CHAPTER IV

MATERIALS, METHOD AND THE SAMPLE
The present investigation, namely, "Factors related to productivity (work-output) of younger and older workers" has been studied keeping the earlier stated objectives and hypotheses in view. The method and materials chosen to accomplish the requirements of the study are discussed in this chapter.

The Subjects of the Study

The present attempt as already stated is to study factors related to individual work-output of younger and older workers in public and private industrial organizations in an Indian setting. Accordingly, for the purpose of the investigation it was decided to draw the sample consisting of workers of different age groups from the two types of industries in different areas of Andhra Pradesh. First, the list of industries of the two types in the selected districts were prepared. Then the industries were sampled. Two industries refused permission and they were replaced by others. The industries drawn were as follows.

1. Private (Medium) Sector

1. The Thana Electric Supply Co Ltd,
2. Ranka Cables
3. Tini Pharma (Pvt) Ltd
4. Venkatachalapathri Cotton Mills
5 Surcot Industries
6 Containers India Ltd
7 Sneha Vinyl Company
8 SRT Electrical Industries
9 Perfect auto die Castings Ltd

2. Public (Medium) Sector
   1 Electronics Corporation of India Ltd, Hyderabad
   2 Electronics Corporation of India Ltd, Renigunta
   3 Bindu Tools Ltd, Renigunta
      (N=120)

3 Private (Small) Sector
   1 Sree Veeranjaneya Industries
   2 Kiran Electronics Pvt Ltd
   3 Govindaraja Industries
   4 Tools & Crafts Pvt Ltd.
   5 Alluru Non-ferrous Castings Ltd
   6 Plastona Company
   7 SIBAR
   8 AKD Industries
   9 United Engineering Co.Ltd
10 Chedwin Auto Cylinders Ltd
    (N=120)
The supervisor of each unit in a factory were requested to give a list of workers and their age. From the supervisors list subjects were drawn randomly (age group-wise) for the investigation.

Workers were interviewed for data collection at their lunch hour and evening time after working hours with prior permission.

The sample for the investigation consists of 360 men workers at middle level of two different age groups (20-39 years, 40-59 years); drawn randomly from public and private sector, small-scale and medium scale units. The units were from Chittoor, Cuddapah, Hyderabad and Ranga Reddi districts. As there are no small scale units under public sector division, only medium scale units were taken for the study.

Table 1 Sample distribution

<table>
<thead>
<tr>
<th></th>
<th>Medium scale</th>
<th>Small scale</th>
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<tbody>
<tr>
<td></td>
<td>Age group</td>
<td>N</td>
</tr>
<tr>
<td>Public Sector</td>
<td>20-39</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>40-59</td>
<td>60</td>
</tr>
<tr>
<td>Private Sector</td>
<td>20-39</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>40-59</td>
<td>60</td>
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</tbody>
</table>
To test the hypotheses (refer chapter III) the measurement of the following variables was required:

**Dependent variables:**

1. Individual work-output (quality and quantity)
2. Individual work-output (quality rating)

**Independent variables**

1. Work involvement
2. Organizational climate
3. Achievement motivation
4. Adjustment
5. Cooperation

**Measurement of Individual Work-output:**

The concept of individual productivity is of considerable importance, as productivity is an index of economic welfare. Economists and businessmen have used the term productivity in relation to the output secured for a given amount of labour. Productivity therefore means the physical volume of output attained per worker or per man hour.

In so far as the present study is concerned individual work-output needed to be measured. This was taken to mean two things: a) the rate of work or volume of work per unit time i.e., in this case, per day, and b) the quality of the work turned out, keeping in view...
the standards for the particular product or item that he is working on. What is evaluated here is the quality of the individual's performance.

Although a variety of judgemental procedures exist to measure individual work-output, rating scales are widely used, primarily because they are so simple to construct. Rating scales may take various forms, but the primary characteristic is the requirement that a check be placed at some point along a scale by a qualified observer (rater). There may be a line along which a manager is to place a mark, or numbers may be used, one of which is to be circled to indicate the evaluation (rating).

To measure productivity, a rating scale constructed by John B Minor and Mary Green Minor (1977) modified to suit local conditions was used. It measures quality, and quantity of work on a 5-point scale for each rating:

- far below typical performance 1
- below typical performance 2
- within typical performance 3
- above typical performance 4
- far above typical performance 5

The English version of the scale was translated into regional language (Telugu), supervisors connected with the worker were asked to rate the output of each
individual worker with regard to two aspects of his performance
a) quantity and b) quality on a 5-point scale for each variable

With regard to quantity of work the instruction was
as follows: Mr. works under your supervision. We
request you to kindly rate his performance with special
reference to the quantity of his daily output i.e., how
much work he turns out per day keeping a typical per-
formance in view. Kindly use the five item descriptive
scale. Please place him in the appropriate category. We
particularly request you to consider his performance
objectively and give your evaluation. This evaluation
will not be used for any official purpose (e.g., promotion,
increment or other organizational evaluation and will be
kept confidential).

A similar rating scale was used to assess the
quality of the work output with appropriate modification
of the relevant sentences. The English version of sche-
dules as used in the study are appended.

A test retest correlation on a sample of 15 super-
visors gave an $r$ of 0.88 for quality and 0.95 for quantity
of work-output with an interval of 15 days between evaluations.

Work involvement

In the past, several instruments have been designed
by psychologists and sociologists to measure work involve-
ment. Two instruments (Blood 1969, Warr, Cook & Wall 1979)
were designed to measure involvement with work in general. Blood (1969) considered the notions of work involvement and the protestant work ethic to be equivalent, and such equivalence is reflected in his measure. Warr, Cook and Wall (1979) in developing their measure of work involvement, defined the construct as "the extent to which a person wants to be engaged in work". The problems of construct validity for each of these measures stem from the fact that the items in these instruments are measuring constructs that carry excess meaning.

In the present study the work involvement scale developed by R N Kanungo (1982) was used to measure work involvement of workers. Compared with earlier measures of work involvement (Blood, 1969), the new scale used for this study provides refinements in the definition and measurement of work involvement. Work involvement measured by the new scale refers to a normative belief about the work role in life (code of ethics about work in general) and is more a function of past socialization of the respondent.

The scale consists of 11 statements, of which 5 are filler items. Subjects were asked to indicate the degree of their agreement or disagreement with each statement by putting a cross mark on a 5-point scale.
A Pilot study was conducted to test the reliability of the Telugu version on a sample of 40 subjects, was found to be 0.84. The correlation coefficient between English and Telugu versions was found to be 0.80 which was significant.

**Organizational climate**

Based on previous theory and research on climate identified for creativity, specific organizational climate dimensions suitable for nurturing creativity were identified. It has been observed that external and internal factors have more dominating and deeper influence, and the management of the organization feels that it cannot do much to improve things so far as external factors are concerned. But management must provide leadership to motivate all levels of personnel for creation of better climate.

The most important external environmental factors that influence the climate for creativity were identified.
as: a) Cultural/Social systems, b) Economic system, c) Political/Governmental and Administrative systems, d) Science and Technology system

Generally in the Indian context the following factors influence the internal climate of an organization

1. Managerial policy and its practice
2. Personal policy and its practice
3. Availability and utilization of skills
4. Relationship among various groups, particularly industrial relations climate
5. Setting up of performance standards and acceptance of these standards
6. Work culture and work ethics reflecting a sense of responsibility about the task assigned to groups and individuals
7. Physical facilities and resources of work
8. The pattern of compensation, recognition and reward.

To measure organizational climate "organizational climate for creativity" scale developed by V Ganesan was used in the present study (Ganesan, 1976)
Items for the scale were drawn from other measures (Litwin and Stringer, 1968, Rosen, 1961, Tornow and Pinto, 1976) to include measures of various aspects of each climate dimension. Some items were negatively phrased. The original measure with 93 items under eleven climate dimensions were analysed by several judges for clarity, appropriateness and content validity. To improve internal consistency 15 items were rejected after item analysis. In the final analysis 63 items were taken. It measure the following eleven climate dimensions:

1. Organizational flexibility
2. Stimulation of creativity
3. Non-evaluative climate
4. Conflict tolerance
5. Allowance for risk taking
6. Freedom from pressure
7. Autonomy
8. Recognition
9. Enriching climate
10. Organizational anxiety
11. Climate for identity

Organizational climate for creativity questionnaire consists of 63 statements that describe various conditions in organizations. Subjects are to respond in terms of
"How much is there now" in the organization and also "How much you are satisfied" in terms of percentages in the original questionnaire. But the questionnaire was modified to provide for each item a 5-point scale for the convenience of the subjects to respond easily. Subjects were asked to rate the climate in their organization on a 5-point scale:

- Strongly agree: 5
- Agree: 4
- Moderately agree: 3
- Mildly agree: 2
- Strongly disagree: 1

A pilot study was conducted on a sample of 40 subjects to measure the test-retest reliability of the Telugu version questionnaire. The correlation coefficient was found to be 0.89 which was significant.

**Measurement of Achievement Motivation**

Generally achievement motivation of the subjects was measured by using the projective techniques. In this study "Sentence Completion Test" developed by B N. Mukherjee (1969) was used. The Sentence Completion Test (SCT) is a forced choice measure of verbalized need...
for achievement. Unlike the Thematic Apperception Test (TAT) designed by McClelland and his co-workers (1953) in which achievement motivation is measured by projective technique of eliciting achievement imagery, the sentence completion test was developed to assess the consciously recognized achievement values (V Ach) Achievement value refers to a continuum which is defined by the degree of importance that an individual attaches to competence in an achievement area.

An individual's score on the SCT is the number of times he has chosen a statement dealing with any one of the following aspects of achievement motivation:

a) hope of success, b) fear of failure, c) high standard of excellence, d) sense of competition, e) optimism, f) perseverance, g) concern for creative work, h) preference for difficult and challenging tasks, i) interest in making future plans, j) identification with a successful authority.

The Sentence Completion Test consists of 50 forced-choice triads (one item reflecting achievement related sentiments and the other two pertaining to other aspects of manifest needs) selected in such a manner as to minimize the social desirability factor. A subject's score on the SCT is the number of times he has chosen a
statement reflecting achievement related values. Thus a high score on SCT is interpreted as a keen desire to compete successfully with a standard of excellence, an expressed interest in undertaking difficult and challenging tasks, and a strong sense of optimism. Test-retest reliability for the Telugu version of the scale was found to be 0.85 which was significant. Unlike the Thematic apperception test designed by McClelland and his co-workers, this sentence completion test is easy to administer, to score and also to answer for the subjects. Hence Sentence completion test developed by D.N. Mukherjee (1969) Department of Psychology, York University, Toronto, Canada was used to measure the subjects' achievement motivation.

The "Adjustment Inventory" (Adult form) developed by Hugh M Bell (1938) was used to measure the adjustment level of workers in five areas: Health, Home, Social, Emotional and Occupational. It consists of 160 statements, each one with two alternatives, yes or no. Subjects were asked to mark either 'Yes' or 'No' depending upon the applicability of each statement to their daily life events. Scoring stencils were used to score the subjects responses and interpret the results as follows.
a) Home adjustment Individuals scoring high tend to be unsatisfactorily adjusted to their home surroundings. Low scores indicate satisfactory home adjustment.

b) Health adjustment High scores indicate unsatisfactory health adjustment, low scores indicate satisfactory adjustment.

c) Social adjustment Individuals scoring high tend to be submissive and retiring in their social contacts. Individuals with low scores are aggressive in social contacts.

d) Emotional adjustment Individuals with high scores tend to be unstable emotionally. Persons with low scores tend to be emotionally stable.

e) Occupational adjustment Individuals with high scores tend to be dissatisfied with their present occupations. Those who make low scores tend to be well pleased with their present jobs.

A pilot study was conducted on a sample of 40 subjects to test the reliability of the Telugu version of the questionnaire which was 0.91. The correlation coefficient was found to be 0.87 between Telugu and
Measurement of co-operation

In the present investigation "Cooperation" of the employee had to be measured. The cooperation scale constructed by John B Minor and Mary Green Minor (1977) which measures quantity of work, quality of work and co-operation was examined in a pilot study. It was found that the scale can't measure cooperation level of an employee in detail or in depth. Supervisors who rated their workers by using the scale also reported their inability to rate the degree of cooperation of each worker exactly. Hence the scale was modified. Three dimensions of the cooperation of a worker were included. Cooperation was defined as an act or activity of the worker on the job situation which reflects his willingness or readiness to share with others his knowledge or experience and help his colleagues, supervisors and subordinates in their work. Supervisors who rated cooperation were asked to rate the worker comprehensively taking into account the cooperation in three areas together viz., cooperation with superiors, subordinates and co-workers. A five-point rating scale was used to assess cooperation.
The supervisors were instructed as follows: Mr. X works under your supervision. Please evaluate him for the degree of cooperation extended by him to his superiors, equals, and subordinates. You are requested to use the following five-point scale and rate each worker objectively. Your objective measurement will go a long way in furthering our research. Please rest assured that your evaluation will not be used for any official or non-official use in your organization.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Rating</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Far below typical</td>
<td>1</td>
<td>Least cooperative. Does all things by himself and does not help others.</td>
</tr>
<tr>
<td>Below typical</td>
<td>2</td>
<td>By and large does not cooperate except under specific instructions to do so.</td>
</tr>
<tr>
<td>Within typical</td>
<td>3</td>
<td>Cooperates when it is essential for the job on hand, otherwise keeps to himself.</td>
</tr>
<tr>
<td>Above typical</td>
<td>4</td>
<td>Generally cooperates voluntarily with others. Does not wait to be told to do so. Others appreciate</td>
</tr>
<tr>
<td>Far above typical</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
his cooperative behaviour

Far above typical-3 Goes out of the way to extend a helping hand and cooperate with others Identifies himself with the group Highly appreciated by all for cooperativeness

The scale was pilot tested on a sample of 10 supervisors and ten workers. Their suggestions were taken and incorporated. Supervisors found it to work well and easy to fill in. Test-retest reliability on a sample of 20 supervisors who rated one worker each with a gap of fifteen days gave a coefficient of 0.92. The form of the scale is appended.

Procedure

It was planned that data would be collected from the workers of industrial organizations. The instruments selected in this study for testing were 1) Employee evaluation rating scale, 2) Work involvement questionnaire, 3) Organizational climate questionnaire, 4) Achievement motivation questionnaire, 5) Adjustment Inventory, and 6) Co-operation questionnaire.

The sample for the present study was drawn from the industries after obtaining their permission and cooperation, the testing tools being self-administration type,
the instruments were administered to the subjects along
necessary with the instructions. They were requested to answer
them during lunch interval or after completing their
work. This was made expecting stress during the routine
schedule of work. About 3 to 4 sessions spread over two
or three days was necessary to complete the testing.

After collecting the data sheets from the workers,
employee evaluation rating scales were distributed to
all the supervisors concerned. On a preappointed date
supervisors were contacted and the cooperation scales
were first administered during their leisure time. Then
they were requested to rate the workers on their work-
output.

Statistical treatment:

The raw scores obtained through testing were sub-
jected to relevant statistical treatment.

To find out the differences between public sector
and private sector undertakings, younger and older
workers, small scale and medium scale industries with
regard to quality and quantity of individual work output,
Duncan's range test and 't' tests were used wherever
applicable.
Multivariate analysis (Multiple Regression-Stepwise) was carried out to assess the contribution of independent variables to work-output (dependent variables).