CHAPTER SIX

Low - Cost Modernisation

CHAPTER 'VI'

LOW - COST MODERNISATION

6.1 INTRODUCTION:

The small scale sector has grown and now contributes about 35% of the total value of output and also value added, in the manufacturing field. However, the small scale industry has to be competitive and viable in order to improve this position of importance.

Modernisation is an essential part of the business in this coming computer age. The present situation of working, use of old methods, out-dated processes are to be changed and modernised to compete internally and externally and survive in the market for economy and quality. Foundry industry is a parent- industry to 21 industries. Indian foundries have concentrate on the following factors :-

1) Incorporating the recent developments in the technology,
2) Adoption of the latest developments to suit our requirements,
3) Assimilation and adoption of Research and Development efforts,
4) Modernisation of existing foundries.

Out of these, modernisation has to be given top priority.

6.2 DEFINITION, MEANING AND SCOPE :

i) "The term 'modernisation' is used to denote primarily 'the installation of new machinery and equipment' or the modification of old buildings." (1)

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(1) Sharma T.R., Singh Chauhan S.D., 'Industrial Economics', Shivalal Agarwal and Company, Educational Publishers, 1972, Fifth Edn. PP.128.

The general modernisation process attempts and results in change and innovation. The definition should be expanded to include the managerial aspect as well.

ii) Change and innovation may be in form of an (1) introduction of new technology or process, (2) new types of machines or innovations in existing machines, (3) development of new regions, business or production areas, (4) introduction of new methods of working and management and, (5) recruitment of new personnel or training and retraining of existing personnel.

In short, modernisation implies an introduction of some 'new' elements which would ultimately enable the firm to improve its performance and reduce its cost of production.

iii) Modernisation suggests economisation which is attained by eliminating reduntant and infructuous functions and equipments. Economy is achieved by reducing the average cost of production, by developing more economical processes. Modernisation, therefore, frequently involves reorganization of the industry, e.g. the closure of more inefficient units in order to concentrate production in low - cost units.

iv) Modernisation is not only a cosmetic face-lift of a firm. If refers more importantly to the process by which new technology is brought in use. Modernisation is not only the replacement of old machinery by new, but also ushering in those conditions and practices in firm, which would enable it tc be strong and efficient.

v) Modernisation also entails, the adoption of advanced managerial techniques, the employment of adequately trained personnel and the application of improved methods of work. It is essen-tial to upgrade the necessary skills and knowledge of the

personnel, employed in a firm so as to make them suitable for a modern firm. Therefore, modernisation implicitly emphasises the need for training of employees and retraining of the existing employees and employment of personnel, who are better qualified.(2)

vi) Last but not the least, modernisation means technological upgradation. There are two options available- (1) revamping the existing technology and (2) upgrading the existing technology. The first option entails long - term - planning, and long - term - commitment of resources. Replacing the existing technology with modern technology. The replacement may require big initial capital investment, but which, in the long run, reduces the cost of production and improves the quality of product and enables to cross the obsolecence hazard. The second option relates to a short-term policy decision. Advocates of this option argue that in a highly capital-scarce economy, firms must develop the ability to use the existing resources efficiently to be competitive. One of the best ways to analyse decision, is to use the so-called 'Decision - Tree.' **Fig. No.6.1**

vii) There is no universal solution. The best alternative has to be found out on a case - to - case basis. Because, Modernisation is not buying a set of drawings or a set of designs, but a host of other managerial activities behind converting an

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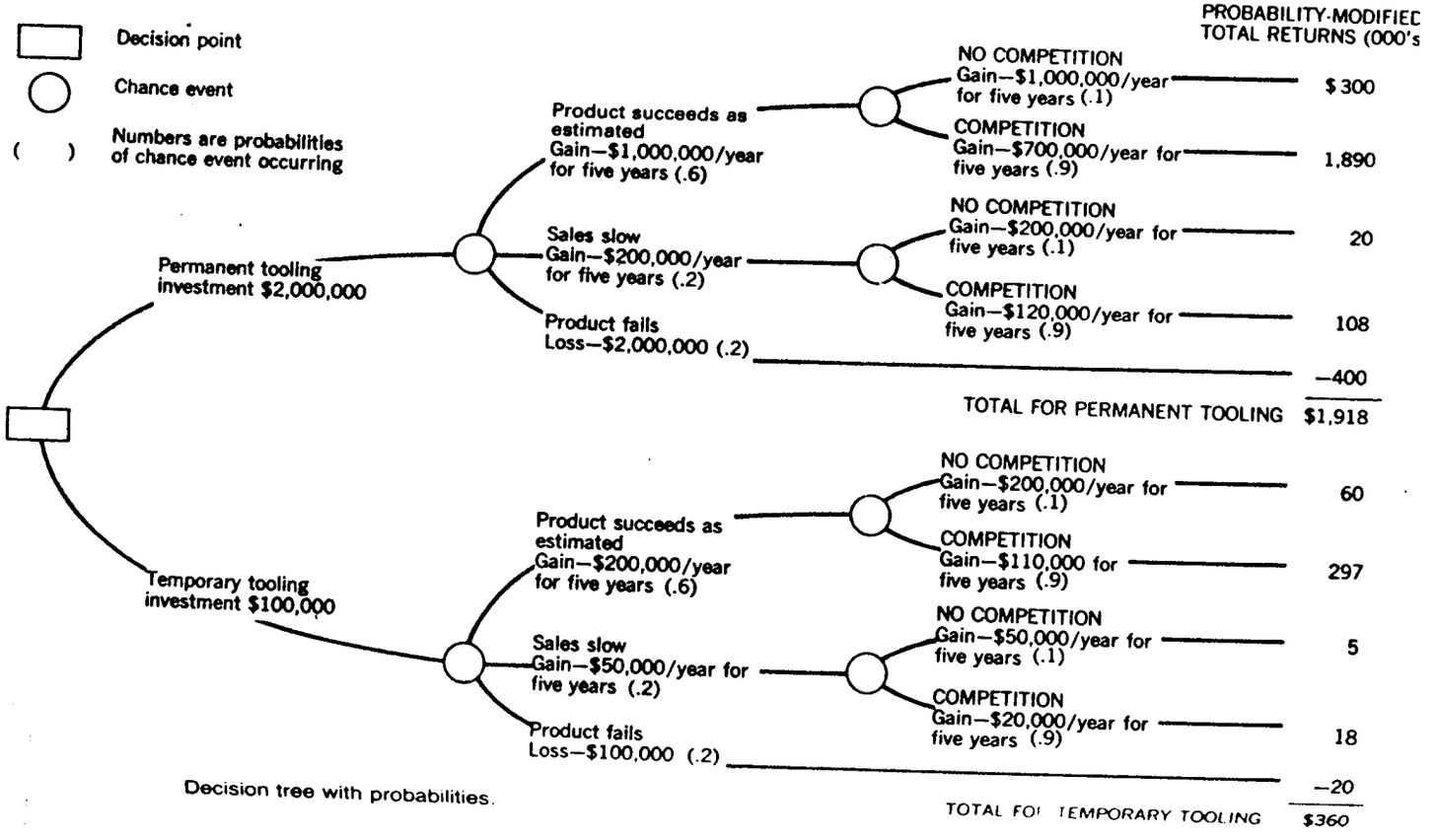
(2) Krishnamurthy, 'Seminar on Managerial Response to Emerging Technologies.'Special reports, May 5, 1988.

Fig. No.6.1



Decision tree with probabilities.

idea into a useful goods and services meant for the people. For this successful switching over from obsolete, outdated techniques to advanced and modernised techniques, the firm, must possess,

1) awareness of such need of transfer,

2) the ability to adopt and adapt the advanced technique, i.e. it has to be guided by economic considerations,

3) the preparedness and possession of necessary efforts and skills of the management.

The small and medium units can ill-afford experimentation in this regard nor can they sustain a long gestation or leasing period. Therefore, they have to be more circumspect in starting on an arrangement for such transfer.

6.3. IMPORTANCE AND NEED OF MODERNISATION:

"The competitiveness of Japanese product has focused attention on their manufacturing systems since the basis of their success has been high-quality competitively priced products. Indeed, the Japanese market strategy seems to be rooted in their production systems and the literature is filled with reports of remarkable quality levels, achieved along-with lower costs through higher productivity and very low in-process inventories." (3)

The success of Japan in the industrial world can be attributed to her policies of "JIT" and of "Autonomation". JIT means Just-In - Time entails producing the necessary parts in the quantities needed at the time they are needed.

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(3) Buffa Elwood S., Sarin R.K., 'Modern Production/Operations Management, 'John Wiley and Sons, 1987, eight edition, PP.436.

Autonomation system means 'autonomous defects control' which depends on automatic stop devices and workers team - work.

On the face of it, it seems that Japanese systems of JIT and Autonomation are not feasible in developing and capital-scarce countries like India. But Autonomation need not necessarily be costly. Electronics Industry is making rapid strides and economical automated devices are being marketed at reasonable prices. The basic fact should not be ignored that modernisation of industries is a basic pre - requisite for economic development.Because, ultimately modernisation means economisation viz avoidance of any wastages, better utilisation of available resources and reduction in cost of production.

In fact, it will not be an exaggeration to state, that the manufacturing units have no choice but to modernise themselves if they wish to survive in the present competitive sphere.

For large - scale modernisation, the initial investment may be high but the ultimate cost will go on decreasing. Modernisation can also be done on the smaller scale and the same benefits will accrue to the firm.

Modernisation is a dynamic concept involving changes in materials as well as processes. This is the most critical factor in the overall economics of engineering production, but it meets with resistence from both labour and administrative staff. At the same time, the changes must be introduced. The industry must be equipped with qualified manpower, to assimilate and adopt the relevant technology. This does not necessarily imply changes in the personnel. Personnel has to be assured of security of employment and can be persuaded to undergo the necessary training.

Modernisation will ultimately result into, i) better productivity, ii) better yields and lower cost of production and iii) better quality of production.

6.4 MODERNISATION IN INDIAN FOUNDRIES :

It has been observed that Indian foundry is a case of inverse relationship between the percentage of technological sophistication (in terms of moulding, melting and mechanization) and that of firms adopting such systems. **(4 - 5)** Many foundries exist with outdated technologies. The situation have changed completely over the years in respect of raw materials available, products etc. But these foundries are still working with obsolete technologies.

Technological sophistication assigned to any system is judged by the proportion of S and T (science and technology) input present in the system. It has been observed that :

1) More than 20% of Indian foundry units have adopted such moulding systems whose technological sophistication is less than 1%. Only 2.5% Indian foundry units have adopted such moulding systems whose technological sophistication is 5% and above. It is thus inferred that Indian foundries have achieved a low level of technological sophistication in moulding process.

2) It has beer observed that maximum foundries have installed cupola furnace for melting practices. The technological sophistication of cupola - systems is considered as below 5% .

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(4) Govindrajuly V., 'Evolution of Indian Foundry', **FISSR** Thesis Institute for Social Sciences and Research, Vellore, September,1986.

(5) Govindrajuly V and Pillai R.M. 'Technological Assessment of Indian Foundry,' 36th Annual Convention - **IIF -1987**

About 25% foundries have installed Oil Fuel Furnace which have achieved a better rate of technological sophistication (i.e.15%). Less than 5% firms have adopted such melting systems whose technological sophistication is more than 15%. They belong to the category which have installed Electric Arc Furnance, Electric Induction Furnance or Plasma Arc Furnance.

3) Only 2% foundries have a fully mechanised sand plant and vaccum emission spectograph. While about 18% foundries have moulding machines.

About 8% foundries have adopted certain procedures for sand - testing. In case of other processes - fettling system, heat - treatment, inspection of incoming materials etc. - also the percentage of mechanization is unsatisfactory.

It is thus inferred that Indian Foundry is a case of inter -mediate technological sophistication in mechanisation. There may, however, be some cases where obsolete technology may, be appropriate but all in all, it is a need of time to modernise the foundry industry.

The foundry industry is passing through a very critical time. It is going to face a serious competition from 'Powder - Metallurgy' technology. It is essential to modernise in order to survive in this competitive world and to ensure its continuos progress. The recent report by the Department of Heavy Industry also emphasises on modernisation of existing foundry for manufacturing high quality castings. And it is important that Government should adopt some definite measures to ensure some relief to the foundries.

6.5 THE MODERNISATION IN THE FOUNDRIES UNDER SURVEY:

It was observed that Foundies A and B have made some attempts at modernisation.

Foundries C, D, and F have not attempted any modernisation process.

Foundry E can be said to have achieved a better degree of modernisation.

I) Foundries A and B have already installed Rotary Furnace, which is considered as a moderate attempt of low-cost modernisation and is better than the conventional cupola furnace. C.I. casting by Rotary furnace is ideal and convenient for light and medium type castings.(6) Its advantages are :-

1) It occupies less space.
2) Loading the metal is easy by manual power.
3) It gives uniform temperature to the metal and there is no wastage due to the cold metal.
4) There are no problems emerging from inferiority of coke because in rotary furnace, the fuel is furnance oil.

As explained in the chapter 'Production : Quality Control,' these two foundries undertake the laboratory testing of metal and sand. For modernisation, in a foundry, laboratory testing is absolutely necessary. (7) So it can be said that foundries A and B have attempted to modernise their production methods.

II) The foundries C, D and F have not made any attempts at modernisation. Foundry C is a sick unit. Foundry D is too small a unit. Foundry F is facing difficulties. No definite plans

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(6) Special study on C.I. Foundry Industry of Kolhapur,1985-86, Government of India, Ministry of Industry, SISI, PP 42

(7) Special Study on C.I. Foundry Industry of Kolhapur. ibid.

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for modernisation have been chalked out by any of these units.

III) Foundry E has made great strides in the process of modernisation. It has installed an Electric Induction furnance. Its advantages-(8)

1) The biggest advantage of electric melting lies in the fact that it affords most efficient melting practice as regards fuel efficiency. In the use of Cupola as a melting unit, there is a severe limitation the type of charge - mix that can be incorporated. There is also a danger of phosphorous being picked up from the ash in coke which results into loss of metallics. In electric melting, such loss of metallics is much less.

2) The operating cost of an electric melting unit is 8% to 12% less than the Cupola operating cost.

Composition of Operating Cost Per Ton of Liquid Metal for Induction Furnace and Cupola **(9)**

Particulars	Cupola Value in Rs. Per Ton of liquid metal	Induction Value in Rs.per Ton. of liquid metal
Metallics	1800	1500
Energy	325	341
Additiives	116	416
Indirect Material	30	13
Melting Loss	227	Nil
	2489	2272

(8) Mr. Agashe A., 'Seminar on Melting Technology of Cast Iron and Steel,' August 1984.

(9) Mr. Agashe A., ibid.

The table has been based on the following assumptions :

1) Chemical components of liquid iron are same in both cases.
2) Heavy Melting steel assumed for induction metallics and Pig Iron/ Cast Iron,scrap assumed for cupola.
3) Rates assumed are those prevailing in third week of July 1984.

DISADVANTAGES :

1) Electric melting installation requires a relatively high financial capital outlay - Rs.15 to 20 lakhs.
2) The castings generally have inferior machinability as compared to Cupola Iron Castings. This due to finer pearlite produced in the matrix of electrically melted iron compared to Cupola melted iron.(Even then, on balance, this is the more economical technique.)

LABORATORY EQUIPMENT:

Foundry E possesses a full - scale laboratory with all necessary gadgets and equipments. This process has been explained in detail in Chapter 'Production: Quality Control '.