PRODUCTIVITY IMPROVEMENT IN SMALL SCALE INDUSTRIES THROUGH FINANCIAL INCENTIVES TO WORKERS

ABSTRACT

THESIS SUBMITTED FOR THE AWARD OF THE DEGREE OF

Doctor of Philosophy
IN
Business Administration

BY
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Under the Supervision of
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ALIGARH MUSLIM UNIVERSITY
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BACKGROUND

Gain in productivity can be achieved by producing more output with the same input or the same output with lesser input. Such savings in resources by consuming less or increase in profits by producing more, in turn, raises the standard of living of the community.

The operations system of a business organisation utilises resources like land, capital, men, technology and information to provide the desired output for earning profits and satisfying the customer's needs. High profits may be earned by investing more and more only if money is no bar and proper utilisation of the resources is not a matter of concern. Customer's satisfaction, on the other hand, may be achieved by producing the product of desired quality at a reasonable price.

But organisations operating in a competitive and dynamic business environment cannot afford to achieve these two goals without proper utilisation of the scarce resources and coping with the technological upgradation. It is for this purpose that managers should define, measure, monitor, and improve their organisations' performance and competitiveness.

Productivity is that criterion of performance which not only indicates a system's own progress but also compares it with that of the
competitors over time. The term productivity refers to "doing right things well" and is generally expressed as the ratio of output to input.

Productivity implies effective and efficient use of resources in producing products of the desired quality.

**BENEFITS OF IMPROVED PRODUCTIVITY**

Benefits of improved productivity of any organisation are shared by all associated with the organisation either directly or indirectly, and the nation as well. The benefits in terms of four different perspectives are listed below:

(a) National Perspective:

- Faster economic growth and higher standard of living of the community
- Increased employment opportunities by starting new industries

(b) Management Perspective:

- Increased demand of the products
- Increased opportunities by starting new industries
- Increased profits

(c) Customers Perspective:
• Reduced prices
(d) Workers Perspective
• Increased wages and salaries
• Improved quality of work life

TECHNIQUES OF PRODUCTIVITY IMPROVEMENT

Productivity improvement techniques are those techniques which require little or no capital but contribute to an increase in productivity. Techniques of productivity improvement could be classified into two categories:

(a) Incentive-based techniques: Any short-term or long-term policy of an organisation to reward its workers for increased productivity is referred to as an incentive-based technique of productivity enhancement. Incentives may be either financial or non-financial. The non-monetary means through which workers are motivated to increase the productivity like appreciation of their work by the management are classified as non-financial incentives. The financial incentive schemes on the other hand, suggest sharing of the profit with the workers so that they earn some extra money for their effectiveness and efficiency.

There are two general types of financial incentive plans: individual and group. The individual plans include time rate (day work), measured
day work, piece rate (piece work), piece rate with minimum pay, and gain-sharing, whereas, group incentive plans include Scanlon plan, Improshare, and profit sharing.

(b) Non-incentive techniques: The non-incentive category of techniques include human factors, innovation, learning curve, management by objectives, materials management, operations research, quantity and quality management, technology upgradation, value analysis, and work study.

RESEARCH STUDY

The present work is a study of small-scale industrial units (SSIs) in Uttar Pradesh from the productivity management viewpoint.

In the Indian context, where the typical problems are of a large population, under-employment and unemployment, SSIs are generally accepted as a viable media to adopt labour-intensive means of production. This sector has also proved its worth by contributing about 42 per cent in overall production, 35 per cent in exports, and 30 per cent to employment generation. It is, therefore, felt that SSIs functioning be improved consistently.

The topic of the proposed research has thus been decided as "Productivity Improvement in SSIs through Financial Incentives to Workers".
CONTENTS

The thesis comprises of four main chapters followed by bibliography and appendices.

The first chapter introduces productivity from various perspectives and in different contexts, its measurement and improvement, and benefits of improved productivity. Incentives, in general, and financial incentives, in particular, are also described in this chapter as an important management tool for productivity enhancement.

The second chapter presents the literature review in its first section followed by the objectives of the study, its methodology and the limitations. Relevant findings and excerpts of the literature reviewed are classified and presented with the aim of identifying the research gap. Need for studying the present issue is then briefly explained before specifying the objectives. A comprehensive note on the research guidelines, its methodology, and the limitations conclude this chapter.

Analysis and interpretation of the data is presented in the third chapter. The chapter is divided into seven sections according to the issues under study and the classification of data. The first six sections consist of direct analysis, as well as, analysis based on cross-classification of relevant data using statistical tests. The last section deals
with the interpretation of the respondents' view on productivity-related issues.

The fourth chapter contains the findings of the present study, discussions on the statistical investigations, the concluding observations, and the directions for future research.

At the end is provided the bibliography followed by appendices to complete the thesis.

OBJECTIVES

The objectives of the study are classified as primary and secondary and are stated below:

Primary:

1. To probe the awareness of SSI units about the importance of productivity, its measurement and improvement.

2. To study the role of incentives, in general, and of financial incentives, in particular, in productivity improvement.

Secondary:

1. To study the common practices of SSI units regarding payment of wages and incentives to the workers.

2. To study the trends of labour productivity in SSI units.
3. To propose suggestions for productivity enhancement in SSI units.

RESEARCH HYPOTHESES

The six null hypotheses tested to find significance of studying the cross-classified data are listed below:

1. Awareness of productivity and its measurement in a unit does not depend on its age.

2. Awareness of productivity and its measurement in a unit does not depend on the amount of money invested in the unit on plant and machinery.

3. Whether the productivity of a unit has been increasing, decreasing or otherwise over time is independent of the type of incentive the unit was giving to its workers.

4. The effect of financial incentives on productivity does not depend on whether the incentive is combined with time-rate or piece-rate system of wage payment.

5. The extent to which financial incentives improve labour productivity does not depend on the duration for which the incentives were provided.
6. The owner's satisfaction level regarding gain in productivity through financial incentives does not depend on the type of financial incentive.

**METHODOLOGY**

The nature of the present research work suggests a hybrid design of research. Exploratory approach is found appropriate for studying the first objective, descriptive for the next two objectives, and causal type of research for the fourth objective. The last objective is studied on the basis of findings, as well as the researcher's own judgement and observations.

The population under study can be defined as "all small-scale industrial units, basically of manufacturing type, working in the major industrial cities of Uttar Pradesh including the clusters of SSIs as classified by the Abid Hussain Committee (1997)."

Due to unavailability of an up-dated and reliable sampling frame only convenience sampling was found suitable for selecting a representative sample to provide stable results as precisely as possible.

A structured questionnaire was used for data collection from the sample. In view of the need and objectives of the study the questionnaire contained 43 questions designed to gather information regarding the concept and practices of SSIs related to productivity management.
As a part of pilot study the questionnaires were distributed personally in Aligarh to the owners of few SSI units. After completing the pilot study, questionnaires were distributed to various units through either the friends and relatives identified for the purpose or personality where direct approach was possible. In all, 150 units were contacted out of which 93 responded to the questionnaire.

DATA ANALYSIS

The entire processing of information is divided into seven sections. The first six sections deal with the facts and figures related to the sample units whereas the last section presents interpretation of the respondents' views on productivity-related issues. Analysis of the first six sections consist of direct analysis as well as, analysis based on cross-classification of relevant data using chi-square statistics.

FINDINGS OF THE STUDY

The findings of the study are summarised below:

• The median age of the units is found to be 21 years and the median amount invested on plant and machinery in the units is Rs. 45 lakhs. Each unit, on an average, employs 50 workers of different categories.

• One-fourth of the responding owners / managers are qualified in technical streams like engineering and management while the rest
include those from other non-technical disciplines. The average experience of the respondents in their present units is 13 years. Not more than ten per cent of them have undergone any professional training.

- Productivity management in SSIs is still in its infancy. It is considered more as a theoretical aspect rather than a practical approach.

- Although 50 per cent of the units are found measuring productivity, only few owners / managers understand productivity in its real sense.

- Among the five commonly used performance measurement parameters (product quality, production volume, productivity, profitability and market share), productivity has been found as only the fourth important parameter.

- Not all units which are aware of the benefits of productivity improvement are measuring their productivity. Also, all units which do not measure productivity are not necessarily unaware of the benefits. Here it would not be out of place to point out that, generally speaking, the role of productivity is not being fully understood and appreciated by the SSIs.
• Profit per rupee of investment is the major index of performance used in SSIs.

• Measurement of productivity and its awareness in a unit does not depend on how old the unit is. It depends, however, on the investment.

• The practice of providing financial incentives to workers is very common in SSIs, but with different objectives. The main purpose of financial incentives is to increase production. Improving quality of the product has also been the objective of giving incentives in some units. Such incentives are mostly used as a short-term measure only.

• Financial incentives also improve the quality of work even if they are meant for increase in production.

• The amount of gain in labour productivity over time depends on the type of incentive. Financial incentives are generally found as the most effective means of increasing productivity.

• Increase in productivity is not affected by whether financial incentives are combined with piece-rate or time-rate system of wage payment.
- The extent to which financial incentives serve their purpose is independent of the type of scheme and the duration for which the incentives are given.

- Wages in SSIs are fixed according to either industry norms or through negotiations between the workers and owners.

- Time-rate system of wage payment to regular workers is more common as compared to piece-rate system, particularly in the units which follow industry norms for wage payment.

- Casual workers are generally paid on daily-wage basis.

- Wages are usually increased annually.

- Workers performance is generally measured as number of units produced per worker or per labour-hour.

- The trend of labour productivity over the years has been either increasing, constant, decreasing or erratic in different units irrespective of the industry a unit belongs to or its location.

- Low efficiency of workers and lower grade of technology are identified as the two main factors resulting in a decreasing trend of productivity in any SSI unit.

- No positive impact of liberalisation on productivity aspects is observed at the grass-root level in SSIs.
The small number of owners / managers who are aware of ISO-9000 feel that going for this certification is expected to bring some positive change in the attitudes of manager as well as workers toward productivity.

Almost all units are found to be unaware about the existence of the National Productivity Council and its role.

SSIs are generally not satisfied with the government's assistance and incentives to them as even their basic requirements, like that of power, are not readily fulfilled.

Despite some favourable recommendations of the Abid Hussain Committee, small-scale sector has strong apprehension about its future particularly in view of the current economic policy and the contentious issue of MNCs entry.

While the debate on productivity-linked incentives is still inconclusive because of its multi-dimensional effects on the workers performance at the workplace, the blue-collar’s output in the small business organisation is found to be linked with monetary rewards to a great extent.
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1998
CERTIFICATE

Certified that Mr. Jamal A Farooqie, a candidate for the degree of Doctor of Philosophy in this department, has completed his thesis entitled "Productivity Improvement in Small Scale Industries through Financial Incentives to Workers" under my supervision.

To the best of my knowledge and belief the research work is based on the investigations made, data collected and analysed by him and it has not been submitted in any other university or Institution for the award of any degree or diploma.

Dated: June 08, 1998

(Dr. Azhar Kazmi)
PREFACE

The operations system of a business organisation utilises resources like land, capital, men, technology and information to provide the desired output for earning profits and satisfying the customer's needs. High profits may be earned by investing more and more only if money is no bar and proper utilisation of the resources is not a matter of concern. Customer's satisfaction, on the other hand, may be achieved by producing the product of desired quality at a reasonable price.

But organisations operating in a competitive and dynamic business environment cannot afford to achieve these two goals without proper utilisation of the scarce resources and coping with the technological upgradation. It is for this purpose that managers should define, measure, monitor, and improve their organisations' performance and competitiveness.

Productivity is that criterion of performance which not only indicates a system's own progress but also compares it with that of the competitors over time. The term productivity refers to "doing right things well" and is generally expressed as the ratio of output to input.

The present work is a study of small-scale industrial units (SSIs) in Uttar Pradesh from the productivity management viewpoint.
In the Indian context, where the typical problems are of a large population, under-employment and unemployment, SSIs are generally accepted as a viable media to adopt labour-intensive means of production. This sector has also proved its worth by contributing about 42 per cent in overall production, 35 per cent in exports, and 30 per cent to employment generation. It is, therefore, felt that SSIs functioning be improved consistently.

The topic of the proposed research has thus been decided as "Productivity Improvement in SSIs through Financial Incentives to Workers".

The study aims at probing into the awareness of SSIs about the importance, measurement and improvement of productivity. The role of incentives, particularly financial incentives, to workers in productivity improvement is then studied.

The thesis is comprised of four main chapters followed by bibliography and appendices.

The first chapter introduces productivity from various perspectives and in different contexts, its measurement and improvement, and benefits of improved productivity. Incentives, in general, and financial incentives, in particular, are also described in this chapter as an important management tool for productivity enhancement.
The second chapter presents the literature review in its first section followed by the objectives of the study, its methodology and the limitations. Relevant findings and excerpts of the literature reviewed are classified and presented with the aim of identifying the research gap. Need for studying the present issue is then briefly explained before specifying the objectives. A comprehensive note on the research guidelines, its methodology, and the limitations conclude this chapter.

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CHAPTER 1

INTRODUCTION TO PRODUCTIVITY AND INCENTIVES
CHAPTER 1

INTRODUCTION TO PRODUCTIVITY AND INCENTIVES

National productivity of a country projects the standard of living of its people. The higher the national productivity, the better its standard of living will be. A gain in productivity is achieved by producing more output with the same input or the same output with lesser input. Such savings in resources by consuming less or increase in profits by producing more, in turn, raises the standard of living of the community.

A business organisation has to have some resources like land, capital, men, technology, machines and equipments, and information as input to the operations system in order to produce the needed goods, services, and information, as output, to the customers. Such an organisation then continues to operate as long as it enjoys profit and the customers' satisfaction. High profits may be earned by investing more and more only if money is no bar and proper utilisation of resources is not a matter of concern. Customer's satisfaction, on the other hand, may be achieved by producing the product of desired quality at a reasonable price and delivering it to the customers when needed. But enterprises operating in a competitive and dynamic business environment cannot afford to achieve these two goals without proper utilisation of the scarce
resources and coping with the technological upgradation. It is for this purpose that managers should define, measure, monitor, and improve their organisations' performance as a indicator of their competitiveness. Performance is a broad concept and according to Scott Sink (1983) is comprised of at least seven criteria: efficiency, effectiveness, quality, quality of work life, innovation, profitability, and productivity. These performance components differ in their meanings and measurement and are, therefore, considered in a diverse manner by different managers and organisations according to their needs. Efficiency estimates "how fast" a task is completed and, according to Peter Drucker (quoted in Stoner, 1987), refers to "doing things right". He refers effectiveness to "doing the right things" as an estimate of "how well" the task is completed. Although these two parameters of performance measure the pace and worth, respectively, of a task done by an individual person or system but do not give any idea about competitiveness of the same because factors like work environment, which influence performance, do not figure in these estimates. Other criteria too, apart from productivity, indicate only the individual's or system's success but not competitiveness.

1.1 Productivity Defined:

Productivity is that criterion of performance which not only indicates a system's own progress but also compares it with that of the competitors.
Productivity is a combination of efficiency and effectiveness and, therefore, refers to "doing right things well". Before elaborating this concept further let us have a look at some of the definitions, or their excerpts, of productivity as given by various authors and researchers.

- Productivity is the measure of how well resources are brought together in organisations and utilised for accomplishing a set of results. (Mali, 1978).
- Productivity is the ratio of output to input. (ILO, 1979).
- Productivity is the quality or state of being productive. (Riggs, 1984).
- Productivity is the measure of how well an operations system function. (Stoner, 1987).
- Productivity is the ratio of outputs produced per unit of resources consumed, compared to a similar ratio from some base period. (Hicks, 1994).

Having an insight into the concept and explanations of productivity available in literature, as discussed above, it can be concluded that productivity implies effective and efficient use of resources in producing products of the desired quality expressed as output per unit of input.
1.2 Productivity Viewed from Different Perspectives:

Productivity is defined differently according to the purpose and for various combinations of inputs, outputs, and organisations. Four major views of productivity, which are most commonly accepted, are explained here. (Mali, 1978).

(1) National Productivity: Country as a whole is the organisation and all resources, tangible and intangible, are considered combinedly for input whereas all economic goods and services produced are taken together as the output.

\[ \text{Total National Productivity} = \frac{\text{GNP}}{\text{Labour + Capital}} \]

(2) Industry Productivity: Productivity in industries is similar to that at national level with the difference that here organisation is the industry and input and output are related to that industry only.

(3) Firm or Organisational Productivity: It is defined as 1 & 2 above but for an individual firm or organisation.

(4) Individual worker's Productivity: Here productivity is defined considering only the performance of individual workers.
These four interpretations of productivity are inherently related to each other as individuals constitute an organisation; organisations of similar kinds form an industry; and different types of industries build an nation.

1.3 Total and Partial Productivity:

When productivity ratio is determined for an organisation with reference to all outputs and all inputs, the ratio is called Organisational productivity. Total productivity, or Total factor productivity. This is expressed as:

\[ TFP = \frac{\text{Goods + Services}}{\text{Labour + Capital + Materials + Energy}} \]

If this ratio is determined with reference to all outputs and partial input then the ratio is called Partial productivity e.g. capital productivity, machines productivity, and labour productivity. Productivity index, the ratio of current year’s productivity to the productivity of the base year, indicates percent gain or loss in productivity over the period. These are expressed as:

- Capital productivity = Output/Capital
- Labour productivity = Output/Labour hours
- Machine productivity = Output/Machine hours
- Productivity index = Productivity(current year)/Productivity(base year)
1.4 Productivity Management:

Low productivity means high inflation which results in reduced profits. This in turn reduces investment and finally such low investment leads to decreased productivity. So as not to fall in this vicious circle of low productivity, organisations should measure and attempt to improve partial and total productivity on a continuous basis. Benefits from productivity improvement are many, the major being a higher standard of living. But since the measurement of productivity in its real sense is not that easy there are also factors which tend to reduce productivity. A comprehensive programme to manage productivity, therefore, needs to be designed. And it is, of course, the responsibility of operations management and the top management of the organisation. Gerstanberg of General Motors Corporation (1982) said, "increased productivity results mostly from sound planning, from wise investment, from technology, from better techniques, from greater efficiency- in short, from the better exercise of the functions of management (DelMar, 1985).

Productivity management, as defined by Sardana and Pran (1991), is a formal management process involving all levels of management and employees with productivity improvement as the ultimate objective. Five steps of managing productivity are given as productivity planning, productivity measurement, productivity evaluation, productivity improvement, implementation and control.
It is said that a well defined problem is half solved. In the planning phase, one should consider all factors which affect the organisation's functioning, its strengths and weaknesses, and finally arrive at selection of performance objectives and the strategies to measure and improve the same.

1.5 Productivity Measurement and Improvement:

As discussed earlier productivity can be measured either at organisational level taking into account all the outputs and inputs or partially considering different inputs resources with all the outputs separately. A popular measure of productivity is labour productivity i.e. the quantity produced per labour- hour. Measuring the output in service industries is rather difficult than in manufacturing industries and for this reason productivity measurement in service industries is more difficult than the manufacturing industries. In fact, nature of work in all types of organisations contain both quantitative and qualitative factors and hence measurement of productivity requires a joint assessment of quantitative and qualitative performance. Depending upon the nature of organisations and their objectives, different methods of productivity measurements are employed.

After measuring the productivity, evaluation of the results and identifying the room for improvement, if any, is the next step in a productivity management programme.
A misconception about productivity improvement among the work force is that it leads to unemployment. Also they have least interest in improving the enterprises' productivity unless rewarded for the same. For these two important reasons workers in any organisation resist any proposed change in the system to enhance productivity.

1.6 Techniques of Productivity Improvement:

Productivity improvement techniques are those techniques which require little or no capital but contribute to an increase in productivity. Techniques of productivity improvement could be classified into two categories:

(a) Incentive-based techniques (generally employed for labour productivity)

(b) Non-incentive techniques (generally employed for process productivity)

Any short-term or long-term policy of an organisation to reward its workers for increased productivity is referred to as an incentive-based technique of productivity enhancement. Incentives may be either financial or non-financial. The non-monetary means through which workers are motivated to increase the productivity like appreciation of their work by the management are classified as non-financial incentives. The financial incentive schemes, on the other hand, suggest sharing of the profit with the workers so that they earn some extra money for their effectiveness and efficiency. Since the emphasis of the present
work is on labour productivity, the incentive-based techniques are discussed in detail in section 1.10.

The non-incentive category of techniques include human factors, innovation, learning curve, management, by objectives, materials management, operations research, quantity and quality management, technology, upgradation, value analysis and work study. These approaches are briefly explained in the following paragraphs.

Human factors (or ergonomics) is the discipline that deals with designing and development of man-machine systems considering human capabilities and limitations to perform in a particular work environment. Such systems increase the proficiency of the people at work.

Innovative managers and workers can always help the organisation improve its productivity. Innovation, in simple words, is making the strange familiar. The ability of people to create and develop new ideas makes room for improvement.

Learning at workplace reduces the efforts to be put in by the individuals to produce the same or a better output. A learning curve, also known as experience curve, describes the rate of reduction in the unit cost of production over the time that a worker spends on the job. Experience curves are used to measure the performance improvement.
Yet another practice in use for improvement of productivity is that of management by objectives (MBO) or goal setting. In a system following MBO, the annual objectives are written and agreed upon between each manager and his superior so that the managerial performance can be measured in terms of these objectives. At the end of each year the performance is evaluated and measures are taken for eliminating or reducing the fall-outs.

Material is said to be the most expensive direct resource of any organisation. In some cases, this contributes 50 to 60 per cent of the total direct expenditure. Use of proper material at the right time and at the right place is, therefore, considered as a promising factor in productivity improvement.

Operations research (OR) is a multi-disciplinary approach of optimising the objective functions of management like cost and profit. Complex problems of optimisation are converted into models and solved using mathematical and statistical tools. Various models covered under the umbrella of OR include linear programming, integer programming, decision-making models, and queueing models.

Productivity can also be improved by effectively managing the quantity and quality of the resources being used as input to the production system. Economic order quantity (EOQ), Materials requirements planning (MRP), and Just-in-time (JIT) manufacturing are some important techniques of inventory management.
Apart from inspection, statistical quality control (SQC) is an effective method of quality check for input resources. The recently conceived philosophy of total quality management (TQM) encompasses all possible efforts to improve qualitatively the overall performance of organisations.

Technology is that set of processes, tools, methods, procedures, and equipment used to produce goods or services (Schroeder, 1993). For having an edge over the competitors, business organisations need continuous upgradation of their technologies by choosing the appropriate ones and rejecting those consuming more or producing less. Technology upgradation is possible through either indigenously developed alternatives or technology transfer.

Value analysis is a cost reduction technique and is defined as a systematic approach of identifying and eliminating or reducing the unnecessary costs. A product or process is analysed in terms of its primary and secondary functions and the cost. Such analyses often result in the design of equivalent, but less costly, products and hence improve the productivity.

Work study is concerned with the concept of labour control and has been contributing as an important element in attaining the objective of productivity. The first component of work study is to economise the body movements of workers while performing a specific job. The method of doing a task is thus standardised and measured in terms of the time to complete the task. This
standardisation of time, the second component of work study, helps in job evaluation, man-power planning, determination of wages and working out incentive plans.

The last step of productivity management programme is the implementation and control of all changes and improvements proposed for productivity improvement.

1.7 Factors Tending to Reduce Productivity:

Some important factors responsible for low productivity in an organisation on the part of designers, manufacturers, managers and workers are given below (ILO, 1979):

(1) Work content added due to following features of the product:

- Design
- Incorrect quality standards
- Lack of standardisation

(2) Work content added due to following features of the process or method:

- Bad design of the plant layout
- Use of improper machines and tools
- Uneconomical working methods of the workers

(3) Ineffective time added due to the management inefficiency:

- Failure in standardising the product
- Failure in effective operations planning and control
- Failure in providing better working conditions

(4) Ineffective time added due to the workers inefficiency:

- Lateness and slow working
- Carelessness causing rework
- Carelessness causing accidents

1.8 Factors affecting Productivity Improvement:

There are four interrelated variables which influence organisational changes as a measure of productivity improvement, namely, Tasks, Structure, Technology, and People (DelMar, 1985). Tasks are the objectives that organisations sets out to achieve. Technology is an organisation's inventory of equipment, processes, methods and plant. Structure, refers to the organisational arrangement of authority, responsibility, delegation, communication channels, and the span of management. Individuals are the people who make up an
organisation with their individual attitudes, expectations, and value systems. One or more of these variables need to be manipulated in order to achieve increased productivity.

A continuous change in the organisational behaviour has been emphasised by Hicks (1994) in order to achieve continuous improvement in its productivity over time.

The International Labour Organisation in its book on work study (1979), makes all sections of the community responsible for taking actions to achieve increase in productivity. Governments, for example, are supposed to create conditions favourable to the efforts of employers and workers to raise productivity. This is to be achieved by having a balanced programme of economic development taking the necessary steps to maintain employment. Efforts could also be made for providing employment to those who may became redundant as a result of productivity improvement programme in individual enterprises.

The other two sections of the community -- employers and workers, are, however, more vital to affect productivity improvement in industries. The management of an organisation must create conducive environment with the workers' cooperation and good will to enhance the productivity.
1.9 Benefits of Improved Productivity:

In fact, benefits of enhanced productivity of any organisation are shared by all associated with the organisation either directly or indirectly, and the nation as well. The benefits in terms of the four different perspectives are listed below:

(a) National Perspective

- Faster economic growth and higher standard of living of the community
- Increased employment opportunities by starting new industries

(b) Management Perspective

- Increased demand of products
- Increased opportunities of further investments
- Increased profits

(c) Customers Perspective

- Reduced prices

(d) Workers Perspective

- Increased wages and salaries
- Improved quality of work life
1.10 Incentives:

In any enterprise productivity is a goal of management and not of the workforce unless motivated through some means to achieve such a goal. Workers want some socio-economic benefits as reward for the extra efforts put in to improve the productivity. Such socio-economic factors which can motivate them for performing more efficiently and effectively are identified under the name incentives. Negative tactics, like punishment are also sometimes adopted by managers to motivate their workers for maintaining a certain level of output and productivity. However, incentive generally means reward and not punishment. Incentives are classified as financial and non-financial. The choice of financial, non-financial or a suitable combination of both depends upon the nature of work and the type of workers.

Incentive plans are designed differently by various organisations according to their needs. Some major objectives of incentive schemes are however common and listed below (Krishna, 1983):

- Increased production
- Reduced waste of resources
- Improved quality
- Reduced downtime of equipment
Less accidents, and

Reduced absenteeism

The mechanism of incentives as they work to motivate workers is explained in the following section with reference to some basic theories of motivation.

1.11 Behavioural Underpinning of Incentives:

Motivation of all sections of employees is necessary to achieve the productivity targets. Some employees need motivation to a greater extent than others. This is so because employees differ in their characteristics as individuals. An employee may work at a satisfactorily acceptable level even without any apparent externally induced motivation. Another employee may perform only at a barely acceptable level in the absence of explicit motivation. However, there is always a group of employees that needs it more than the others because of their certain individual characteristics which make them to perform only at marginal levels. Most theories of motivation are, therefore, based on the principle of hedonism which states that individuals behave in a manner so as to seek pleasure and to minimise displeasure. This philosophical approach provides some basis for identifying why individuals act the way they do, and not for understanding why people choose a particular behaviour over other (Szilagyi et al, 1980).
Popular theories of motivation relevant to incentives are briefly discussed below:

(a) Maslow's Hierarchy of Human Needs: Maslow's hierarchy of needs has probably received more attention from managers than any other theory of motivation because it has direct implications for managing human behaviour in organisations (Stoner, 1987). Maslow viewed human motivation as a hierarchy of the following five needs:

1. **Physiological** - includes the need for air, water, food, and sex.

2. **Security** - includes the need for safety, order, and freedom from fear or threat.

3. **Belongingness and love (Social needs)** - include the need for love, affection, feelings of belonging, and human contact.

4. **Esteem** - includes the need for self respect, self esteem, achievement, and respect from others.

5. **Self actualisation** - includes the need to grow, to feel fulfilled and to realise one's potential.

Physiological needs of employees must be satisfied by a wage sufficient to feed, shelter, and protect them and their families satisfactorily. A safe working environment must be provided before managers offer incentives designed to
provide employees with esteem, feeling of belonging, or opportunities to grow.

Security needs require job security, freedom from feelings of arbitrary treatment, and clearly defined regulations.

Sense of belonging and being loved can be satisfied if working in a friendly environment and the employees should feel that they are an integral part of the organisation. Employees should also having a feeling of self recognition and self respect at their workplace.

Esteem needs are satisfied when they feel their job performance as the achievements and get recognition and appreciation from the management.

When all other needs are satisfied, according to Maslow, employees will become motivated by the need for self actualisation which means personal growth in their work either by producing high quality work or being creative in their ideas. It is up to managers how to manage and motivate their work force by identifying their needs at times and the means to satisfy them. Incentives can motivate people only when their needs of that time are satisfied.

In many organisations, there are disincentives to increase productivity and the workers actively seek to restrict output. Disincentives occur when workers believe that increased productivity may lead to lay-offs, job reassignment, and work speedups (Schroeder, 1993). Under these
circumstances, wage incentive plans are one way to make it clear that both parties will benefit from improved productivity.

(b) Motivation-Hygiene Theory: This theory, proposed by Frederick Herzberg, investigates what people want from their jobs. The original experiment on some 200 accountants and engineers revealed two distinct types of motivating factors: satisfiers and dissatisfiers. The dissatisfiers or hygiene factors include salary, job security, company policies, and working conditions. Whereas work content, achievement, and recognition etc. were found among satisfiers or motivation factors (Szilagyi, 1980). The theory, in simple words, concludes that for avoiding dissatisfaction of people on their jobs and making them satisfied both financial and non-financial incentives are significant.

(c) Alderfer's ERG Theory: ERG theory is a revised hierarchy of needs describing existence, relatedness, and growth as three groups of core needs (Robbins, 1991). Comparing the ERG theory with that of Maslow's, Robin found this theory as being more consistent with our knowledge of individual differences among people. According to him, variables such as education, family background, and cultural environment can alter the importance or driving force that a group of needs holds for a particular individual.

The existence group includes the needs for pay, benefits and physical working conditions. All those needs that involve inter-personal relationships with
others in the work place belong to the relatedness group of needs. Growth needs are those needs that involves a person’s efforts toward creative or personal growth on the job.

Worker's motivation through incentives can easily satisfy these groups of needs, particularly the existence group, which inturn improves the productivity.

(d) Equity Theory: Equity theory of motivation is concerned with the individual’s perception to discrepancy between the amount of rewards they receive and their efforts. The greater the discrepancy the more individuals are motivated to reduce incentives, minimise this gap and make people more satisfied to improve productivity.

(e) Reinforcement Theory: This theory emphasizes the role of operant conditioning which reinforces the behaviour of people to behave in a desired way so that the organisational goals can be achieved optimally. The four fundamental principles of reinforcement theory-measurable behaviour, contingencies of reinforcement, reinforcement schedules and the value and size of the reinforcer - serve as the foundation of this approach to motivation (Szilagyi, 1980). Financial incentives are found effective reinforcers that enable employees to be productive and satisfied with their work.
Despite of such theories and research findings that relate productivity with incentives, management are usually reluctant to install wage incentive plans.

Mitchell Fein explains three reasons for this resistance (Schroeder, 1993):

(1) Some managers are concerned that incentives will diminish their ability to control the operations and over a period of time the incentives will deteriorate, causing labour problems.

(2) Some managers believe that productivity improvement is largely created by management efforts; there is no need to share productivity gains.

(3) Management's rights advocates believe that improvement is best shared periodically as increases in wages and benefits.

In spite of all such arguments, the need to share productivity gains with labour through incentives has been found to be the most powerful and economical management tool to get the productivity enhanced.

1.12 Non-financial Incentives:

People do not always get motivated through monetary benefits and rewards. Depending upon the society, the type of people and the kind of needs they want to meet, non-monetory or social rewards also become equally important, if not more, as compared to the monetary rewards. The Maslow's need hierarchy probably presents the most elaborated profile of human needs.
After the fulfilment of physiological and security needs employees look forward to satisfying their higher need levels. The physiological and security needs of people can be satisfied by providing them with financial incentives. Beyond these non-financial incentives are likely to act as catalyst in the motivation process.

Some commonly employed non-financial incentives are management's recognition and appreciation of employees' efforts through certificates, etc., invitation to some of them to participate in decision-making, and promoting them to next higher levels as reward for their productivity.

1.13 Financial Incentives:

There are two general types of financial incentive plans: individual and group. The individual plans include time rate (day work), measured daywork, piece rate (piece work), piece rate with minimum pay, and gain-sharing, whereas, group incentive plans include Scanlon plan, Improshare, and profit sharing.

1.13.1 Time Rate Plan: According to this simplest wage scheme, a worker is paid on the basis of the number of hours he works and the hourly rate fixed for the job arbitrarily or negotiated with the Union. Using this method of payment a worker's daily earnings would be:
\[ E = RH \times HW \]

Where:

- \( E \) = earnings (Rs./day)
- \( RH \) = hourly rate (Rs./hr)
- \( HW \) = hours worked (hours/day)

1.13.2 Measured Day Work Plan: This is very similar to the time rate plan except that the hourly rate is fixed using work measurement techniques instead of fixing it arbitrarily. Further the rate is revised from time to time on the basis of the number of units produced per past period of time.

1.13.3 Straight Piece Rate Plan: Payment is made at a constant amount per unit of output. Piece rate is set on the basis of the standard time determined using work measurement techniques, the type of work and its worth. Standard time has been defined as the time required by an average worker, working at a normal pace, to complete a specific task, using a defined method, under specified working conditions, with adequate allowance for personal fatigue, and delay times (ILO, 1979; Riggs, 1984; Aft, 1985). The method in symbolic form is explained below.
\[ E = RP \cdot O \]
\[ E = (RH \cdot \text{std. time per unit}) \cdot O \]

where:

- \( RP \) = piece rate (Rs./piece)
- \( O \) = number of units produced
- \( E, RH \) = same as in 1.13.1

If this income comes out to be lesser than the minimum compulsory wage, set by the law, then that minimum shall be paid to the worker.

Riggs has explained this scheme in another form, giving the equation that follows:

\[ E = RH \cdot (A/T) \]

Where:

- \( E \) = earnings per hour (in rupees)
- \( RH \) = hourly rate (Rs./hr.) as established for the task
- \( A \) = standard time of the task (hrs./unit)
then,

Earnings (rupees) = \( E \times \) number of hours worked

Straight piece rate system is widely used where jobs are of a repetitive nature and the task is under the worker's direct control i.e. there is no effect on the workers' performance by any other worker or machine.

To take into account the factors which may affect the workers' performance but are not under his control, another piece rate plan with a minimum guaranteed wage is employed as explained next.

1.13.4 Piece Rate with a Minimum Wage: In this incentive scheme 100 per cent or some per cent of a daywork is guaranteed.

\[
RH = \frac{(DG/x)}{DH} \text{ Rs./hr.}
\]

Where:

\( DG \) = day work guarantee (Rs./day)

\( DH \) = day hours (usually 8 hours)

\( x \) = per centage of the day work guaranteed (in decimal form)

The daily earnings are now determined using the equations as in 1.13.3.
RP = RH * std. time per unit, and

E = RP * O. (If E < DG then DG is paid to the worker)

The piece rate (RP) is calculated as usual. With the help of the standard time per unit for the operator paced part of the task and the operator's day rate (RH). Total number of units produced during eight hours (man- machine combined) is represented by O.

1.13.5 Earned Hours Plan: The number of units produced in a day are converted into the hours earned by the worker and when multiplied by the hourly rate gives the earnings of the day.

E = EH * RH

Where:

EH (earned hours) = (std. time per unit) (number of units)

Calculations, under this incentive scheme, are similar to those explained in 1.13.4 when considering 100 per cent or some other per cent of daywork guaranteed and the operator- machine combined tasks.

1.13.6 Gain Sharing Plan: A gain-sharing or bonus incentive plan determines earnings using a variable rate- one base rate for production up to standard, and
another (higher) rate for production over standard. This way the gain in production over standard is shared between the worker and the management. The equations generally used for calculating the earnings is given below:

\[ E = (SRP \times SO) + (O - SO) \times IRP \]

where:

- \( SRP \) = standard rate per piece (Rs)
- \( SO \) = standard output per shift (units)
- \( O \) = actual output per shift (unit)
- \( IRP \) = increase rate per piece (Rs)

Group incentive schemes are applicable for tasks of interactive nature and people work together as a team to give the desired output. Indirect labour and management also are benefited under such group incentive schemes. The sections that follow describe some group incentive plans.

1.13.7 Scanlon Plan: This incentive plan is based on the ratio of payroll to production of the plant. This ratio measures the plant’s productivity. For example, during the year preceding the adoption of a Scanlon plan, the payroll for a company was Rs. \( X \), and the sales for the same period was Rs. \( Y \), then the
ratio $X/Y$ (Say, $Z$) will be used for computation of future incentive plan as explained below.

Assume that the first month’s payroll and sales, after the productivity programme has been implemented, are $X_1$ and $Y_1$ respectively. The new ratio is then $X_1/Y_1 = Z_1$ (say), the expected monthly payroll of this month based on the ratio $Z = Z(Y_1)$, then the difference (savings) would be:

$$\text{Savings} = Z(Y_1) - X_1 = S$$

A percentage of this savings, usually 75 to 80, is deposited with a fund to be distributed to all employees as bonus and the balance to the company. This balance can be utilised, when the ratio $(X/Y)$ increases indicating a decrease in productivity for further improvements.

1.13.8 Improshare (Improving productivity through sharing): Improving productivity through sharing is an incentive plan developed by Mitchell Fein, that works on a fifty-fifty basis to share any gain in productivity (in terms of time) between management and the employees, the bonus is calculated as follows:

- Total hours worked per week, $TH = WF \times H$
- Produced hours per week, $PH = DLS \times O$
- Base Productivity Factor, $BPF = TH/PH$
Where:

\[ WF = \text{workforce size (number of employees)} \]

\[ H = \text{hours spent at work per week per employee} \]

\[ O = \text{number of units produced during the base week} \]

\[ DLS = \text{hours of direct labour required per unit under normal conditions (standard time)} \]

Then, the factor to adjust the time standard to reflect the overall required time, called the improshare standard, is given by:

\[ \text{IMPS(hours)} = BPF \times DLS \]

Improshare earned hours, \( \text{IMPEH} = \text{IMPS} \times \text{units produced} \)

Here by the 'units produced' is meant those units which are produced by the same workforce during a week after the productivity improvement programme has been implemented.

Total hours gained, \( \text{THG} = \text{IMPEH} - \text{TH} \)

Bonus hours gained by the employees, \( \text{BHG} = 0.5 \times \text{THG} \) (because total gain is to be divided into two parts on fifty-fifty basis)

The bonus is then expressed as a percentage of total hours (TH).
Bonus = \frac{BHG}{TH} \times 100\% 

The bonus thus calculated would be added to every employee's base wage.

1.13.9 Profit Sharing: Profit sharing is another type of group incentive plan where the total profits earned during a specified period are shared between management and the work force in a ratio agreed upon by the two parties. Such a plan highlights increased productivity as a common goal of both parties rather than 'increased production' as the target of workforce and 'increased productivity' that of the management.

Incentive plans are many and only a few from each category, individual and group, are discussed above. Further, each incentive scheme, be it individual or group type, has its own merits and demerits. Organisations, however, design and implement their own incentive plans for the employees. Two important conditions are, however, satisfied by the plan. First, the plan is to be well understood and agreed upon by both the parties in advance and second, it is to work well within the frame work of labour laws.

Having presented an overview of various aspects of Productivity Management and Incentive schemes it can be concluded that productivity does not only evaluate the performance of an individual or an organisation but also compares it with the competitors. Moreover, a continuous improvement in
productivity is essential which can be achieved by motivating people using different methods including financial incentives.

Section 2.1 of the chapter that follows further elaborates the relationship between productivity and financial incentives.
REFERENCES


CHAPTER 2

RESEARCH OBJECTIVES
AND METHODOLOGY
CHAPTER 2
RESEARCH OBJECTIVES AND METHODOLOGY

This chapter deals with the literature review in its first section followed by the objectives of the study, its methodology and the limitations. Relevant findings and excerpts of the literature reviewed are classified and presented under the section 2.1 with the aim of identifying the research gap and attempting to formulate the research objectives. Need for studying the present issue is then briefly described before specifying the research objectives. A comprehensive note on the research guidelines, its methodology, and the limitations conclude the chapter.

2.1 Review of Literature:

Productivity as a performance criterion is too complex to be conceptualised and measured because of the wide spectrum of its definition that changes from resource to resource and from industry to industry. For instance, measurement of labour productivity in a manufacturing organisation is different from that in a service organisation and even within the same organisation white-collar productivity differs from the blue-collar productivity. An attempt in this context is made here to review the studies and practices of previous academicians and practitioners available in literature.
2.1.1 Productivity-Large vs Small Units: Strategic planning, a crucial step toward a successful Productivity Management Program (Sink, 1985), in small business organisations is different from that in large units because of their limitations related to the product, technology, market, economy, and human resource development. Such differences, however, do not draw any firm line of demarcation between them so far as productivity planning and its implementation are concerned.

Given below are the concepts and research findings, revealed by this review, on various issues related to total productivity, labour productivity and financial incentives.

2.1.2 Productivity in Manufacturing and Service Organisations: Mundel describes productivity ratio as an index which is mathematically given by: (Hicks, 1994)

\[
\frac{AOMP}{RIMP} \div \frac{AOBP}{RIBP} \times 100
\]

Where:

- AOMP = aggregate output, measured period
- AOBP = aggregate output, base period
- RIMP = resource input, measured period
- RIBP = resource input, base period

In the expression, the numerator is called the current performance index, whereas the denominator is referred to as the base performance index. Mali (1978) has, however, suggested five categories of ratios representing the productivity index.
namely, overall indices, objective ratios, cost ratios, work standards, and time standards ratio.

A study conducted by Cosmetators et al. (1983) reveals that performance evaluation is highly dependent on the definition of productivity and its measurement. For a multi-product manufacturing firm a systematic procedure for developing a product-wise productivity measurement was described by Ray et al. in 1987. They have developed such a model for effective monitoring and controlling of various input factors to take care of the interdependency among various stages of production.

Aboganda (1994) has suggested a methodology for productivity measurement that could be used to determine the impact of productivity on profitability in strategic or long range plans. According to him, change in quantity of resources used from the base period to the review period is due to change in productivity and change in the level of production activities.

Computer-aided productivity measurement was proposed by Oden (1988) with a series of interactive computer software developed in Lotus 1-2-3.

Measurement of productivity in service organisations has always been a difficult task due to their output being intangible and which cannot be quantified easily. However, researchers continued their efforts in this direction and suggested various approaches for different organisations. Golany et al. (1990), for
example, outlined a productivity assessment based on Data Envelopment Analysis (DEA) methodology. DEA offers the first satisfactory multi-input, multi-output measure of productivity, and allows for productivity management at the intra-firm and inter-firm levels with particular application in marketing.

Another article, by Sherman (1984), describes an approach to help evaluate and improve the productivity, identify inefficiencies and ways to improve productivity with special reference to banks and hospitals. A simple ratio of patient-bed-days to staffing-hours is given by Riggs (1984) for hospital's productivity. Also he has highlighted 'employee accountability' as a means of productivity improvement in service organisations. The approaches to achieve this goal include improving communication between supervisors and subordinates, motivating employees, assisting administrative decisions on wages etc., and establishing a database for productivity improvement. In a NPC research division publication (1993), the labour productivity of a transport undertaking is defined as the ratio of output (passenger-kilometers) to the number of employees.

Once the management of an organisation has established its productivity ratio, the next step then is an attempt to enhance it on a regular basis. According to Woodruff (1984), adopting an open attitude towards employees, seeking suggestions from the rank-and-file and caring about problems, have been shown to
improve morale and increase overall productivity. Innovation and involvement on the part of all concerned are the requirements of the perpetual research for improvement concluded Worrall (1987). He said, productivity improvement was not a one-time cost reduction exercise but a continuous ongoing operation. Suzaki's study, conducted in 1985, of Japanese automobile manufacturers, has focused the work-in-process inventory levels as the key to productive factory operations.

Wrennall (1994), however, has realised that approaches to productivity improvement developed early in this century are inadequate now and, therefore, the need of the hour is to address productivity in the areas covered under the banner of Business Process Re-engineering, e.g., operations strategy development, resource renewal, time compression and timeliness, total quality management, and information systems.

Roach (1996) in his study on productivity-led recovery in the US had discussed the roles of information technology and the policy of downsizing, the two measures of productivity and efficiency improvement. He believes that the pace of technological innovation is correlated with expenditure on research and development which, in turn, improves the organisations' competitiveness. Downsizing, on the other hand, can simply increase the efficiency for a short-term period by "eliminating resources whose returns are no longer covering their costs."
2.1.3 Measurement of White-Collar Productivity: Human resource, according to the job they perform, are broadly classified as white-collar and blue-collar workers. The former class is professional and service-oriented, whereas, the later is non-professional and equipment-oriented. Moreover, white-collar's output possesses the characteristics of services, and that of the blue-collar possesses the characteristics of goods. A productivity management programme designed for blue-collar workers, therefore, should not be applied for white-collars without modifying its features. Sometimes, it becomes rather imperative to have an entirely different programme for their productivity measurement and improvement.

Mali (1978) has proposed seven strategies for white-collar productivity improvement, development of productivity mindedness among the workers, use of equipment aids where possible, increase in discretionary content of jobs, use of productivity appraisals in place of performance appraisals, time-management training of the workers, their motivation and managing-productivity-by-objectives.

Hicks (1994) has summarised eleven of the white-collar productivity improvement techniques described by Lehrer in his publication entitled “White-collar Productivity”. The techniques are enumerated as clerical methods/human factors/work-measurement, paper work simplification, input-output ratios, multiple-regression,
physical resource/technology structure, work-unit analysis, management-by-objectives, organisational structure analysis, operational functional analysis, overhead value analysis, and quality circles.

Schroeder (1993) also has emphasized a separate consideration to white-collar productivity as it affects all segments of society—manufacturing, service and non-profit. Giving extensive managerial input to some knowledge workers, Schroeder, et al. (1985) in a study defines ten measures of white-collar productivity in two categories. The first category, 'What is accomplished', includes client satisfaction, project success and dollars generated. 'How the work is done' is the second category listing the remaining seven measures as degree of innovation, handling of non-standard situations, degree of immersion in the job, meeting of deadlines, lack of surprises, documentation and transferability of work, and adaptability to change.

An analytical model developed by White et al. (1989) provides a basis from which management may adjust previously assessed determinants of their organisation's productivity. The organisation on which the model was tested raised productivity by an average of 17 per cent within two years. The increase was directly attributed to the organisation's use of the productivity measurement system.

2.1.4 Measurement of Labour Productivity: Labour productivity
blue-collar productivity) is generally defined as the output per labour-hours. A value-added productivity ratio structure, conceptualised by NPC project team in 1992, computes labour productivity in terms of value added per employee per year. Later, in a study of Asian countries by NPC, the concept of 'economically active population (EAP)' was used as input measure instead of employed persons, and the 'gross domestic product (GDP)' as the output measure for productivity computations (NPC research division).

The International Labour Organisation has defined EAP as 'the group of all persons of either sex who furnish the supply of labour for the production of economic goods and services as defined by the United Nations System of National Accounts and Balances during a specified time-reference period'.

The revised study of labour productivity in Asian countries has introduced the concept of 'purchasing power parity (PPP) adjusted GDP' in terms of a common monetary unit called the 'international dollar'. In the earlier study, it was the exchanged-rate base GDP used as the output which did not reflect the purchasing power disparities among the covered currencies (NPC research division, 1993).

Masud (1985) described labour productivity index as the ratio of standard labour-hours to the actual labour-hours. in his
study on determination of the future manpower at Cessna Aircraft Company.

Establishing a relationship between labour productivity and work-sampling, Thomas (1991) concludes that work-sampling studies show how busy the workers are, and the results can be used to predict labour productivity or to quantify inefficient work hours.

To understand labour productivity from labour market viewpoint, instead of product market, Aggarwal et al. (1992) made an attempt to examine the relationship between two measures of labour productivity, i.e. output per worker and output per rupee of wages paid, for large and small manufacturing companies. It was concluded that there is evidence to the effect that the relationship could indicate the nature and magnitude of distortions in the labour market.

Another dimension of labour productivity measure is introduced by Upendra (1995) as 'the elasticity of labour productivity with respect to wage rate', defined as the ratio of marginal labour productivity in relation to wage rate and that of average labour productivity. This ratio estimates the substitution probabilities of labour for capital.

2.1.5 Productivity Improvement through Financial Incentives:

Methods for improvement of labour productivity, in general, and
incentive plans as one of them, in particular, have been the topic of much research and controversy.

Vroom (1964) regards wages to represent an almost universal form of inducement for individuals to perform work. According to him there is a positive relationship between wages and workers productivity.

On the other hand, Brown (1969) says that money has been found to be one of the least powerful incentives in case where wages are adequate. He also maintains that the law of diminishing returns applies to all material incentives: as the reward increases, the desire for further reward decreases until it reaches a vanishing point.

In an article by Thomas (1985), piece-rate systems were found to act as deterrents to development of job improvement because they include only direct labour. However, incentive plans that include all factory personnel and emphasize cooperative labour-management relations were highlighted as means to improve productivity.

An approach of quality-oriented wage incentives for production line workers was presented by Tabucanon in 1985. The plan rewards workers on the basis of the 'loss-level' of their output.
Good industrial relations and union's involvement in decision making, according to Hanlon (1985), are also important strategies for improving labour productivity. He says, union-management collaborative efforts can improve productivity promoting greater flexibility in the deployment of human resources and creating a climate favourable to shop-floor innovation. Union involvement is conditional upon assurances that productivity gains will not lead to loss of jobs.

A review of several motivational theories and the productivity gain-sharing plans by Wygant in 1987 has presented advantages and disadvantages of financial incentives. Recommendations were made concerning the installation of financial reward plans and the factors that influence their success or failure.

A comparative study of Japan and the USA on the workers' involvement in productivity and quality was done by Goodfellow in 1991. Six tested rules to improve productivity and maintain high quality were presented. The aspects addressed in those rules are management goals, customer needs, meaningful goals, vivid illustrations and explanations of customer needs, and management philosophy.

Emphasizing the need of a good incentive scheme to motivate workers towards increased productivity, Rai (1979) said that regular wages bought the time of an employee but not his...
output and motivation without which his tangible and intangible outputs were not available to the company. He, however, suggested never to apply any incentive scheme aiming at covering the management's shortcomings.

In 1985 Lane conducted a survey of industrial engineers in the USA to find out their views about a certain productivity programme. When he asked the respondents to mention the single most important benefit resulting from a formal incentive programme, 55.5 per cent said "increased workers efficiency", 18.8 per cent mentioned "improved quality of output", "increased company loyalty" was the response of 12.3 per cent, and "a combination of all of these" said the remaining 13.4 per cent.

Whitman (1990) concludes that incentives are an important aspect of increase in production if it is true that increase in productivity is "what management labours to raise, but what labour cannot manage without a raise."

Employee-trust is described by Carmody (1994) as one of the most valuable and hand-won productivity aspects of any corporate culture. And according to him the risk of damaging this very aspect is high in the absence of a proper employee motivation programme.

Advocating against the time-based reward structure, McGrath (1994) concludes that an incentive plan which pays employees for quantity and disregards quality can easily become
self-defeating. Therefore, managers must begin to tie employee renumeration directly to employee productivity in a manner that can be effectively measured and that is easily understood by employees. He, however, suggests gain-sharing programme as one method of linking employee self-interest to overall company productivity.

Yet another important aspect related to worker's morale and productivity is the management feedback. Key (1994) points out that many companies do not give real feedback to their workers, which tends to cause the workers to lose confidence in the company's management resulting in frustration and hence lower productivity.

Contrary to the belief of linking productivity with financial incentives in a positive sense, Datta (1996) discussed various negative fallouts of providing incentives at the shop floor. These troubles with incentives were attributed to different 'output bases' for each section in a company, conflicting viewpoints of workers and management regarding productivity-linked incentive schemes, and merging incentives into the basic wage structure which means more incentive to seniors irrespective of their productivity. He has, however, favoured the system being adopted by the Raymond Woolen Mills Ltd., of combining disincentive for lower production with incentive for higher production.
According to Kohn (1993), "rewards do not create a lasting commitment. They merely, and temporarily, change what we do". He has presented a six-point framework that examines the true costs of an incentive program and justifies his view that rewards do motivate people but only to get awards and not to alter their attitudes towards the work. With a comprehensive review of previous studies, his discussion was basically on the white-collar's productivity linked with incentives.

Although a large body of knowledge in the form of research findings and experiences on the current issue is available but this section concludes at this point with the presentation of only relevant literature which clearly identifies the need for the present study.

2.2 Need for the Study:

Based on the research findings, practical approaches of professionals, and academic discussions on various issues of productivity and incentives, a part of which has been summarised in the previous section, the inferences made are described in the paragraphs that follow.

No one method of productivity measurement and improvement has as yet been evolved to form a common basis of performance evaluation and comparison. Although incentives for workers, specifically financial incentives, have been emphasized as a major motivating factor for achieving higher productivity, no consensus on any particular scheme has been achieved.
Further, all studies referred to in the previous section have focussed on several important aspects of productivity as well as financial incentives. But no reference has been found specifically devoted to the treatment of these issues from the viewpoint of small-scale industries (SSIs). In the Indian context, where the typical problems are of a large population, under-employment and unemployment SSIs are generally accepted as a viable media to adopt labour-intensive means of production. SSIs, have also proved their worth by contributing 42 per cent in overall production, 35 per cent to exports, and 30 per cent to employment generation (SSS Today, 1996). It is, therefore, imperative that SSIs functioning be improved consistently. The Abid Hussain Committee (1997) has proposed many plans and provisions, including the enhancement of investment ceiling to Rs. 3 crore for the betterment of SSIs, still a lot more needs to be done related to the productivity aspects of the small scale enterprises (SSEs).

The facts and findings stated above give a clear indication that a study on productivity in SSIs and its improvement through financial incentives to workers may contribute positively to further reform the sector as is the need of today's business world.

In line with the above discussion the topic of the proposed research has been decided as "Productivity Improvement in Small-Scale Industries through Financial Incentives to Workers".

2.3 The Problem Statement:

The problem thus identified and titled as above contains four
key concepts — productivity, small-scale industries, financial incentives, and workers. To better understand and work on the objectives of this study the concepts are elaborated below:

(i) **Productivity**: As discussed in the previous chapter productivity offers different dimensions when viewed in various perspectives. The common practical definition of the term productivity is, however, given as the measure of resource utilisation, generally, expressed as the ratio of output to input. Although partial productivity, by definition, is different from total productivity but in the context of SSIs, labour productivity alone is also treated as the total productivity for the purpose of analysis. It is justified with the assumption that resources other than labour, being less significant in labour-intensive organisations, may be kept constant.

(ii) **Small-scale Industries**: The group of industries consisting of small units, as defined later, is popularly known as small-scale industries (SSIs), small-scale sector, small-business and as small-scale enterprises (SSEs). SSI units are defined in terms of limits on (original) investment in plant and machinery. Till recently this limit was Rs. 60 lakh for non-exporting units and 75 lakhs for exporting and ancillary undertakings. The Abid Hussain Committee has now proposed the revised limit as Rs. 3 crore for all types of small industries named as small-scale enterprises (SSEs). The limit has again been revised and is
now Rs 1 crore. No change to this effect has, however, been made in the thesis as the revision was announced near the completion of the thesis.

(iii) **Financial incentives:** Psychologists call incentives as extrinsic motivators. Incentives are rewards to work better quantitatively or qualitatively or both. The motivation of employees to work harder through the introduction of incentives is linked with the hierarchy of human needs suggested by Maslow. Financial incentives like enhanced piece-rate, bonus, and other forms of monetary rewards are supposed to help workers satisfy their physiological and security needs which, in turn, motivates them to perform better.

(iv) **Workers:** In the context of SSIs, workers mean those working as skilled, semi-skilled or unskilled labour in the units. They are commonly known as blue-collar workers.

For improving productivity, the first requirement is to define and measure the same so that appropriate strategy for its enhancement can be developed. The study, therefore, attempts in its first few sections, to have an insight into the SSIs regarding their awareness and measurement on productivity. Productivity enhanced through financial incentives to workers is then taken in detail. Sandwitched between the two, systems of wage payments are also studied as financial incentives are supposed to work in accordance with the wages.
Objectives of the study are specified in the paragraph that follows.

2.4 Objectives of the Study:

A well-defined problem is half-solved. No problem should be dealt with as a whole, but in parts. In order to achieve the goals it is advisable to break the problem and specify the statement of the present research problem in the form of specific objectives. The objectives of the study are classified as primary and secondary and are stated below:

Primary Objectives:

(1) To probe the awareness of SSI units about the importance of productivity, its measurement and improvement.

(2) To study the role of incentives, in general, and of financial incentives, in particular, in productivity improvement.

Secondary Objectives:

(1) To study the common practices of SSI units regarding payment of wages and incentives to the workers.

(2) To study the trends of labour productivity in SSI units.

(3) To propose suggestions for productivity enhancement in SSI units.

2.5 Scope of the Study:

Multi-dimensional classification of SSI units and the wide spectrum of productivity measurement and improvement techniques made it
necessary to define the domain of the present study. Small-scale units, for example, are classified on the basis of the type of activity, the type of organisation, the type of industry they belong to, and whether they are ancillary or service enterprises. Productivity, on the other hand, may be measured as partial factor or total factor productivity. For productivity enhancement many techniques are available including financial incentives to workers. Therefore, the point-wise scope of the work is defined as follows:

(1) The study is confined to the SSI units located in Uttar Pradesh. Further only those cities/towns were selected which are either included in the clusters of SSIs (The Abid Husain Committee Report, 1997) or found convenient to approach.

(2) Major emphasis of the study is on manufacturing units as it appears to be easier and more relevant to measure productivity and study its relationship with financial incentives in manufacturing units.

(3) Units having fixed investment of less than 5 lakh on plant and machinery are not included in the study assuming them as uninterested units in productivity management owing to their size. Hence, our survey covers units of the relatively organised sector.

(4) SSI units with only proprietorship or partnership type of organisation are considered for the sample.

(5) The study concerns with only labour productivity and overall productivity.
No technique for productivity improvement other than incentives, particularly, financial incentives is considered in detail.

2.6 The Research Framework:

A framework for conducting the study was prepared in accordance with the nature of the objectives. It was divided into the following two parts:

2.6.1 Measures to Achieve the Objectives: Direct analysis and cross-classification of data are generally used as the measures for achieving the objectives of the study. Since the literature reviewed in this connection does not provide any direction to conduct study on productivity awareness, no hypothesis could be formed initially to probe this awareness of SSI units. Later on, the objective was refined into two formal hypotheses. These hypotheses along with the others stated in the next sub-section are tested statistically, using Chi-square test for independence. The remaining data was analysed directly in terms of percentage and sample proportions.

2.6.2 Research Hypotheses: The six null hypotheses tested to find the significance of studying the cross-classified data are listed below:

(1) Awareness of productivity and its measurement in a unit does not depend on its age.

(2) Awareness of productivity and its measurement in a unit does not depend on the amount of money invested in the unit on plant and machinery.
Whether the productivity of a unit has been increasing, decreasing or otherwise over time is independent of the type of incentive the unit was giving to its workers.

The effect of financial incentives on productivity does not depend on whether the incentive is combined with time-rate or piece-rate system of wage payment.

The extent to which financial incentives improve labour productivity does not depend on the duration for which the incentives were provided.

The owner's satisfaction level regarding gain in productivity through financial incentives does not depend on the type of financial incentive.

2.7 The Research Methodology:

This section presents an overview of how this research work is planned and completed referring to the research design, sampling process, data collection and its analysis.

2.7.1 Research Design: Exploratory, descriptive, and causal are defined as three general categories of research based on the type of information required and the volume of relevant knowledge pertaining to the subject available at hand. Since these categories of research are not mutually exclusive, any combination of them can, therefore, be applied to a research process according to the need. The nature of the present research work also suggests a similar kind of hybrid design.
To be specific, exploratory research is found appropriate for studying the first objective, descriptive for the next two objectives, and causal type of research for the fourth objective. However, the last one is based on the findings as well as the researcher's own judgement and observations.

2.7.2 Sample Design: The population under study can be defined as "all small-scale industrial units, basically of manufacturing type, working in the major industrial cities of Uttar Pradesh including the clusters of SSIs as classified by the Abid Hussain Committee, 1997" (refer appendix-3). Random sampling was not possible for this purpose due to non-availability of an up-dated and reliable sampling frame e.g. the list of SSI units supposed to be available at the District Industrial Centres (DICs). Continuing the search for any suitable sampling frame the researcher has also visited offices of the Development Commissioner (SSIs), New Delhi and the Directorate of Industries (U.P.), Kanpur. The efforts however proved futile. Convenience sampling was then found suitable for selecting a representative sample of the SSI units to provide stable results as precisely as possible.

In case of non-probability sampling the sample size decisions are made by calculating the size either as if it were a probability sample or else on an "all-you-can afford" basis (Tull and Hawkins, 1984). An estimate of the sample size is thus made using the method used for SRS sample from multinomial populations (refer appendix-2).

2.7.3 Questionnaire Design and Content: A structured questionnaire
was decided to be used as the device for data collection from a sufficiently large and representative sample of the vast population of SSI units under study. Considering those respondents who might be facing problem with English language it was thought to translate the questionnaire in Hindi also. The idea was later on dropped realising that it is actually the technical terms used in the questionnaire and not the statement of the questions which may cause this difficulty to the respondents. And since technical terms are generally more popular in English no such translation was made. However, assistance was provided in this regard wherever it was needed at the time of filling up the questionnaires.

In view of the need and objectives of the study the questionnaire contained 43 questions designed to gather information regarding the concepts and practices of SSIs related to productivity management. These questions were divided into eight sections which include profile of the responding units, profile of the respondents, productivity awareness and measurement, productivity improvement, measurement of labour productivity, systems of wage payment, incentive plans, and other related issues. The last section of the questionnaire deals with some opinion based open-ended questions to know the respondents' views on various productivity-related issues.

Questions in other sections were designed as either open-ended or close-ended depending upon the nature of the response expected. However, to make the response quick and precise, closed-ended questions were generally preferred.
The section on profile of the units contains questions regarding the location, year of establishment, major products, and investment on plant and machinery. To know the profile of the responding owners/managers information on their educational background, past and present experience, nature of responsibility, and training was gathered.

The other section of the questionnaire dealing with productivity awareness of the units consists of questions related to productivity ranking as a performance measurement parameter, reasons for measuring or not measuring productivity, and ratio of productivity. Productivity improvement methods being applied in the units and their benefits are dealt in the section on productivity improvement. Another section designed to collect data on labour productivity aspects of SSIs include labour productivity index, its trend over the years, and factors responsible for any decrease in labour productivity.

To study the structure of wage payments, questions were designed to obtain information on wage payment systems for regular and casual workers, basis of selecting a particular system, and policy of investments in wages. The major section of the questionnaire contained questions on incentive plans which include types of incentives, purpose for providing the incentives, the extent to which these incentives serve their purpose, their duration, effect on product's quality and schemes of financial incentives.

2.7.4 Data Collection: It was decided to cover as many cities and towns of Uttar Pradesh as possible from the list of those ten which are listed
as the clusters of SSI in U.P. by the Abid Husain Committee. In addition to this other cities were included in the sample where approach by any means was possible. Considering the expected reluctant response influenced by inhibitions in research studies in India a need was felt to first identify those friendly associates who had personal or professional contacts in SSIs. Those persons were then briefed about the research and method of data collection.

As a part of pilot study the questionnaires were distributed personally in Aligarh to the owners of few SSI units. After completing the pilot study, questionnaires were administered to various units through either the friends and relatives identified for the purpose or personally where direct approach was possible. In all 150 units were contacted for data collection. Only those 93 responses were considered for the study which were received by the target date set for data collection.

Along with the questionnaire a formatted sheet to obtain the figures on production and wages of the units for the last ten years was enclosed. However, except a few, the respondents did not complete the sheet because of either lack of time, non-availability of such data or simply not to disclose those figures.

2.8 Limitations of the Study:

Academic research on any topic is itself a continuous and,
perhaps, an endless process. Each part of that research, therefore, has to have some limitations in the form of either the resource constraints like that of time and money, or the self-defined scope of the study. This work too has some such constraints which, in fact, were not confined to any particular stage of the work.

The major limitations of the study are described below:

(1) While reviewing literature the researcher has tried his best to explore as many sources as possible for enrichment of the review, yet some matter may have been inadvertently overlooked. Such matter would have enabled a more critical identification of the research gap and setting of the objectives of this study.

(2) The sample size has been just sufficient to estimate population parameters with no more than 90 per cent confidence interval because the geographic distribution of the population was too wide to be covered within the time and financial constraints.

(3) Generally industrialists are found to be apprehensive of any possible misuse of the information a researcher seeks from them about their business. Further, the word 'productivity' and the meaning in its real sense is found uncommon among the SSI owners/managers which made them more reluctant in answering the questions.
It would indeed be fair to say that the number of units contacted were small, but it was not for lack of effort, but for want of time, financial resources and informational support.

This completes the overview of the framework within which the data is analysed to meet the objectives. The next chapter presents the analysis and interpretation of data.
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Nov 94.


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CHAPTER 3

ANALYSIS AND INTERPRETATION OF DATA
A two-fold analysis of data collected through the questionnaire, observations and conversations with the respondents is carried out to arrive at some specific findings and conclusions regarding the present research problem. The entire processing of information is divided into seven sections. The first six sections deal with the facts and figures related to the sample units and consist of direct analysis, as well as, analysis based on cross-classification of relevant data using Chi-square statistics. The last section presents interpretation of the respondents' views on various productivity-related issues.

3.1 Profile of the Responding Units:

The information gathered through question numbers 2, 3, 5, 6 and 17 of the questionnaire draws the profile of the units surveyed. These five questions are related to the units' location, age, major products, investment on plant and machinery, and size of the workforce. Figure 1 shows the geographical distribution of the sample that contains small-scale industrial units operating in Uttar Pradesh and located at major industrial cities and town like Aligarh, Basti Firozabad, Kanpur, Khurja, Lucknow, Meerut, Moradabad, Roorkee and Saharanpur. Of the 93 responding units, most are manufacturing firms with partnership or proprietorship type of organisation. The sample, also includes repairing, servicing, job work, exporting and processing units as well. Product-wise
Figure - 1: Location-wise Distribution of Units
coverage of the units as given in Figure 2, includes brassware, ceramics, cotton textiles, engineering instruments, glass works, hosiery and garments, leather, locks, machine parts, and wood works. The sample has a dominance of the traditional units like those of working in ceramics, glass and brassware industries.

All the sampled units are spread over a range from less than Rs 30 lakh to more than Rs 75 lakh in terms of their present investment on plant and machinery, as shown in Figure 3, with the median amount in such investment being Rs. 46 lakh. The median age of the responding units is 21 years, four of them being as old between 41-50 years and 30 as young
30 as young between 1-10 years. Table-3.1 exhibits their age-wise distribution under various classes. Each unit, on an average, employs 50 workers of skilled, semi-skilled and unskilled type.

Table 3.1

<table>
<thead>
<tr>
<th>Year of establishment</th>
<th>Units' age (years)</th>
<th>Number of units</th>
<th>Percentage of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between 1947-56</td>
<td>41-50</td>
<td>04</td>
<td>04</td>
</tr>
<tr>
<td>Between 1957-66</td>
<td>31-40</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Between 1967-76</td>
<td>21-30</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Between 1977-86</td>
<td>11-20</td>
<td>29</td>
<td>32</td>
</tr>
<tr>
<td>Between 1987-96</td>
<td>1-10</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>--</td>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

[3 did not respond (dnr)]

3.2 Profile of the Respondents:

The profile of the responding owners/managers in the sample units describes their educational background, present and past experience, and training status, based on the responses against question numbers 4, 39, 40, 41 and 42 of the questionnaire. A two-third majority of the respondents possess non-technical educational qualifications comprising of graduates and post-graduates in various disciplines. A total of only 25 per cent are
qualified in technical streams of engineering and management. No more than nine per cent of the owners/managers have undergone training like CA and EDP. A 10 years experience is observed as the mean of those 32 per cent respondents who had mentioned some experience prior to taking up the present responsibility. Further, the average length of stay as owner, manager or partner in the responding unit is found to be 13 years.

3.3 Productivity Awareness, Measurement and Improvement:

Relative ranking method using a 5-point scale is applied to evaluate the respondents' awareness regarding the importance of productivity as a measure of performance. As shown in Table 3.2(a), based on the total score of each parameter with reference to question number 7(a), relative ranking of productivity as a performance measurement parameter is determined. Productivity has emerged as the fourth important parameter of performance measurement with 3.29 as its average score. Product quality, being the most important, is 1.83 on the scale followed by profitability (2.96), production volume (3.08). and market share (3.84).

It is also found that the respondents who measure productivity (question number 8) rank it higher than those who do not measure the same. Table 3.2(b) exhibits the differences between the two groups.

It may be interesting to know at this point whether there is any correlation in the ranked data presented in Table 3.2(b).
Table-3.2(a)

Relative Ranking of Performance Measurement Parameters

<table>
<thead>
<tr>
<th>Performance measurement parameters</th>
<th>Total score</th>
<th>Average score**</th>
<th>Relative ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production volume</td>
<td>274</td>
<td>3.08</td>
<td>3</td>
</tr>
<tr>
<td>Profitability</td>
<td>263</td>
<td>2.96</td>
<td>2</td>
</tr>
<tr>
<td>Product quality</td>
<td>163</td>
<td>1.83</td>
<td>1</td>
</tr>
<tr>
<td>Productivity</td>
<td>293</td>
<td>3.29</td>
<td>4</td>
</tr>
<tr>
<td>Market share</td>
<td>342</td>
<td>3.84</td>
<td>5</td>
</tr>
</tbody>
</table>

(2 dnr + 2 invalid)

* Total score is computed by adding numbers (1 to 5) assigned to the parameter by the respondents for its ranking.

** Average score is computed by dividing the total score by the number of units responding (N = 89).

Table 3.2(b)

Relative Ranking of Performance Measurement Parameters

<table>
<thead>
<tr>
<th>Performance measurement parameters</th>
<th>Relative ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units measuring productivity</td>
</tr>
<tr>
<td>Production volume</td>
<td>3</td>
</tr>
<tr>
<td>Profitability</td>
<td>4</td>
</tr>
<tr>
<td>Product quality</td>
<td>1</td>
</tr>
<tr>
<td>Productivity</td>
<td>2</td>
</tr>
<tr>
<td>Market share</td>
<td>5</td>
</tr>
</tbody>
</table>
The Spearman rank correlation coefficient is thus calculated using the two relative rankings of each parameter. Its value (0.6) suggests a positive association between the rankings done by the two groups. A null hypothesis of no correlation in the ranked data of the population is then tested and found acceptable at ten per cent level of significance. This concludes that the relative importance of productivity for a unit is independent of whether the unit measures it or not. But this finding does not deny the fact that units measuring productivity are essentially aware of its importance, whereas units not measuring the same may or may not be aware of it considering this as an important phenomenon of performance measurement.

A logical assumption can, therefore, be made that the units measuring productivity are more aware about its importance than the remaining ones and hence they can accordingly be classified as 'high awareness' and 'low awareness' units for further discussion.

Apart from these five parameters, a few more like labour-relations, labour-efficiency, consistency in quality, credit capacity, and goodwill are also mentioned as important criteria for measuring performance, by 22 per cent of respondents, while referring to question number 7(b). The remaining did not mention anything.

Such factors are undoubtedly significant in the overall performance of any enterprises. But when listed among those five major performance indicators, they draw attention towards two important problems the SSIs generally face. One, related to the labour, particularly their efficiency.
and the other concerned with financial bottlenecks. Such responses reflect either the satisfaction of the owners/managers with regard to labour and finance or their effort to improve upon these parameters in order to cope with the competition.

Regarding the measurement of the units' productivity (question number 8), 51 per cent claim to be measuring it with some specific reasons. Two reasons behind the measurement are found quite common in question number 9. Productivity being the real indicator of resource utilisation is the first important reason with 69 per cent responses in its favour whereas the use of productivity as a criterion of competitiveness is ranked second with 43 per cent responses. On the other hand, conceptual difficulty in measuring productivity (46%), resistance from workers (26%) and the fact that no productivity data is required by any governing body (46%) are mentioned as the main reasons for not measuring productivity of units, as reported in question number 10. When asked about the ratio which measures productivity of their units (question number 11), 77 per cent owners/managers answered in the manner stated in Table 3.3. This also includes the responses of some of those units which do not measure the productivity but have replied to this particular question. This may be due to the fact that every business organisation measures its performance though not necessarily in terms of productivity and, therefore, an appropriate ratio has been marked by many of them against this question.
Table 3.3

<table>
<thead>
<tr>
<th>Productivity ratio</th>
<th>Percentage of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total profit/Total investment</td>
<td>54</td>
</tr>
<tr>
<td>Total production/Total number of workers</td>
<td>40</td>
</tr>
<tr>
<td>Total sales/Total number of employees</td>
<td>32</td>
</tr>
</tbody>
</table>

(Total exceeds 100% because of multiple responses)

The responses to the question number 12, on benefits of improved productivity, indicate that increased profit is the most attractive feature of improving productivity. Other benefits like better utilisation of the resources, higher national productivity, and improved quality of life of workers are ranked second, third and fourth respectively.

The question, being of general nature, was responded by the majority which includes those who are not measuring the productivity for some reason or the other. And since improvement of any aspect in a profit type of organisation, like SSIs, is intended to increase profit, therefore, 'increased profit' seems to be rightly placed on the top of the benefits of improved productivity.

For productivity improvement, the units are employing various means including proper inputs, better scheduling, maintaining cordial relations with the workers, attempting to improve workers' efficiency, creating better working conditions, maintaining quality, reducing cost, giving festive gifts, and providing financial incentives. But, nearly 50 per cent gave no answer.
to question number 13 dealing with methods of productivity improvement.

Since all the units under study are not showing equal concern with productivity measurement and are also ranking it differently the need is, therefore, felt to investigate whether some characteristics of units contribute towards these differences. The sub-sections that follow attempt to test the dependence of such attitude on the investment limit of a unit and its age, using Chi-square statistics.

3.3.1 Productivity Awareness vs Age of Unit: Two classifications of the sample are made for this purpose. One, on the basis of the awareness regarding the importance of productivity and second, on the basis of the age group - older or younger. The units above the median age are called older, whereas those below the median form the younger group. A 2x2 contingency table (Table 3.4) is thus prepared using the data collected through question numbers 3 and 8.

Table 3.4

Sample Response concerning Productivity Measurement: Age-wise

<table>
<thead>
<tr>
<th>Productivity awareness</th>
<th>Age group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Younger</td>
<td>Older</td>
</tr>
<tr>
<td>High</td>
<td>29</td>
<td>15</td>
</tr>
<tr>
<td>Low</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>36</td>
</tr>
</tbody>
</table>

Chi-square value = 1.255
Degree of freedom = 1
The null hypothesis to be tested for this data is formulated as "awareness of productivity and its measurement in a unit does not depend on its age".

The null hypothesis is accepted at ten per cent level of significance which indicates that the differences between the two sample proportions on the issue of productivity measurement (or productivity awareness) are only due to chance. The conclusion is that measurement of productivity in a unit is independent of its age.

This result of the test interprets that productivity related issues in the units do not relate themselves to the number of years the units have been in operation. It implies that some other factors like the level of competition, the manager's attitude and the amount of money invested may be important whether productivity of a unit is measured and any attempt to derive the benefits of enhanced productivity is made.

3.3.2 Productivity Awareness vs Investment of Unit: The same test is applied here with investment as the basis for the second classification of the sample instead of the age. The units are divided into two levels of investment - low and high, with the median investment amount as the divider. The contingency table (Table 3.5) given below for this analysis is prepared using the data from question numbers 6 and 8.
Table-3.5

Sample Response concerning Productivity Measurement:

Investment-wise

<table>
<thead>
<tr>
<th>Productivity awareness</th>
<th>Investment group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>High</td>
<td>21</td>
<td>26</td>
</tr>
<tr>
<td>Low</td>
<td>33</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>39</td>
</tr>
</tbody>
</table>

Chi-square value = 6.984
Degree of freedom = 1

The null hypothesis for this data is formulated as "awareness of productivity and its measurement in a unit does not depend on the amount of money invested in the unit on plant and machinery".

The null hypothesis is rejected at ten per cent level of significance. That means the two classifications of the units are statistically dependent on each other. In other words, measurement of productivity in a unit is related to the investment on plant and machinery.

This interpretation is also supported by the response of question number 28, linking productivity management with investment range. There, the respondents considered productivity management as an important issue for SSI units with an investment of 5 to 50 lakh (25%) above 50 lakhs (only 38%) and any amount (35%).
The test simply establishes a relationship between the two classifications of the units but does not indicate its nature (direct/adverse). Also, in view of the practical definition of productivity it does not seem to be expensive and unaffordable to measure and monitor the productivity index. It can therefore be interpreted that it is imperative for big units to manage their productivity from the competition viewpoint and at the same time small units should also focus on proper utilisation of the resources to reduce the risk to their existence.

3.4 System of Wage Payment:

Financial incentives for workers in a small-scale unit are assumed to be planned in accordance with the system of wage payment being adopted by the unit. This section based on the data obtained in question numbers 18 to 21 studies the wage structures commonly employed in SSIs. The sample is divided into a ratio of 1:1.6 for paying wages to their regular workers on piece rate and time rate bases, respectively. For casual workers, however, daily wage system is found to be the most popular (56%) followed by piece rate system with 29 per cent responses. Units following time rate and hourly rate systems for casual workers constitute 20 per cent of the sample. This total exceeds 100% because of multiple responses.

Among the commonly known bases for adopting a particular wage system, industry norms and negotiations with the workers are preferred by most of the units (84%). The rest 34 per cent of responses favour job evaluation, statutory norms and owner’s choice systems. This total
exceeds 100 per cent because of multiple responses.

The break-up of units following piece rate and time rate systems of wage payments for their regular workers under each of the two most commonly adopted bases is given in Table 3.6.

Table 3.6

<table>
<thead>
<tr>
<th>Basis for determination of wages</th>
<th>Wage system</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Piece rate</td>
<td>Time rate</td>
</tr>
<tr>
<td>Negotiations with the workers</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Industry norms</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>37</td>
</tr>
</tbody>
</table>

The wages are usually increased on annual basis. Workers' demand and revision of statutory limits are mentioned as the other two criteria for increment in wages.

3.5 Labour Productivity Measurement and Improvement through Financial Incentives:

The respondents seemed to be more clear about labour productivity, unlike the overall productivity, because of their direct concern with the labour output. Sixty eight units have responded to question number 14 asking as to which ratio they use as the basis for measurement of labour productivity. With some units indicating more than one ratio, the distribution of responses among various ratios is given in Table 3.7.
Table 3.7

Measurement of Labour Productivity

<table>
<thead>
<tr>
<th>Labour productivity ratio</th>
<th>Percentage of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total production/Total number of workers</td>
<td>40</td>
</tr>
<tr>
<td>Total production/Total labour-hours</td>
<td>43</td>
</tr>
<tr>
<td>Standard labour-hours per unit/Actual</td>
<td>22</td>
</tr>
<tr>
<td>labour-hour per unit</td>
<td>22</td>
</tr>
<tr>
<td>Total profit/Total number of workers</td>
<td>15</td>
</tr>
</tbody>
</table>

Among 70 units, 47 per cent claim an increasing trend of labour productivity during the last few years, whereas, 19 per cent indicate a decline, and a constant trend is noticed by 23 per cent of the units. The remaining units reported that the labour productivity value are erratic and do not follow a consistent pattern over time (question number 15).

A data sheet to collect figures of production, workers and wages during the last few years was also designed and attached with the questionnaire (refer appendix-1) intending to determine the trend of labour productivity in the sample SSI units. Only 22 units provided partial data to this sheet. The data obtained was, therefore, not found to be sufficient for further processing.

In response to question number 16 dealing with factors responsible for a decreasing trend of labour productivity in SSIs, worker’s inefficiency
and lower grade of technology are highlighted as the two major factors.

Except six, all units provide some kind of incentives to their workers for various purposes (question number 22). Financial incentives are being preferred by 40 units (43%), non-financial by 14 units (15%), and 32 units (35%) provide a combination of both. Increased production and improved quality have emerged as the two main purposes of providing incentives, particularly financial incentives, to the workers. Reducing absenteeism among the workforce is observed as yet another reason which yield incentives for the workers (question number 23).

While designing question 23, it was assumed that incentives might compensate for managerial deficiencies in an organisation, that may otherwise affect the labour productivity. For example, improper working of the machines and equipments or poor working conditions may be responsible for low production and the management should take care of such factors. Instead, the owners/managers provide some incentive to the workers in order to prevent them from any possible protest against the management. The sample, however, has completely ruled out this possibility.

The study also reveals, from question number 25, that in most of the units financial incentives, or their combination with non-financial ones, have met the targets to a large extent, though not completely. Further, 63 per cent units use them as a short-term measure only, 21 per cent as a long-term policy, and the rest use them as a combination of both.

It is observed by only six per cent respondents that a monetary
incentive to produce more may result in poor quality of work. Nevertheless, a larger section of the sample has experienced a positive impact of financial incentives on product's quality (question number 26).

Answering to a verbal question regarding the trade-off between quantity and quality they explained that their supervision makes it sure that financial incentives do not deteriorate the quality. Not only this, but incentives, sometimes, also motivate the workers to improve the quality of work.

Although an overwhelming majority of 69 units (out of 87) visualises some relationship between financial incentives and labour productivity (question number 27(a)), yet only 46 units have mentioned the use of any scheme of financial incentive in response to question number 27(b).

Profit-sharing, increased piece rate, bonus, financial support on festivals, increased wage on piece-rate basis, overtime, extra duty allowance, advances and loans, prizes, and incentives for low absenteeism have been enumerated as important schemes of providing financial incentive.

The combined response of questions numbers 15 and 27(b), as shown in Table 3.8 suggests that the units realising some relationship of financial incentives with labour productivity dominate the group expressing an increasing trend of labour productivity.
Table 3.8

<table>
<thead>
<tr>
<th>Trend of labour productivity</th>
<th>Whether financial incentives are related to labour productivity:</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Increasing</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>Constant</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Decreasing</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>11</td>
</tr>
</tbody>
</table>

3.6 Effects of Incentive Policies on Labour Productivity:

This section now attempts to study the effects on labour productivity of various internal policy matters of SSI units regarding incentives, in general, and financial incentives, in particular. The study has been divided into four sub-sections that follow.

3.6.1 Type of Incentive vs Trend of Labour Productivity: To conduct this study using Chi-square as a test of independence, the units are classified according to the trend of labour productivity they claim for the last few years and the type of incentive the units are providing to their workers. The 2 x 3 contingency table (Table 3.9) for the required set of data is prepared to test the null hypothesis that "whether the productivity of a unit has been increasing, decreasing or otherwise over time is independent of the type of incentive the unit was giving to its workers."
Table 3.9

Sample Response concerning Type of Incentive

<table>
<thead>
<tr>
<th>Type of Incentive</th>
<th>Trend of labour productivity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increasing</td>
<td>Constant</td>
</tr>
<tr>
<td>Financial</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Non-financial plus combination of both</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>16</td>
</tr>
</tbody>
</table>

Chi-square value = 8.364
Degree of freedom = 2

The null hypothesis is rejected at ten per cent level of significance concluding that the type of incentive, whether financial or otherwise, makes an impact on the change in labour productivity over time.

This result along with the data presented in Table 3.8 confirms productive impact of financial incentives on labour productivity in SSIs.

3.6.2 Wage-Incentive Combination vs Labour Productivity: The two classifications of the SSI units under study here are based on the combination of financial incentive with the wage payment system and the extent to which the incentive has served its purpose. The data is obtained from questions 18, 22 and 24. The responses of question 24 to the choices 'completely' and 'large extent' are combined to form the high satisfaction level regarding labour productivity. The low satisfaction level is similarly formed combining the responses to the options 'small extent' and 'some extent'. The contingency table for this section is Table 3.10.

84
The null hypothesis that "the effect of financial incentives on productivity does not depend on whether the incentive is combined with time-rate or piece-rate system of wage payment" is being tested using this table.

### Table 3.10

**Sample Response concerning Wage-Incentive Combination**

<table>
<thead>
<tr>
<th>Wage-Incentive combination</th>
<th>Satisfaction level</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Piece rate-Financial</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Time rate-Financial</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

Chi-square value = 2.307
Degree of freedom = 1

At ten per cent level of significance and with 1 degree of freedom the null hypothesis is marginally accepted. The interpretation is that either gain in labour productivity is statistically independent of the wage-incentive combination or the data is insufficient to reach a strong conclusion. This further elaborates that financial incentives combined with a piece-rate system or time-rate system of wage payment produce similar results as far as the satisfaction regarding gain in productivity is concerned.
3.6.3 Period of Incentive vs Labour Productivity: Based on whether incentives are provided as a short-term measure, as a long-term policy, or both, the units are divided into two classes. Units using incentive for short period form one class while the remaining units form the other class. The second classification is the same as that in section 3.6.2. The contingency table (Table 3.11) contains the data from question numbers 24 and 25.

The null hypothesis for this data is formed as "the extent to which financial incentives improve labour productivity does not depend on the duration for which the incentives were provided."

Table 3.11

Sample Response concerning Period of Financial Incentive

<table>
<thead>
<tr>
<th>Period of Incentive</th>
<th>Satisfaction level</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Short term</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Long term plus combination of both</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>34</td>
</tr>
</tbody>
</table>

Chi-square value = 0.169

Degree of freedom = 1

At ten per cent level of significance and with 1 degree of freedom, the null hypothesis is accepted. It means the differences in the two
proportions of the sample are not significant and the extent of increment in labour productivity is independent of the period for which incentives are provided.

That means, although incentives to workers increase their productivity but, the extent of this increase does not necessarily depend on the period for which incentives are given. No matter how long or short the period is, incentives bring gain in labour productivity.

3.6.4 Scheme of Financial Incentive vs Labour Productivity: All schemes of financial incentives mentioned in 27(b) are grouped into three classes - Bonus and Profit sharing, Piece rate, and others. Like section 3.6.2 and 3.6.3 the other classification of units is based on the extent to which financial incentives serve the purpose of improving labour productivity. The contingency table based on the data of questions 24 and 27(b) is presented as Table 3.12. This cross-classification of the data is tested for the null hypothesis that "the owner's satisfaction level regarding gain in productivity through financial incentives does not depend on the type of financial incentive."

At ten per cent significance level and with 2 degrees of freedom the null hypothesis is accepted and hence no dependency exists between these two classifications of the sample.

In other words, all schemes of financial incentives are equally effective so far as the extent of gain in labour productivity through them is concerned.
Table 3.12

Sample Response concerning Satisfaction level

<table>
<thead>
<tr>
<th>Satisfaction level</th>
<th>Scheme for financial incentive</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bonus and Profit-sharing</td>
<td>Piece rate</td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>High</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>12</td>
</tr>
</tbody>
</table>

Chi-square value = 0.716
Degree of freedom = 2

3.7 General Issues Related to Productivity in SSIs:

The questionnaire administered to the sample also contained a portion designed to know the general opinion of the SSIs owners/managers on some related issues. These were sought by the means of appropriately worded open-ended question. The overall response, however, was very poor. The reasons include the respondent's limited knowledge and interest in the areas covered, their indifferent attitude toward some of the issues discussed, the shortage of time a businessman usually faces, and lack of their interest in this research on the whole. For instance, more than 50 per cent respondents did not mention anything regarding the role and contribution of the top level and supervisory level managements in productivity improvement. The remaining responses, too, are of general nature like Yes/ No/Important, etc. or simply describing the primary roles
of management in any organisation, but not related to productivity.

About the efficacy of financial versus non-financial incentives 35 units out of 93 simply preferred financial incentives, eleven mentioned both, six are found in favour of non-financial incentives, and 41 did not respond. Among the positive responses are included, “financial incentive may work alone, whereas, non-financial need a combination with financial”, “financial vs. non-financial depends upon the status of personnel in the unit and their hierarchy of needs”, and “financial incentives speak definitely more than non-financial ones about the seriousness of management’s intentions”.

Such opinions can be interpreted in terms of the suitability of a particular type of incentive scheme according to the workers' financial status. Moreover, non-financial incentives can easily boost the morale of a worker, but as such cannot improve his financial position. Financial incentives are, reported to be more promising device than others for productivity enhancement.

Such type of replies reflect a positive inclination of the respondents towards financial incentives as a means of productivity improvement. In fact, the workforce of SSIs can easily be motivated to perform better by providing monetary incentives as the majority of the workers are mainly concerned with earning their livelihood.

Liberalisation of Indian economy, which started in 1991, is expected to make a fundamental impact on the working within industrial units. Among its several impact areas, productivity, particularly labour productivity, is
the one where positive effect is likely. In line with this thinking, a question was included to elicit opinion of SSI owners/managers on this issue.

The response again indicates no significant effect of liberalisation at the grass root level in small-scale units. Among the majority, even the awareness regarding possible changes after liberalisation, a six years old process, is not found satisfactory. One respondent, for example, said “an improved (labour) productivity cannot compete with an imported technology”. Yet another answer to this question was that like any other process, liberalisation too brought a positive change in the attitudes but only for a short period.

Another key factor, apart from productivity is the quality of products which SSIs should ensure to improve their competitiveness in the market. With this in mind, and considering that some SSI units may go for ISO-9000 certification, a question related to its effect on the attitudes of units’ managers and workers was included in the questionnaire. It is found that going for ISO-9000 certification makes some difference in the attitudes of all concerned with the unit about productivity and financial incentives.

A mixed opinion is received about the effects on productivity of a unit being manufacturing or service unit, exporting or non-exporting unit, and belonging to a particular industry. A cross-classification of data related to such aspects of a unit (question numbers 31, 33 and 35) and that pertaining to productivity ranking and measurement etc. (e.g. question numbers 7 and 8) would have been significant for verification of such findings. But the data was not found sufficient for testing such relationships.
It needs to be mentioned here that the National Productivity Council (NPC) in New Delhi and its regional centres in various states bear the basic responsibility of propagating the benefits of productivity improvement. Every year at least two SSI units are selected for the National Productivity Award. It was, however, surprising to note that almost all units in the sample showed their ignorance when asked about the role of NPC and such local bodies in creating awareness among SSIs about productivity and its improvement.

The findings based on the analysis and interpretation of the data collected during the study are summarised and discussed in the next chapter to conclude the present study.
CHAPTER 4

RESEARCH FINDINGS AND CONCLUSIONS
CHAPTER 4

RESEARCH FINDINGS AND CONCLUSIONS

This chapter, being the concluding one, contains the findings of the present research, discussions on the statistically investigated relationships between the various variables under study, the concluding observations and some research issues for the succeeding scholars and researchers interested in working on the theme of productivity management in small-scale industries.

4.1 Findings of the Study:

Since the five objectives of the study were classified as either primary or secondary, their findings are accordingly grouped, presented, and discussed in the following sub-sections.

4.1.1 Awareness About Productivity Management: To probe the awareness of SSI units about the importance of productivity, its measurement and improvement was the first primary objective to be achieved.

Nearly 50 per cent of the units surveyed are found measuring their productivity for one or more reasons to justify the measurement. The reasons mentioned by the majority of these 50 per cent of the units indicate that they are quite aware of the conceptual and practical meaning of productivity and its role in making them competitive in the
market. However, conversations with some of them reflected a total ignorance of the word productivity. A majority of the remaining 50 per cent units, which are not measuring productivity, show the same type of ignorance. Sometimes even its explanation was not found sufficient to make them understand and respond to the questionnaire. The units not measuring the productivity either found it difficult to measure or felt no need of such measurement as data on productivity was of no use for them. Resistance offered by workers also prevents some of the units from measuring the productivity. This might be due to a general misconception prevailing amongst workers that any measurement and evaluation of their performance may lead the management to reduce the workforce. It was interesting to know that 55 per cent of those owners/managers who do not measure the productivity as such are at the same time showing some kind of ratio (while replying to another question) for measuring the productivity of their unit. This inconsistency in their response may simply be attributed to two reasons. One, the confusion they have between production and productivity. Second, the fact that each business organisation, however small or big it may be, measures its performance which may not necessarily be in terms of productivity.

Profit per rupee of investment was found as the most commonly used productivity index in SSIs. Similarly, it was again higher profit which got the highest score amongst the various benefits of improving productivity. Although high profitability is a logical ultimate goal of all profit-type organisations, SSIs are found more amenable to this
parameter of performance. Through informal discussions with some SSI owners known to the researcher it was revealed that small units generally tend to overutilise their human and machine resources in order to generate more profits. Improved quality of worklife of workers was reported to be among the benefits of enhanced productivity by only 22 per cent of the units.

Regarding methods of productivity improvement, 20 per cent units mentioned 'incentives' as the best way to increase productivity.

Productivity has got fourth place on the relative-importance scale when compared with production volume (third), profitability (second), product quality (first), and market share (fifth) as performance measurement parameters. This rating of each parameter seems to be justified in the context of its use. Product quality has its own importance in the competitive market. Moreover, some bias towards quality, it being a buzzword today, is also possible. The next important parameter then is profitability the prime objective of SSIs, followed by production volume, which is directly related to the profitability. SSIs, due to their typical set-ups, have rightly considered market share as a matter of least concern for them. When compared separately based on whether measuring productivity or not, the units had ranked productivity differently-second and fourth, respectively. The Spearman rank correlation test, later on, found no significant reason for this difference between the groups. Nevertheless, it was logically assumed that the units which measure productivity are more aware of its importance and hence ranked
it higher than those which do not measure the same.

The data indicates some kind of relationship between the productivity awareness of units and their age. In the high awareness group, ratio of younger to older units is 2:1 which is only 1.2:1 in the low awareness group. And since the overall ratio of the units in the two awareness groups is almost 1:1, it can be presumed that the younger units are more conscious of productivity aspects than the older ones.

This difference is probably existing because younger units are relatively unstable as they do not have the advantages which come naturally to the older units owing to their longer standing in the business world. Hence it becomes more important for younger units to manage their resources more effectively and efficiently. Also, the owners/managers of younger age-group being formally educated, particularly those in technical streams, are able to understand and practice the concept of productivity in a better way. Further, the education-business interaction, which is being greatly emphasized nowadays, certainly influences the role of productivity in SSIs.

However, no significant relationship between age and productivity awareness was statistically confirmed.

A similar test of independence between productivity awareness and investment on plant and machinery inferred that the higher the investment of a unit the more is its awareness on productivity. Units in low awareness group showed dominance (72%) of low investment units and
that in the high awareness group include 55 per cent of high investment units.

Interviews with owners/managers have also confirmed that investment is indeed a vital factor for productivity measurement and improvement. For instance, owners of SSI units found that neither their margin was good enough to afford the application of such managerial approaches nor did they need to measure the performance except in terms of profit.

Although a direct relationship between productivity awareness and investment is observed yet there are some exceptions where not all high investment units are necessarily more aware about productivity than all low investment units. The findings are summarised below:

* The median age of the units is found to be 21 years and the median amount invested on plant and machinery in the units is Rs. 45 lakh. Each unit, on an average, employs 50 workers of different categories.

* One-fourth of the responding owners/managers are qualified in technical streams like engineering and management while the rest include those from other non-technical disciplines. The average experience of the respondents in their present units is 13 years. Not more than ten per cent of them have undergone any professional training.

* Productivity management in SSIs is still in its infancy. It is considered more as a theoretical aspect rather than a practical approach.
Although 50 per cent of the units are found measuring productivity, only few owners/managers understand productivity in its real sense.

Among the five commonly used performance measurement parameters (product quality, production volume, productivity, profitability and market share), productivity has been found as only the fourth important parameter.

Not all units which are aware of the benefits of productivity improvement are measuring their productivity. Also, all units which do not measure productivity are not necessarily unaware of the benefits. Here it would not be out of place to point out that, generally speaking, the role of productivity is not being fully understood and appreciated by the SSIs.

Profit per rupee of investment is the major index of performance used in SSIs.

Measurement of productivity and its awareness in a unit does not depend on how old the unit is. It depends, however, on the investment.

4.1.2 Role of Financial Incentives in Productivity Improvement: Another primary objective of the study was to investigate the role of incentives, particularly financial incentives, in improving labour productivity.

At the outset of such investigation it was found that 86 units, out of 93 (92%), are providing incentives to their workers for different purposes
which ultimately lead to some gain in labour productivity. Though the study suggests a positive relationship between financial incentives and productivity, still, some contradictory results are also obtained by previous researchers. The reason being that linking productivity with incentives in fact, depends on the type of the workers (blue-collar or white-collar), their psychology and needs, and the work environment. A total of 72 out of these 86 units give financial incentives either alone or in combination with non-financial incentives. Cross-classification of relevant data and its statistical testing revealed that the type of incentive is significant with respect to the trend of labour productivity in SSIs over time.

Mostly the units provide incentives for an increase in production volume, or in some cases to improve the product's quality. Although high absenteeism is a common feature of the SSIs, incentives in only 23 per cent units were aimed at reducing absenteeism. It appears contradictory to the general practice of using some monetary means in small units to make workers loyal to their employers. Dominance of traditional units in the sample, facing not much competition, could have been a reason for this low percentage of units giving incentives to reduce the absenteeism.

Since small-scale enterprises are generally not managed by well-trained and professional managers, incentives were also thought to be a way out to compensate for managerial deficiencies in such units. No owner/manager has, however, agreed to this opinion.

Regarding the extent to which incentives were able to enhance labour
productivity, 50 per cent of the sampled units felt great satisfaction and the remaining ones were satisfied only to a small extent. Majority of the units (63%) use financial incentives as a short-term measure to achieve the immediate production target, whereas, 21 per cent adopt a long-term incentive policy. There are still few units (16%) which claim that they provide incentives on a regular basis apart from what profit they share with the workers for the extra efforts made to meet the additional demands.

Considering the SSIs culture in India and their common features, workers are invariably supposed to get motivated to work harder for some financial gains. A possible relationship was, therefore, examined between the period of incentives and the satisfaction to the owners/managers about the achievement of their objectives. It was concluded that the extent to which an incentive serves its purpose does not depend on the duration for which the incentive scheme was implemented.

On further analysing the issue of productivity improvement through financial incentives, no special effect of any particular schedule of financial incentives was noticed on the level of satisfaction the SSI units could achieve about the gain in productivity.

The findings concerning the relationship of the level of satisfaction to the workers and to the managers, for that matter, with the period and the type of financial incentive scheme would have been more reliable and easy to visualise if it were examined experimentally. The reason being that the present data pertains to the units which are different in their products, processes, markets, etc. Moreover, workers from different units do not have
any common platform and hence no direct means to compare their relative efforts and benefits. For instance, if workers of a unit are exposed to a variety of incentive schemes and then the change in labour productivity over the period is observed, more significant results could be possible to obtain. In the absence of such comparative experiments, workers are likely to improve their performance in their respective units for some financial returns irrespective of the units' policies on productivity-linked incentive plans. Thus making it difficult to study the effects of such policies on improvement of productivity.

Following points summarise the findings discussed in this subsection.

* The practice of providing financial incentives to workers is very common in SSIs, but with different objectives. The main purpose of financial incentives is to increase production. Improving quality of the product has also been the objective of giving incentives in some units. Such incentives are mostly used as a short-term measure only.

* Financial incentives also improve the quality of work even if they are meant for increase in production.

* The amount of gain in labour productivity over time depends on the type of incentive. Financial incentives are generally found as the most effective means of increasing productivity.

* Increase in productivity is not affected by whether financial
incentives are combined with piece-rate or time-rate system of wage payment.

* The extent to which financial incentives serve their purpose is independent of the type of scheme and the duration for which the incentives are given.

4.1.3 System of Wage Payment and Trend of Labour Productivity: The secondary objectives were basically specified to study those aspects of SSIs which could support the process of achieving the main objectives. One of the secondary objectives was to study the common practices of SSIs regarding wage payments. Approximately 60 per cent of the units were following a time-rate system of wage payment for their regular workers as against a piece-rate basis which was practiced by the remaining units. Both the systems have their own merits and demerits which, in some way or the other, have an impact on the production volume, product quality and the manager-worker relations. But as high labour turnover has been a common phenomenon in small units, it was unexpected to learn that more units preferred time-rate rather than piece-rate system of wage payments. For casual workers, daily wage system was found most popular followed by piece-rate. In most of the units, the basis for following a particular wage system was either industry norms or negotiations with the workers. For increment in wages, annual system was found more common than others like revision of statutory norms and worker’s demand. An attempt was made to study the effect of financial incentives on labour productivity when incentive is combined with the two
systems of wage payment. It resulted in the conclusion that wage-incentive combinations do not have any significant effect on labour productivity.

Study of the trend of labour productivity in SSIs was another secondary objective of the present research. About 80 per cent of the units were reported to be measuring labour productivity as they have shown some kind of ratio for its measurement. Number of units produced per worker and that per labour-hour were observed as the two main indicators of labour productivity in SSI units. Labour productivity, in 47 per cent of the units, has shown an increasing trend during the last few years. The remaining units have noticed either a decreasing trend (19%), no change in labour productivity over the time (23%), or an inconsistent performance (11%). Workers' inefficiency and lower grade of technology were found as the two main causes of decline in labour productivity in the SSI units.

Surprisingly only 30 per cent units considered shortage of working capital as a factor responsible for low productivity of SSIs.

The point-wise summary of the findings is given below:

* Wages in SSIs are fixed according to either industry norms or through negotiations between the workers and owners.

* Time-rate system of wage payment to regular workers is more common as compared to piece-rate system, particularly in the units which follow industry norms for wage payment.

* Casual workers are generally paid on daily-wage basis.
* Wages are usually increased annually.

* Workers performance is generally measured as number of units produced per worker or per labour-hour.

* The trend of labour productivity over the years has been either increasing, constant, decreasing or erratic in different units irrespective of the industry a unit belongs to or its location.

* Low efficiency of workers and lower grade of technology are identified as the two main factors resulting in a decreasing trend of productivity in any SSI unit.

4.1.4 Peripheral Issues: Product quality is also a vital constituent of the overall performance of any enterprise. The government is considering to provide incentives to those small-scale undertakings which acquire ISO-9000 certification. The sample of the study in general, did not seem prepared for acquiring such certification.

The respondent's opinion about the impact of liberalisation on their attitude towards productivity was also indifferent.

On the role of NPC in propagating the concept of productivity and assisting its improvement, the owners' views were negative. They were, however, complaining about the overall assistance from the government.

The following points summarises the major findings of this portion of the study.

* No positive impact of liberalisation on productivity aspects is
observed at the grass-root level in SSIs.

* The small number of owners/managers who are aware of ISO-9000 feel that going for this certification is expected to bring some positive change in the attitudes of manager as well as workers toward productivity.

* Almost all units are found to be unaware about the existence of the National Productivity Council and its role.

* SSIs are generally not satisfied with the government's assistance and incentives to them as even their basic requirements, like that of power, are not readily fulfilled.

* Despite some favourable recommendations of the Abid Husain Committee, small-scale sector has strong apprehensions about its future particularly in view of the current economic policy and the contentious issue of MNCs entry.

4.2 Conclusions and Suggestions:

Higher productivity means reduced wastage of resources, which in turn, brings the cost down. Lower cost then leads to reduced price and hence higher demand. When demand goes up, the production volume is increased. Producing and selling more ultimately generates more profits.

Productivity of a business enterprise is the ratio of its output to the input. Output of an enterprise, that include goods and services, when expressed in financial terms is generally measured as profit, production
The input, on the other hand, has three components and is expressed as fixed assets, working capital, wages and salaries, and other miscellaneous heads of the budget.

The first category of input components include product design and development, product-mix, process design, tools and equipments, production planning and scheduling, plant layout, plant maintenance, supply of raw material, and working conditions etc. The second category is that of working capital and other financial elements necessary to operate the unit. The third, and perhaps the most vital, element is the workforce.

So far as the first category of elements are concerned, the owners/managers of SSI units, generally not being professional and trained, are less capable of selecting and utilising them properly. Also, they do not prefer to hire consultants and experts in this regard because of their being almost unaffordable for small units. To make the required working capital available at the right time has also been a difficult task for the SSIs for various reasons like credit problems, limited access to the capital markets, and ineligibility for listing on the BSE, NSE and other exchanges. The only resource then is manpower, particularly in labour-intensive units, which if managed and motivated properly can contribute towards productivity improvement of small-scale industrial units. For the reasons related to the management, or otherwise, workers performance is adversely affected mainly by their absenteeism, lateness and carelessness.
It is, therefore, imperative for SSIs to focus more on labour productivity and its continuous improvement so that they can generate enough profit required for their survival and smooth functioning.

Among the various means of improving productivity, the non-incentive based techniques, which are product or process-oriented, hardly suit the SSIs requirements. The only option left to SSIs is then using incentives for workers. Moreover as revealed by the study, financial incentives produce a greater impact because the workers are usually at that stage of human needs hierarchy where non-financial incentives seem to be relatively ineffective.

The above discussion leads to the conclusion that in order to survive and compete in the present business scenario, SSIs must concentrate on productivity which can effectively be improved through financial incentives to the workers.

However, there are certain limitations and weaknesses of SSIs which when put together are found responsible for low productivity and high absenteeism in this sector. The findings of the present study thus identify some gaps between the desired goals of high productivity and the present performance of SSIs.
* Each unit should be provided with a specific format to record its performance on annual basis so that the unit's productivity can be measured and compared with the past years' index.

* Units should be encouraged to win the NPC award by giving the awardee some extra incentives.

* Inter-unit and inter-industry comparisons of the units' productivity should be made by some competent body, like local centres of the NPC, so that the units put extra efforts to maintain the data on productivity.

* Institution-Industry meets should be arranged regularly for an updated communication between them.

* Proper and regular supply of the required inputs to the industry should be ensured by the local governments.

* All schemes and incentives concerning SSIs should be revised and implemented in accordance with the present needs and past performance of units.

* For better performance of workers, their quality of work life including the working conditions should be improved and both the management as well as workers must be accountable to each other.

### 4.3 Direction for future Research:

Various constraints like that of time, financial, administrative, academic and personal fix-up the boundaries of a particular research
work. The work may otherwise have a multi-directional expansion with focus on different issues. The present study too had defined its scope and limitations and hence provides room for its further improvement and enrichment. Based on the experience gained during the study the following issues are identified as relevant and important for future researches in the area of productivity management in small-scale sector.

(i) Productivity Management in Exporting Units: The units which earn foreign exchange by means of selling their products directly or indirectly through any agency in the foreign market are classified as exporting units. The exporting units of the small-scale sector have been contributing significantly to the country's total exports during the last two decades. For instance, in the year 1993-94 the share of SSIs in the total export was about 35 per cent. Readymade garments, sports goods, processed food and leather products are the major exporting items being produced by these units. Despite of such an impressive performance by the SSIs the country's total exports has been very low and therefore SSIs, being a major contributor, need special attention for making further improvements. And since productivity management emphasizes lesser wastage of resources, exporting units should be studied in detail for measurement and improvement of their productivity. Also, the outlook of the owners/managers of such units about productivity related issues is expected to be somewhat different, rather positive, from their non-exporting counterparts. A comparative study on productivity of these two classes of SSIs could also be a great contribution to the industry.
(ii) Productivity Improvement and Schemes of Financial Incentives: Through the present study the use of financial incentives has emerged as an effective tool for motivating the SSIs workforce to improve its performance quantitatively and, sometimes, qualitatively as well. It was also found that though financial incentives increase labour productivity, no single scheme could be identified as being more effective than others. Insufficient data pertaining to the production (value), and wages for the last few years in the sampled units was one reason which made it impossible to determine the trends of labour productivity in the sector and the effect of the financial incentives on those trends. Such data, if made available in future, may prove its worth for proposing some concrete guidance to the SSIs in regard to incentives to the workers linking them with enhanced productivity.

Another approach for conducting similar study on the effects of various types and schemes of incentives on labour productivity may be based on experiment. Workers from selected units may be identified as subjects for an experiment to study the behavioural and attitudinal changes with respect to various schemes introduced and applied for different time periods.

(iii) Downsizing and Technological Upgradation in SSIs for Productivity Enhancement: Labour inefficiency and lower grade of technology in SSIs particularly in traditional units, are two important productivity bottlenecks. Can the upgradation of technology and
elimination of the resources, whose returns are not covering their costs, improve the productivity? Finding an answer to this question is an interesting proposed topic for research in the area of productivity improvement in SSIs.

(iv) Education, Training and Entrepreneurial Skills of the Owners/Managers vis-a-vis the Units' Performance: Apart from the common technological and institutional constraints of SSIs, the education, attitude and professional skills of their owners are also supposed to influence the performance. Findings of some study on the extent to which such factors may affect the productivity of a unit may be helpful in the betterment of SSIs.

(v) Inter-state and Inter-industry Comparative Study on Productivity Measurement and Improvement: Units belonging to the small industry are spread over different states in the country producing various items for societal use. The 138 clusters of SSIs in India, located in different cities and towns, are classified according to their potential of producing specific items. Location-wise and product-wise study of such units with variations, if any, in the incentives and facilities being provided to them may contribute in planning, controlling and improving the performance of small-scale industrial units in the country.

The domain of the present study along with the suggested topics for future research does not claim to encompass the entire gamut of planning and policy-making activities for productivity enhancement in the small-scale
sector. They are simply the milestones on the way to productivity improvement.

While the debate on productivity-linked incentives is still inconclusive because of its multi-dimensional effects on the workers performance at the workplace, the blue-collar's output in the small business organisations is, however, found to be linked with monetary rewards to a great extent.
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BIBLIOGRAPHY

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APPENDIX 1

QUESTIONNAIRE
QUESTIONNAIRE

I am working for my Ph.D. on "Productivity Improvement in SSIs". This questionnaire is meant for collecting data on this issue and not for any other purpose. You are requested to kindly help me in this regard by answering the following questions:

1. Name of the Unit:
2. Address of the Unit:
3. Year of its establishment:
4. In which year did you become the owner/manager of the unit:
5. Your major products/services are:
   a) Food Products
   b) Beverages, Tobacco & Tobacco Products
   c) Cotton Textile
   d) Wool, Silk & Synthetic Fibre Textiles
   e) Hosiery and Garments
   f) Wood Products
   g) Paper Products & Printing
   h) Leather Products
   i) Rubber & Plastic Products
j) Chemical & Chemical Products
k) Non-Metallic Mineral Products
l) Basic Metal Industries
m) Metal Products
n) Machinery & Parts Except Electrical
o) Electrical Machinery & Parts
p) Transport Equipments & Parts
q) Miscellaneous Manufacturing Industries
r) Repair Services
s) Services not elsewhere classified

6. Present investment on plant and machinery?
   a) Less than 30 lakh  b) 30-45 lakh
c) 45-60 lakh  d) 60-75 lakh
e) More than 75 lakh

7(a) Rank the following performance measurement parameters as 1, 2, 3, 4 and 5 according to their importance in business organisations (1 for the most important and 5 for the least).
   a) Production volume ..... b) Profitability....
c) Product quality....   d) Productivity....
e) Market share....

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7(b) Do you feel there are other important parameters apart from the above five? Please mention.

8. Do you measure the productivity of your unit?
   a) Yes  b) No

9. If 'Yes', then why? (You may tick more than one reason)
   a) Productivity is the real indicator of resources utilisation.
   b) Productivity compares the unit’s performance with others.
   c) For winning the National Productivity Award.
   d) Such data is required by some organisation(s) governing the SSI units.
   e) Any other reason? (Please specify)

10. If 'No' (Q. 8), then why? (You may tick more than one reason).
    a) Productivity is difficult to measure.
    b) It is expensive to maintain such data.
    c) Resistance from workers.
    d) No such data is required for any purpose.
    e) Any other reason? (Please specify)

11. How do you measure the Productivity? (You may tick more
than one).

a) Total Sales/Total no. of employees

b) Total profit/Total investment

c) Total production/Total no. of workers

d) Any other ratio? (Please specify)

12. What are the benefits of Productivity Improvement? (You may tick more than one).

a) Reduced input for the same or more output.

b) Increased profits.

c) Improved life-quality of workers

d) Higher national productivity

e) Any other? (Please mention)

13. What method(s) do you adopt for productivity improvement (Please mention).

14. How do you measure labour productivity? (You may tick more than one).

a) Total production/Total labour hours

b) Total production/Total number of workers

c) Standard labour hours per unit/Actual labour-hours per unit

d) Total profit/Total no. of workers

e) Any other (Please mention)
15. The trend of labour productivity in the unit during the last five years has been:
   a) Increasing  b) Decreasing  c) Constant  d) Erratic

16. Which factor, do you think, is most responsible for a decreasing trend of labour productivity in a SSI unit?
   (You may tick more than one).
   a) Workers's efficiency  b) Poor quality of material  c) Lower grade of technology  d) Lesser amount of working capital  e) Any other (Please mention)

17. The numbers of workers working presently in the unit are:
   a) Skilled ....  b) Semi-skilled ....  c) Unskilled ....

18. What system of wage payment is the unit following for regular workers?
   a) Piece-rate  b) Time rate  c) Any other
19. And for casual workers?
   a) Piece-rate  b) Time-rate
   c) Daily wage  d) Hourly wage
   e) Any other

20. On what basis are these systems of wage payment adopted?
   a) Negotiations with the workers.
   b) By the choice of the owner/manager.
   c) Job evaluation.
   d) Industry norms.
   e) Statutory norms.
   f) Any other (Please mention).

21. When are the wages increased?
   a) Annually
   b) When workers demand
   c) When the statutory limits are revised
   d) Any other (Please mention).

22. Which type of incentive does the unit give to the workers?
   a) Financial  b) Non-financial
   c) Both  d) None
23. For what purpose(s) are financial incentives provided?
   (You may tick more than one)
   a) Increase production
   b) Improve quality
   c) Reduce absenteeism
   d) Profit sharing
   e) Compensate managerial deficiencies, if any.
   f) Any other (Please mention)

24. To what extent these purposes are served?
   a) Completely
   b) Large extent
   c) Some extent
   d) Small extent
   e) Not at all

25. Financial incentive in this unit are used as:
   a) A short-term measure
   b) A long-term policy
   c) Both as long-term policy and short-term measure for extra-ordinary work.

26. How does financial incentive affect the product's quality?
   a) Positively
   b) No effect
   c) Negatively
27(a) Is there any relationship between financial incentive and labour productivity?

a) Yes
b) No

27(b) If yes, mention some schemes of financial incentives in order of their importance.

28. Productivity Management in SSIs is basically a matter of importance for units having investment of rupees:

a) Upto 5 lakh  b) 5-50 lakh
c) Above 50 lakh  d) Any amount
e) None of the above

Please respond to the following questions briefly based on your expert opinions regarding each of them.

29. Role and contribution of top management (owner manager and family members in business, if any) in productivity improvement?

30. Role and contribution of supervisory management in productivity improvement?

31. Opinion about efficacy of financial versus non-financial incentives?
32. Any change in attitude of owners/managers of SSI units, particularly after liberalisation, about productivity and financial incentives?

33. Does a unit being exporting/non-exporting until make a difference to productivity and financial incentive?

34. Does the type of industry a unit belongs to make a difference to productivity and financial incentive?

35. Does being in product manufacturing or service provision make a difference to productivity and financial incentive?

36. The fact that some SSI units voluntarily or otherwise go in for ISO 9000 certification make a difference to attitude of
a) Top Management
b) Supervisory management
c) Workers
about productivity and financial incentive?

37. Have the NPC and local producty council played a significant and perceptible role about creating awreness about productivity improvement? If yes, cite specific instance when your SSI unit benefitted?
38. Any other views and opinions you would like to express about the issue of productivity and financial incentive.

Please also answer the followings regarding yourself.

39. Your educational qualification?
   a) Engineering
   b) Management
   c) Other

40. Do you have any professional training like EDP, CA, ICWA, etc.?
   a) Yes
   b) No

41. Any previous experience?
   a) Yes
   b) No

42. If yes, then,
   a) For how long:
   b) Nature of business/service:

43. Of this unit, are you?
   a) The proprietor
   b) A Partner
   c) A Senior Manager

Thank you.
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<th>Year</th>
<th>Total Production (Rupees)</th>
<th>Number of workers</th>
<th>Total Wages paid (Rupees)</th>
<th>Remarks</th>
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<td>Semi-skilled</td>
<td>Unskilled</td>
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APPENDIX 2

SAMPLE SIZE DETERMINATION
SAMPLE SIZE DETERMINATION

The sample size (n) is estimated according to the guidelines given by Tull and Hawkins in their book on Marketing Research*.

For the present study following calculations were made:

1. \( e = \pm 0.05 \) (allowable error)
2. \( z = 1.00 \) (confidence level: 90\(^{\circ}\))
3. Assuming the following estimates for the proportions of SSI units providing financial incentives (\( P_f \)), non-financial incentives (\( P_{nf} \)), and a combination of both (\( P_{fnf} \)):
   \[ P_f = 0.45, \quad P_{nf} = 0.15, \quad P_{fnf} = 0.40 \]
4. Using the formula \( n = z^2 \frac{(P(1-P))}{e^2} \), the respective samples sizes are calculated as:
   \[ n_f = 99, \quad n_{nf} = 51, \quad n_{fnf} = 96 \]
5. The sample size conversion factor is thus obtained as:
   \[ n = 99 \times 1.71 = 169 \]

APPENDIX 3

CLUSTERS OF SSI\textsubscript{s} IN INDIA
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Cluster</th>
<th>Location</th>
<th>State</th>
<th>Metro(M)</th>
<th>City(C)</th>
<th>Town(T)</th>
<th>Rural(TR)</th>
<th>Natural(H)</th>
<th>Reserved(R)</th>
<th>Unreserved(U)</th>
<th>Traditional Art/Craft</th>
<th>Traditional Consumer Goods</th>
<th>Modern SSI</th>
<th>Vertical(V)</th>
<th>Large Unit Centered(L)</th>
<th>Technology Export upgrad.</th>
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<td>Truchipalai</td>
<td>Tamil Nadu</td>
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APPENDIX 4

ADDRESSES OF CONCERNED LIBRARIES/OFFICES
ADDRESSES

Indian Statistical Institute,
203, Barrackpore Trunk Road,
Calcutta 700035

Association of Indian Universities (AIU),
16, Kotla Marg, New Delhi 110002

Indian Council of Social Science Research (ICSSR),
35, Ferozshah Road, Near Mandi House,
New Delhi.

Ratan Tata Library,
5, Siri Institutional Area, Hauz Khas,
New Delhi.

Planning Commission Library,
Yojna Bhavan, Sansad Marg,
New Delhi.

National Productivity Council (INPC).
5-6, Institutional Area, Lodhi Road,
New Delhi 110 003.

Development Commissioner (SSIs).
Nirman Bhavan, New Delhi.
Directorate of Industries (Uttar Pradesh),
G.T. Road, Kanpur.

District Industrial Centre (DIC),
Industrial Estate, Aligarh.

National Small Industries Corporation Ltd. (NSIC),
Industrial Estate, Aligarh.