CHAPTER - 1

INTRODUCTION
1.1 INDUSTRIALIZATION AND ECONOMIC DEVELOPMENT:

Industrialization contributes to economic development. Growth provides a steady increase in the demand for goods and services. In other words, the objectives of industrialization are:

* to promote economic development and to increase income levels;
* to increase employment and to remove unemployment;
* to strengthen foreign trade;
* to stimulate the development of other sectors; and
* to develop strategic industries and to safeguard the defence requirements.

Industrialization and economic growth stimulate investment and ease the absorption of new technology, make for orderly financial markets, and improve incentives to save. In the Indian context, industrialization also greatly assists the development of the agricultural as well as the decentralized sector and stimulate the financial and service sectors to a great extent. Industrial development to a greater extent depends upon the availability of natural resources, basic skills and level of education, availability of physical infrastructure of the industry, broad-based institutional infrastructure, free flow of information and technology, regulation of standard measures and safety, scientific and technological research and entrepreneurship.

***** THE INDUSTRIAL SPECTRUM:

The ultimate objectives of economic development in the Indian context is creating employment opportunities, expanding international trade and raising the living standards of masses.

The industrial sector of the country presents a wide spectrum. The various industries can be grouped into different categories on the basis of the size of the unit, ownership, use of output, inputs used, etc.

TABLE 1: CLASSIFICATION OF INDUSTRIES:

This is shown in table 1.

***** SIZE-BASED CLASSIFICATION:

On the basis of the size of capital investment, industries may be classified into small, medium and large-scale
CLASSIFICATION OF INDUSTRIES

<table>
<thead>
<tr>
<th>Size-based</th>
<th>Proprietary-based</th>
<th>Use-based</th>
<th>Input-based</th>
<th>Area-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Multi-National</td>
<td></td>
<td></td>
<td>5. Chemical-based industries</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Service-based industries</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7. Electronics-based</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8. Service-based industries</td>
<td></td>
</tr>
</tbody>
</table>

INDUSTRIES

- SMALL-SCALE
- MEDIUM-SCALE
- LARGE-SCALE
- MULTI-NATIONAL

- MODERN SMALL-SCALE
- ANCILLARIES
- TINY SECTOR

- COTTAGE
- HOUSEHOLD

- HANDLOOM
- KHADI
- VILLAGE INDUSTRIES
- HANDICRAFTS
- SERICULTURE
- COIR

Size-based Classification of industries
industries. Industrial undertakings having an investment in plant and machinery, not exceeding Rs. 60 lakhs are regarded as small-scale unit in India, while the investment level for export-oriented units and ancillaries is Rs. 75 lakhs. However, in view of the continued inflation, the Government is contemplating to raise the limit to Rs. 3 crores. In that case, the size-based classification undergoes a drastic change.

Within the small-scale sector, there is a special category known as the tiny sector. An industrial undertaking with fixed assets not exceeding the value of Rs. 5 lakhs and located in a village or town with a population of less than 50,000 is regarded as a tiny unit (Desai, 1997).

We may include the ancillary unit also in the small-scale sector. An ancillary unit is an undertaking having an investment in fixed assets of up to Rs. 75 lakhs and engaged in the manufacture of parts, components, sub-assemblies, tooling or intermediates or rendering of services 50% of the total output being meant for others, provided that no such undertaking shall be a subsidiary of or owned or controlled by any other undertakings.

There are no clear definitions of medium and large-scale units. However, an undertaking with a fixed investment of up to Rs. 5 crore may be regarded as large-scale units and those which fall between the small-scale sector and investment ceiling of Rs. 5 crore may be regarded as medium-scale units.

**COMPARATIVE DISTINCTIVE CHARACTERISTICS OF SMALL VS MEDIUM & LARGE ENTERPRISES:**

<table>
<thead>
<tr>
<th>SMALL ENTERPRISES</th>
<th>MEDIUM/LARGE ENTERPRISES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Privately owned</td>
<td>Private or public limited companies.</td>
</tr>
<tr>
<td>2. Proprietors &amp; family members play key role</td>
<td>Professional, skilled persons are hired from outside.</td>
</tr>
<tr>
<td>3. Fixed assets form the largest component of capital</td>
<td>Fixed assets form the modest component of capital stock.</td>
</tr>
<tr>
<td>4. Finance is from personal savings or relatives and bankers</td>
<td>Finance is from public, financial institutions, etc.</td>
</tr>
<tr>
<td>5. Infant mortality is high.</td>
<td>Infant mortality is low.</td>
</tr>
<tr>
<td>6. Growth potential is low.</td>
<td>Growth potential is quite high</td>
</tr>
<tr>
<td>7. Human resources development is totally absent.</td>
<td>Human resources development is adequate in many firms.</td>
</tr>
</tbody>
</table>
8. Ad hoc management                      Professionally managed.
9. Labor is not organized.                Labor is fully organized.
10. Per unit turnover is low               Per unit turnover is high.

(Source: Desai, 1997)

***** ROLE OF SMALL SCALE INDUSTRIES:

In recent years, the small-scale industry in India has fared extremely well, maintaining a high rate of growth that has not been matched by the large-scale industrial sectors. There has been a big leap in the number of small-scale units, in employment generated and in the range and quality of items manufactured. In fact, according to the midterm appraisal of Eighth Five Year Plan, the actual performance of this sector has bettered the targets during the first three years of Plan and it is virtually certain that this impressive track record would be maintained in the coming years, too. (Desai 1997)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>NO. OF UNITS</th>
<th>PRODUCTION AT CURRENT PRICES</th>
<th>EMPLOYMENT</th>
<th>EXPORTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(LAKHS)</td>
<td>(RS.CRORES)</td>
<td>(LAKHS)</td>
<td>(RS.CRORES)</td>
</tr>
<tr>
<td>1990-91</td>
<td>19.48</td>
<td>1,55,340</td>
<td>125.30</td>
<td>9,664</td>
</tr>
<tr>
<td>1991-92</td>
<td>20.82</td>
<td>1,78,699</td>
<td>129.80</td>
<td>13,883</td>
</tr>
<tr>
<td>1992-93</td>
<td>22.35</td>
<td>2,09,300</td>
<td>134.06</td>
<td>17,785</td>
</tr>
<tr>
<td>1993-94</td>
<td>23.84</td>
<td>2,41,648</td>
<td>139.38</td>
<td>25,307</td>
</tr>
<tr>
<td>1994-95</td>
<td>25.38</td>
<td>2,93,031</td>
<td>146.51</td>
<td>32,555</td>
</tr>
<tr>
<td>1995-96</td>
<td>26.78</td>
<td>3,45,776</td>
<td>151.20</td>
<td>38,036</td>
</tr>
</tbody>
</table>

(Source: Desai: 1997)
CHARACTERISTICS OF SSI SECTOR:

Wide range:
- Produces more than 7500 products

Dominant product groups:
- Food products (21.84%)
- Chemicals and chemical products (12.27%)
- Basic metal industry (10.44%)
- Metal products (8.41%)
- Electrical machinery and parts (6.05%)

Dominant export products:
- Hosiery and garments (29.04%)
- Food products (21.38%)
- Leather products (18.02%)
- Chemical products (7.99%)
- Metal products (5.13%)

Tiny enterprises:
- Constitute around 96% of number of units
- Share in production (38.50%)
- Share in employment (79.40%)

Key economic ratios (2nd census):

\[
\frac{\text{Production}}{\text{Investment in fixed assets}} = 4.62
\]

\[
\frac{\text{Net value added}}{\text{Investment in fixed assets}} = 1.10
\]

\[
\frac{\text{Employment}}{\text{Per lakhs Rs of investment in fixed assets}} = 3.94
\]

STATUS OF SSI UNITS IN AMRAVATI DISTRICT:

The information provided by District Industries Centre (DIC), Amravati reveals the status of SSI units in Amravati district as on August 1996 is shown in Table 1.3
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Category of Industry</th>
<th>Permanent Registration</th>
<th>Provisional Registration</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Agro based</td>
<td>240</td>
<td>804</td>
<td>1044</td>
</tr>
<tr>
<td>2.</td>
<td>Forest based</td>
<td>106</td>
<td>60</td>
<td>166</td>
</tr>
<tr>
<td>3.</td>
<td>Mineral based</td>
<td>96</td>
<td>203</td>
<td>299</td>
</tr>
<tr>
<td>4.</td>
<td>Food &amp; beverages</td>
<td>207</td>
<td>232</td>
<td>439</td>
</tr>
<tr>
<td>5.</td>
<td>Textiles</td>
<td>39</td>
<td>63</td>
<td>75</td>
</tr>
<tr>
<td>6.</td>
<td>Leather</td>
<td>20</td>
<td>35</td>
<td>55</td>
</tr>
<tr>
<td>7.</td>
<td>Rubber</td>
<td>06</td>
<td>06</td>
<td>12</td>
</tr>
<tr>
<td>8.</td>
<td>Plastics</td>
<td>51</td>
<td>89</td>
<td>140</td>
</tr>
<tr>
<td>9.</td>
<td>Chemicals</td>
<td>120</td>
<td>134</td>
<td>254</td>
</tr>
<tr>
<td>10.</td>
<td>Metal based engg</td>
<td>363</td>
<td>503</td>
<td>865</td>
</tr>
<tr>
<td>11.</td>
<td>Electrical</td>
<td>21</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>12.</td>
<td>Electronics</td>
<td>05</td>
<td>53</td>
<td>58</td>
</tr>
<tr>
<td>13.</td>
<td>Non-metal</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14.</td>
<td>Others</td>
<td>253</td>
<td>383</td>
<td>636</td>
</tr>
</tbody>
</table>

***** INSTITUTIONAL INFRASTRUCTURE IN MAHARASHTRA:

Maharashtra constitutes to be in the vanguard of industrial progress in India. It accounts for more than 22% of country's industrial output, 25% of the value added by the organized industries sector and over 35% of exports.

The strong industrial base of the State is being expanded to include a new and diversified range of industries. The State provides special support to 1,39,396 small enterprises to become more competitive and vibrant. Maharashtra is the premier state heralding the industrial revolution in the country. It is a model to other states in India. Maharashtra is an entrepreneurial state of par excellence.

Maharashtra provides a strong institutional infrastructure for promotion of industries. Organizations which could be of use to the entrepreneurs and even companies for setting up their projects in the Maharashtra are listed hereunder:

SSI: POLICY FRAMEWORK

In line with the new economic policies, policy measures for SSI were announced in the policy document on 6 August 1991.

** Salient features:

** Continued Measures:

* Priority sector lending to SSI by banks/financial institutions.
Excise exemption scheme:

- Reservation of items for exclusive production
- Price and purchase preference.
- Uniform package of incentives for the entire sector.

** New Measures:

- Removal of locational restrictions.
- Enlargement of coverage.
- Enhancement of limits.
- Shift from capital investment subsidies to infrastructure development support.
- Inclusion of services in the sector.
- Allowing equity investment in SSI (up to 24%).
- A package of incentives and facilities for the tiny sector.
- Shift from mere protection/regulation to promotion of quality, technology and efficiency.
- Substantial de-regulation & simplification of rules & procedures.

***** WHOM TO APPROACH FOR WHAT

1. FOR SELECTION OF INDUSTRY:

- Small Industry Service Institutes (SISI):
  They guide entrepreneurs in selecting industries, areas, suitable raw materials and machinery.

- Indian Investment Center, New Delhi:
  They advice on foreign capital formation and technical collaborations.

- Ministry of Industries, Govt. of India, New Delhi:
  They approve cases of foreign collaboration.

2. FOR REGISTRATION:

- Director of Industries
  SSI Registration number.
3. FOR FACTORY ACCOMMODATION:

Director of Industries: Provides built up factory space in industrial estates.

4. FOR MACHINERY:

SISI: They advice about the machinery & equipment needed for manufacturing different products.

National Small Industries Corp.: Supplies indigenous as well as imported machinery on hire-purchase basis.

State Small Industries Corp.: Provides indigenous machinery on deferred credit basis.

Chief Controller of Imports & Exports: Issues import licenses for machinery of foreign origin.

5. RAW MATERIALS:

Development Commissioner: Arranges indigenous raw materials & distribute through state govs. They also arranges imports of raw materials through Minerals & Metals Trading Corp and State Trading Corp of India.

Director of Industries: Allots quotas of scarce raw materials.

Small Scale Industries Corp.: They supply raw materials.

Chief Controller of Import & Exports & its Port offices: Issues licenses for import of raw materials.

6. FOR FINANCE:

SIDBI: Provides finances for new projects, expansion, diversification, modernization, rehabilitation.

State Financial Corporations/State Industries Development Corp.: Provides long-term credit for purchase of fixed assets.

State Bank of ... Sanctions medium-term and installment
India & its subsidiaries: Credit loans for purchase of machinery & construction of factory buildings. Also provides working capital for purchase of raw materials.

Commercial banks: Sanctions loans for meeting working capital needs.

SISI: They furnish technical reports to the State bank of India on applicant units.

Finance Corporations: Sanctions loans for meeting working capital needs.

7. FOR TECHNICAL KNOW-HOW:

SISI: Prepares improved designs & drawings for the products. Assists in making tools, dies, jigs and fixtures. They help in optimum utilization of men, materials and machineries through technological and management consulting. They train managers and supervisors in industrial management. They train workers to upgrade their skills.

NSIC: Provides advanced trainings in their prototype production cum training centers in the operation of modern machines.

Council of Scientific & Industrial Research (CSIR): Develops new technological processes and disseminates the same to industry.

Productivity Councils: They train the factory owners in getting higher productivity.

Small Industry Extension Training Institute, Hyderabad: Provides full-time management training to the managers/proprietors of small industry sector.

8. FOR STANDARDIZATION:

SISI: Providing technical guidance in the production of goods according to prescribed standards.

Bureau of Indian Standards: Prescribes specifications for the products and gives ISI marks.

Director of Industries: Prescribes standards and give "Q" mark to the small industrial products.

9. FOR MARKETING:
SISI
Conducts distribution & surveys of small industrials
Issues competency certificates to the units receiving govt. orders
Promotes ancillary relationship with the large and medium scale units

NSIC
They secure contracts from the DGSD, Railways and Defense for supply of manufactured goods on behalf of SSIs.

State Small Industries Corp.
They secure orders from the State govs and other semi-govt organizations for the supply of stores.

Export Promotion

SISI
They enlist small units for participation under Export Scheme of the State Trading Corporation of India.
They render technical counseling for satisfactory execution of export orders
They disseminate information about the items having export markets
They maintain close liaison with specialized agencies like Export Promotion Councils to have up-to-date knowledge about products having export markets

Chief Controller of Import & Exports New Delhi
They issue licenses for export of products to foreign countries

Export Houses
They organize exhibitions and showrooms

Star Trading Houses
They maintain close liaison between Indian exporters & foreign buyers.
They settle commercial disputes.
They frame special export promotion schemes

Commodity Boards
They guide the production and export of commodities along the right lines.

10. FOR INVENTIONS:

The Inventions Promotion Board,
Lajpat Nagar IV,
New Delhi-14
They promote workable inventions of practical utility, through financial practical utility, through financial assistance & other incentives.

11. FOR MISCELLANEOUS PROBLEMS:

The Federation of Associations of Small Industries of
They represent the problems faced by small industries to the govt.
India,
Rohtak Road,
New Delhi.

12. FOR TRAINING:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIDO/SISI</td>
<td>They arrange training courses to workers, supervisors in gaining skills.</td>
</tr>
<tr>
<td>NSIC/SIETI</td>
<td>They conduct entrepreneurship training programs for entrepreneurs.</td>
</tr>
<tr>
<td>ESTC/KVIC</td>
<td></td>
</tr>
<tr>
<td>CFTI/EDI</td>
<td></td>
</tr>
<tr>
<td>MDI/NIESBUD</td>
<td></td>
</tr>
</tbody>
</table>

***** INSTITUTIONS ASSISTING SMALL INDUSTRIES:

The various institutions assisting SSIs in various areas can be shown in figure 1.2
Institutions assisting Small Industries
1.2 INVENTORY : BASIC CONCEPTS:

In any society, there are various demands for items required for its own existence. Everyone in the society requires food, clothing, shelter and other necessities, not only to survive, but also to lead a good life. Products have to be cultivated or manufactured, infrastructures have to be built, amenities to be provided. For all these exercises, materials are required in one form or the other resulting in timely supply of such commodities to the needs of the society.

The stocks of inventory could be for manufacture or for sale. Every industry requires raw materials for production, customers buying their materials directly from the source against their needs, users of machines keeping certain items for replacement in stock in case such machine fails to perform, etc.; are the examples where importance of stocking of goods arises.

Production in the factory is done to meet a certain demand. If products are not manufactured for want of materials then the whole sale is lost and at the same time, the total goodwill could also be lost. For every need of the industry, there should be a source of supply by which the need is met. In other words for any demand, there should be a proportionate supply. In the absence of which there would be non-availability due to stock outs.

Sometimes the supplies may not come or arrive on time and hence, one has to keep more stocks at the production or at the user’s point to take care of fluctuations in supply. There could also be an uncertainty of demand, may be more items are to be produced for demands which were not forecasted before. In situations of uncertainty of demand and supply, one has to keep the balance of stocks so that at no point of time, sales are lost for want of finished goods.

Inventory or control of inventory is just not stocking of goods, but stocking the right goods balancing these two factors.

Another factor one should keep in mind is the high cost involved in stocking the inventories. Every industry whether it is Public Sector or in private sector has stocked crores and crores of rupees worth of inventory. It is estimated that in both sectors, there are more than Rs.30,000 crores worth of inventory which are held in warehouses. These stocks which are held carry an inventory carrying cost. In Indian context, where interest rates are around 15-18%, the inventory carrying costs could be to the tune of 25%. If we calculate the inventory carrying costs on stocks of Rs. 30,000 crores, then we spend Rs. 7,500 crores just to maintain this inventory. (IIMM, 1992).
1.3 FACTORS INFLUENCING INVENTORY:

Two fundamental questions which normally arise in inventory control are:

(i) How much to buy at one time?
(ii) When to buy this quantity?

Four fundamental factors govern answers to these questions.

1. Requirements broken down time wise. This is based upon information from a sales forecast and the production schedule.

2. Quantity in stock or on order: This information is usually obtained from the stores stock ledger balances and the unfulfilled purchase orders.

3. Procurement time or lead time: This is the total length of time required to obtain the materials. It consists of two parts - the administrative lead time and the supplier's lead time.

4. Obsolescence: Consideration should always be given to the possibility of design changes or other factors which would make the material obsolete.

With respect to the specific inventories, the relevant factors which influence them are as below:

A- Raw Materials:

The size of the raw materials and production components will depend upon:

(1) Administrative or internal lead which is the time taken within the company to place the order. This will include time taken for calling quotations, comparing quotations, making inquiries, negotiations wherever necessary, obtaining sanctions of competent authority, etc.

(2) The supplier's lead time to deliver the goods from the time purchase order is placed on him.

(3) Vendor relations: Good relations with suppliers usually have a great influence on prompt supplies. This is a matter not usually realized.

(4) Availability of the materials

(5) Government policies especially in regard to imports and more so in the case of canalized imports.

(6) Annual consumption of the material and the fluctuations in demand - seasonal or otherwise.

B- Work-In-Progress:

The size of this inventory here is dependent upon:
(1) The production cycle time. This can be very long as in the case of a heavy engineering unit or a shipyard.

(2) Make or buy policies of the company. In some cases when the company decides to make a specific component, it becomes the usual practice to manufacture it when the machines are idle.

(3) Percentage of machine utilization.

(4) Balancing of production capacities of various machines and shops.

C- Finished Goods:
The factors influencing this inventory are:

(1) Accuracy of the sales forecast.

(2) Production in economic lot size which may be higher than sales requirements.

(3) Available storage space.

Hence, inventories must:

* be sufficient to take care of demands till the next supply arrives,
* be sufficient to take care of probable delays in supplies; and
* be sufficient to take care of probable variations in demand.

To take care of these factors, the problems that need to be tackled are:

* determination of the level of inventory for placing a replenishment order and the quantity to be ordered, and
* the extent of delay in supplies and the extent of variations in demand which inventory should be able to withstand.
1.4 DESCRIPTION OF THE RESEARCH EFFORTS:

This research explores the development of inventory policy decisions in inventory control systems. Single and multi-level inventory policy models have been tested. New policy determination algorithms have been analyzed for single-level product inventory systems. In addition, system parameter modifications have been suggested for use when single-level policy determination procedures are used to determine multi-level product inventory policies. The models in this research have been tested considering inventory parameters and factors as detailed below:

1. Type of demand: known distribution;
2. Cost functions: constant;
3. Lead times: zero;
4. Amount of order actually received: 100%.
5. Interdependence between demand of items: single-item case;
6. Interdependence between locations and echelons: single echelon and multi-echelon;
7. Discounting of future costs: constant (no discount);
8. Various types of constraints: no constraint;
9. Types of backlogging policies: no backlogging permitted;
10. Conditions of obsolescence of products: no deterioration with time;
11. Types of planning horizon: finite planning horizon;
12. Types of planning periods: multi-period planning;

Model parameters considered in this research, specifically demands for finished products and all production and inventory parameters, are assumed known with certainty.

The research activities completed in this investigation includes the tasks as detailed below:

1. Understanding the profile of SSI units in Amravati.
2. Understanding awareness of JIT methodologies being practiced by entrepreneurs in Amravati.
3. Understanding and analyzing the purchasing procedure of ordering.
4. Developing software development programs for inventory management for SSIs.
5. Testing and analyzing various inventory control models and suggesting to choose the most feasible ones.