubic feet per hour of LPG would be required. Also, gas oil could be used. In all, the total cost is estimated at Rls. 200,000.

IV. 10. Personnel Requirement

Filter manufacturing is a highly labor intensive operation. Allowing for the daily production of about 70,000 elements per two shifts, the number of personnel and service staff until the project achieves

full capacity is given in Annex 11. Also, salaries and wages of each group together with social and other benefits are listed accordingly in Annex 12.1 and 12.2.

IV. 1. Execution Program

Since formal agreement has yet to be concluded between the entrepreneurs and promoters, there exists a tentative execution plan. Nevertheless, we have been instructed by the Promoters that the project should start production by 1352. As the attached plant layout in Annex 8 indicates, the plant size and estimate of required buildings are provided. Once the project is approved by the Government of Iran and the Agreement is signed by the parties, the detailed construction plans and drawing can be worked out immediately. Therefore, time schedule of execution and build-up of production is based on year 1352.

IV. 12. Raw Materials

It has been one of the requirements of the project that raw materials should be obtained or developed locally

for the purpose of production. A careful examination of the available raw materials such as cotton yarns, felt, cardboard and cotton seeds indicates that if proper processing is performed according to our techniques, they would conform to the entrepreneurs standards. Also, with the help of Promoters, we have been able to establish the prices of local raw materials which proves their economical use for the project. In all, raw material requirements of the project are divided into local and bought outs. In Annex 13.1 we list the quantities and costs of local items of raw materials. But, in Annex 13.2 we list the quantities, factory delivered costs, CIF costs, custom duties and commercial surtaxes for bought out items of raw materials.

V. FINANCIAL ASPECTS

V. 1. Assumptions

Certain assumptions have been made for the purpose of preparing the financial forecast of the project. These assumptions are summarized as under:

- Full tax exemption for the first 5 years of sales. For the following years, tax has been calculated on the basis of the prevailing Iranian tax law.

  Depreciation rates at 10% for machinery, 20% for dies and tools, 8% for buildings and 20% for furnitures and cars.

- Amortization of pre-operational and contingencies at a rate of 20%.

- Royalty at 3% of net sale.

- Rates of interest on long term loans at 9% and on short term credits at 12%.

- Full custom duties and tariffs exemptions for imported machinery and equipment.

- Exchange rates at DM 1 = Rials 22.6 and U.S. $ 1 = Rials 76.5.

V..2. Fixed Capital Cost

The total capital cost of the project is conservatively estimated within the scope of the project. Following is a summary:

	(In 1000 Rls.)
Land	800
Site Improvements	500
Buildings	4,650
Machinery & Equipment:	
Import	9,102
Local	3,270
Installation	1,273
Auxiliary Facilities	1,300
Cars & Office Equipment	800
Engineering Fee	1,100
Pre-Operational and Contingencies	1,705
Total Fixed Cost	24,500

V. 3. Engineering Fee

It has been agreed that the Promoters will pay to the entrepreneur a sum of about DM 50,000 for services which has been and will be rendered by the entrepreneur. These services consist of planning, layout, submission of mechanical drawings, designation of machinery, etc. The fee, therefore, has been included in the capital cost since its major portion is contributing to the value of project's fixed assets.

V. 4. Pre-Operational And Contingencies

Prior to start of production, there are certain elements of costs which have to be financed by the capital. These costs include salaries and wages, training cost, material wastage, travelling expenses, legal fees, company and loan registration charges, etc. as well as the interest of long term loan. These costs have been estimated and add up to about Rls. 550,000.

Contingencies at Rls. 1,155,000 have been allowed for any additional items of costs which have not been foreseen and/or for any price escalation. Estimate is based on 5% of total fixed cost of the project which has been adjusted to round the total capital cost fi - gure.

V. 5. Working Capital

The working capital requirements of the project starting from the first year of production and sales in 1352 upto the year of full production capacity and onwards are worked out in Annex 14. Working capital requirements at the beginning will be mainly financed by the capital investments and short term credit and later through the internal funds and depreciation reserves.

V. 6. Production Cost

Elements of production costs are worked out on the basis of the prevailing local costs. The forecasted cost of production and profitability is detailed in Annex 15. Quantities of raw materials are based on the

number of filter elements; and costs are based on actual prices of imported and local items.

Salaries and wages for factory production personnel and service staff are calculated according to the time required to produce and market the number of corresponding elements. Also, social benefits, profit sharing, new year bonus, subsidy of meal and transportation charges are included.

Repair and maintenance of the production facilities and buildings are based on the entrepreneur's experience and also the practices of Iranian industry. The cost is calculated on the percentage of machinery and buildings costs.

Administration and selling expenses are calculated on the basis of salaries and wages for service staff plus certain expenses for advertising and public relation purposes calculated as percentage of net sales.

valuation of raw material, work in progress, finished goods and receivables using the following time basis.

Raw materials	4 months stock
Work-in-progress	1 month production time cycle
Finished Goods	2 months stocks
Receivables	3 months credit
Suppliers credits	3 months

The time basis is peculiar to each industry and to trade practice in each country, and must be checked that it is reasonable.

Work in progress calculations indicate the position at the end of each year, and since raw material stocks must be available before production can be increased, the raw material calculations are based on the following year's production programme.

Royalty has been calculated at 3% of net sales. Other non-operating expenses are interest charges and amortisation of pre-operational and contingencies.

V. 7. Profitability

Forecasts of Profit and Loss, Cash Flow, and Balance Sheet are worked out in details in Annexes 15, 16 and 17. Comparing the prevailing CIF prices of similar imported filter element with the project output, it is evident that because of high labor intensity of production the prices will be competitive. Also, the project's profitability is considered encouraging for the Promoters.

V. 8. Foreign Exchange Saving

The detail analysis is provided in Annex 18. It should be noted that because of availability of a portion of raw materials and low cost of labor, the foreign exchange savings of the project are exceptionally high. The foreign exchange saving will be Rls. 64,400,000 in 1352 increasing to Rls. 86,100,000 in 1354. For a ten years

period, average foreign exchange savings of the project would be Rls. 72,500,000 per annum.

V. 9. Local Content And Value Added

The local content and value added are calculated on the basis of available information and their effects to the Iranian economy. The results are summarized in Annex 19. It is evident that again because of high labor intensity of operation and availability of local sources of raw materials, both local content and value added are quite promising. On average local content and added value of the project are about 75% and 38% respectively.

Filter Manufacturing Project — Annex 1

Estimated Population of Cars & Commercial Vehicles
(1000 Units)

Passenger Cars	1345	1346	1347	1348	1349
Population	-	145.9	165.4	183.6	200.1
Scrapage (9%)	-	-13.1	-14.1	-16.5	-18.0
Imports & Production	-	+32.6	+33.1	+33.0	+40.0
Total Net in Use	145.9	165.4	183.6	200.1	222.1
Buses & Mini Buses					
Population	-	12.3	14.7	15.1	15.5
Scrapage (8%)	-	-1.0	-1.2	-1.2	-1.2
Imports & Production	-	+3.4	+1.6	+1.6	+3.0
Total Net in Use	12.3	14.7	15.1	15.5	17.3
Trucks					
Population	-	30.3	33.7	36.5	38.5
Scrapage (4%)	-	-1.2	-1.3	-1.5	-1.5
Imports & Production	-	+4.6	+4.1	+3.5	+4.5
Total Net in Use	30.1	33.7	36.5	38.5	41.5
Vans					
Population	-	8.8	13.1	15.2	17.7
Scrapage (8%)	-	-0.7	-1.0	-1.2	-1.4
Imports & Production	-	+5.0	+3.1	+3.7	+5.0
Total Net in Use	8.8	13.1	15.2	17.7	21.3
Total Net Population	197.1	226.9	250.4	271.8	302.2

Note: Military cars & vehicles not included.

Pilot Manufacturing Project — Annex 2

Estimated Population of Cars & Agricultural Machinery

(1000 Units)

Tractors & Combines	1345	1346	1347	1348	1349
Population	-	15.1	17.7	20.4	23.4
Scrapage (6%)	-	-0.9	-1.1	-1.1	-1.4
Imports & Production	-	+1.5	+1.8	+4.1	+5.0
Total Net in Use	15.1	17.7	20.4	23.4	27.0
Road Machineries					
Population	-	1.1	1.4	1.7	2.1
Scrapage (3%)	-	-0.03	-0.04	-0.05	-0.06
Imports & Production	-	+0.34	+0.38	+0.42	+0.56
Total Net in Use	1.1	1.4	1.7	2.1	2.6
Stationary Engines					
Population	-	56.5	65.6	75.7	86.9
Scrapage (2%)	-	-1.1	-1.3	-1.5	-1.7
Imports & Production	-	+10.2	+11.4	+12.7	+13.5
Total Net in Use	56.5	65.6	75.7	86.9	98.7
Total Net Population	72.7	84.7	97.8	112.4	128.3

Note 1: $\frac{1}{3}$ of stationary engines are normally used as stand-by.

Note 2: Military machinery not included.

Pilot Manufacturing Project — Annex 3.1

Estimated Consumption of Oil Filter
(1000 Units)

Passenger Cars	1245	1246	1247	1248	1249
Total Not in Use	145.9	165.4	183.6	200.1	222.1
Average Consumption/year (unit)	2	2	2	2	2
Total	291.8	330.8	367.2	400.2	444.2
Buses & Mini Buses					
Total Not in Use	12.3	14.7	15.1	15.5	17.3
Average Consumption/year (unit)	9	9	9	9	9
Total	110.7	132.3	135.9	139.5	155.7
Trucks					
Total Not in Use	30.3	33.7	36.5	38.5	41.5
Average Consumption/year (unit)	9	9	9	9	9
Total	272.7	303.3	328.5	346.5	373.5
Vans					
Total Not in Use	8.8	13.1	15.2	17.7	21.3
Average Consumption/year (unit)	9	9	9	9	9
Total	79.2	117.9	136.8	159.3	191.7
Cumulative Consumption	754.4	884.3	968.4	1045.5	1165.1

Filter Manufacturing Project — Annex 3.2

Estimated Consumption of Oil Filter
(1000 Units)

Tractors & Combines	1345	1346	1347	1348	1349
Total Net in Use	15.1	17.7	20.4	23.4	27.0
Average Consumption/year (unit)	3	3	3	3	3
Total	45.3	53.1	61.2	70.2	81.0
Hand Machinery					
Total Net in Use	1.1	1.4	1.7	2.1	2.6
Average Consumption/year (unit)	4	4	4	4	4
Total	4.4	5.6	6.8	8.4	10.4
Stationary Engines					
Total Net in Use	56.5	65.6	75.7	86.9	98.7
Average Consumption/year (unit)	6	6	6	6	6
Total	337.1	261.7	304.3	349.2	394.8
Cumulative Consumption	376.8	333.4	372.3	427.8	486.2
Total Consumption	1031.8	1206.7	1340.6	1473.1	1651.3

Note: In calculating consumption of oil filters for stationary engines, the stand-by engines (1/3 of total population) are not included.

Filter Manufacturing Project **Annex A.1**

Estimated Consumption of Fuel Filter
(1000 Units)

Passenger Cars	**1985**	**1986**	**1987**	**1988**	**1989**
Total Net in Use	145.9	165.4	183.6	200.1	222.1
Average Consumption/year (unit)	-	-	-	-	-
Total	-	-	-	-	-

Buses & Mini Buses					
Total Net in Use	12.3	14.7	15.1	15.5	17.3
Average Consumption/year (unit)	6	6	6	6	6
Total	73.8	88.2	90.6	93.0	103.8

Trucks					
Total Net in Use	30.3	33.7	36.5	38.5	41.5
Average Consumption/year (unit)	6	6	6	6	6
Total	181.8	202.2	219.0	231.0	249.0

Vans					
Total Net in Use	8.8	13.1	15.2	17.7	21.3
Average Consumption/year (unit)	-	-	-	-	-
Total	-	-	-	-	-

Cumulative Consumption	255.6	290.4	309.6	324.0	352.8

Estimated Consumption of Fuel Filter
(1000 Units)

Tractors & Combines	1345	1346	1347	1348	1349
Total Not in Use	15.1	17.7	20.4	23.4	27.0
Average Consumption/year (unit)	3	3	3	3	3
Total	45.3	53.1	61.2	70.2	81.0
Road Machinery					
Total Not in Use	1.1	1.4	1.7	2.1	2.6
Average Consumption/year (unit)	4	4	4	4	4
Total	4.4	5.6	6.8	8.4	10.4
Stationary Engines					
Total Not in Use	56.5	65.5	75.7	86.9	98.7
Average Consumption/year (unit)	5	5	5	5	5
Total	189.2	219.8	253.5	291.0	329.0
Cumulative Consumption	239.0	278.5	321.5	369.6	420.4
Total Consumption	494.6	568.9	651.1	693.6	773.2

Note:

In calculating consumption of fuel filters for stationary engines, the stand-by engines (1/3 of total population) are not included.

Element Types (Cartridge)

P915	P9.47e	H13.57	H9.18/2x
H1013t	P934x	P1001	P715e
H10.72/1x	H805e	P827e	P824x
H712e	P925t	P1025 f.g.h.	P714/10
H802	C20105e	H10.39/1n	P8.10x
H9.43e	H7.20e	H10.18/2n	P707e
H806x	C15120e	H10.34/2x	H10.50/10
H8.13t	C23440e	H1013x	H7.39e
0629.01	FF11.90e	H8.20/3x	H8.11n
H804e/n	BP811e	P9.340	P900H/e
H711.e	P811e	H14.96e	H8.16/1e
H10.49t	P9.19/7e	H10.75x	H10.33e
P7.8x	FF11.55e	H13.100/x	H8.13x
H8.16t	BP707e	H8.44/1e	H12.87x
H18.19n	BP1018/1e	BP1018/1e	H926
H8.17t	P923/1e	H10.82x	P825t
H9.43/2t	P9.16/5x	P9.40x	H601e.
H8.27x	P9.43x	H9.19/1e	P9.31/2x
0780.00	H13.10/70	H9310	H10.43/2e
P8280	H7.11/1e	P919e	P9.16/10
0669.00	FP9.350	P803e	P826x
H9.0	P915n	H10.40e	H8.10e
H10.61/1	H7.16x	H10.51n	P10.50x
H7.15/1n	H8.19e	H9.13/1x	

Element Types (PPC Electrical)

C1417e
C1113e
C1785e
C1550/1e
C1550/3e
C1113e
C1134e
C1528/2e
C1633/1e
C1486e
C1538e
C2460e
C1539/1e
C1555/6e
C2154e
C1933e
C2649e
C2555e
C2541/1e
C1513Ge
C1589/1e
C2675e
C1820e
C2345e
C2536e
C2551e
C1854/1e
C1555/1e
C2146e
C1532/1e
C1863/2e

(g) Table of Working Capital Calculations - Million [illegible]

	[illegible]				[illegible]			
	Total	Local	Foreign	Tax	Total	Local	Foreign	Tax
Raw materials	13.4	6.7	5.2	1.5	15.7	7.9	6.1	1.7
Work-in-progress	3.6	2.2	1.1	.3	4.6	2.8	1.3	.4
Finished Goods	7.1	5.0	1.0	.3	9.3	6.6	2.3	.3
Receivables	[illegible]	15.1	[illegible]	.2	21.5	17.2	[illegible]	.4
Totals	40.4	26.0	11.1	2.3	50.6	34.0	13.7	2.8
Less suppliers credits	10.1	10.1	-	-	11.8	11.8	-	-
Net working capital	[illegible]	[illegible]	11.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Financed By								
Commercial banks	17.3	6.2	11.1	-	17.3	3.6	13.7	-
Capital/L.T. loan	5.6	3.2	-	2.4	4.6	1.8	-	2.8
Cash Accumulation	7.4	7.4	-	-	[illegible]	[illegible]	-	-
Totals	[illegible]	[illegible]	11.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total cash accumulation	9.0				25.0			
Less used in working capital	7.4				16.8			
Cash Surplus	[illegible]				[illegible]			

Glider Manufacturing Project [illegible]

Element Types ([illegible])

W9.30/21c	W9.40/7x
WF9.16/1c	WF9.58/c
W9.30/7c	WF9.40/3c
W7.18c	
W9.40c	WF9.30/2c
W9.36/2c	W9.50/3c
W9.36/5c	W9.62/8c
W9.14/2c	W9.50/1c
W7.12c	W9.64/7c
W936	W7.12/7c

Filter Manufacturing Project **Annex 6.1**

Production Forecast
(1000 Units)

I. Oil Filter	1352	1353	1354	1355 Onwards
Type OC	720	816	960	960
Type OS	180	204	240	240
Total	900	1,020	1,200	1,200
Less: Stock Adjustment	150	20	30	-
Total Oil Filter Sold	750	1,000	1,170	1,200
II. Fuel Filter				
Type FC	240	272	320	320
Type FS	360	408	480	480
Total	600	680	800	800
Less: Stock Adjustment	100	10	20	-
Total Fuel Filter Sold	500	670	780	800
III. Total Forecast				
Production	1,500	1,700	2,000	2,000
Less: Stock Adjustment	250	30	50	-
Production Sold	1,250	1,670	1,950	2,000

Sales Forecast
(Million Rials)

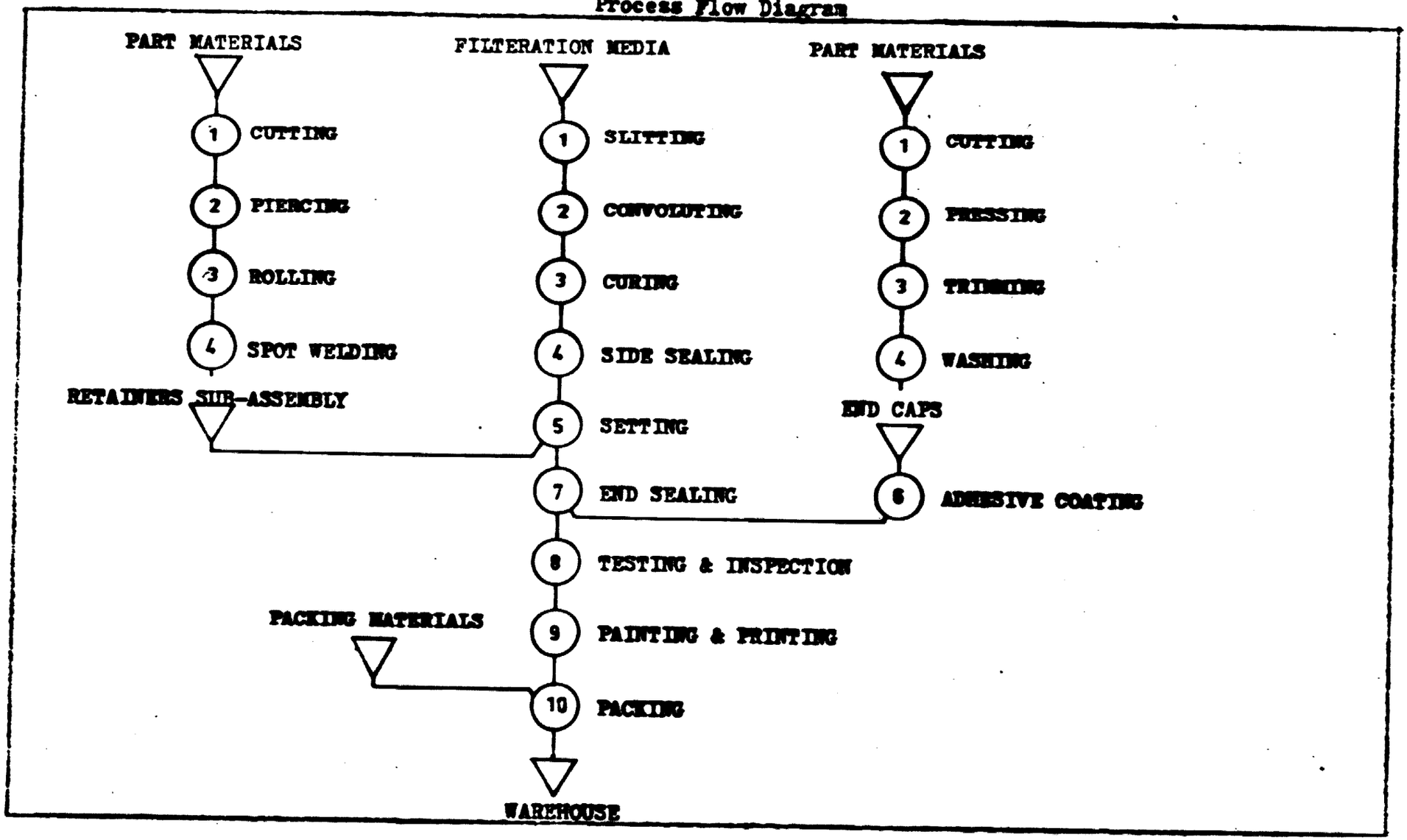
	Unit Price	1152	1153	1154	1155 Onwards
I. Oil Filter					
Type OC	36 Rls./Filter	25.9	29.4	34.6	34.6
Type OS	60 "	10.8	12.1	14.4	14.4
Total	40.8[1] "	36.7	41.6	49.0	49.0
Less: Adjustment		6.1	1.8	1.5	-
Net Sales		30.6	39.8	47.5	49.0
II. Fuel Filter					
Type FC	45Rls./Filter	10.8	12.2	14.4	14.4
Type FS	84 "	30.6	34.1	40.3	40.3
Total	68.4[1] "	41.4	46.5	54.7	54.7
Less: Adjustment		6.2	1.1	2.2	-
Net Sales		34.5	45.4	52.5	54.7
III. Total Forecast					
Total Sales	51.8[1] "	78.1	88.1	103.7	103.7
Less: Adjustment	"	12.1	2.1	3.7	-
Net Sales Revenue	"	66.0	86.0	100.0	103.7

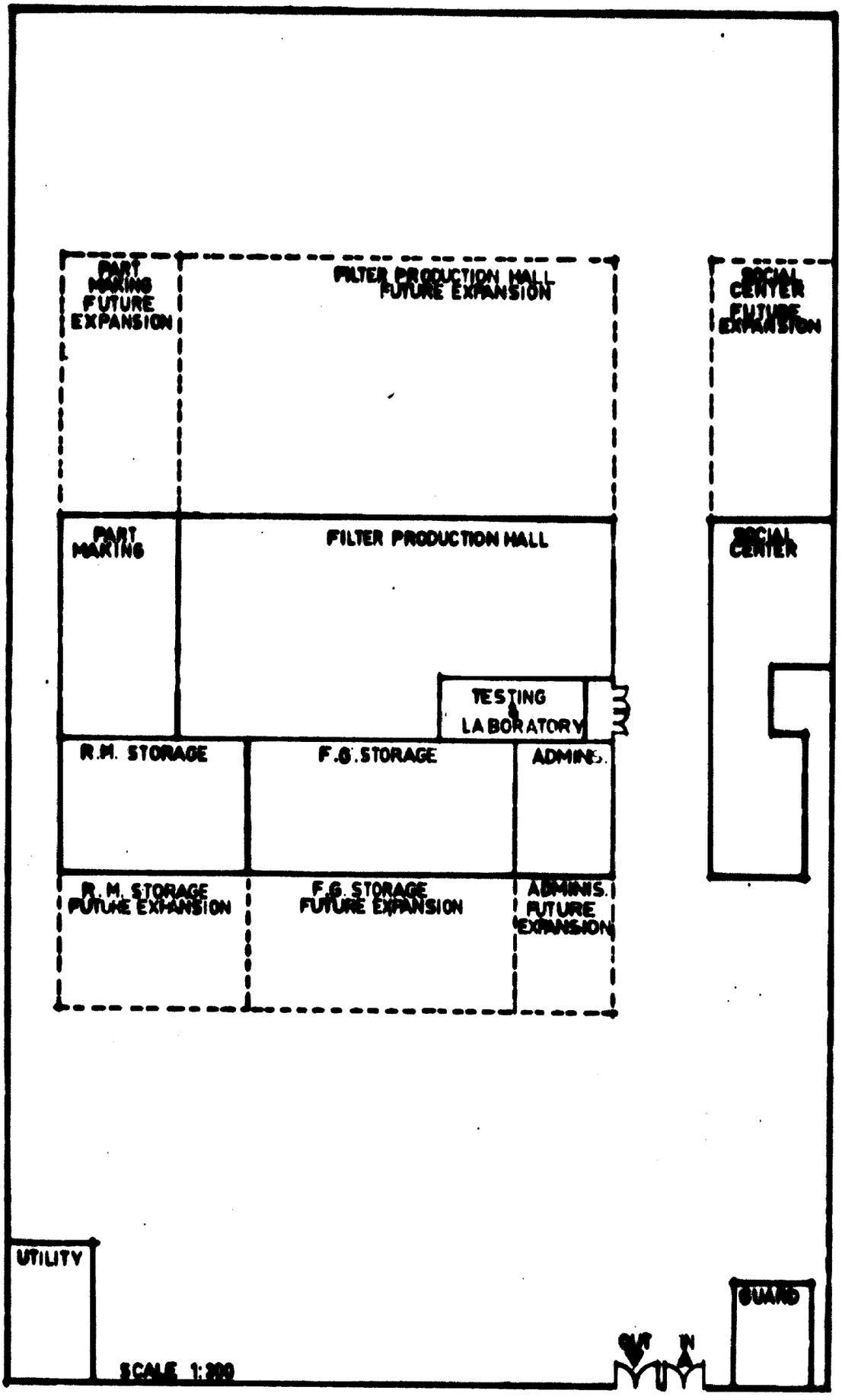
[1] Weighted Average of Unit Sales Price.

Filter Manufacturing Project

Annex 7

Process Flow Diagram




PART MARING FUTURE EXPANSION
FILTER PRODUCTION HALL FUTURE EXPANSION
SOCIAL CENTER FUTURE EXPANSION
PART MARING
FILTER PRODUCTION HALL
SOCIAL CENTER
TESTING & LABORATORY
R.M. STORAGE
F.G. STORAGE
ADMINS.
R. M. STORAGE FUTURE EXPANSION
F.G. STORAGE FUTURE EXPANSION
ADMINS. FUTURE EXPANSION
UTILITY
GUARD
SCALE 1:200
N

Filter Manufacturing Project — Annex 9

List of Machines and Equipment

Quantity	Description	Cost (1000 Rls.) Local	Import(C&F)
	I. Filter Assembly		
1	Slitter Machine	80	18
3	Convoluting Machine	-	1,320
1	Curing Oven	800	1,900
2	Side Sealer	60	260
2	End Sealer	-	880
1	Seaming Machine	-	360
1	Adhesive Mixer	50	-
3	Belt Conveyor	600	-
1	Cooling Equipment	300	-
1	Charging Machine	-	150
	Total	1,790	4,788
	II. Part Making		
1	Automatic Tube Making Machine	-	480
1	Piercing Machine	150	-
2	Rolling Machine	300	-
1	Shearing Machine	100	-
1	Hydraulic Press,100 ton	-	650
1	Hydraulic Press,50 ton	-	360
1	Press Machine, 20 ton	-	180
2	Press Machine, 5 ton	80	-
3	Hand Press, 1.5 ton	60	-
2	Hand Shearing Machine	40	-

(Continued)

Quantity	Description	Cost (1000 Rls.) Local	Import(CIF)
2	Spot Welder(Pneumatic Type)	-	106
3	Spot Welder (Foot Type)	-	66
1	Lathe Machine	-	160
1	Milling Machine	-	350
1	Shaping Machine	-	150
1	Drill Machine	-	70
	Total	620	2,573
	XXI. Testing And Laboratory		
1	Pressure Test Rig	-	60
1	Filter Test Stand	-	150
1	Bursting Tester	-	60
1	Densometer	-	80
1	Microscope	-	15
1	Electric Oven	-	20
	Thickness Guage	-	10
	Total	-	395
	IV. Tools, Dies & Spares		
	Set of Moulds & Jigs	800	-
	Spare Parts	80	200
	Total	880	200

Filter Manufacturing Project — Annex 10

Total Elements of Costs Per Machinery and Equipment

Description (Per Annex 9)		Cost (1000 Rls.)
I. Import (C&F)		
Filter Assembly	4,788	
Part Making	2,572	
Testing & Laboratory	395	
Tools, Dies & Spares	300	
		8,055
II. Charges & Expenses		
Bank Charges @ 5.5% of C&F	443	
Municipality, Clearance & Handling Charges @ 6% of C&F	483	
Loading, Transportation & Unloading Expenses @ 25% of C&F	121	
		1,047
	Sub Total	9,102
III. Local		
Filter Assembly	1,790	
Part Making	690	
Testing & Laboratory	-	
Tools, Dies and Spares	850	
		3,270
Total Factory Delivered Cost		12,372

Filter Manufacturing Project — Annex 11

Personnel Requirement

I. Factory	1352	1353	1354	1355 Onwards
Unskilled	12	13	15	15
Semiskilled	24	27	30	30
Skilled	6	6	7	7
Technical Staff	2	2	3	3
Store Keeper	2	2	2	2
Supervisor	2	2	2	2
Production Manager	1	1	1	1
Quality Control Manager	1	1	1	1
Plant Manager	1	1	1	1
Driver	1	1	1	1
Total	52	56	62	62
II. Service Staff				
General Manager	1	1	1	1
Chief Accountant	1	1	1	1
Chief Salesman	1	1	1	1
Salesman	3	3	6	6
Accountant	2	2	3	3
Purchasing	1	2	2	2
Typist	1	1	1	1
Attendant	2	2	2	2
Driver	1	1	1	1
Total	13	14	18	18
Total Personnel	65	70	81	81

Filter Manufacturing Project — Annex 12.1

Salaries And Wages Including Benefits (1000 Rials)

Factory	1352	1353	1354	1355 Onwards
Unskilled	518	562	648	648
Expenses & Benefits	363	393	454	454
Semiskilled	1,382	1,555	1,728	1,728
Expenses & Benefits	967	1,088	1,210	1,210
Skilled	540	540	630	630
Expenses & Benefits	244	244	284	284
Technical Staff	360	360	540	540
Expenses & Benefits	108	108	162	162
Store Keeper	180	180	180	180
Expenses & Benefits	81	81	81	81
Supervisor	576	576	576	576
Expenses & Benefits	173	173	173	173
Production Manager	600	600	600	600
Expenses & Benefits	180	180	180	180
Quality Control Manager	600	600	600	600
Expenses & Benefits	180	180	180	180
Plant Manager	840	840	840	840
Expenses & Benefits	252	252	252	252
Driver	90	90	90	90
Expenses & Benefits	40	40	40	40
Total	8,374	8,452	9,448	9,448

	1984				1985			
	Total	Local	Foreign	Tax	Total	Local	Foreign	Tax
Raw Materials	15.7	7.9	6.1	1.7	15.7	7.9	6.1	1.7
Work-in-progress	4.7	2.8	1.8	.4	4.7	2.8	1.8	.4
Finished goods	10.5	7.4	2.8	.3	10.5	7.4	2.8	.3
Receivables	25.9	20.1	4.4	.8	25.9	20.1	4.8	.8
Totals	56.8	38.2	14.8	3.0	56.8	38.0	14.0	3.0
Less suppliers credits	11.8	11.8	-	-	11.8	11.8	-	-
Net working capital	44.1	26.4	14.8	3.0	45.0	27.2	14.8	3.0
Financed By								
Commercial Banks	16.3	1.5	14.8	-	8.3	8.3	-	-
Capital/LA. loan	3.6	.7	-	2.9	-	-	-	-
Cash Accumulation	24.2	24.2	-	-	36.7	18.9	14.8	3.0
	44.1	26.4	14.8	3.0	45.0	27.2	14.8	3.0
Total cash accumulation	44.8				67.2			
Less used in working cap	24.2				36.7			
Less dividend	4.8				9.0			
Cash Surplus	15.8				21.5			

Filter Manufacturing Project **Annex 12.3**

Salaries And Wages Including Benefits

1000 Afs.

Service Staff	1352	1353	1354	1355 Onwards
General Manager	1,200	1,200	1,200	1,200
Expenses & Benefits	360	360	360	360
Chief Accountant	600	600	600	600
Expenses & Benefits	180	180	180	180
Chief Salesman	600	600	600	600
Expenses & Benefits	180	180	180	180
Salesman	972	972	1,944	1,944
Expenses & Benefits	291	291	583	583
Accountant	648	648	972	972
Expenses & Benefits	194	194	292	292
Purchasing	288	576	576	576
Expenses & Benefits	86	173	173	173
Typist	288	288	288	288
Expenses & Benefits	86	86	86	86
Attendant	115	115	115	115
Expenses & Benefits	81	81	81	81
Driver	90	90	90	90
Expenses & Benefits	40	40	40	40
Total	6,399	6,774	8,360	8,360

Pilot Manufacturing Project — Annex 11.1

Raw Material Requirements (Local)

I. Quantity (tons)	1352	1353	1354	1355 Onwards
Cotton Yarn	75	85	100	100
Cotton Seed	30	34	40	40
Cardboard	19	21	25	25
Felt	90	102	120	120
Rubber Ring (1000 Pcs)	600	680	800	800
Packing Materials (1000 Pcs)	1,500	1,700	2,000	2,000

II. Cost (Million Rls.)	Unit Price	1352	1353	1354	1355 Onwards
Cotton Yarn	20 Rls./Kg	1,500	1,700	2,000	2,000
Cotton Seed	6 "	180	204	240	240
Cardboard	25 "	470	525	625	625
Felt	90 "	8,100	9,180	10,800	10,800
Rubber Ring	2 Rls./Pc	1,200	1,360	1,600	1,600
Packing Material	3.5 Rls./Pc	5,250	5,950	7,000	7,000
Total		16,700	18,919	22,265	22,265

Filter Manufacturing Project — Annex 13.2

Raw Material Requirements (Bought Out)

I. Quantity(tons)	1352	1353	1354	1355 Onwards
Filter Paper	83	94	110	110
Adhesive Materials	23	26	30	30
GI Sheet	113	128	150	150
GI Hoop	98	110	130	130
PVC Plastisol	23	26	30	30

II. Cost (Million Rls.)	Unit Price					
Filter Paper	110	Rls/Kg	9,080	10,300	12,100	12,100
Adhesive Materials	107	"	2,410	2,730	3,210	3,210
GI Sheet	22	"	2,480	2,810	3,300	3,300
GI Hoop	23	"	2,240	2,550	2,990	2,990
PVC Plastisol	112	"	2,520	2,860	3,360	3,360
Total			18,730	21,250	24,960	24,960

III. CIF Cost (Million Rls.						
Filter Paper	95	Rls/kg	7,850	8,900	10,450	10,450
Adhesive Materials	67	"	1,510	1,700	2,010	2,010
GI Sheet	13	"	1,390	1,580	1,850	1,850
GI Hoop	14	"	1,370	1,550	1,820	1,820
PVC Plastisol	70	"	1,580	1,790	2,100	2,100
Total			13,700	15,520	18,230	18,230

IV. Duties & Taxes						
Filter Paper	12	Rls/kg	990	1,120	1,320	1,320
Adhesive Materials	33	"	745	845	990	990
GI Sheet	6	"	675	770	900	900
GI Hoop	7	"	685	775	910	910
PVC Plastisol	35	"	790	895	1,050	1,050
Total			3,885	4,405	5,170	5,170

Filter Manufacturing Project — Annex 14

Working Capital Requirements
(Million Rials)

Description	Months	1352	1353	1354	1355 Onwards
Inventory:					
Raw Materials	4	13.4	15.7	15.7	15.7
Finished Goods	2	8.5	9.5	10.8	10.8
Receivables	3	16.2	21.5	25.0	25.8
Total Working Capital		38.1	46.7	51.5	52.3
Less: Suppliers Credit		10.7	10.7	10.7	10.7
Commercial Banks		17.3	17.3	16.3	11.3
Net Working Capital		10.1	18.7	24.5	33.3
Annual Increase		10.1	8.6	5.8	8.8
Financed By:					
Capital		5.5	-	-	-
Earned Reserves		4.6	8.6	5.8	8.8

Filter Manufacturing Project. — **Annex 15**

Forecasted Incom. Statement
(Million Rials)

	1352	1353	1354	1355	1356	1357 Onwards
Production						
Oil Filter (1000 Elements)	900	1,020	1,200	1,200	1,200	1,200
Fuel Filter (1000 Elements)	600	680	800	800	800	800
Net Sales	65.0	86.0	100.0	103.7	103.7	103.7
Cost of Production						
Raw Materials	35.4	40.2	47.2	47.2	47.2	47.2
Salaries & Wages	8.3	8.7	9.4	9.4	9.4	9.4
Spares & Repair	1.0	1.1	1.2	1.2	1.2	1.2
Utilities	2.9	3.2	3.6	3.6	3.6	3.6
Factory Overhead	0.9	1.1	1.5	1.5	1.5	1.5
Depreciation	2.3	2.3	2.3	2.3	2.3	2.3
Total	50.8	56.6	65.2	65.2	65.2	65.2
Add: F.G. Opening Stock	-	8.5	9.5	10.8	10.8	10.8
Total	50.8	65.1	74.7	76.0	76.0	76.0
Less: F.G. Closing Stock	8.5	9.5	10.8	10.8	10.8	10.8
Cost of Goods Sold	42.3	55.6	63.9	65.2	65.2	65.2
Gross Profit (Loss)	22.7	30.4	36.1	38.5	38.5	38.5
Operating Expenses						
Administration	7.1	7.8	9.4	9.4	9.4	9.4
Selling & Advertising	2.6	2.6	2.0	2.1	2.1	2.1
Royalty	2.0	2.6	3.0	3.1	3.1	3.1
Total Operating Expenses	11.7	13.0	14.4	14.6	14.6	14.6
Operating Profit (Loss)	11.0	17.4	21.7	23.9	23.9	23.9
Non-Operating Expenses						
Interest	3.4	4.6	4.5	3.5	2.4	1.1
Amortization of Pre-Operational	0.3	0.3	0.3	0.4	0.4	-
Total Non-Operation Expenses	3.7	4.9	4.8	3.9	2.8	1.1
Total Cost of Production	66.2	74.5	84.4	83.7	82.6	80.9
Net Profit (Loss)	7.3	12.5	16.9	20.0	21.1	22.8
Less: Tax	-	-	-	-	-	5.9
: Dividend	-	4.5	4.5	4.5	4.5	4.5
Total	7.3	8.0	12.4	15.5	16.6	12.4
Profit & Loss b/f	-	7.3	15.3	27.7	[illegible].2	59.8
Profit & Loss to B/S	7.3	15.3	27.7	43.2	[illegible].8	72.2

Filter Manufacturing Project

Annex 16

Forecasted Cash Flow
(Million Riels)

Sources	1350	1351	1352	1353	1354	1355	1356	1357 Onwards
Net Profit	-	-	7.3	12.5	16.9	20.0	21.1	22.8
Add Back Depreciation	-	-	2.6	2.6	2.6	2.7	2.7	2.3
Cash Generated	-	-	9.9	15.1	19.5	22.7	23.8	25.1
Capital	4.5	10.5	-	-	-	-	-	-
Long Term Loan	4.0	11.0	-	-	-	-	-	-
Short Term Credit	-	7.0	21.0	-	-	-	-	-
Total Sources	8.5	28.5	30.9	15.1	19.5	22.7	23.8	25.1
Applications								
Pre-Operational Expenses	0.8	0.9	-	-	-	-	-	-
Capital Expenditures	7.5	15.3	-	-	-	-	-	-
Increase in Raw Materials Stock	-	11.8	1.6	2.3	-	-	-	-
Increase in Finished Goods Stock	-	-	8.5	1.0	1.3	-	-	-
Increase in Receivables	-	-	16.2	5.3	3.5	0.8	-	-
Repayment of Long Term Loan	-	-	-	1.0	1.0	4.0	4.0	5.0
Repayment of Short Term Credit	-	-	-	-	1.0	8.0	8.0	8.0
Payment of Tax	-	-	-	-	-	-	-	-
Payment of Dividend	-	-	-	-	4.5	4.5	4.5	4.5
Total Application	8.3	28.0	26.3	9.6	11.3	17.3	16.5	17.5
Surplus	0.2	0.5	4.6	5.5	8.2	5.4	7.3	7.6
Cumulative Surplus	0.2	0.7	5.3	10.8	19.0	24.4	31.7	39.3

Filter Manufacturing Project — **Annex 17**

Forecasted Balance Sheet
(Million Rials)

Assets	1350	1351	1352	1353	1354	1355	1356	1357 Onwards
Current Assets								
Cash and Bank	0.2	0.7	5.3	10.8	19.0	24.4	31.7	39.3
Raw Materials Stock	-	11.8	13.4	15.7	15.7	15.7	15.7	15.7
Finished Goods Stock	-	-	8.5	9.5	10.8	10.8	10.8	10.8
Debtors	-	-	16.2	21.5	25.0	25.8	25.8	25.8
Total Current Liabilities	0.2	12.5	43.4	57.5	70.5	76.7	84.0	91.6
Fixed Assets								
At Cost	7.5	22.8	22.8	22.8	22.8	22.8	22.8	22.8
Less Depreciation	-	-	2.3	4.6	6.9	9.2	11.5	13.8
Net Fixed Assets	7.5	22.8	20.5	18.2	15.9	13.6	11.3	9.0
Net Pre-Operational Expenses	0.8	1.7	1.4	1.1	0.8	0.4	-	-
Total Fixed Assets	8.3	24.5	21.9	19.3	16.7	14.0	11.3	9.0
Total Assets	8.5	37.0	65.3	76.8	87.2	90.7	95.3	100.6
Liabilities and Equity								
Current Liabilities								
Creditors	-	7.0	28.0	28.0	27.0	19.0	11.0	3.0
Taxes Payable	-	-	-	-	-	-	-	5.9
Dividends Payable	-	-	-	4.5	4.5	4.5	4.5	4.5
Total Current Liabilities	-	7.0	28.0	32.5	31.5	23.5	15.5	13.4
Long Term Debt								
Loan	4.0	15.0	15.0	14.0	13.0	9.0	5.0	-
Equity								
Capital	4.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Profit and Loss and Reserves	-	-	7.3	15.3	27.7	43.2	59.8	72.2
Total Equity	4.5	15.0	22.3	30.3	42.7	58.2	74.8	87.2
Total Liabilities and Equity	8.5	37.0	65.3	76.8	87.2	90.7	95.3	100.6

Pilsner Manufacturing Project — Annex 18

Foreign Exchange Saving
(Million Birr)

	1352	1353	1354	1355 Onwards
CIF Price of Pilsner if Imported	81.6	92.5	108.8	108.8
Less:				
Royalty	2.0	2.6	3.0	3.1
Imported Raw Materials(CIF)	13.7	15.5	18.2	18.2
Imported Spares & Tools	0.5	0.5	0.5	0.5
Depreciation of Imported machinery & Equipment	1.0	1.0	1.0	1.0
Total	17.2	19.6	22.7	22.8
Total Foreign Exchange Saving	64.4	72.9	86.1	86.0

Filter Manufacturing Project — Annex 19

Local Content And Added Value
(Million Rials)

	1352	1353	1354	1355 Onwards
I. Local Content				
Total Production Cost	66.2	74.5	84.4	83.7
Less: Foreign Content	12.2	18.5	21.4	20.7
Local Content	54.0	56.0	63.0	63.0
Local Content (%)	76	75	75	75
II. Added Value				
Sales[*]	69.2	77.5	87.4	86.7
Less: Raw Materials & Non Traded Inputs	41.7	47.4	53.9	51.7
Added Value	27.5	30.1	33.5	35.0
Added Value (%)	39.7	38.8	38.4	40.5

[*] Total Cost of Production Plus 20% of Share Capital.

MINISTRY OF ECONOMY

RESEARCH CENTRE FOR INDUSTRIAL & TRADE DEVELOPMENT

TEHERAN - IRAN

01879
(4 of 4)

PROJECT EVALUATION

VOLUME 4

ECONOMIC EVALUATION

J. Goodwin

Tehran
January 1974

Printed by The Bureau of Statistics
Ministry of Economy
Government of Iran

It is necessary to check that the capital is available when required and therefore the allocation of available capital is reconciled under the sub-heading "Financed By".

After meeting all initial capital investment in fixed assets and intangible assets, out of the total of 30.0 Million Rials, comprised of the equity capital and long term loan, a balance of 5.6 Million Rials remains for application to working capital. This reduces from 1363 onwards as the long term loan is repaid.

The commercial banks had agreed to provide 17.3 Million Rials which was fully utilised for working capital in 1362, and repayments of this credit commenced in 1364.

The 5.6 Million Rials plus 17.3 Million Rials making 22.9 Million Rials does not meet the estimated requirements of 31.8 Million Rials in 1362, and the difference of 7.4 Million Rials is met from cash accumulations.

The calculation of the cash surplus at the end of each year indicates that the cash required for working capital should be available and the surplus figures reconcile closely with Annex 16. It is also necessary to check that, at a date in 1362 when the finished goods are fully stocked and 3 months credit has been extended to sales, and only 3 months cash accumulation has resulted, the capital will be available.

Raw material	11.8	Commercial Banks	17.3
Work-in-progress	3.6	Capital/Lt. loan	5.6
Finished goods	7.1	Cash accumulation	2.8
Receivables	16.3		
	38.8		25.7
Less suppliers credits	8.9	Deficit	4.2
	29.9		29.9

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

S.F. PROJECT - IRA-16

COUNTRY : IRAN

PROJECT EVALUATION

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VOLUME 4

ECONOMIC EVALUATION

Volume 1 dealt with the basic accounting principles required by the Project Evaluator for an understanding of the Cost Estimating and Financial Projections discussed in Volume 2 which covered technical and financial studies. Volume 3 critically analysed an actual feasibility study, drawing attention to the necessary division of expenditure and income into the categories required to effect an evaluation of a project from the viewpoint of the national economy.

This volume discusses the use of cost and profitability estimates to derive static national economic indices, and the use of financial projections to obtain dynamic economic indices, including social cost benefit analysis.

CHAPTER 1

ECONOMIC PROJECT EVALUATION - An Interdisciplinary Study

In the preparation of technical studies the skills of the engineer, the cost accountant and the market researcher are brought together, and jointly they contribute to the estimate of cost and profitability, and the estimated capital cost of a project. But this is a static assessment and it is then the function of the financial analyst to present a dynamic statement, combining capital investment with the finance available, and cash inflows with cash outflows, over a period of years. The financial analyst in preparing financial projections bases his work on the data and estimates compiled in the feasibility study.

The appraisal of a project from the point of view of the economy, that is the economic evaluation, uses the statement of cost and profitability, or its equivalent, to derive static economic ratios, and uses the financial projections to arrive at dynamic ratios.

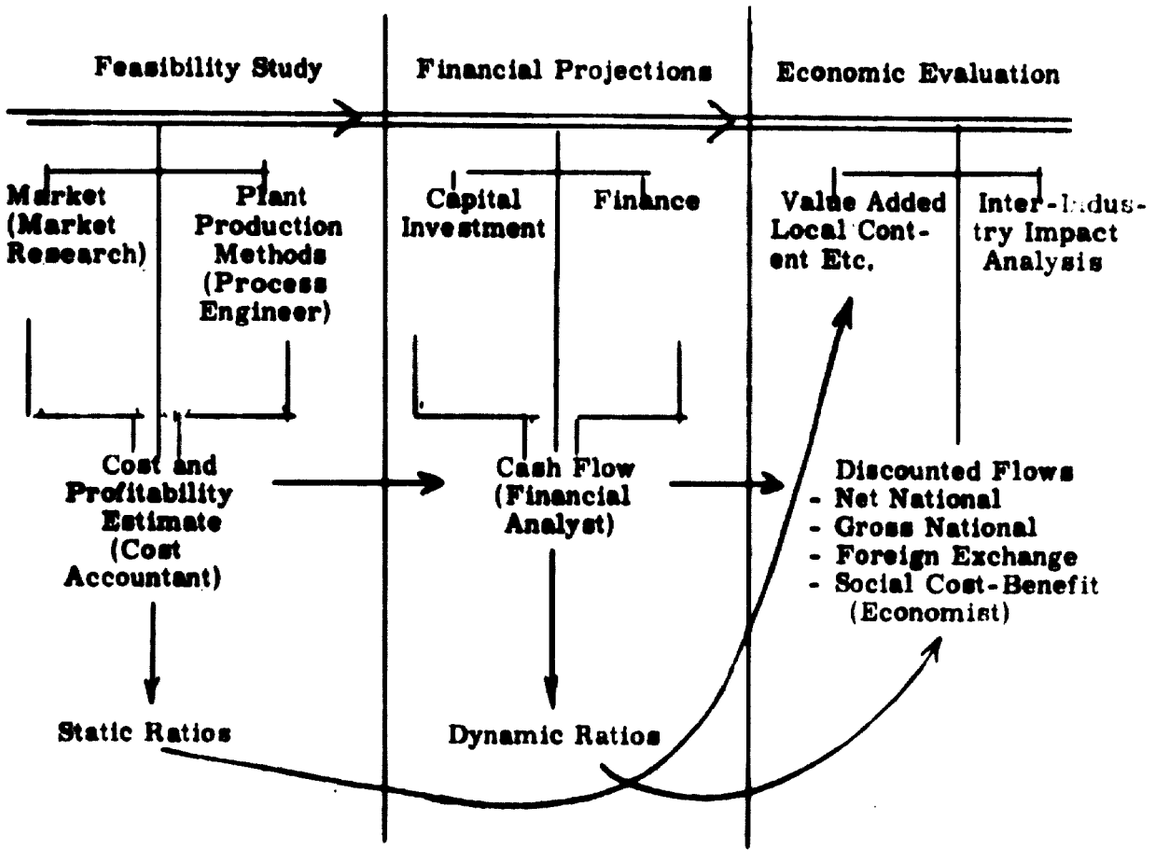
This relationship between the feasibility study, the financial projections, the economic evaluation, and its interdisciplinary nature is depicted in chart form.

The Feasibility Study

The starting point of any project is an assessment of whether, with reasonable risk, an entrepreneur may obtain a higher rate of return for his investment and efforts than he could obtain in other ways.

Even for a very small project the entrepreneur will have considered the questions of availability and cost of raw materials, the technical aspects of processing and packing, the distribution and the sale price of the product, the extent of the market and his share of it, and the returns he hopes to obtain for his capital investment and his labour.

Project Evaluation - An Interdisciplinary Study



But once the entrepreneur is forced to seek capital elsewhere ... seek Government approval for his project, he is constrained to present the project in as attractive a manner as possible. A feasibility study may be made more attractive by understating or omitting certain capital costs, by understating or omitting certain operating costs, by an over-optimistic assessment of probable sales, or by using a high and uncompetitive selling price for the product. In some circumstances a feasibility study may be deliberately misleading in addition to being optimistic.

Clearly, most feasibility studies presented, for consideration to Government or financial institutions have a 'sales' motivation and probably present an optimistic assessment of the commercial viability.

The Commercial Profitability

When a feasibility study is presented to a Bank in support of an application for financial support, either as a term loan or equity capital, the bank will normally appraise the project in accordance with widely accepted standards. The bank will check the status of the entrepreneurs, the technical feasibility, the market, and the status of the senior management. Further the bank will make it's own assessment of the cost of the project and the soundness of the capital structure. Based on it's own assumptions, the bank will compile, on a time scale, a statement of profitability, a cash flow, and a projected balance sheet.

This is an important step in evaluating a project. It means that an experienced independent organisation without 'sales' motivation, has posed and answered the question, - "Is this project commercially viable". It has tried to remove the optimism almost certainly built into the feasibility study. If it is a development bank, the bank will have considered, at least in general terms, whether the project is broadly in line with the economic objectives of the nation.

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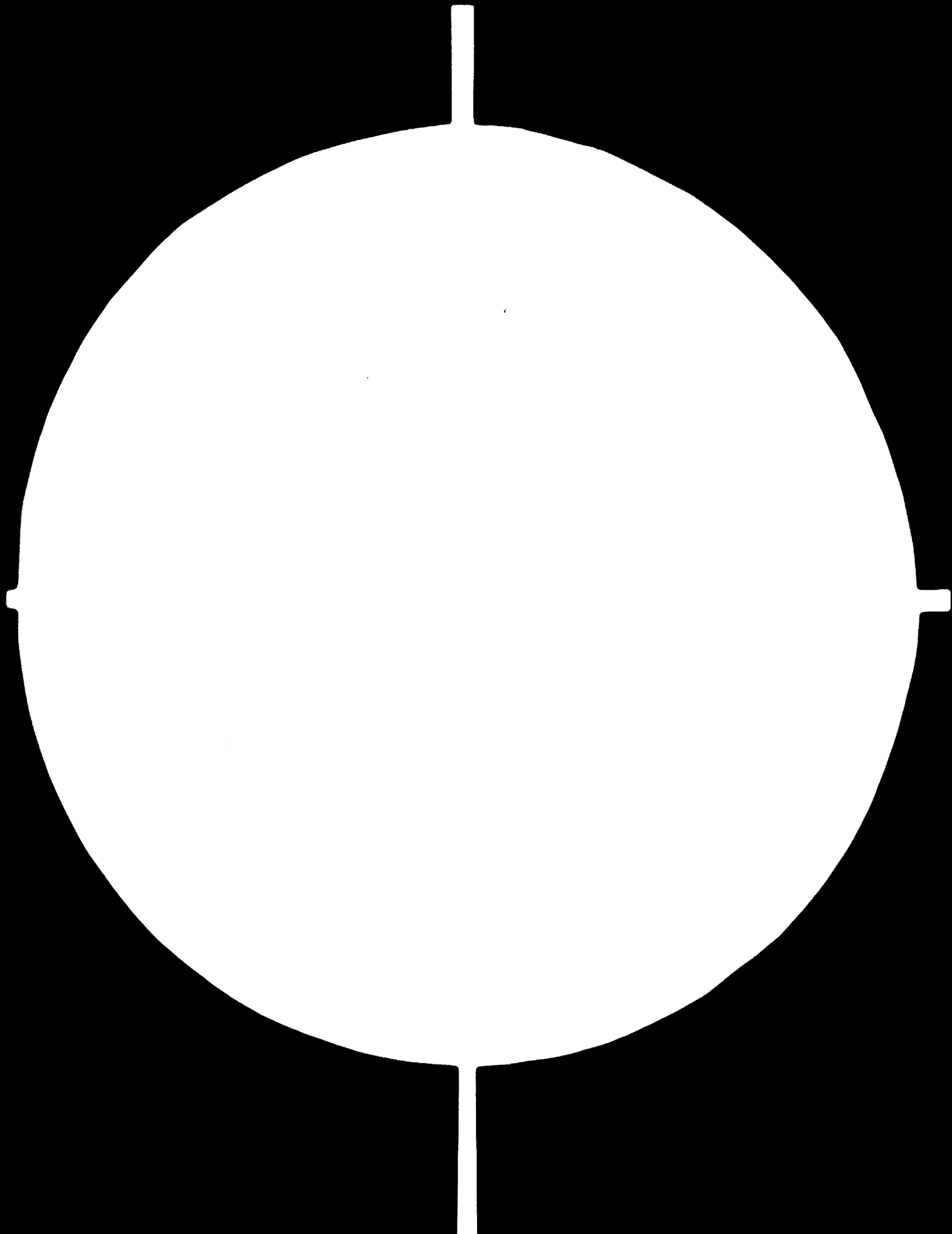


CHAPTER III

STATIC ECONOMIC CRITERIA

In this Chapter a brief outline of the more usual static economic indices is provided. In those indices making use of operating costs, a single year is selected when the plant has reached full output, and this particular year is assumed to represent the operating conditions throughout the plant life.

1. Use of Resources to save Foreign Exchange

(a) $\frac{\text{Annual Foreign Exchange Saving}}{\text{Total Capital Employed}}$ = Measure of the contribution the project makes to the saving of foreign exchange per unit of capital employed

(b) $\frac{\text{Annual Foreign Exchange Saving}}{\text{Foreign Capital Employed}}$ = Measure of the contribution the project makes to the saving of foreign exchange per unit of foreign capital employed

2. Use of resources to provide employment.

$\frac{\text{Total Capital Employed}}{\text{Total number of employees}}$ = Capital employed per worker

3. Use of resources to provide surplus

$\frac{\text{Operating profit after interest but before tax}}{\text{Total capital employed}}$ = Measure of the contribution to savings per unit of capital employed. (This does not include employee savings)

4. Value Added

$\%\ \text{Value Added} = \frac{100 \times \text{Total Value Added}}{\text{Total Cost + Profit}}$

This is a simple ratio of the expenditures contributing to the value added as defined for the purpose of national accounts to the sale

price, on the basis of a single "normal" operating year. The cost items included in the value added are indicated in the schedule.

5. Domestic Content

$$\% \text{ Domestic Content} = \frac{100 \times \text{Domestic Expenditures (see schedule)}}{\text{Total Cost + Profit}}$$

This is a simple ratio of the total of domestic expenditures to the sale price on the basis of a single "normal" year. The cost items included in the value added are indicated in the schedule.

6. Protection Ratios

A number of ratios have been suggested all of which make some comparison of exfactory prices with equivalent cif prices. This method has two main difficulties:-

(1) The derivation of the cif price from the foreign fob price(s) plus freight and insurance.

(2) Unstable market conditions which result in highly variable ratios.

$$\% \text{ Nominal Protection} = \left(\frac{\text{Total of all import taxes}}{\text{Equivalent c.i.f. Prices}} \right) 100$$

$$\% \text{ Net Nominal Protection} = \left[\frac{\left(\text{Total of all Import Taxes}\right) - \left(\text{Taxes on Imported Component/Materials}\right)}{\text{Equivalent c.i.f. Prices}} \right] 100$$

Normally the ex-factory price will have included the necessary taxes/ duties in the raw materials and components to be incorporated in the product, and the minimum total protection required on the cif price is:-

$$\left[\frac{\text{Ex-factory Price - c.i.f. Price}}{\text{c.i.f. Price}} \right] 100$$

It is of course essential to calculate the expected tariff considered to be necessary, and subsequently the statutory tariff may be modified to meet changing conditions. However as a single criteria to assess

the merits of a project relating to another, as a basis of decision to proceed of not to proceed, it is less informative than the static value added considered together with the static domestic content.

7. **Composite Ratios**

Attempts have been made to combine the various parameters into a single index, which is then used to compare the economic desirability of one project with another. One such ratio, proposed by Enke, is termed the "Social Investment Rating".

$$S.I.R. = \frac{R - M}{L + Ka}$$

Where R = Market Value of Output

M = Cost of materials/Component bought out

L = Annual labour cost

Ka = Annual Capital Expense = Cost of Capital + Depreciation

Presumably the cost of capital referred to in Ka would be based on the annual interest charges on loan capital (which alter every year) plus interest on equity at an agreed rate of interest.

8. **Value Calculations**

There are a number of value calculations which are not ratios, but which provide for the particular project, an assessment of some economic factor, for example foreign exchange savings and contribution to Government revenue.

$$\text{Foreign Exchange Savings} = \left[\begin{array}{l}\text{Equivalent c.i.f. value of imported goods}\end{array}\right] + \left[\begin{array}{l}\text{Value of Exports}\end{array}\right] - \left[\begin{array}{l}\text{Foreign Exchange Costs}\end{array}\right]$$

The cost items included in foreign exchange costs are indicated in the schedule

$$\text{Change in Government Revenue} = \left[\begin{array}{l}\text{Duties on}\\ \text{similar}\\ \text{imported}\\ \text{goods}\end{array}\right] - \left[\begin{array}{l}\text{Duties on raw materials}\\ + \text{company taxes}\\ + \text{employee taxes}\end{array}\right]$$

Schedule of Expenditures Included in Value Added, Domestic Content, and Foreign Exchange

		Total Cost	Value Added	Domestic Content	Foreign Exchange Costs
1	Raw material and bought out components				
	a) Domestic	x		x	
	b) Foreign	x			x
	c) Duties on imported goods and components	x		x	
2	Consumable stores (includes packing, LAB)				
	a) Domestic	x		x	
	b) Foreign	x			x
	c) Duties on imported consumable stores	x		x	
3.	Repair components				
	a) Domestic	x		x	
	b) Foreign	x			x
	c) Duties on repair components	x		x	
4.	Wages/salaries including social benefits (total)				
	a) Iranian	x	x	x	
	b) Foreign	x	x		x
5.	Salaries of staff including social benefits				
	a) Iranian	x	x	x	
	b) Foreign	x	x		x
6.	Insurance of all employees	x	x	x	
7.	Water, Electricity, Fuel	x		x	
8.	Depreciation of Machinery				
	a) Domestic	x	x	x	
	b) Foreign	x	x		x

	Total Cost	Value Added	Domestic Content	Foreign Exchange Costs
9. Depreciation of Buildings	x	x	x	
10 Royalty and Payments	x	x		x
11. Administration expenses (excluding staff)	x		x	
12. Selling expenses (excludes staff)				
a) Domestic	x	x	x	
b) Foreign	x			x
13. Interest				
a) Domestic loan	x	x	x	
b) Foreign loan	x	x		x
14. Rent	x	x	x	
15. Other Expenditure				
a) Domestic	x	x	x	
b) Foreign	x	x		x
16. Profit				
a) On Domestic Capital	x	x	x	
b) On Foreign Capital	x	x		x
Total				

CHAPTER IV

DYNAMIC ECONOMIC CRITERIA

The Required Basic Data

The basic documents essential to the preparation of discounted economic projections are:-

1. A statement of capital expenditure, indicating domestic and foreign components, with a time scale for the investment.
2. A statement of source of funds
3. A statement of profitability on a time scale
4. A statement of cash flow
5. A forecasted balance sheet over the period under review.

For any new project these forecast financial projections are only approximate, and are in turn subject to estimates of all the individual items of capital cost, operating costs, and sales forecasts. Any gross discrepancies in the feasibility study will affect the financial projections and reduce the validity of subsequent economic projections. It is therefore of the utmost importance to ensure that the financial projections are the best possible estimate of the expected financial performance of the enterprise.

The Basis of the Projections

Because a project is anticipated to operate for a number of years, it will be both a cost and a benefit to the economy throughout it's life. In the construction stages, resources are utilized on the project, which are real and immediate, to provide for benefits to be derived from the project during later years. An immediate benefit is generally considered to have greater value than the same benefit derived at a later date. This raises two important concepts.

(i) The period over which the national profitability should be discounted, which should take into account replacement costs and obsolescence.

(ii) The discount rate which would normally, but not essentially, lie between the interest rate on Government bonds and the commercial bank loan rate of interest. It is a subjective decision which places a value on a benefit next year as compared with this year.

The changes in economic indices for industrial projects when discounting for periods beyond 15 years, are relatively small, and it is suggested that calculations be based on a project life of 15 years. A project known to have a shorter life than 15 years would be analysed on the basis of its estimated life.

Dynamic economic criteria may be considered under four headings:-

1. Value Calculations
2. Ratios
3. Internal Discount Rates
4. Cost-Benefit Analysis

All four groups depends on the systematic collection of costs and benefits, so that the project may be considered from the point of view of:-

a) The Business (BE)

b) Foreign Exchange (FE)

c) The Economy, inclusive of employee payments (NG)

d) The Economy, exclusive of employee payments (NN)

The classification of costs and benefits under the headings, BE, FE, NG and NN are provided in Appendix IV/1 in which non relevant items are indicated by a dash, -, positive cash flows (outputs) by (+) and negative cash flows (inputs) by (-).

Value Calculations

Value calculations do not provide ratios by which the merits of one project may be compared with another, but they indicate the present value of a project at the time it is under consideration.

If the summation, on a year by year basis, of the inputs and outputs, as defined under BE, FE, NG and NN in Appendix IV/1 are discounted, we obtain a measure of the present value of the project from the point of view of the business enterprise, foreign exchange, the national gross value and the national net value. In this calculation the residual value of the assets at the close of the period must be estimated and discounted.

Economic Ratios

If the summation, on a year by year basis, of the net outputs, as defined under BE, FE, NG and NN in Appendix IV/1 are discounted, and the net result divided by the discounted totals of the year by year capital employed, we have ratios of the benefits obtained over the life of the project to the resources employed over the life of the project. It is important to note that the resources employed may change from year to year.

These ratios are simple and meaningful and not in any way abstract. The N.G ratio is that of the discounted value added to the resources employed

Internal Rates of Return

The concept of the internal rate of return as applied to commercial financial projections has been discussed in Volume II. The internal rate

of return is the discount value which makes the present value equal to zero. In the economic sense it is a measure of the growth of a company's capital, the growth of foreign exchange, or the growth ofnational value added.

1. Business Enterprise Rate of Return

This is the annual rate of return on the total resources invested in the business enterprise in fixed assets and current assets including equity and loan funds from the point of view of the business enterprise.

2. Rate of Return - Foreign Exchange only:

This is the annual rate of return of the foreign exchange flow, discounted over time, in relation to foreign exchange invested.

3. National Gross Rate of Return:

This is the rate of return to the nation, based on the rates, value added by the project to the investment in the project, discounted for time. In this case, in terms of surplus, labour has a zero value.

4. National Net Rate of Return:

The national net rate of return to the nation is based on the rate of the surplus consisting of profit, depreciation interest and tax, to the investment in the project discounted for time. In this case labour costs at 100% of their cost are deducted from the surplus.

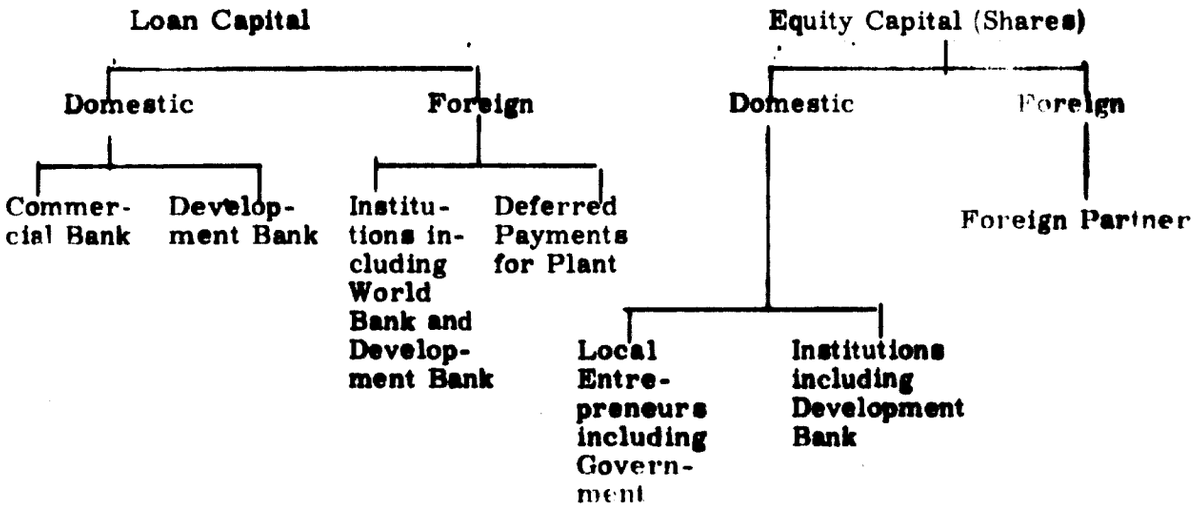
Cost Benefit Analysis

Social cost benefit analysis expresses the pertinent costs and benefits in terms of units of aggregate consumption, and attempts to measure all relevant factors which affect the national welfare, not just apparent economic benefits. The method involves the calculation

It must not be forgotten that the skilled assessment of the commercial viability of a project is the first important tool of economic evaluation, and that economic evaluations from the national view point are additional tools which do not replace the commercial viability appraisal. A commercial failure may mean wastage of foreign exchange, bankruptcy, unemployment, and loss of confidence. Indeed, most if not all, calculations of national economic profitability need the commercial financial projections as their essential base.

Sources of Capital - Motivation - Government Interest

In the main, the institutions and individuals providing capital to establish an industrial project, with the exception of Government, are not directly motivated by the public interest.



Development Banks and the World Bank are committed to furthering development in the less developed countries, and therefore in a general sense they are working to improve the welfare of a state, although both are organized on a commercial basis with the obligation to try to obtain financial returns on investments. Commercial banks are more stringent about their interest charges and the security they require for the loans they make which are generally made against the

of the contribution made by the project to aggregate consumption, taking into account the relative weight on each commodity and the value of social discounting.

As desirable as a complete social cost benefit analysis may be, in some circumstances, there are two constraints:

1) The basic economic information is not readily available and political value judgements are not easily made;

2) The methodology has to be applied to a multiplicity of projects, and staff with a suitable background would have to be allocated to the work.

National parameters which directly reflect political value judgements include, distribution of income, merit wants such as health and education, and the social rate of discount to be applied to surpluses. Additionally the proportion of surpluses returning for re-investment and the proportion being consumed must be estimated.

Shadow prices are required for labour, foreign exchange, and investment. In the field of investment, in which political restraints are dominant separate shadow prices are necessary for Government investment and for private capital.

In arriving at the social rate of discount, which is a very strong operator in evaluation calculations, not only is the economic concept difficult and abstract but ultimately one has to fall back on political value judgements which are difficult to make.

All of this is designed to arrive at a single index, on which to judge a project - the cost benefit ratio.

Further, in a rapidly developing economy the parameters would show significant changes over the operating period of the project.

Internal Rate of Return, Using a Range of Shadow Prices

Although full scale social cost-benefit analysis cannot be currently applied, the criteria to be used and the method of presentation of the criteria should guide thinking towards the effects of departures from actual commercial costs of labour, foreign exchange, capital, together with discounting, by calculating the internal rate of return over a range of values.

The effect of pricing labour at zero and at the commercial rate, over a weighted range of foreign exchange rates may be demonstrated graphically to provide the decision-maker with a clear picture of the implications of his decision. In this case the other main variable, the cost of capital would be held constant at the commercial figures.

It is possible to process the figures for a project in isolation, which assumes that there is no alternative to the project, and that all resulting benefits are additional to the economy. This cannot be so, because at least the alternative exists of not proceeding with the project. In many cases there is the alternative of importation of the product or an alternative product, and this imputes both foreign exchange transactions and value added. In other cases there are alternative projects to consider, - alternative ways of doing the same thing. It is therefore necessary to analyse the alternative(s) so that only additional benefits deriving from the investment may be calculated.

The year by year flow of benefits relative to both the project and the alternative for the various computations to be undertaken are extracted from the financial statements and brought together. The differences between the retail prices used in the project and the retail prices used in the alternative, are accounted for my adjusting the annual cash flows of the project to agree with the retail prices of the alternative. This is referred to as "Adjustment to real terms".

The nomenclature and the sign of types of cash flow relative to the different computations may be standardised as set out in Appendix IV/i, to permit relatively inexperienced personnel to do most be of the routine work.

If the internal discount rates are plotted on a graph it becomes possible to see immediately the effect of:-

a) Applied labour shadow prices between zero and the commercial price, by interpolation between the two curves.

b) Foreign exchange shadow prices over a selected range of values.

Each of the two curves are plotted from three calculated co-ordinates, the internal rates of discount appearing on the 'y' axis and on the 'x' axis, the three variable foreign exchange notional shadow prices. The shadow price of domestic capital in these curves is assumed to remain at unity.

In circumstances where the shadow price of domestic capital is an important variable, co-ordinates for a further two curves may be calculated, which would permit, by interpolation, the evaluation of the internal discount rate of a project for any desired combination of notional shadow prices for labour, domestic capital, and foreign exchange within the ranges selected.

The extent of computation required depends on the degree of information considered to be necessary. In all cases five basic financial projections are essential and the number of additional economic computations to provide different levels of information are tabulated below:

		Basic Calculations	Discount Tabulations
(1)	Using shadow prices for labour from 0 to 1.0 and for foreign exchange from 1 to 1.4, to permit graphical representation, and adjusting for the alternative to the project, to compute the internal rate of return for B.E, F.E, N.G, and N.N.	14	8
(2)	As (1) but without adjusting for the alternative	5	8

		Basic Calculations	Discount Tabulations
(3)	Without using shadow prices but including adjustment for the alternative	8	4
(4)	Simple discounted calculations for B.E, F.E, N.G, and N.N, without shadow prices and without adjustment for the alternative	3	4

For most industrial projects it is probable that the 4th set of computations would provide an acceptable level of criteria, without considering the alternatives and without using shadow prices. The full analysis (the 1st set of computations) could be used on very large investments where substantially different alternatives have to be considered. Further, it is probably less abstract to use discounted ratios instead of the internal rate of return, and certainly the former are no less meaningful.

APPENDIX IV/1

CASH FLOW - STANDARD NOMENCLATURE AND SIGN

	FE	NN	NG	BE
Domestic Investment & Loan Transactions				
Land	-	-	-	(-)
Buildings	-	(-)	(-)	(-)
Machinery and Equipment	-	(-)	(-)	(-)
Installation of Domestic Machinery & Equipment	-	(-)	(-)	(-)
Pre-operation Expenses	-	(-)	(-)	(-)
Inland Freight	-	(-)	(-)	(-)
Inland Insurance	-	(-)	(-)	(-)
Erection Expenses	-	(-)	(-)	(-)
Repayment of Domestic Loan(s)	-	-	-	-
Working Capital				
1. Shareholders Funds	-	(-)	(-)	(-)
2. Short term credits	-	(-)	(-)	-
3. Taxes on imported supplies	-	(-)	(-)	(-)
Repayment of Short Term Credit	-	-	-	-
Foreign Exchange Investment & Loan Transactions				
Machinery & Equipment - imported	(-)	(-)	(-)	(-)
External Freight	(-)	(-)	(-)	(-)
External Insurance	(-)	(-)	(-)	(-)
Installation of Foreign Machinery & Equipment	(-)	(-)	(-)	(-)
Payment of Guarantee	(-)	(-)	(-)	(-)
Repayment of Foreign Loan	(+)	-	-	-

APPENDIX IV/1

	FE	NN	NG	BE
Working Capital				
1. Shareholders Funds	(-)	(-)	(-)	(-)
2. Short Term Credit	(-)	(-)	(-)	-
Repayment of Short Term Credit	(+)	-	-	-
Profit and Loss Transactions				
Raw Materials				
Raw Material - Domestic	-	-	-	-
Raw Material - Domestic - Taxes	-	(+)	(+)	-
Raw Material - Foreign	(-)	-	-	-
Raw Material - Foreign - Duties	-	(+)	(+)	-
Electric Power				
Electricity	-	-	-	-
Electricity - Taxes	-	(+)	(+)	-
Electricity - Government subsidy	-	(-)	(-)	-
Steam	-	-	-	-
Fuel	-	-	-	-
Water	-	-	-	-
Direct Labour				
Foreign Personnel	(-)	-	-	-
Domestic Personnel	-	-	(+)	-
Taxes	-	(+)	(+)	-
Consumable Stores				
Consumable stores - Domestic	-	-	-	-
Consumable Stores - Domestic - Taxes	-	(+)	(+)	-

APPENDIX IV/1

	FE	NN	NG	BE
Consumable Stores - Foreign	(-)	-	-	
Consumable Stores - Foreign - Duties	-	(+)	(+)	-
Repairs and Maintenance				
Maintenance Labour	-	-	(+)	
Maintenance Labour - Taxes	-	(+)	(+)	-
Maintenance Spares - Domestic	-	-	-	-
Maintenance Spares - Domestic - tax	-	(+)	(+)	-
Maintenance Spares - Foreign	(-)	-	-	-
Maintenance Spares - Foreign - Duties	-	(+)	(+)	-
Factory Supervision and Overheads				
Foreign Personnel	(-)	-	-	-
Domestic Personnel	-	-	(+)	-
Taxes	-	(+)	(+)	-
Administrative Overheads				
Foreign Personnel	(-)	-	-	-
Domestic Personnel	-	-	(+)	-
Taxes on Personnel	-	(+)	(+)	-
Supplies and Services - Domestic	-	-	-	-
Insurance	-	-	-	-
Selling Expenses				
Domestic Personnel	-	-	(+)	-
Taxes on Personnel	-	(+)	(+)	-
Packing Material - Domestic	-	-	-	-
Packing Material - Taxes	-	(+)	(+)	-

APPENDIX IV/I

	FE	NN	NG	BE
Interest				
Bank Borrowings - Domestic	-	-	-	-
Medium/Long Term Loans - Domestic	-	-	-	-
Medium/Long Term Loans - Foreign	(-)	-	-	-
Depreciation				
Plant and Machinery	-	(+)	(+)	(+)
Buildings	-	(+)	(+)	(+)
Other assets	-	(+)	(+)	(+)
Production Cost	-	-	-	-
Taxes Sub-Total	-	-	-	-
Production Tax	-	(+)	(+)	-
Sales (Local	-	-	-	-
Sales (Export)	(+)	-	-	-
Profit	-	(+)	(+)	(+)
Company Tax	-	-	-	-
Amortisation of Pre-Operating Expenses	-	(+)	(+)	(+)
Import House Transactions				
CIF Cost	(-)	-	-	-
Customs Dues	-	(+)	(+)	-
Taxes (1)	-	(+)	(+)	-
(2)	-	(+)	(+)	-
(3)	-	(+)	(+)	-
Other Costs	-	-	-	-
Rental - Storage Costs	-	(+)	(+)	-

APPENDIX IV/1

	FR	NN	NG	BE
Importers Labour Cost	-	-	(+)	-
Importers Other Costs	-	-	-	-
Importers Profit	-	(+)	(+)	-

CHAPTER V

CASE STUDY USING SHADOW PRICES, AN ALTERNATIVE TO THE PROJECT AND INTERNAL RATE OF RETURN

In Volume III, a feasibility study prepared by an entrepreneur for a filter manufacturing plant, was taken and critically analysed, as an example of the approach the Government Project Evaluator might have towards studies prepared by others. This same study has been used to provide an example of the application of the method of computing the internal rates of return for the business enterprise, foreign exchange, national gross and national net, leading to a graphical presentation of the effect of variation in the shadow prices of labour and foreign exchange.

Definition of Criteria

All the calculations in this study make use of discounted cash flow techniques, and relate to a period of the past ten years of the life of the project from the date of the first investment. This is an arbitrary period, taken for the purpose of demonstration and a more logical time period would be the expected life of a plant or a period of not less than 15 years, whichever is the shorter.

Discount tables based on the formula $V_{n/r} = (1 + r)^{-n}$, which assumes that the cash flow takes place at the end of each year, have been used in all cases. The validity of this assumption is discussed in Chapter IX of Volume 2..

Four different internal rates of return are derived, to illustrate different ways of looking at the same project. The internal rate of return is the value of discount which over the project life makes the net present value equal to zero.

(1) Business Enterprise Rate of Return

This is the percentage rate of return applied throughout the reference period. in this case 10 years, on the total

value of stocks. They have to make a profit on the money they lend.

The foreign entrepreneur is motivated by profit but it may not be profits arising from the Iranian business but profits arising from the supply of raw materials, components, and know-how, and sometimes profit on the production plant he may supply. The local entrepreneur is motivated by the dividends he hopes to receive and so obtain a return on his investment and ingenuity, without regard to the fact that he may only receive a dividend as a result of tariff protection.

But the Government has a vital and often crucial interest and responsibility both financial and social in all of the capital transactions and in the institutions and nationals committed to them.

The financial obligations of the Government may include:

(1) The provision of finance to the Development Bank in equity participation and/or loans.

(2) A guarantee of repayment of loans from the World Bank.

(3) Direct participation in equity or through a Government agency.

The social obligations will include:

(4) A need to avoid or prevent collapse of the particular industry being established, and the effect of collapse on national and foreign confidence.

(5) A need to protect the local entrepreneur from exploitation by foreign investors.

Economic Project Evaluation

In addition to the interest and responsibility, the Government has in the institutions and persons providing the resources for a new industrial project, it has a related but independent interest in ensuring that the project makes an acceptable contribution to the economy of the country.

resources invested in the business, both equity and loan capital, from the point of view of the business enterprise.

(2) Foreign Exchange Rate of Return

This is the percentage rate of return applied throughout the reference period, on the foreign exchange invested in the business, both equity and loan, based on the foreign exchange flow only. It provides a measure of the generation of foreign exchange.

The calculations adjust for the difference in the flow of foreign exchange of the project as compared with the flow of exchange of the alternative to the project, to arrive at the foreign exchange advantage deriving from the foreign capital invested in the project. In this case, the alternative would be to continue importing the fully manufactured products.

(3) National Gross Rate of Return

This is the percentage rate of return applied throughout he reference period on the total resources invested in the business, from the point of view of the nation. The cash flows taken into account are those normally summated to provide the value added by the project, including all wage and salary payments, but it should be noted that they are related to capital investment and not to the ex-factory price of the product.

In this project, unlike many projects, there is a planned reduction in the retail prices as compared with the previous prices. The price reduction decreases the value added and therefore to show the full benefit of the project to the economy, this difference in price must be added back to the value added.

Identical calculations using three different premium rates for foreign exchangem 1.0, 1.2 and 1.4 provide the co-ordinates

for a graph showing the effect of increased value of foreign exchange on the internal discount rate.

(4) National Net Rate of Return

This is the percentage rate of return applied throughout the reference period on the total resources invested in the nation. The cash flows taken into account are those normally summated to provide the value added excepting that wage and salary payments are not included.

As in the case of the national net rate of return, and adjustment is made for the difference in customer price as between the project and the alternative, and calculations for foreign exchange premium rates of 1.0, 1.2, and 1.4, are made.

The Computations

There are 22 tabulated computations, the first five being derived directly from the feasibility study, and all succeeding computations follow from the first five. The 22 tables are given in the following "List of Projections". The origin of each table is given in the second schedule, and this is followed by a detailed description of each table.

LIST OF PROJECTIONS

Basic Projections

1. Domestic Investment and loan transactions
2. Foreign Investment and loan calculations
3. Analysis of profit and loss statement
4. Transactions of the alternative
5. Adjustment for difference in the selling price under the alternative and the project.

Business Enterprise Projections (B.E.)

6. Computation of the net rate of return to the business enterprise.

Foreign Exchange Projections (F.E.)

7. Difference between foreign exchange flow of the alternative and the project
8. Computation of the net rate of return based on foreign exchange only

Gross National Projections (N.G.)

9. Difference between gross national flow of the alternative and the project adjusted to real terms.
10. Computation of the gross national rate of return, adjusted to real terms.
11. Adjustment of the gross national flow of the alternative for 20% and 40% foreign exchange premium.
12. Adjustment of the gross national flow of the project for 20% and 40% foreign exchange premium adjusted to real terms.

13. Difference between gross national flow of the alternative and the project for 20% and 40% foreign exchange premium.

14. Computation of the gross national rate of return, adjusted to real terms for 20% foreign exchange premium.

15. Computation of the gross national rate of return, adjusted to real terms for 40% foreign exchange premium.

Net National Projections (N.N.)

16. Difference between net national flow of the alternative and the project adjusted to real terms.

17. Computation of the net national rate of return adjusted to real terms

18. Adjustment of the net national flow of the alternative for 20% and 40% foreign exchange premium

19. Adjustment of the net national flow of the project for 20% and 40% foreign exchange premium

20. Difference between net national flow of the alternative and the project for 20% and 40% foreign exchange premium

21. Computation of the net national rate of return, adjusted to real terms for 20% foreign exchange premium

22. Computation of the net national rate of return, adjusted to real terms for 40% foreign exchange premium.

DERIVATION OF TABULATIONS

Table No.	Derived from Table No.
1	Feasibility Study
2	Feasibility Study
3	Feasibility Study
4	Feasibility Study
5	Feasibility Study
6	1, 2, 3
7	2, 3, 4
8	7
9	1, 2, 3, 4, 5
10	9
11	4
12	1, 2, 3, 5
13	11, 12
14	12
15	13
16	1, 2, 3, 4, 5
17	16
18	4
19	1, 2, 3, 5
20	18, 19
21	20
22	20

Table 1 - Domestic Investment and Loan Transactions

The Domestic Investment Projection (Table 1) and the Foreign Investment Projection (Table 2), record all cash flows other than those recorded in the Profit and Loss Statement (Table 3).

As the title of Table 1 implies, it is a projection of domestic investment, and since production is planned to start in 1352, most of the investment takes place in the two years preceding commencement of operations, while installation is proceeding. It is important to estimate closely at what dates the various expenditures will be made, and it is helpful to prepare a capital cash flow statement on a quarterly basis covering the pre-production period. The expenditures in columns 1 and 2 would then be spread over 8 columns each representing a period of 3 months, although the total would remain the same.

The total domestic investment figures are deducted from the feasibility study as set out in Volume III, "Critical Analysis of a Feasibility Study", and these were allocated over the years 1350 and 1351 on an estimated basis.

The expenditure on land is an expense to the business enterprise but from a national viewpoint it is not an input.

The investment in working capital starts in late 1351, when raw materials are arriving on site in readiness for production, and continues to build up in the following year. Although 1352 is an operating year, there is an increase in the investment in stocks which is not reflected in the Profit and Loss Statement (Table 3). The investment in working capital made during 1351 and 1352 is 11.1 million Rials (foreign) and 16.9 million Rials (domestic), a total of 30.3 million Rials, and the total figure is derived from the "Table of Working Capital Calculations" on page 8 of Volume III, "Critical Analysis of a Feasibility Study". The commercial banks are providing 17.3 millions and 5.6 million Rials is available from the capital account, that is 22.9 million Rials total

and the balance of 7.4 million Rials is from cash accumulation. The proportioning of this amount between domestic and foreign expenditure (Tables 1 and 2) is based on the ratios established from the feasibility study, and the amount for 1351 is based on the stock of raw materials only. The figures for working capital in Table 1 are in error, the correct figures being shown on page 53 a but the error makes little difference to the subsequent calculations.

Although there is an increase in the working capital in 1353, 1354, and 1355, this is met from internally generated funds and is therefore accounted for in the Profit and Loss Statement.

Short term domestic credits are considered to be a capital investment, and repayments are shown only for reconciliation with the cash flow in the feasibility study, because their accumulation is provided for in the Profit and Loss Statement.

It is necessary to allocate the equity and loan funds to expenditures because, in the calculations for the business enterprise, loans are considered as neutral as distinct from the other three calculations. Long term loans which usually carry a charge on the fixed assets are assumed to contribute to the cost of fixed assets, the balance being made up from equity capital. If after meeting the cost of fixed assets and pre-production expenses there remains an unspent balance of equity capital, this is assumed to be used as working capital. Short term bank credits are normally intended to contribute part of the working capital, which in this study is part foreign and part domestic.

The reconciliation of the working capital figures in Table 1 and Table 2 with the working capital calculations on page 8 of Volume III, "Critical Analysis of a Feasibility Study" is given below:

		1351	1352	Total
Equity				
Domestic		5.6	-	5.6
Foreign		-	-	-
Commercial Bank Loan				
Domestic		2.6	3.6	6.2
Foreign		5.2	5.9	11.1
	Total	7.8	9.5	17.3
Grand Total		13.4	9.5	22.9
Add cash accumulation				7.4
Total Working Capital				30.3

Each expenditure is identified in the four columns, headed FE, NN, NG and BE, indicating whether it is treated as an input (-), and output (+), or neutral, -, in each case.

The expenditures are then summated on a year by year basis, including or excluding the individual expenditures, as identified in the four columns, to provide the cash flow relative to FE, NN, NG and BE.

Table 2 - Foreign Investment and Loan Transactions

The foreign investment projection is constructed in a similar manner to Table 1.

The expenditures on fixed assets and pre-production expenses do not need further explanation, but some problems may arise on the working capital estimates and the repayment of loans.

As with Table 1, the working capital expenditures are in error but not sufficient to materially affect the subsequent calculations. They are derived and reconciled as set out under the explanation of Table 1, and page 53 b.

Because the foreign expenditure calculation is concerned only with the flow of foreign funds it is necessary to account for repayments of foreign loans, - the loans themselves having been absorbed during the years shown.

There is an increase in the foreign short term loan for 1353 of 2.6 million Rials and for 1354 an amount of 1.2 million Rials to cover increased investment in the working capital. The 1352 investment was 11.1 million Rials, and if 2.6 is added, this gives the 1353 investment of 13.7 and in 1354 it rises to 14.8. These figures reconcile with the working capital calculations on page 9 of Volume III, "Critical Analysis of a Feasibility Study".

Repayment of the short term credit does not agree with the cash flow of the feasibility study, because it is not correct to provide for the abolition of credit provided by the suppliers of goods, as explained on page 6 of Volume III. The repayment of both foreign and domestic short term loans included in Tables 1 and 2 is compatible with the rate of repayment provided for in the feasibility study cash flow.

Repayment of the long term loan which was provided mainly to purchase foreign machinery, conforms with the repayment schedule of the feasibility study cash flow.

Table 3 - Analysis of Profit and Loss Statement

The format of Table 3 is designed to adapt the normal profit and loss statement provided in a feasibility study to the required analysis.

The individual and total figures set out in the feasibility study have been accepted with only minor modifications, and the subtotals of Table 3 agree with the feasibility study. For example the cost of raw materials as given in the feasibility study in 1352 is 35.4 million Rials, and in Table 3, this figure has been broken down into, domestic expenditure including internal transport on foreign materials, the cost of foreign imported materials and duty on imported materials. Under 'Personnel', tax on salaries has not been considered worth while separating out, and no provision is made for foreign personnel.

The figures for Spares and Repairs in the feasibility study have been divided into domestic and imported in proportion to the domestic and foreign investment in plant, and duty on the imported spares, not included in the feasibility study, has been added.

Factory overheads in the feasibility study are considered to be mainly consumable stores, and these have been divided into imported and domestic in proportion to the material imports, and duty on the imported stores, not included in the feasibility study, has been added.

Depreciation has been adjusted from 2.3 million to 2.0 million in line with the recommended rates set out on page 15 of Volume III, and to include depreciation on the contingencies.

The figures in the feasibility study for administration, and selling and advertising, have been retained in total but re-allocated in Table 3 to personnel, Benefits, and Supplies and Services (advertising etc.). Royalty figures remain unchanged.

Interest is assumed to be paid during the financial year that it is accrued, but interest for 1350 and 1351 has been spread

Resources, both domestic and foreign are not inexhaustible, and must be used to the best advantage of the people of a country. This is a social obligation which is not the main motivation of any of those directly concerned with supplying the financial resources for the project.

In discharging this obligation, the Government seeks criteria on which to assess the contribution a project is likely to make to the economy of the country, and the techniques of economic project evaluation have been developed and are continually being refined to further this objective.

In many cases, the criteria seeks to establish a basis for a decision on whether the contribution of a project to the economy is such that it should or should not proceed, but in other cases it may be necessary to assess whether one alternative is better than another.

The financial characteristics of the project are used to derive one or more ratios or indices to indicate the contribution of the project to the economy. These ratios may be simple and in respect of one economic factor only or may be sophisticated and endeavour to combine most relevant factors in a single index. The ratios may relate to the situation in one particular year, and to these the term 'static ratios' has been applied, or they may take into account the whole life of the project using discounting techniques, and in this case the ratios have been termed 'dynamic'.

A feasibility study may not have been prepared in detail, and in that case, the information required to arrive at the desired evaluation criteria must be elicited directly by the Government, from the entrepreneurs.

If a Development Bank has considered the project, it will have been subject to rigorous financial and market checks, but the bank appraisal which endeavours to be less optimistic than the entrepreneurs study, is confidential and will not be reflected in the entrepreneur's feasibility study.

over subsequent years in the feasibility study. Interest calculations can only be approximate unless the precise terms of repayment are known, and the figures given in Table 3 are a reasonable estimate of the domestic and foreign components.

Amortisation of pre-operating expenses has been reduced by 1.1 million due to the treatment of contingencies as a capital investment and therefore included in the depreciation.

In each of the four columns FE, NN, NG and BE only those items which contribute directly have been summated. The BE calculation has only three items contributing to the surplus, profit, depreciation and amortization, while the FE, column includes only those payments being made overseas. The NG column is identical to the NN column except that the NG column includes the cost of labour as a gain to the economy.

Table 4 - Transactions of the Alternative

The alternative to setting up the new factory is considered to be a continuation of the existing arrangements under which the filters are imported fully assembled into Iran. The filters are imported by import/wholesale organisations, who pay the import duty, and sell wholesale to retailers at a profit, and the retailer stocks and sells retail at a profit to the end user.

The cif cost, the wholesale price and the retail price, all estimated unit averages, were deduced in Volume III, based on Annex 18 of the feasibility study. As indicated in Volume III, had more detailed information been included in the feasibility study, actual average prices could have been used. Importers profit and retailers profit are deduced by estimating labour and other costs.

Close attention is required to the preparation of Table 4, since labour and other costs have to be ascertained. Further it should be established whether importers operate partially on loan capital, and the extent of capital invested in fixed assets.

During the construction years, it is assumed that imports of fully assembled filters would be the same for the project as for the alternative and may therefore be ignored.

Table 5 - Adjustment for Difference in the Selling Price under the Alternative and the Project

The price of imported filters to the end user is considerably more than the estimated retail price of filters it is planned to produce under the project. It should be noted, however, that the project does not propose to sell through wholesalers, and therefore particular attention should be given to the provision of capital to hold adequate stocks at the factory. Actually provision is made to hold in stock, sufficient filters to meet two months demand which should be adequate.

The annual unit sales are taken from the feasibility study, and the retail prices are estimated in Volume III.

The calculation of the annual difference in the sales revenue, is essential to arrive at a real assessment of the value of the project to the economy.

Table 6 - Computation of the Net Rate of Return in the Business Enterprise

The expenditure flow is derived from Tables 1, 2 and 3. In the first two years, the flow is the summation of the figures of Tables 1, 2, and 3 and for subsequent years the flow comes from Table 3 alone. The annual cash flows are discounted for time and the internal rate of discount interpolated.

Table 7 - Difference Between Foreign Exchange Flow of the Alternative and the Project

Table 7 brings together the flow of foreign exchange as calculated for the project in Tables 2 and 3, and for the alternative in Table 4. The flow of the alternative in years 1 and 2 during the construction period, when normal imports would continue, is

assumed to be equal to the flow of imports to be accounted for in the project calculation, and both may be ignored. Because it is the difference being calculated, it is important that the cash flows carry the correct sign, + or -.

Table 8 - Computation of the Net Rate of Return Based on Foreign Exchange Only

Table 8 follows directly from Table 7, and discounts the difference between the foreign exchange cash flow of the project and the alternative, over time, to provide the internal rate of discount.

A very good saving in foreign exchange results from a relatively low investment in foreign plant and materials.

Table 9 - Difference Between Gross National Flow of the Alternative and the Project Adjusted to Real Terms

In the case of the return to the business enterprise (Table 6) and in the case of the return based on foreign exchange (Table 8), the difference between the retail price of the imported article and the price of the domestically produced article, was not relevant. However, from the national viewpoint this difference must be taken into account, and Table 9 does this after first calculating the difference between the flow of the alternative and the project. Table 9 is derived from Tables 1, 2, 3, 4 and 5. Column 2 comes from Table 4, column 3 from Tables 1, 2, and 3, and column 4 from Table 5.

Table 10 - Computation of the Gross National Rate of Return Adjusted to Real Terms

Table 10 follows directly from Table 9 and discounts the difference between the cash flow of the project and the alternative, adjusted for the retail price difference, to provide the internal rate of discount.

This provides the co-ordinates for the first point on the relative curve, in which the foreign exchange transactions are included at their market value.

Table 11 - Adjustment of the Gross National Flow of the Alternative for 20% and 40% Foreign Exchange Premium

In this table the gross national cash flow of the alternative is assumed to be adjusted by reason of the payment of a premium of 20% and 40% on the foreign exchange component. In the case of the alternative all foreign exchange flows are inputs and therefore negative, and a premium thus reduces the flow to the economy.

Column 2, 3 & 4 derive directly from Table 4.

Table 12 - Adjustment of the Gross National Flow of the Project for 20% and 40% Foreign Exchange Premium Adjusted to Real Terms

In this table the gross national cash flow of the project is assumed to be adjusted by reason of the payment of a premium of 20% and 40% on the foreign exchange component. In the case of the project the net flow of foreign exchange is negative in each year and a foreign exchange premium reduces the flow to the economy.

Columns 2 and 3 derive from Table 1, 2, and 3, and Column 4, which adjusts for the difference in the retail price of the imported article and the domestically produced article, derives from Table 5.

Table 13 - Difference Between Gross National Flow of the Alternative and the Project for 20% and 40% Foreign Exchange Premium

This table brings together columns 5 and 6 of Table 11 and columns 5 and 6 of Table 12 to provide the difference between the project flow and the alternative flow.

Table 14 - Computation of the Gross National Rate of Return Adjusted to Real Terms for 20% Foreign Exchange Premium

In this table the flows in column 4 of Table 13, are discounted and interpolated, and this provides the second point on the gross national curve.

Table 15 - Computation of the Gross National Rate of Return, Adjusted to Real Terms for 40%, Foreign Exchange Premium

In this table the flows in column 7 of Table 12, are discounted and interpolated, and this provides the third point on the gross national curve.

Table 16 - Difference Between Net National Flow of the Alternative and the Project Adjusted to Real Terms

Column 2 derives from Table 4, column 3 from Tables 1, 2, and 3, and column 5 from Table 5. The difference between the flow of alternative and the project is first calculated and this is then adjusted for the difference in the price of the imported article and the domestically produced article.

This table is comparable with Table 9, but it relates to the net national flow.

Table 17 - Computation of the Net National Rate of Return Adjusted to Real Terms

This table derives directly from Table 16, discounting the flow and interpolating to calculate the internal discount rate.

This provides the co-ordinates for the first point on the relative curve, in which the foreign exchange transactions are included at their market value.

Table 18 - Adjustment for the Net National Flow of the Alternative for 20%, and 40% Foreign Exchange Premium

This table is comparable with Table 11 but it relates to the net national flow.

The net national flow of the alternative is assumed to be adjusted by reason of the payment of a premium of 20% and 40% on the foreign exchange components. The flow of foreign exchange is negative and a foreign exchange premium reduces the flow to the economy.

Column 2 derives from Table 4.

Table 19 - Adjustment of the Net National Flow of the Project for 20% and 40% Foreign Exchange Premium Adjusted to Real Terms

This table is comparable with Table 12 but it relates to the net national flow.

The net national flow of the project, is assumed to be adjusted by reason of the payment of a premium of 20% and 40% on the foreign exchange component. All the foreign exchange flows are negative and a premium reduces the flow to the economy.

Columns 2 and 3 derive from Tables 1, 2 and 3, and column 4, which adjusts the difference in the retail price of the imported article and the domestically produced article, derives from Table 5.

Table 20 - Difference Between Net National Flow of the Alternative and the Project for 20% and 40% Foreign Exchange Premium

This table is comparable with Table 13 but it relates to net national flow.

It brings together columns 5 and 6 of Table 18 and columns 5 and 6 of Table 19 to provide the difference between the project flow and the alternative flow.

Table 21 - Computation of the Net National Rate of Return Adjusted to Real Terms for 20% Foreign Exchange Premium

This table follows directly from column 4 of Table 20, and it discounts the cash flow and interpolates the internal discount rate. This provides the second point on the net national curve.

Table 22 - Computation of the Net National Rate of Return Adjusted in Real Terms for 40% Foreign Exchange Premium

In this table the cash flows in column 7 Table 20 are discounted and interpolated, providing the third point on the net national curve.

SUMMARY OF COMPUTATIONS

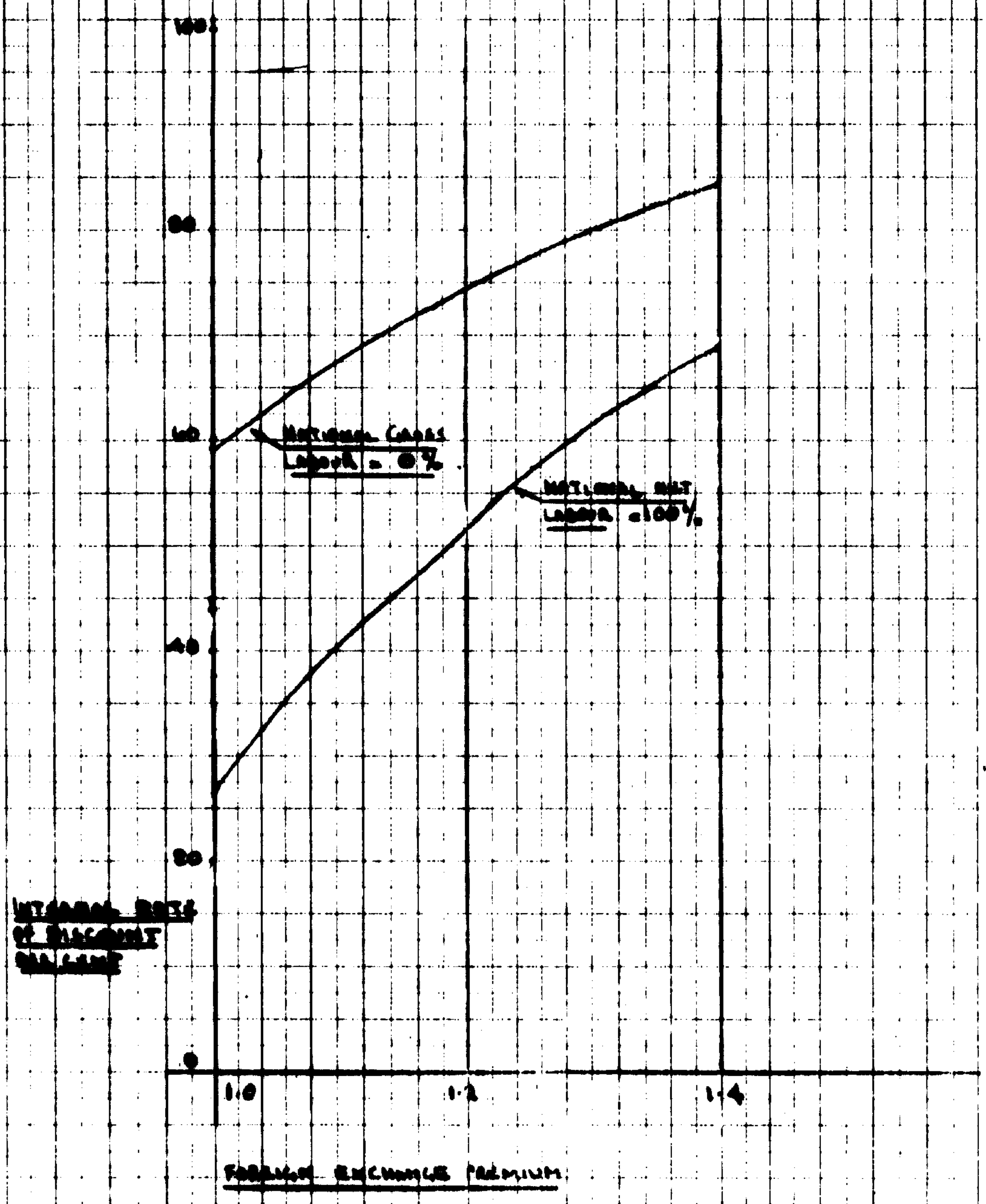
1. Tabulated internal discount rates together with curves showing relationship between national gross and national net discount rates against increased foreign exchange premiums.

2. Calculation of value added on the basis of Ministry of Economy formula.

3. Calculation of financial ratios at fifth year of operation.

	FEP		
	1.0	1.2	1.4
NATIONAL GROSS	59.3	74.5	[illegible]
NATIONAL NET	26.3	51.6	[illegible]
FOREIGN EXCHANGE	99+	–	–
BUSINESS	44.0	–	–

FILTER MANUFACTURING PROJECT – [illegible]



Calculation of Value Added on the Basis of Ministry of Economy Formula in Fifth Year of Operation

$$\text{Value Added} = \left[\begin{array}{c}\text{Total production cost} \\ + \text{Profit}\end{array}\right] - \left[\begin{array}{c}\text{Raw materials and components}\end{array}\right] - \left[\text{Tax}\right] - \left[\begin{array}{c}\text{Consumable Stores}\end{array}\right] - \left[\begin{array}{c}\text{Water Elect. Fuel}\end{array}\right]$$

$$= \left\{ 81.7 - 42.0 - 5.6 - 1.5 - 3.6 \right.$$

$$= 29.0$$

$$\% \text{ Value Added} = \frac{100 \times \left[\text{Value Added}\right]}{\left[\begin{array}{c}\text{Production Cost}\end{array}\right] + \left[\begin{array}{c}\text{Profit on the basis of 20\% of equity capital}\end{array}\right]}$$

$$= \frac{100 \times 29.0}{81.7 + 1.5}$$

$$= 34.8\%$$

The feasibility study must undergo a competent "screening" and adjustments made before it may be used as a basis for economic evaluation.

The Government's economic evaluation of the project is seen to be one part, albeit a very important part, of a group of studies, which is dependent on the thoroughness and accuracy of the feasibility study.

Calculation of Financial Ratios at Fifth Year of Operation

a. % Return of Sales = $\frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$

= $\frac{22.0}{103.7} \times 100$

= **21.2%**

b. % Return of Equity = $\frac{\text{Operating Profit}}{\text{Equity Capital}} \times 100$

= $\frac{22.0}{15.0} \times 100$

= **146%**

c. Profit before interest to total capital employed =

Operating Profit before interest		23.9
Share capital	15.0	
Add Reserves	59.8	
	74.8	
Less Intangible Assets	.1	
	74.7	
Plus Loan Capital	5.0	
	79.7	

% Profit to Capital Employed = $100 \times \frac{23.9}{79.7}$ = 30%

d. Saving of Foreign Exchange per unit of Foreign Exchange Invested = $\frac{\text{Foreign Exchange Saved} \times 100}{\text{Investment in Foreign Fixed Assets}}$

= $\frac{89.5 \times 100}{12.07}$

= **741.5%**

Notes on Working Capital Figures in Tables 1 and 2

The working capital calculations set out in Volume III differ slightly from those presented in Tables 1 and 2, but it is not a significant difference and the subsequent calculations would show only minor changes.

For the purpose of exposition, the relative parts of Tables 1 and 2 are modified below to agree with the working capital calculations in Volume III.

Table 1	'000 Rls.	1350	1351	1352	1353
Investment in Working Capital					
(1) Shareholders Funds	5,600		5.6		
(2) Short Term Credit	6,200		2.6	3.6	
(3) Taxes on imported supplies					
Totals					
FE		-	-	-	-
NN		-5.0	-14.9	-3.6	-
NG		-5.0	-14.9	-3.6	-
BE		-5.0	-12.3	0	-

Table 2

'000 Rls	1350	1351	1352	1353	1354	1355	1356	1357
Investment in Working Capital								
(1) Shareholders Funds								
(2) Short Term Credit	11,100		5.2	5.9				
Repayment of long term loan					1.0	1.0	4.0	4.0	5.0
Repayment of short term loan						.6	5.1	5.1	.3
Totals								
FE		-2.5	-14.7	-5.9	-1.6	+ .5	+9.1	+9.1	+5.3
NN		-2.5	-14.7	-5.9	-	-	-	-	-
NG		-2.5	-14.7	-5.9	-	-	-	-	-
BE		-2.5	- 9.5	-	-	-	-	-	-

TABLE 1

DOMESTIC INVESTMENT AND LOAN TRANSACTIONS

	'000 Rials	FE	BR	NG	DE	INSTALLATION Million Rials 1 1350	2 [illegible]	OPERATIONS Million Rials 3 [illegible]732	4 [illegible]733	5 [illegible]734	7 [illegible]735	7 [illegible]736	8 [illegible]737	9 [illegible]738	10 [illegible]739	11 [illegible]740
Land	800	-	-	-	(-)	.8	-									
Site Improvements	500	-	(-)	(-)	(-)	.5	-									
Buildings	4000	-	(-)	(-)	(-)	3.1	7.6									
Machinery & Equipment	(1300 (3870 (800	-	(-)	(-)	(-)	1.1	4.3									
Installation of Domestic Machinery & Equipment	336	-	(-)	(-)	(-)	.1	.2									
Erection Expenses		-	-													
Pre-Operation Expenses	130	-	(-)	(-)	(-)	.1	.1									
Inland Freight	-	-														
Inland Insurance	-	-														
Contingencies	630	-	(-)	(-)	(-)	.1	.2									
Investment in Working Capital		-														
(1) Shareholders Funds	4000	-	(-)	(-)	(-)		[illegible]	-								
(2) Short term credit	5600	-	(-)	(-)	(-)			4.5								
(3) Taxes on imported supplies	900	-	(-)	(-)	(-)			[illegible]	[illegible]							
Repayment of Short Term Credit		-	-	-	-					+1.0	+4.6					
	23532					[illegible]	[illegible]	[illegible]								

FE	-		-
BR	[illegible]	[illegible]	-4.7
NG	-3.[illegible]	-13.[illegible]	-4.7
DE	-5.[illegible]	12.[illegible]	-0.2

* Included in Profit and Loss Statement

TABLE 2

FOREIGN INVESTMENT AND LOAN TRANSACTIONS

	'000 Rials	FE	BB	BG	BE	INSTALLATION Million Rials		OPERATIONS Million Rials								
						1 1389	2 1390	3 1391	4 1392	5 1393	6 1394	7 1395	8 1396	9 1397	10 1398	11 1399
Equipment	8855	(-)	(-)	(-)	(-)	1.7	6.4									
Freight, Handling, Bank Charges	1847	(-)	(-)	(-)	(-)	.1	.8									
Installation of Foreign Machinery & Equipment	937	(-)	(-)	(-)	(-)	.2	.7									
Engineering Fee	1180	(-)	(-)	(-)	(-)	.2	.9									
Erection Expenses	-															
Pre-Operation Expenses	412	(-)	(-)	(-)	(-)	.2	.2									
Inland Freight	-															
Inland Insurance	-															
Contingencies	517	(-)	(-)	(-)	(-)	.1	.4									
Investment in Working Capital																
(1) Shareholders Funds																
a. Raw Materials & Finished goods	-															
(2) Short Term Credit	11700	(-)	(-)	(-)	-		8.6	3.1	2.3*	1.3*						
Repayment of long term loan		(+)	-	-	-	(-4.0)	(-11.0)		+1.0	+1.0	+2.0	+2.0	+2.0	-	-	-
Repayment of short term loan		(+)	-	-	-					+3.0	+8.0	+ .3				
	25700					2.5	10.1	3.1								
	FE					-2.5	-10.0	-3.1	-1.3	+3.3	+10.0	+4.3	+2.0	-	-	-
	BB					-2.5	-10.0	-3.1	-	-	-	-	-	-	-	-
	BG					-2.5	-10.0	-3.1	-	-	-	-	-	-	-	-
	BE					-2.5	-10.2	-	-	-	-	-	-	-	-	-

* Only relate to BE calculations due to increase in profit & loss statement

TABLE 3

ANALYSIS OF PROFIT AND LOSS STATEMENT

FE	MM	MG	BE	Cost of Production	1 1980	2 1981	3 1982	4 1983	5 1984	6 1985	7 1986	8 1987	Remarks 9 1988	10 1989	11 1990
				RAW MATERIALS											
-	-	-	-	- Domestic (Includes Internal Transport on foreign materials)			17.8	20.2	23.7	25.7	25.7	25.7	25.7	25.7	25.7
-	(-)	(-)	-	- Taxes			-	-	-	-	-	-	-	-	-
-	-	-	-	- Foreign			13.7	15.6	18.3	19.3	19.3	19.3	19.3	19.3	19.3
-	(-)	(-)	-	- Duty - (28.6%)			3.8	4.4	5.2	5.2	5.2	5.2	5.2	5.2	5.2
				PERSONNEL											
-	(-)	(-)	-	- Domestic - Salaries			5.7	5.6	6.4	6.4	6.4	6.4	6.4	6.4	6.4
-	-	(-)	-	- Domestic - Benefits			2.8	2.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0
-	(-)	(-)	-	- Taxes (25% on basic pay of production workers)			-	-	-	-	-	-	-	-	-
(-)	-	-	-	- Foreign			-	-	-	-	-	-	-	-	-
				MAINTENANCE											
-	-	(-)	-	- Labour			-	-	-	-	-	-	-	-	-
-	(-)	(-)	-	- Taxes			-	-	-	-	-	-	-	-	-
(-)	-	-	-	- Imported Spares			.6	.7	.7	.7	.7	.7	.7	.7	.7
-	(-)	(-)	-	- Duty on U.S. (28.5%)			.2	.2	.2	.2	.2	.2	.2	.2	.2
-	-	-	-	- Domestic Spares			.4	.4	.5	.5	.5	.5	.5	.5	.5
-	(-)	(-)	-	- Tax on U.S.			-	-	-	-	-	-	-	-	-
				UTILITIES											
-	-	-	-	- Electricity											
-	-	-	-	- Water			2.9	3.2	3.6	3.6	3.6	3.6	3.6	3.6	3.6
-	-	-	-	- Gas											
-	-	-	-	- Domestic Consumable stores			.6	.5	.7	.7	.7	.7	.7	.7	.7
-	(-)	(-)	-	- Taxes			-	-	-	-	-	-	-	-	-
(-)	-	-	-	- Imported Consumable stores			.5	.6	.8	.8	.8	.8	.8	.8	.8
-	(-)	(-)	-	- Duty (28.5%)			.1	.2	.2	.2	.2	.2	.2	.2	.2
				OPERATING EXPENSES											
-	-	(-)	-	- Personnel (Admin Sales)			4.8	5.1	6.4	6.4	6.4	6.4	6.4	6.4	6.4
-	-	(-)	-	- Benefits			1.5	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
-	-	-	-	- Supplies & Services (Advertising Etc.)			3.4	3.6	3.0	3.1	3.1	3.1	3.1	3.1	3.1
-	(-)	(-)	(-)	- Depreciation			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
(-)	-	-	-	- Royalty			2.8	2.6	3.0	3.1	3.1	3.1	3.1	3.1	3.1
-	-	-	-	- Total operating expenses			62.5	68.5	79.7	79.7	79.7	79.7	79.7	79.7	79.7
-	-	-	-	- (Increase) decrease in finished goods stock			(8.5)	(1.0)	(1.3)	-	-	-	-	-	-
-	-	-	-	COST OF PRODUCTION											
				Total Operating Cost			54.0	66.5	78.4	79.7	79.7	79.7	79.7	79.7	79.7
-	-	-	-	Taxes Subtotal			4.2	4.8	5.6	5.6	5.6	5.6	5.6	5.6	5.6
				NON-OPERATING EXPENSES											
-	-	-	-	- Interest - Domestic			2.3	2.8	1.9	1.6	1.1	1.1	-	-	-
(-)	-	-	-	- Foreign			2.4	2.7	2.6	1.4	.8	.5	-	-	-
-	-	-	-	- Amortization of pre-operating expenses - local			.1	.1	.1	.1	.1	.1	-	-	-
				- Foreign			.1	.1	.1	.1	-	-	-	-	-
-	-	-	-	Total Cost			58.9	73.4	83.1	88.2	81.7	81.4	79.7	79.7	79.1
-	-	-	-	Sales			65.0	86.0	108.0	108.7	108.7	108.7	108.7	108.7	108.7
-	(-)	(-)	(-)	Profit (Loss)			6.1	12.6	16.9	20.5	28.0	28.3	24.0	24.0	24.0
-	-	-	-	Corporation Tax			-	-	-	-	-	5.8	6.2	6.2	6.2
					FE		-19.2	-22.2	-25.4	-26.3	-23.7	-23.4	-28.6	-28.0	-28.0
					MM		+12.3	+19.4	+24.5	+28.1	+28.6	+28.0	+31.6	+31.6	+31.6
					MG		+26.8	+34.7	+42.3	+45.6	+47.4	+47.7	+49.4	+49.4	+49.4
					BE		+ 8.1	+14.6	+18.9	+22.5	+24.0	+24.3	+25.0	+25.0	+25.0

TABLE 4

TRANSACTIONS OF THE ALTERNATIVE

FE	NN	NG	BE	Unit Price (Rs)	Units Sold	1352 1250	1353 1670	1354 Onwards 1950	1355 Onwards 2000
(-)	-	-	-	54.4	CIF Cost (1)	68.0	90.8	106.1	108.9
-	(+)	(+)	-	19.6	Import Duty (2)	24.5	32.7	38.2	39.2
-	-	-	-	.2	Importers Costs	.2	.3	.4	.4
-	-	-	-	.3	Importers other Expenses	.4	.5	.6	.8
-	(+)	(+)	-	10.3	Importers Profit	12.9	17.2	20.1	20.6
-	-	-	-	84.8	Wholesale Price(3)	108.0	141.5	165.4	169.7
-	-	(+)	-	.4	Retailers Labour	.5	.7	.8	.8
-	-	-	-	.6	Retailers Other Expenses	.7	1.1	1.2	1.2
-	(+)	(+)	-	15.3	Retailers Profit	19.1	25.6	29.8	30.6
-	-	-	-	101.1	Retail Price (4)	128.3	168.9	197.2	202.3

(1)	From Annex 18	FE	-68.0	-90.8	-106.1	-108.9
(2)	Tax 36%	NN	+56.5	+75.5	+ 88.1	+ 90.4
(3)	Proportioned Price	NG	+57.0	+76.2	+ 88.9	+ 91.2
(4)	Proportioned Price	BE	-	-	-	-

TABLE 5

ADJUSTMENT FOR DIFFERENCE IN THE SELLING PRICE UNDER THE ALTERNATIVE AND THE PROJECT

	1352	1353	1354	1355 Onwards
Units Sold	1250	1670	1950	2000
Project Retail unit price	58.8	58.8	58.8	58.8
Project retail sales revenue	72.5	96.2	114.7	117.6
Alternative retail unit price	101.1	101.1	101.1	101.1
Alternative retail sales revenue	126.3	168.9	197.2	202.3
Difference	+52.8	+70.7	+82.5	+84.7

TABLE 6

COMPUTATION OF THE NET RATE OF RETURN IN THE BUSINESS ENTERPRISE

Year	Expenditure Flow (Mill. Rials)	Discount Factors for 45%	Discounted Flow at 45% (Mill. Rials)	Discount Factors for 40%	Discounted Flow at 40% (Mill. Rials)
1	- 8.3	.690	- 5.73	.714	- 5.93
2	-22.2	.476	-10.57	.510	-11.32
3	+ 7.9	.328	+ 2.59	.364	+ 2.88
4	+14.8	.226	+ 3.30	.260	+ 3.80
5	+18.9	.156	+ 2.95	.186	+ 3.52
6	+23.5	.106	+ 2.39	.133	+ 3.00
7	+24.0	.074	+ 1.78	.093	+ 2.28
8	+24.3	.051	+ 1.24	.068	+ 1.65
9	+26.0	.035	+ .91	.048	+ 1.25
10	+26.0	.024	+ .62	.035	+ .91
			-16.30		-17.25
			+15.78		+19.29
			- .52		+ 2.04

$$40 + \left(\frac{2.04}{2.56} \times 5\right) = 43.98\%$$

TABLE 7

DIFFERENCE BETWEEN FOREIGN EXCHANGE FLOW OF THE ALTERNATIVE AND THE PROJECT

Year	Expenditure flow - million Rials		
	Alternative	Project	Difference
1		- 2.5	- 2.3
2		-18.8	-18.8
3	68.0	-19.2 - 3.1	+45.7
4	90.8	-22.2 - 1.5	+87.1
5	106.1	-25.4 + 3.3	+84.0
6	108.9	-24.3 +12.0	+96.6
7	108.9	-23.7 + 4.3	+89.5
8	108.9	-23.4 + 5.0	+90.5
9	108.9	-22.9	+86.0
10	108.9	-22.9	+86.0

CHAPTER II

ECONOMIC CRITERIA

Criteria for assessing the contribution to be made by a project to the national economy are established to implement national objectives.

National Objectives

The definition of national objectives is a political policy decision, [illegible] objectives will change as an economy develops. Within the objective of creating an industrial economy the constraints are or might be:-

1) The availability of foreign capital
2) The availability of domestic capital
3) The availability of labour
4) The extent to which immediate benefits are to be preferred over benefits deriving in the future.
5) The creation of an equitable income distribution
6) The creation of a complete spectrum of skills necessary to sustain an industrial economy.

All of these constraints may have current importance and the relative effect or contribution of an individual project must be measured in the most meaningful way, if the national objectives are to be implemented at project level. The creation of an equitable distribution of income in the earlier stages of industrial development is in opposition to the need to create surpluses for re-investment. However, the social implications of a prolonged regression in income distribution could eventually force a re-distribution. Although, like all national objectives, income distribution policy is a political decision, the project evaluator should develop a way to relate the contribution each project is making, positive or negative, to the national distribution of income.

TABLE 8

COMPUTATION OF THE RATE OF RETURN ON FOREIGN EXCHANGE ONLY

Year	Difference in flow of expenditure (Mill. Rials)	Discount Factors for 99%	Discounted Flow at 99% (Mill. Rials)	Discount Factors for %	Discounted Flow at % (Mill. Rials)
1	- 2.5	.503	- 1.26		
2	-16.8	.253	- 6.50		
3	+45.7	.127	+ 5.80		
4	+67.1	.064	+ 4.29		
5	+84.0	.032	+ 2.69		
6	+96.6	.016	+ 1.55		
7	+89.5	.008	+ .72		
8	+90.5	.004	+ .36		
9	+86.0	.002	+ .17		
10	+66.0	.001	+ .09		
			- 7.76		
			+15.67		
			+ 7.91		

The Internal Discount Rate Exceeds 99%

TABLE 9

DIFFERENCE BETWEEN GROSS NATIONAL FLOW OF THE ALTERNATIVE AND THE PROJECT ADJUSTED TO REAL TERMS

Year	Expenditure Flow - Million Rials			Adjustment To Real Terms (Mill. Rials)	Adjusted Flow (Mill. Rials)
	Alternative (Mill. Rials)	Project (Mill. Rials)	Difference (Mill. Rials)		
1		- 8.3	- 8.3		- 8.3
2		-31.9	-31.9		-31.9
3	+57.0	- 7.8 +26.9	-37.9	+52.8	+14.9
4	+76.2	+34.7	-41.5	+70.7	+29.2
5	+88.9	+42.3	-46.6	+82.5	+35.9
6	+91.2	+45.9	-45.3	+84.7	+39.4
7	+91.2	+47.4	-43.8	+84.7	+40.9
8	+91.2	+47.7	-43.5	+84.7	+41.2
9	+91.2	+49.4	-41.8	+84.7	+42.9
10	+91.2	+49.4	-41.8	+84.7	+42.9

TABLE 10

COMPUTATION OF THE GROSS NATIONAL RATE OF RETURN ADJUSTED TO REAL TERMS

Year	Difference in flow of Expenditure (Mill. Rials)	Discount Factors for 55%	Discounted Flow at 55% (Mill. Rials)	Discount Factors for 60%	Discounted Flow at 60% (Mill. Rials)
1	- 8.3	.645	- 5.35	.625	- 5.19
2	-31.9	.416	-13.27	.391	-12.47
3	+14.9	.269	+ 4.01	.244	+ 3.64
4	+29.2	.173	+ 5.05	.153	+ 4.47
5	+35.9	.112	+ 4.02	.095	+ 3.41
6	+39.4	.072	+ 2.84	.060	+ 2.36
7	+40.9	.047	+ 1.92	.037	+ 1.51
8	+41.2	.030	+ 1.24	.023	+ .95
9	+42.9	.019	+ .82	.015	+ .64
10	+43.9	.013	+ .51	.009	+ .39
			-18.62		-17.66
			+20.41		+17.37
			+ 1.79		- .29

$$55 + \left(\frac{1.79}{2.08} \times 5\right) = 59.30\ \%$$

TABLE 11

ADJUSTMENT OF THE GROSS NATIONAL FLOW OF THE ALTERNATIVE FOR 20% AND 40% FOREIGN EXCHANGE PREMIUM

Year	Flow (Mill. Rials)	20% FE Premium (Mill. Rials)	40% FE Premium (Mill. Rials)	Adjusted Flow for 20% Prem. (Mill. Rials)	Adjusted Flow for 45% Prem. (Mill. Rials)
1					
2					
3	+ 57.0	- 13.6	- 27.2	+ 43.4	+ 29.8
4	+ 76.2	- 18.2	- 36.4	+ 58.0	+ 39.8
5	+ 88.9	- 21.2	- 42.4	+ 67.7	+ 46.5
6	+ 91.2	- 21.8	- 43.6	+ 69.4	+ 47.6
7	+ 91.2	- 21.8	- 43.6	+ 69.4	+ 47.6
8	+ 91.2	- 21.8	- 43.6	+ 69.4	+ 47.6
9	+ 91.2	- 21.8	- 43.6	+ 69.4	+ 47.6
10	+ 91.2	- 21.8	- 43.6	+ 69.4	+ 47.6

TABLE 12

ADJUSTMENT OF THE GROSS NATIONAL FLOW OF THE PROJECT FOR 20% AND 40% FOREIGN EXCHANGE PREMIUM, ADJUSTED TO REAL TERMS

Year	Flow (Mill. Rials)	20% FE Premium (Mill. Rials)	Adjustment to real terms (Mill. Rials)	Adjusted Flow for 20% premium (Mill. Rials)	Adjusted Flow for 40% premium (Mill. Rials)
1	- 8.3	- .5		- 8.8	- 9.3
2	-31.8	- 3.8		-35.7	-39.5
3	+19.1	- 5.7	+52.8	+66.2	+60.5
4	+34.7	- 4.2	+70.7	+101.2	+97.0
5	+42.3	- 4.9	+82.5	+119.9	+115.0
6	+45.9	- 4.1	+84.7	+126.5	+122.4
7	+47.4	- 3.8	+84.7	+128.2	+124.3
8	+47.7	- 3.7	+84.7	+128.7	+125.0
9	+49.4	- 4.6	+84.7	+129.5	+124.9
10	+49.4	- 4.6	+84.7	+129.5	+124.9

TABLE 13

DIFFERENCE BETWEEN GROSS NATIONAL FLOW OF THE ALTERNATIVE AND THE PROJECT FOR 20% AND 40% FOREIGN EXCHANGE PREMIUM

Year	Flow for 20% premium			Flow for 40% premium		
	Alternative (Mill. Rs)	Project (Mill. Rs)	Difference (Mill. Rs)	Alternative (Mill. Rs)	Project (Mill. Rs)	Difference (Mill. Rs)
1		- 8.8	- 8.8		- 9.3	- 9.3
2		- 35.7	- 35.7		- 39.5	- 39.5
3	+ 43.4	+ 66.2	+ 22.8	+ 29.8	+ 60.5	+ 30.7
4	+ 58.0	+101.2	+ 43.2	+ 39.8	+ 97.0	+ 57.2
5	+ 67.7	+119.9	+ 52.2	+ 46.5	+115.0	+ 68.5
6	+ 69.4	+126.5	+ 57.1	+ 47.6	+122.4	+ 74.8
7	+ 69.4	+128.2	+ 58.8	+ 47.6	+124.3	+ 76.7
8	+ 69.4	+128.7	+ 59.3	+ 47.6	+125.0	+ 77.4
9	+ 69.4	+129.5	+ 60.1	+ 47.6	+124.9	+ 77.3
10	+ 69.4	+129.5	+ 60.1	+ 47.6	+124.9	+ 77.3

TABLE 14

COMPUTATION OF THE GROSS NATIONAL RATE OF RETURN, ADJUSTED TO REAL TERMS FOR 20% FOREIGN EXCHANGE PREMIUM

Year	Difference To flow of Expenditure (Mill. Rials)	Discount Factors for 75%	Discounted Flow at 75% (Mill. Rials)	Discount Factors for 70%	Discounted Flow at 70% (Mill. Rials)
1	- 8.8	.571	- 5.02	.588	- 5.17
2	-35.7	.327	-11.67	.346	-12.35
3.	+22.8	.187	+ 4.26	.204	+ 4.65
4	+43.2	.107	+ 4.62	.120	+ 5.18
5	+52.2	.061	+ 3.18	.070	+ 3.65
6	+57.1	.035	+ 2.00	.041	+ 2.34
7	+58.8	.020	+ 1.18	.024	+ 1.41
8	+59.3	.011	+ 1.65	.014	+ .83
9	+60.1	.007	+ .42	.008	+ .48
10	+60.1	.004	+ .24	.005	+ .30
			-16.69		-17.52
			+16.55		+18.84
			- .14		+ 1.32

$$70 + \left(\frac{1.32}{1.46} \times 5\right) = 74.52\ \%$$

TABLE 15

COMPUTATION OF THE GROSS NATIONAL RATE OF RETURN, ADJUSTED TO REAL TERMS FOR 40% FOREIGN EXCHANGE PREMIUM

Year	Difference in flow of Expenditure (Mill. Rials)	Discount Factors for 90%	Discounted Flow at 90% (Mill. Rials)	Discount Factors for 85%	Discounted Flow at 85% (Mill. Rials)
1	- 9.3	.526	- 4.89	.541	- 5.03
2	-39.5	.277	-10.94	.292	-11.53
3	+30.7	.146	+ 4.48	.158	+ 4.85
4	+57.2	.077	+ 4.40	.085	+ 4.86
5	+66.5	.040	+ 2.74	.046	+ 3.15
6	+74.8	.021	+ 1.57	.025	+ 1.87
7	+76.7	.011	+ .84	.013	+ 1.00
8	+77.4	.006	+ .46	.004	+ .54
9	+77.3	.003	+ .23	.003	+ .31
10	+77.2	.002	+ .15	.002	+ .15
			-15.83		-16.56
			+14.87		+16.73
			- .96		+ .17

$$65 + \left(\frac{.17}{1.13} \times 5 \right) = 65.75\ \%$$

TABLE 16

DIFFERENCE BETWEEN NET NATIONAL FLOW OF THE ALTERNATIVE AND THE PROJECT ADJUSTED TO REAL TERMS

Year	Expenditure flow - Million Rials			Adjustment To real terms (Mill. Rials)	Adjustment Flow (Mill. Rials)
	Alternative (Mill. Rials)	Project (Mill. Rials)	Difference (Mill. Rials)		
1		- 8.3	- 8.3	-	- 8.3
2		-31.9	-31.9	-	-31.9
3	+56.5	+ 4.5	-52.0	+52.6	+ .6
4	+75.5	+19.4	-56.1	+70.7	+14.6
5	+88.1	+24.5	-63.6	+82.5	+18.9
6	+90.4	+28.1	-62.3	+84.7	+22.4
7	+90.4	+29.6	-60.8	+84.7	+23.9
8	+90.4	+29.9	-60.5	+84.7	+24.2
9	+90.4	+31.6	-58.8	+84.7	+25.9
10	+90.4	+31.6	-58.8	+84.7	+25.9

TABLE 17

COMPUTATION OF THE NET NATIONAL RATE OF RETURN, ADJUSTED TO REAL TERMS

Year	Difference in flow of Expenditure (Mill. Rials)	Discount Factors for 30%	Discounted Flow at 30% (Mill. Rials)	Discount Factors for 35%	Discounted Flow at 35% (Mill. Rials)
1	- 8.3	.770	- 6.39	.741	- 6.15
2	-31.9	.592	-18.88	.549	-17.51
3	+ .8	.455	+ .36	.406	+ .33
4	+14.6	.350	+ 5.11	.301	+ 4.39
5	+18.9	.269	+ 5.08	.223	+ 4.21
6	+22.4	.207	+ 4.64	.165	+ 3.70
7	+23.9	.159	+ 3.80	.122	+ 2.92
8	+24.2	.123	+ 2.98	.091	+ 2.20
9	+25.9	.094	+ 2.43	.067	+ 1.74
10	+25.9	.073	+ 1.89	.050	+ 1.30
			-25.27		-23.66
			+26.29		+20.79
			+ 1.02		- 2.87

$$25 + \left(\frac{1.02}{3.89} \times 5\right) = 26.31$$

• The contribution an industrial project would make to the development of skills, is largely subjective but might possibly be measured in terms of the alternative cost of training the equivalent personnel in institutions of learning.

Possible Criteria

The criteria on which a decision may be taken to proceed or not to proceed with a project will normally include economic factors only some of which may be expressed by comparative numbers, business relationships, and political considerations.

A range of possible criteria is provided in the following list but the list is not to be considered exhaustive. The final decision on a project may be related to any of the possible criteria, but it is mainly the function of the project evaluator to derive the numerical coefficients for the guidance of the decision maker.

a) Indices

(i) Foreign exchange saving (Annual)
(ii) Capital investment per worker
(iii) Evaluation value of training
(iv) Total new jobs created
(v) Foreign contribution to capital cost
(vi) Value added
(vii) Domestic content
(viii) Government Revenue
(ix) Ex factory sale price vis a vis imported CIF price plus all import taxes

b) Inter Industry Relationship

Does the project fit into the future pattern of the economy or is it in economic isolation?

c) Contractual Agreements

Scrutiny of any/all contractual agreements with foreign partners or suppliers.

TABLE 18

ADJUSTMENT OF THE NET NATIONAL FLOW OF THE ALTERNATIVE FOR 20% AND 40% FOREIGN EXCHANGE PREMIUM

Year	Flow (Mill. Rls.)	20% FE Premium (Mill. Rials)	40% FE Premium (Mill. Rials)	Adjusted Flow for 20% Premium (Mill. Rials)	Adjusted Flow for 40% Premium (Mill. Rials)
1					
2					
3	+56.5	-13.6	-27.2	+42.9	+29.3
4	+75.5	-18.2	-36.4	+57.3	+39.1
5	+88.1	-21.2	-42.4	+66.9	+45.7
6	+90.4	-21.8	-43.6	+68.6	+46.8
7	+90.4	-21.8	-43.6	+68.6	+46.8
8	+90.4	-21.8	-43.6	+66.6	+46.8
9	+90.4	-21.8	-43.6	+66.6	+46.8
10	+90.4	-21.8	-43.6	+66.6	+46.8

TABLE 19

ADJUSTMENT OF THE NET NATIONAL FLOW OF THE PROJECT FOR 20% and 40% FOREIGN EXCHANGE PREMIUM ADJUSTED TO REAL TERMS

Year	Flow (Mill. Rials)	20% FE Premium (Mill. Rials)	Adjustment To real terms (Mill. Rials)	Adjusted Flow for 20% premium (Mill. Rls.)	Adjusted Flow for 40% premium (Mill. Rls.)
1	- 8.3	- .5		- 8.8	- 9.3
2	-31.9	- 3.8		- 35.7	- 39.5
3	+ 4.5	- 5.7	+52.8	+ 51.6	+ 45.9
4	+19.4	- 4.2	+70.7	+ 85.9	+ 81.7
5	+24.5	- 4.9	+82.5	+102.1	+ 97.2
6	+28.1	- 4.1	+84.7	+108.7	+104.6
7	+29.6	- 3.9	+84.7	+110.4	+106.5
8	+29.9	- 3.7	+84.7	+110.9	+107.2
9	+31.6	- 4.6	+84.7	+111.7	+107.1
10	+31.6	- 4.6	+84.7	+111.7	+107.1

TABLE 20

DIFFERENCE BETWEEN NET NATIONAL FLOW OF THE ALTERNATIVE AND THE PROJECT FOR 20% AND 40% FOREIGN EXCHANGE PREMIUM

Year	Flow for 20% Premium			Flow for 40% Premium		
	Alternative (Mill. Rials)	Project (Mill. Rls)	Difference (Mill. Rls)	Alternative (Mill. Rls.)	Project (Mill. Rls)	Difference (Mill. Rls.)
1		- 8.8	- 8.8		- 9.3	- 9.3
2		- 35.7	-35.7		- 39.5	- 35.7
3	+42.9	+ 51.6	+ 8.7	+29.3	+ 45.9	+ 16.6
4	+57.3	+ 85.9	+28.6	+39.1	+ 81.7	+ 42.6
5	+66.9	+102.1	+35.2	+45.7	+ 97.2	+ 51.5
6	+68.6	+108.7	+40.1	+46.8	+104.6	+ 57.8
7	+66.6	+110.4	+41.8	+46.8	+106.5	+ 59.7
8	+66.6	+110.9	+42.3	+46.8	+107.2	+ 60.4
9	+68.6	+111.7	+43.1	+46.8	+107.1	+ 60.3
10	+68.6	+111.7	+48.1	+46.8	+107.1	+ 60.3

TABLE 21

COMPUTATION OF THE NET NATIONAL RATE OF RETURN ADJUSTED TO REAL TERM FOR 20% FOREIGN EXCHANGE PREMIUM

Year	Difference Inflow of Expenditure (Mill. Rials)	Discount Factors for 50%	Discounted Flow at 50% (Mill. Rials)	Discount Factors for 55%	Discounted Flow at 55% (Mill. Rials)
1	- 8.8	.667	- 5.87	.645	- 5.68
2	-35.7	.444	-15.85	.416	-14.85
3	+ 8.7	.296	+ 2.58	.269	+ 2.34
4	+28.6	.197	+ 5.63	.173	+ 4.95
5	+35.2	.132	+ 4.65	.111	+ 3.91
6	+40.1	.066	+ 3.53	.072	+ 2.89
7	+41.8	.059	+ 2.47	.047	+ 2.43
8	+42.3	.039	+ 1.85	.030	+ 1.27
9	+43.1	.026	+ 1.12	.019	+ .82
10	+43.1	.017	+ .73	.012	+ .52
			-21.72		-20.53
			+23.36		+19.13
			+ .64		- 1.40

$$50 + \left(\frac{.64}{2.04} \times 5\right) = 51.57\ \%$$

TABLE 22

COMPUTATION OF THE NET NATIONAL RATE OF RETURN ADJUSTED TO REAL TERMS FOR 40% FOREIGN EXCHANGE PREMIUM

Year	Difference in flow for Expenditure (Mill. Rials)	Discount Factors for 65%	Discounted Flow at 65% (Mill. Rials)	Discount Factors for 70%	Discounted Flow at 70 % (Mill. Rials)
1	- 9.3	.606	- 5.64	.588	- 5.47
2	-35.7	.367	-13.10	.346	-12.35
3	+16.6	.223	+ 3.70	.203	+ 3.37
4	+42.6	.135	+ 5.75	.120	+ 5.11
5	+51.5	.082	+ 4.22	.070	+ 3.61
6	+57.8	.050	+ 2.14	.041	+ 2.37
7	+59.7	.030	+ 1.79	.024	+ 1.43
8	+60.4	.018	+ 1.09	.014	+ .85
9	+60.3	.011	+ .66	.008	+ .48
10	+60.3	.007	+ .42	.005	+ .30
			-18.74		-17.82
			+19.77		+17.62
			+ 1.03		- .30

$$65 + \left(\frac{1.03}{1.33} \times 5\right) = 68.87\ \%$$

CHAPTER VI

PROJECT IMPACT ANALYSIS

By G. Eckstein (GOPA)

INTRODUCTION:

The evaluation of industrial projects is multi-dimensional: of interest are profitability criteria, interindustry relations, skill formations, competence and reliability of management, pricing problems and financial planning.

Commercial and national profitability are the obvious and most important criteria. In addition, however, the project should be examined from the point of view of utilizing indigenous resources, its requirements as to technical and managerial personnel, employment potentials and so on.

Project Impact Analysis identifies the effects of the projects under consideration on backward and forward linked industries. The importance of these linkage effects depends on the one hand on the relative value of the newly planned projects, and on the other hand on their place within the production process. To perform such an analysis, which means appraising the overall economic impact of investment decisions, however, requires a significant amount of highly detailed data as well as an input-output framework for the whole economy.

EVALUATION CRITERIA AND PRIORITY DETERMINATION

Three criteria have been chosen in the calculated example.

The first criterion is called the social profitability criterion and is defined as the ratio of the total increment in gross domestic product over the total investment required.

The second criterion suggested is referred to as the balance of payment criterion and is defined as the ratio of the substituted imports over the project induced imports.

The third criterion is the employment effect, which is calculated as the ratio of newly generated employment over total investment.

Each criterion can be selected separately to support the decision on project choice e.g. in cases of a chronic shortage in foreign exchange the balance of payment criterion might be the one and only one to be looked at.

Project selection and priority determination usually will be based on all three criteria together. One way is simply adding the numerical values of each ratio, without any weights, if each criterion is considered equally important.

In the other way weights according to the relative importance of each criterion have to be decided upon and attached to it, before adding the values.

The ranking of investment projects according to priority is then relatively simple: the higher the sum of the weighted or unweighted ratios the more desirable the project. [1)]

METHODOLOGY

The method used follows the standard mathematical operations of input-output analysis and is extended insomuch as the investment requirements are calculated with the help of a tentatively constructed capital flow matrix. The method may have particularly application in relation to very large capital investments, for example where a complete new industry is to be established, for example shipbuilding or capital goods industries as a whole.

Viewing the results, some of the assumptions and limitations of input-output analysis should be kept in mind. It is assumed that

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1) See G. Boon, Project Evaluation and Priority Determination, Mexico, D.F., 1969.

each industry has a specified method of production characterised by constant scale returns (i.e. doubling all variable inputs doubles the output) and fixed factor proportions - hence the technical input coefficients are fixed. There is no joint production, each industry is producing its 'own' commodity. The two most obvious disadvantages of transactions tables is that they are likely to be at least partly out of date, or contain estimation error if projected, and that the purchases of a particular input by an industry during a period do not necessarily equal the industry's use of the input, i.e. transactions tables are an imperfect source of information on technical input coefficients because an industry's stocks of its inputs may change. But a more fundamental problem is that the output of a specific industrial sector in a transactions table represents a particular product mix for ratio of the outputs classed together and if this changes then the input coefficients may also change. [1)]

The extension of the standard input-output analysis by incorporating estimates on capital requirements needs some clarification: It is assumed that for some period of time the degree of capacity utilization does not change and therefore the relationship between sectoral capital stocks (Kij) and sectoral output (Xj) remains constant. It is further assumed like in short term investment models, that these average capital-output ratios are identical with the marginal capital-output ratios.

$$\frac{Kij}{Xj} = \frac{dKij}{dXj} = \frac{Iij}{dXj} = \text{Const.}$$

In the so-called 'open' input-output model estimated demand requirements for a special machinery are considered to be a datum for the present analysis. Formerly, these investment requirements were imported and if this equipment will be produced domestically it

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1) For further details see Chenery, H. and Clark, P.G., Interindustry Economics, Wiley 1959.

has to be produced by the machinery sector (sector 12 in the input-output system). The output of a sector constitute either intermediate goods or final goods. Final goods are those with a final destination such as consumption, investment, and export. Consequently the requirement for this special type of machinery equipment constitute a final demand for the output of sector 12.

In order to apply the evaluation criteria the model has to provide the following effects of this final demand bill:

- expansion of gross output
- increments in gross value-added
- increments in labour requirements
- increments in capital requirements
- total induced imports

Gross Output Expansion

$$(1a)\quad \left[I - A\right]^{-1} \cdot \left[Y\right] = \left[\bar{X}\right] \qquad (1b)\quad \sum_{1}^{i} \left[\bar{X}\right] = \bar{X}$$

The expansion of gross output $\bar{X}$ is obtained by multiplying the column vector of final demand $\left[Y\right]$, which consists of all zeros except for sector 12 (Y_{12} = 3 bill. R), with the inverted Leontief-Matrix $\left[I - A\right]^{-1}$, and summing the resulting column vector $\left[\bar{X}\right]$.

Gross Value Added Increments

$$(2a)\quad \left[VA/X\right] \cdot \left[\bar{X}\right] = \left[\bar{Y}\right] \qquad (2b)\quad \sum_{1}^{i} \left[\bar{Y}\right] = \bar{Y}$$

The column vector of increments in value-added $\left[\bar{Y}\right]$ is obtained by multiplying the diagonal matrix of the gross value added - output ratios $\left[VA/X\right]$ with the column vector of gross output expansions derived by Equation 1a.

Summing up the national income effect $\bar{Y}$ (or gross domestic product effect) is obtained.

Increments in Labour Requirements

(3a) $[a] \cdot [\bar{X}] = [\bar{L}]$ (3b) $\sum_{1}^{i} [\bar{L}] = \bar{L}$

Equation 3a states that multiplying the diagonal matrix of gross output expansion by the row vector of the direct labour-gross output coefficients $[a]$ the row vector of increments in labour requirements $[\bar{L}]$ is obtained. Summing up, again, total incremental $\bar{L}$ is derived.

Increments in Capital Requirements

(4a) $[g] \cdot [\bar{X}] = [\bar{K}_d]$ (4b) $\sum_{1}^{i} [\bar{K}_d] = \bar{K}_d$

(5a) $[B] \cdot [\bar{K}_d] = [\bar{K}_o]$ (5b) $\sum_{1}^{i} [\bar{K}_o] = \bar{K}_o$

(b) $\bar{K}_d = \bar{K}_o$

In order to calculate the row vector of increments in capital requirements by destination $[\bar{K}_d]$ the diagonal matrix of gross output expansion is multiplied by the row vector of direct capital gross output coefficients $[g]$.

Multiplying the capital flow matrix $[B]$ by the column vector of capital requirements by destination just derived from Equation 4a, yields the column of capital requirements by origin $[\bar{K}_o]$. Equations 4b and 5b, again, are summing-up procedures. By definition the capital requirements by destination and by origin are identical (Eq. 6).

Total Induced Imports

(7a) $[\bar{X}_d] = [\bar{X}] \cdot [1-(M_i/X + M_c/X)]$ (7b) $\sum_{1}^{i} [\bar{X}_d] = \bar{X}_d$

d) **Intangibles**

(i) Attitude of labour
(ii) Political considerations
(iii) Quality of local Government

(e) National Preferences

(i) Decentralization
(ii) Small industries

(f) Commercial Profitability

(i) Commercial financial projections
(ii) Present net value
(iii) Internal rate of return

(g) National Economic Profitability

(i) Present net value
(ii) Internal rate of return
(iii) Foreign Exchange internal rate of return
(iv) Cost benefit analysis

(h) Risk Factor

(i) Stability of Earnings

Static Ratios Versus Dynamic Ratios

In commercial evaluation it has been seen that static financial ratios are of a great value in assessing the year by year progress of a company, for example as applied to the annual Balance Sheet. But in assessing the total financial return over the life of the project in relation to the capital investment, dynamic ratios based on discounted cash flow, such as the net present value or the internal rate of return, provide more significant criteria.

$$(8a)\quad \left[\dot{X}\right] \cdot \left[\dot{X}_{dI}\right] = \left[\dot{M}_{I,c}\right] \qquad (8b)\quad \sum_{1}^{i} \left[\dot{M}_{I,c}\right] = \dot{M}_{I,c}$$

$$(9a)\quad \left[b_I\right] \cdot \left[\dot{K}_d\right] = \left[\dot{M}_{Kd}\right] \qquad (9b)\quad \sum_{1}^{i} \left[\dot{M}_{Kd}\right] = \dot{M}_{Kd}$$

$$(10a)\quad \left[\dot{M}_{I,c}\right] \cdot \left[\dot{M}_{Kd}\right] = \left[\dot{M}\right] \qquad (10b)\quad \sum_{1}^{i} \left[\dot{M}\right] = \dot{M}$$

Total induced imports are calculated the following way: at first, by multiplying (Eq. 7a) the diagonal matrix of gross output expansion with the column vector of one minus intermediate import-gross output coefficient plus consumption import-gross output coefficient $\left[1-(M_I/X + M_c/X)\right]$ the column vector of the domestic gross output effect $\left[\dot{X}_d\right]$ of the project is obtained. Subtracting then this column vector $\left[\dot{X}_d\right]$ from the project's gross output increments (Eq. 8a) yields the column vector of intermediate and final consumption imports $\left[\dot{M}_{I,c}\right]$.

Secondly (Eq. 9a), by multiplying the diagonal matrix of increments in capital requirements by destination (see Eq. 4a) with the row vector of import coefficients in the capital flow matrix $\left[b_I\right]$, the row vector of increments in imports of investment goods is obtained $\left[\dot{M}_{Kd}\right]$.

Finally (Eq. 10a), adding together the column vectors of intermediate plus final consumption imports and of investment goods imports yields the column vector of total induced imports $\left[\dot{M}\right]$.

The equations 7b - 10b are, again, summing-up procedures.

Data Requirements

Input-Output Tables

The application of the model requires a standard input-output (domestic) transactions table, from which the input-coefficients matrix and inverted Leontief-matrix are derived. The input-coefficients table directly provides the necessary information on value added-output ratios (Eq. 2a) and intermediate import-output coefficients (Eq. 7a).

Similarly, using the available import matrix, the consumption imports-output coefficients (Eq. 7a) can be derived by dividing the sectoral consumption imports of this table over the sectoral gross output data from the transactions table.

In cases where an import matrix is no available, which means imports are only presented as the bottom row in the transactions table, sectoral consumption import-output coefficients can be approximated the following way: Firstly, multiplying the coefficient M_C/C (total consumption imports over total consumption) by the import elasticity of demand for imported consumption goods e_M, the propensity of the imports of consumption goods over total consumption is obtained. $M_C/C \cdot e_M = E_M/C$. Secondly, by multiplying the sectoral value added-gross output coefficients, VA_i/X_i, by the coefficient of total consumption over total value added, C/VA, the sectoral consumption-gross output coefficients are obtained. $VA_i/X_i \cdot C/V = C_i/X_i$. Finally, multiplying E_M/C by C_i/X_i yields the required consumption import-gross output coefficients by sector. M_{Ci}/X_i. See I. Sandee, Ajuste del Modelo Sectoral, Banco de Mexico, Sept. 1967.

Capital Flow Matrix

One of the standard mathematical operations in Input-Output Analysis is computing the impact of changes in Final Demand of selected industries on a specific industry in question.

However, it should be recalled that the demand is for current account only; Capital Investment has been treated as Final Demand

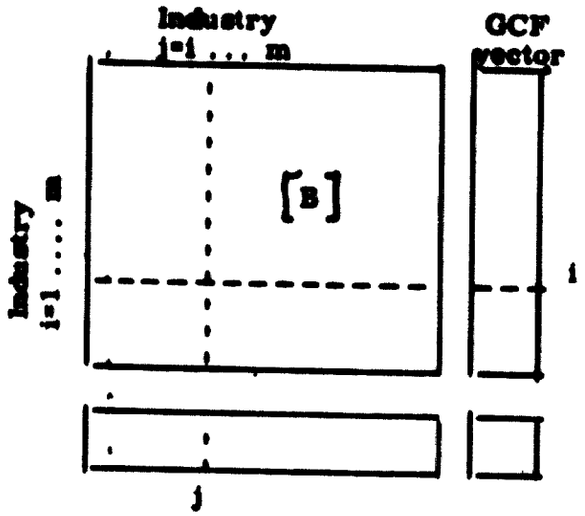
and hence has been excluded from the I/O matrix body. This is a severe limitation on the use of I/O tables particularly for a capital goods industry.

Thus the construction of a capital flow matrix to be additive to the existing I/O tables will be a significant improvement in the use of I/O analysis.

A capital flow matrix is an input-output matrix dealing exclusively with goods sold on capital account. A given industry produces a certain amount of capital, keeping some for its own use and selling the rest to other industries. At the same time this industry also buys plant and equipment from other industries.

The capital flow matrix, $[B]$, shown in the following figure, is an industry-by-industry matrix. Because the same industries are represented by the rows and the columns, it is a square matrix. Each element, bij of the matrix represents the dollar value of capital produced by industry i and bought on capital account by industry j in a given year. A row of this matrix gives the value of capital goods bought by every industry in the economy from the industry represented by that row. A column gives the value of capital that is bought from every industry in the economy by the industry represented by that column.

The row sums of a capital flow matrix form a column vector representing how much of the total amount of capital produced in the nation is bought from each industry in a given year. This vector shows total national gross capital formation, one of the components of gross national product. In contrast, the column sums represent how much of the total amount of capital produced in the economy is bought by each industry.



$\sum_{j=1}^{m} b_{ij}$ = the total amount of capital goods bought from industry i

$\sum_{i=1}^{n} b_{ij}$ = the total amount spent for capital goods by industry j

$\sum_{i=1}^{n} \sum_{j=1}^{m} b_{ij}$ = the total value of plant and equipment bought/sold in the economy

Simplified Numerical Example of Project Impact Analysis

It is assumed that in a developing country it has been decided to produce "Heavy Mechanical Equipment" instead of importing this type of goods. The imports to be substituted are estimated at an average value of 300 Mio money units. These estimated requirements constitute a final demand for the output of sector II, viz., Metal Products.

Economy of the Country

Transaction Table:

Industry	I	II	III	FD	Total
I	0	600	300	100	1000
II	100	0	300	600	1000
III	500	200	0	800	1500
Prim. Inp.	400	200	900		
Total	1000	1000	1500		

Input Coefficients:

Industry	I	II	III
I	0	0.6	0.2
II	0.1	0	0.2
III	0.5	0.2	0
value added	.30	.15	.47
imports	.10	.05	.13
Total	1.0	1.0	1.0

Gross Output Expansion

$$(I - A)^{-1}_{1975} \cdot (Y) = (\bar{X})$$

$$\sum_{1}^{1} (\bar{X}) = \bar{X} \qquad 1 = 1, 2, 3$$

The column vector of final demand is multiplied by the inverted matrix and the column vector of gross output expansion is obtained.

Column vector of demand consists of all zeros except for sector II (300 Mio money units)

Summing up the total gross output expansion effect is obtained.

Inverted Matrix $(I - A)^{-1}$

$$\begin{array}{c} \\ I \\ II \\ III \end{array} \begin{array}{c} \begin{array}{ccc} I & II & III \end{array} \\ \begin{bmatrix} 1.30 & 0.87 & 0.43 \\ 0.27 & 1.22 & 0.30 \\ 0.71 & 0.68 & 1.28 \end{bmatrix} \end{array} \cdot \begin{bmatrix} 0 \\ 300 \\ 0 \end{bmatrix} = \begin{bmatrix} 261 \\ 366 \\ 204 \end{bmatrix}$$

$$\bar{X} = 831$$

Gross Value-Added Increments

$$(VA / X) \cdot (\bar{X}) = (\bar{Y})$$

$$\sum_{1}^{i} (\bar{Y}) = \bar{Y}$$

Multiplying the diagonal matrix of the gross value-added output ratios by the column vector of gross output expansions the column vector of gross value-added increments is obtained. Summing up the national income effect (gross domestic product effect) is obtained.

	VA	X	VA/X	$\bar{X}$	$\bar{Y}$
I	300	1000	0.30	261	78
II	150	1000	0.15	366	55
III	700	1500	0.47	204	96

$$\bar{Y} = 229$$

Increments in Labour Requirements

$$(\alpha) \cdot (\bar{X}) = (\bar{L})$$

$$\sum_{1}^{i} (\bar{L}) = \bar{L}$$

Multiplying the diagonal matrix of gross output expansion by the row vector of the direct labour-gross output coefficients we obtain the row vector of increments in labour requirements. Summing up again the total employment effect is obtained.

	a	$\bar{X}$	$\bar{L}$
I	0.0827	261	22
II	0.0171	366	6
III	0.0204	204	4

$\bar{L}$ = 32 (workers)

Increments in Capital Requirements

$$(\beta) \cdot (\bar{X}) = (\bar{K}_d)$$

$$\sum_1^i (\bar{K}_d) = \bar{K}_d$$

Multiplying the diagonal matrix of gross output expansion by the row vector of direct capital - gross output coefficients, the row vector of increments in capital requirements by destination is obtained.

Summing up, the total investment requirements by destination is obtained.

	β	$\bar{X}$	$\bar{K}_d$
I	1.11	261	290
II	1.28	366	468
III	1.68	204	342

$\bar{K}_d$ = 1100

$$(I^o) \cdot (\bar{K}_d) = (\bar{K}_o)$$

$$\sum_1^i (\bar{K}_o) = \bar{K}_o$$

Investment origin matrix multiplied by the column vector of investment requirements by destination yields the column vector of investment requirements by origin.

Summing up, the total investment requirements by origin are obtained.

Investment origin matrix I^o

$$\begin{array}{c} \\ \text{I} \\ \text{II} \\ \text{III} \\ \text{Imp.} \\ \text{Total} \end{array} \begin{array}{c} \begin{array}{ccc} \text{I} & \text{II} & \text{III} \end{array} \\ \begin{bmatrix} 0.816 & 0 & 0 \\ 0 & 0.681 & 0 \\ 0.068 & 0.214 & 0.661 \\ 0.116 & 0.105 & 0.339 \\ 1.000 & 1.000 & 1.000 \end{bmatrix} \end{array} \cdot \begin{bmatrix} 290 \\ 468 \\ 342 \end{bmatrix} = \begin{bmatrix} 237 \\ 319 \\ 345 \\ 199 \end{bmatrix}$$

$$\bar{K}_o = 1100$$

$$\bar{K}_d = \bar{K}_o$$

The total investment requirements by destination and origin are identical.

Total Import Effect

$$(\bar{X}_d) = (\bar{X}) \cdot (1 - (M_I / X + M_C / X))$$

$$\sum_1^i (\bar{X}_d) = \bar{X}_d$$

$$(\bar{X}) - (\bar{X}_d) = (\bar{M}_{I/C})$$

$$\sum_1^i (\bar{M}_{I/C}) = \bar{M}_{I/C}$$

Multiplying the diagonal matrix of the gross output expansion by the column vector of 1 minus intermediate import-gross output coefficient plus consumption import-gross output coefficient yields the column vector of domestic gross output effect.

Summing up gives the total domestic output effect.

Subtracting the column vector of domestic gross output increments from the project gross output increments yields the column vector of intermediate plus final consumption imports.

Summing up, again, gives the total intermediate plus final consumption import effect.

	M_I/X	M_C/X	$M_I/X+M_C/X$	$1-(M_I/X+M_C/X)$	$\bar{X}$	$\bar{X}_d$	$\bar{M}_{I/C}$
I	0.0112	0.0055	0.0167	0.9833	261	257	4
II	0.1839	0.0026	0.1865	0.8135	366	298	68
III	0.0519	0.0046	0.0565	0.9435	204	192	12

$$\bar{M}_{I/C} = 84$$

$$(\gamma) \cdot (\bar{K}_d) = (\bar{M}_{Kd})$$

$$\sum_1^i (\bar{M}_{Kd}) = \bar{M}_{Kd}$$

Multiplying the diagonal matrix of increments in capital requirements by destination with the row vector of import coefficients in the investment origin matrix yields the row vector of increments in imports of investment goods.

Summing up gives the total sum of imports of investment goods.

	γ	K_d	M_{Kd}
I	0.116	290	34
II	0.105	468	49
III	0.339	342	116

$$\bar{M}_{Kd} = 199$$

$$(\bar{M}_{I/C}) + (\bar{M}_{Kd}) = (\bar{M})$$

$$\sum_1^i (\bar{M}) = \bar{M}$$

Adding to the column vector of intermediate and final consumption imports the column vector of investment goods imports, the column

vector of total imports is obtained.

Summing up gives the total import effect.

	$\bar{M}_{I/C}$	$\bar{M}_{Kd}$	$\bar{M}$
I	4	34	38
II	68	49	117
III	12	116	128

$\bar{M} = 283$

Priority Determination

- social profitability criterion

$$\frac{\text{increment in national income}}{\text{total investment}} \quad \frac{\bar{Y}}{\bar{K}} = \frac{229}{1100} = 0.208$$

- balance of payment effect

$$\frac{\text{substituted imports}}{\text{induced imports}} \quad \frac{\bar{E}}{\bar{M}} = \frac{300}{283} = 1.06$$

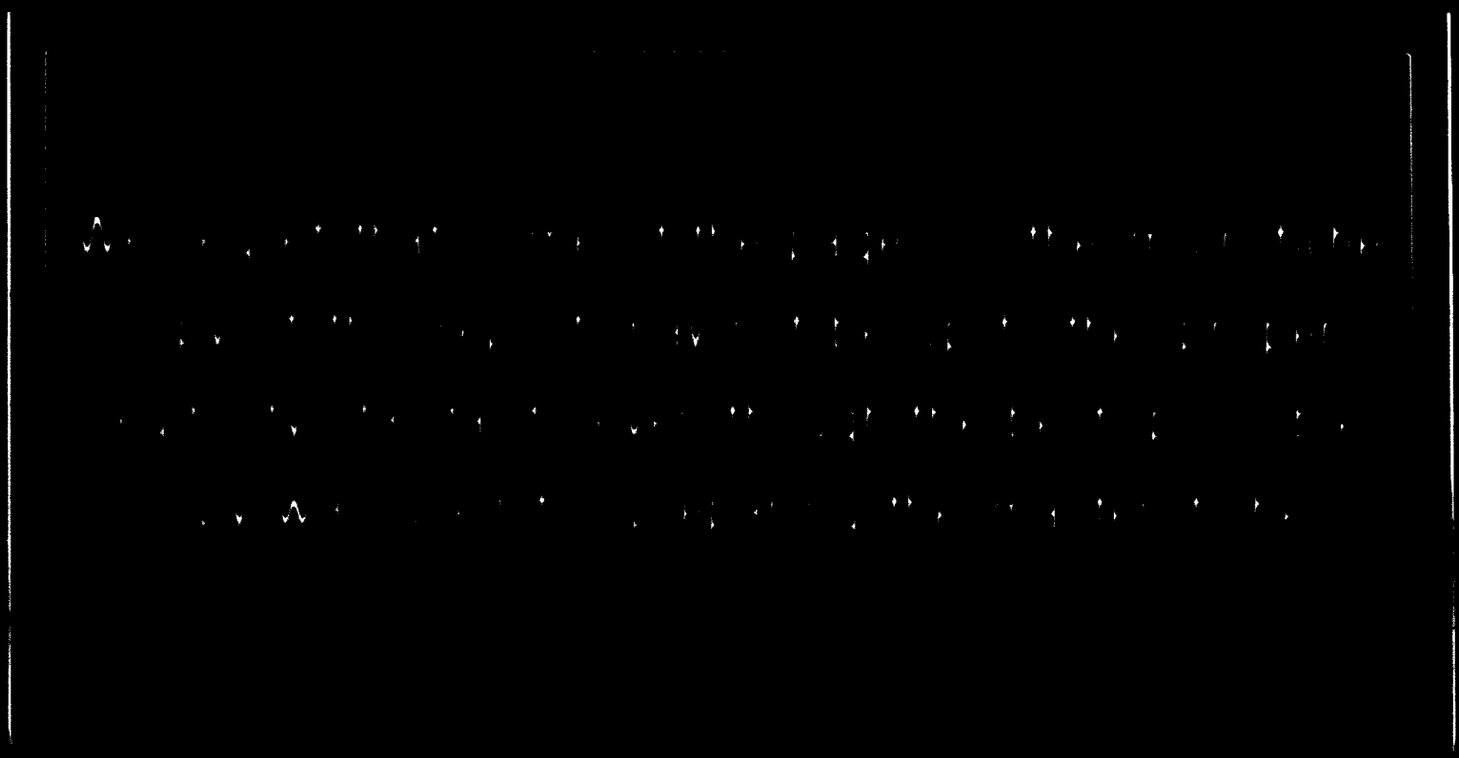
- employment generating effect of investment

$$\frac{\text{increment in employment}}{\text{total investment}} \quad \frac{\bar{L}}{\bar{K}} = \frac{32}{1100} = 0.029 \text{ per Mio money unit}$$

The higher the ratios of each of these criteria the more preferable is the project.

In cases where all three criteria seem to be relevant, the ratios can simply be added up to get a total ratio, or - before addition - subjective weights are attributed to them to get the sum of a weighted ratio.

In economic evaluation it is possible to devise many static indices, based on a single operating year when the project is assumed to be fully operational, and of course these have value. But to assess the economic return to the nation in relation to the national resources employed, is a function of time, and more significant criteria results from discounting the flow of costs and benefits (in money terms) over the life of the project.



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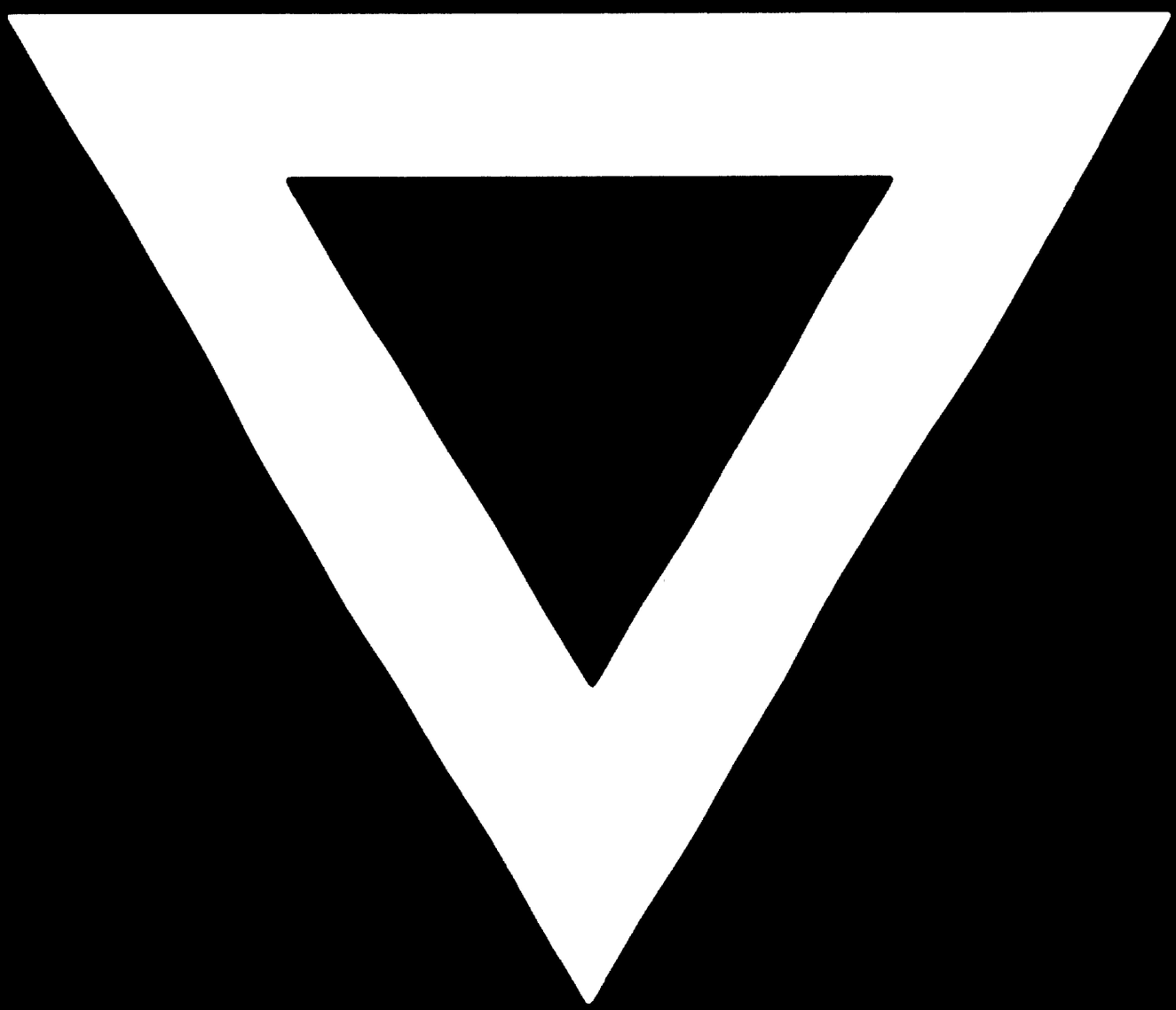

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