CHAPTER II

RELATIONSHIP BETWEEN LABOUR WELFARE MEASURES AND LABOUR PRODUCTIVITY

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Relationship Between Labour Welfare Measures and Labour Productivity

Industrial progress of a nation along with other factors is the outcome of its committed labour force. The health and contentment of working class along with good relations are crucial to the management. In this regard the importance of labour welfare was recognized as early as 1931, when the Royal Commission on Labour stated that the benefits go under this nomenclature are of great importance to the worker who is unable to secure by himself. The schemes of labour welfare may be regarded as “a wise investment” which should and usually does bring a profitable return in the form of greater efficiency. After independence, in the year 1951, the Planning Commission realized the usefulness of labour welfare measures, when it observed that increase in production is not possible without the contribution and cooperation of laboring class. To achieve higher amount of production, working conditions require to be improved to a large extent. The workers should at least have the means and facilities to keep themselves in a state of sound health. Sound health would result in increase in efficiency. Increase in efficiency would result in enhancement of productivity and enhancement of productivity would lead to increase in production which is the indicator of industrial progress.

It is in the interest of the enterprise that the workers at least have the means and facilities to keep themselves quite fit for work so that required efficiency level may be maintained. This health and efficiency of the workers may be achieved only by adequate nutrition and suitable housing conditions. The working conditions should be such as to safeguard the health of the workers and protect them against occupational hazards. The work place should provided reasonable amenities for their essential needs. The workers should also be equipped with the necessary technical training and a certain level of general education. The Labour Investigation Committee preferred to include under welfare, “anything done for the intellectual,
physical, moral and economic betterment of the workers…..”³ This definition shows that increase in labour productivity may be possible through good health, high moral and social values, good economic condition and required level of knowledge. Through labour welfare measures all these may be improved for the enhancement of productivity.

The purpose of providing labour welfare amenities is to bring about the development of the whole personality of the worker- his social, psychological, economic, moral, cultural and intellectual development to make him a good worker, a good citizen and a good member of the family.⁴ The labour welfare activities are not only intra-mural but also extra-mural, not only statutory but also non-statutory. These are undertaken by any of the three agencies- the employers, trade unions or the government. These welfare amenities aim at physical and mental development of the workers, both as a part of the production process and also to enable them to sustain and improve upon the basic capacity of contribution to the processes of production.

Now the relationship between various labour welfare measures and the productivity is being discussed taking into account the sub-groups of welfare activities given as under:-

**Health Services and Labour Productivity**

The need for the labour welfare arises from the very nature of the industrial system, which is characterized by two basic factors; one, the conditions under which work is carried on are not congenial for health; and secured, when a labour joins an industry, he has to work in an entirely strange atmosphere. It takes much time to adjust a worker in this new atmosphere. It affects the health of the worker adversely. In industries the working environment is injurious to the health of the workers as there is excessive heat or cold, noise, odours fumes, dust and lack of sanitation and fresh air etc, which lead to occupational hazards.
The health services provided by the industries help in maintaining the health of its workers. These health services include:

(a) Factory health centre; playgrounds; health education; medical examination of workers and health research.

(b) Factory dispensary and clinic for general treatment; treatment of individual diseases, fatigue and treatment of accidents.

(c) Women and child welfare work, anti-natal and prenatal care; maternity aid; infant welfare; crèches; women’s general education; health and family welfare.

(d) Workers’ recreation facilities; playgrounds, outdoor life; athletics, gymnasium and women’s recreation.

(e) Education: provision of reading rooms; libraries; circulating library; visual education; pictorial education; lecture programmes; debating unions; study circles; education of workers’ children, nursery schools; primary schools; women’s general education with emphasis on hygienic, sex life, family planning, child care, domestic economy and home handicrafts.

(f) Cultural activities include; musical evenings and circles; art circles; folk songs, the arts and stories; histrionics, folk dancing and festival celebrations.

Productivity is measured as volume of output per man hour. Enhancement of productivity is the combined result of labour efficiency technology, plant & machinery and other input factors. It is very difficult to measure the share of labour in this productivity. Yet, all are agreeing on the point that higher the efficiency of labour higher would be the productivity. The efficiency of labour is the end result of high morale, level of knowledge, attitude and training alongwith good health. If the workers enjoy good health, they would not feel irritated or tired at the place of duty. They would be able to work for long periods. A healthy person may bear higher responsibilities of work and take sound decisions. A sound mind lies in a sound
body. So, good health of workers is of utmost importance in the development of an industrial enterprise. The healthy and happy workers work with heart and soul together. They are self-motivated resulting in increase in productivity which in turn increases total production.

**Work Environment and Labour Productivity**

Two important factors have potential to effect the performance of a job: provisions of appropriate working conditions and the physical environment of work. What changes in performance are brought about by changes in performance are brought about by changes in the work environment? A word of caution is necessary here. When changes are brought about, two things might happen: there is a changed environment; and there is a response to change in general. The second is often also called “the Hawthorne effect.” This means that a change in physical working environment brings about a temporary improvement in morale leading to increased productivity. This is a response to change in general and should not be taken as a response to specific changes. Hence a manager increase has to be careful in generalizing from the temporary increase in productivity.\(^5\)

In a world of changing values, where ideologies are rapidly undergoing transformation, rigid statements about the field of labour welfare need to be revised. Labour welfare work is increasing with changing opportunities and needs to meet varying situations. It is also increasing with the growing knowledge and experience of techniques. An able welfare officer would, therefore include in his welfare programme the activities that would be conducive to the well-being of the worker and his family. The test of welfare activity is that it removes, directly or indirectly, any hindrance, physical or mental of the workers and restores to them the peace and joy of living the welfare work embraces the workers and their families. The following list gives us an idea of the conditions of work environment inside and outside the work place:
(a) the workshop sanitation and cleanliness must include the regulation of
temperature, humidity, ventilation, lighting, elimination of dust, smoke,
fumes and gases, convenience and comfort during work, operative
postures, sitting arrangements etc; distribution of work hours and
provision for rest times, meal time, breaks, and workmen’s safety
measures.
(b) The factory sanitation and cleanliness must consist of: provision of
urinals, lavatories and bathing facilities; provision of spittoons, water
disposal, disposal of wastes and rubbish, general cleanliness; white-
washing and repairs of buildings and workshop; ingress egress, passage
and doors; and care of open spaces, gardens and roads.
(c) Provision and care of drinking water;
(d) Canteen Services;
(e) Management of workers’ cloak rooms, rest rooms and library

Various features of physical environment have been manipulated in both field
and laboratory experiments to understand their effect on output. Such physical
features as illumination, noise, vibration, colour and music have been experimented
with extensively. We will discuss illumination and noise to give an idea of their
impact on productivity. The discussion will take into account research generalization
without going into details of methodology.

**Impact of Illumination on Labour Productivity**

Daylight is the best illumination for work. In the absence of daylight, artificial
light does not approximate daylight it might put a severe strain on the eyes of the
workers on duty. Two characteristics of light have been found to be important –
intensity and distribution. The intensity of light should vary according to the nature
of the task. Tasks requiring precise manipulation require more intense illumination
than tasks involving the manipulation of large objects. Distribution of light is equally important. A situation where illumination covers the total work environment rather than concentrating on single aspect of the work area is better. In the case of later, whenever the visual field is shifted to a poorly illuminated surroundings it dilates the pupils. Excessive papillary activity causes fatigue and eye strain. In this way it is clear that poor illumination puts adverse effect on efficiency of the workers. The strain and fatigue caused by poor illumination or artificial illumination result in low productivity.

**Impact of Noise on Labour Productivity**

Noise is generally considered a distractor. When the noise level at the work place is high a worker has to concentrate more or exert greater efforts to perform the task in hand. Similarly, if the noise is intermittent greater efforts are required unlike a situation where it is constant. In fact, the constancy of noise reduces its distracting characteristics and the person adopts himself to its more easily. In such cases sudden silence may become more distractive than continuous noise. However, if noise is part of the work, it does not affect workers as much as it does when it is extraneous. A typist, for example, may not find the clatter of the type-writer distracting unlike the person sitting next to him.

In addition to illumination and noise, such factors as colours, vibrations and music have also been found to affect productivity as well as performance. Whether it is noise or bad illumination, the maintenance of productivity is at the expense of the worker. He must exert additional efforts to maintain his output. Noise and bad illumination, for example, lead to increased muscle tension and metabolic rate. The physiological change brings about accumulation of waste products and depletion of carbohydrate reserves leading to fatigue with a consequent effect on output.

**Impact of Fatigue and Boredom on Labour Productivity**
Both fatigue and boredom are important phenomena because of their effect on industry. Their effect often becomes apparent in increased spoilage and decreased output in addition to a greater possibly of accidents and high absenteeism. Fatigue is rather complex to understand, particularly because muscular fatigue, which is an effect of prolonged muscular activity, may not correspond with the subjective feeling of fatigue. Thus a person fatigued physiologically may no feel tired and may continue to work and maintain his normal level of productivity because of his strong motivation and desire to complete his work. Conversely, a poorly motivated person may get a subjective feeling of fatigue and his output may reduce. An age-old method to measure the effect of fatigue is to plot the output curve every half an hour. The curve will show an initial “warm up” period rising to peak performance and then a steady decline in output suggesting that finally fatigue is setting in. This method is useful where output can be plotted as in piece-rate jobs with countable units. White collar, secretarial, and other jobs do not lend themselves to this analysis. Therefore, the existence of fatigue has to be verified differently.

The physiological component of fatigue is usually measured by a device called an ergo graph which consists of a recording system with cord for suspending weight. The weight, which can be increased or decreased, is pulled by the individual using one finger. The recording called an ergo gram shows the changes in performance.

The reduction of fatigue is of extreme practical importance to industry. Several methods have been tested and operated to alleviate fatigue. Since people have different fatigue levels, efforts are made when selecting and placing individuals, to minimize fatigue by reducing the length of work periods, introducing several rest pauses, job rotation, job enrichment and work teams.
Boredom, sometimes referred to as “mental fatigue” refers to the subjective aspect of fatigue. It results when an activity is perceived to be boring, monotonous, repetitive, and not requiring much attention. Boredom is highly specific, unlike fatigue. Fatigue is generalized. A physically tired person will not be able to carry out any other work effectively while a bored person may show tremendous increase in output because of a change of job. The character of the work determines, to a large extent, the feeling of boredom. Less challenging jobs de-motivate the individual and induce boredom.

Some of the measures to reduce boredom have been limited by varied factors such as the level of intelligence, complexity of the task, and the personality of the employee. Extroverts tend to experience boredom more easily because of their dependence on outside stimulation, while older employees and those who prefer regularity in their activities are less bored doing repetitive work. Work that does not provide job satisfaction in most cases has been found to cause boredom. Again, job enrichment workers’ participation, job enlargement, etc; are some of the ways to increase both job satisfaction and productivity.⁶

**Non-Statutory Welfare Measures and Labour Productivity**

As earlier stated, labour welfare measures in India can be classified as statutory and non-statutory. Statutory welfare comprises those provisions whose observance is binding on employees by law. These welfare activities related to certain essential working conditions and standards of health. Non-statutory welfare, on the other hand, concerns those welfare activities which are undertaken voluntarily by employers, e.g; housing, education, recreation, transportation and cooperatives. Although the variety of non-statutory welfare activities is large, their effectiveness in achieving productivity is not very well established. Most organizations in India either have contributed money to these activities to maximize welfare programmes for them.
In India the public sector the private sector and the multinationals have provided following welfare programmes to their workers-

- housing facilities by undertaking extensive constructive programmes;
- providing of loans to workers to construct their own houses;
- medical and educational facilities;
- reimbursement of expenses on severe diseases like cancer or expenses on artificial limbs provided by outside hospitals;
- free education to the children of workers;
- easy availability of car, scooter and cycle loans with long-term interest-free payment plans;
- programme to promote social and welfare activities, to foster fellow feelings among employees, to create a social security fund and to render financial assistance to nominees in the event of the death of a member, irrespective of the cause or place of death;
- night shift allowance;
- uniform for all seasons;
- leave travel assistance;
- benefits for the families of the workers on long leave and leave because of sickness;
- canteen facilities at heavily subsidized rates or free of cost;
- free gifts of the products manufactured or produced by the industry;
- long service award;
- establishment of labour welfare fund trust or people policy, for which bonus amount is deposited in the scheme;
- benefit programmes like gift to newly weds, gift on the birth of children, gift on daughter’s marriage;
- festival advance coupled with the company’s contribution;
- payment of group insurance premium by the employer
Whether it is a welfare fund trust or any other form of voluntary benefit, a welfare policy strives to foster a sense of financial well-being, ownership and job satisfaction amongst workers. Although many non-statutory welfare activities either started as paternalism or on account of the aggressiveness of unions in India, the workers and unions today take them very seriously as an important compensation for their work. In some cases they have almost become proper rights and any hint of eliminating them causes serious concern and frustration among the workers, often leading to go slow, gheraos, and strikes. The management, thus, has to be concerned with the efficacy and cost of non-statutory benefits.

The management has to assess the motivational effect of non-statutory welfare measures on work and other productive behavior. What sort of reactions do these benefits elicit? Are they desirable from the point of view of management? Are non-statutory benefits taken for granted by workers or do they mentally add it to their wages? These are some important questions that require consideration. No study has been done in India, so far, to assess the impact of non-statutory welfare measures. The cost of these amenities is on growth which warrants indepth studies to understand, and possibly predict, the effect of non-statutory activities on labour productivity.

In qualitative terms it may be concluded that the non-statutory welfare measures result in a sense of gratitude and loyalty among laboring class and motivate them to work hard. Generous benefit might, however, create a sense of over-dependence among workers; they may not leave the organization, causing a large workforce stagnation. This might create problems such as considering seniority rather than merit for promotion, perceiving jobs as dead ends and consequently losing interest while at the same time blocking the entry of fresh blood into the organization. The management has to ensure that non-statutory welfare measures help the enterprise to grow and not retard its growth by kicking back and defeating the very purpose for which it was created. However non-statutory welfare is
composed mainly of hygiene factors and not of direct motivators, and the capacity of these factors by themselves to elicit increased productivity is matter of debate and discussion.

**Job Satisfaction and Labour Productivity**

A new model is suggested to orient non-statutory welfare activities from a different perspective. The purpose is to make such activities more meaningful for organizational productivity. The management is more concerned with labour-productivity and not job satisfaction. The human behavior experts opine that job satisfaction and labour productivity are synonymous, or that high job satisfaction will lead to high labour productivity. But the results of our survey, point to the contrary. The two are very different and one does not necessarily determine the other. In fact, even the conditions that determine the two are very different.

A. Hafeez has listed six broad categories of factors that govern job satisfaction of industrial workers in India:

1. Personal adjustments of worker
2. Nature of work
3. Relationship with other workers
4. Nature of supervision
5. Set-up of the undertaking and its relationship with unions
6. The social status of his job in the community

**Labour Productivity**, on the other hand, has been found to be determined largely by the quality of machines and raw materials, R&D, industrial relations, institutional set-up, ability and skills of work force, incentive system, etc.

It has also been experienced by the personal discussions and interviews with the workers on duty that they are motivated to achieve certain goals which result in satisfaction. Labour productivity is seldom a goal itself but is more a means to goal attainment. In most of the cases, labour productivity and job satisfaction are not related to each other except when labour productivity is perceived as a path to certain important goals. Thus with this discussion it may be put that job satisfaction is more broad-based and encompasses various conditions and situations and sometimes labour productivity is also included in it.
However, evidences got from majority of the workers suggest no relationship between job satisfaction and labour productivity. As labour productivity is always a matter of prime concern to an enterprise, discussion here would be of labour productivity not of job satisfaction. Difficulties in the Segregation of Statutory and Non-Statutory and Welfare Expenditure

No publications in India are available which may give a clear picture of expenditure on statutory and non-statutory welfare measures. No demarcation line may be between both the welfare measures. Most of the data available are an amalgam of the expenses of both statutory and non-statutory welfare activities. In India major welfare activities of railways which have highest number of workers are housing, education, co-operatives, cooperative credit and stores in addition to health resorts and holiday houses. Railway has incurred heavy expenditure on labour welfare activities not directly related to labour productivity. H.D. Goyal suggests that these are investments in men which are expected to bring a change in their attitude, which may in turn be reflected in turnover and absenteeism. They are compensations, or a price to reduce the worker’s alienation from work.

The model that is followed for non-statutory welfare is represented below:

![Diagram](image)

In true sense, company satisfaction is a state positive feeling towards the company. This feeling is expressed in loyalty, faith and an attitude that the company is concerned with the welfare of its workers. This model emphasizes that welfare measures will generate company loyalties, and assumes that such allegiance will lead to labour productivity. It is a paternalistic approach. In this way, the non-statutory labour-welfare measures are made to produce a pride and satisfaction with the
enterprise, an enterprise which is generous enough to be concerned with the “Care” and “Well-being” of its workers.

Although increased labour productivity is one of the objectives of non-statutory labour welfare measures in Indian Industry by and large, the motivation for such measures has been philanthropic; a feeling that workers suffer from poverty and need to be taken care of. It is felt that if they are properly looked after, they will be loyal to the organization. Thus, non-statutory welfare measures have been perceived to bring allegiance to the enterprise that has bestowed facilities to the workers. The assumption generally has been that increased allegiance and loyalty to the enterprise will result in high productivity. Through our survey we came to know that there is a high degree positive correlation between company satisfaction and non-statutory labour welfare measures. But it is very difficult to establish relationship between company satisfaction and labour productivity. Several surveys and studies on the relationship between company satisfaction and labour productivity have given very inconsistent findings. Some have found no relationship between the two while others have found some indication of a positive relationship mediated through moderator variables.

The above analysis shows that in the existing model, though it may be true that non-statutory labour welfare measures lead to high company satisfaction, it is doubtful if high company satisfaction will necessarily lead to high labour productivity. Hence if the organization is with increasing productivity, the above model has to be modified. The revised model here reverses the position of labour productivity and company satisfaction. This revised or new model is given as under:-
This new model suggests that non-statutory welfare will directly influence labour productivity. Once this relationship is established, high labour productivity may lead to high satisfaction. Through out discussions with workers of different large scale industries of Kumaun region, we have found that non-statutory welfare, in addition to providing the usual social benefits, should be linked with such concepts as workers’ participation in management and job enrichment. This calls for a shift in emphasis. Let an increase in productivity be not the indirect function of welfare but a direct outcome of this measure. The welfare concept needs to be changed from social service to job contents. If the industrial units are genuinely interested in the workers’ welfare they have to provide meaning in their jobs by increased participation and greater discretion and variety. The workers be encouraged and be able to contribute to the overall effectiveness of the enterprise. Holter, H.⁹ has reported industrial experiments in U.S.A, U.K., India (Engineering, Coal Mining and Textile Industries, respectively) showing that the democratic sharing of power at the lower grades of industrial workers can be stable and effective because it furthers the ends of both workers and the employers.

Majority of the industrial enterprises now pay attention to job enrichment as a process of making a job more meaningful. Job enrichment has the potential to enhance labour productivity and worker satisfaction if changes in jobs are perceived as opportunities rather than as demands. As a process of making a job more interesting and providing opportunities for achievement and growth, it concerns discretion and contents of the job. Increase in both leads to variety, less boredom, and less alienation.¹⁰ Experience with this process in both Indian and foreign industries has been very encouraging.¹¹ It has shown a definite increase in productivity and employee to include job content orientations, its viability for increased labour productivity will be enhanced manifold. On the other hand, its purpose of decreasing alienation—both physical and psychological—and increasing the general well-being of the working population can be more meaningfully achieved.

**Workers’ Education & Training and Labour Productivity**
All of us accept the fact that the workers of a country are the most significant component of the Community and they need to be socially and psychologically satisfied by providing for their opportunities for education and training. Simon Kuznetz has aptly said, “The major capital stock of an industrially advanced country is not its physical equipment, it is the body of knowledge amassed from the tested findings and the capacity and the training of population to use this knowledge effectively."\textsuperscript{12} The term “workers’ education” connotes different meanings for different countries on account of developing countries like India, the term, “workers’ education” is used in its wider connotation and aims at making the worker a better citizen."\textsuperscript{13} The workers’ education has to take into consideration the educational needs of the worker as an individual for his personal evaluation; as an operative for his efficiency and advancement; as a citizen for a happy and integrated life in the community; as a member of a trade union, for the protection of his interests as a member of the working class.

**Contents of Workers’ Education**

As the cultural outlook, historical background, availability of resources (both human and non-human) and stage of economic development differs from country to country, the contents of workers’ education may not be put in watertight compartments. In general, the scope and content of workers’ education should be determined according to environment, level of industrialization and union development. It should cover different types of education, ranging from general education to trade union education, and include vocational guidance, technological training, literacy and artistic studies, and the manner of conducting conferences and seminars. The syllabi are designed to inculcate among the workers a sense of duty and social responsibility while making them aware of their rights. In the new curricula, population education, functional adult literacy and productivity education occupy a place of special importance.

To boost labour productivity, the Seventh Plan laid emphasis on “upgrading the quality of training imparted to the workers at different levels.... Training has to
suit the requirements of industry and should be of the best quality. This will also help in increasing quality output of industrial goods and raise their competitiveness, both in the domestic and international markets. The workers’ education is the education of the worker. It stimulates the workers’ awareness of their rights and responsibilities and enables them to perform their functions effectively through commitment to workers’ organizations for the defense of common interests.

**Workers’ Training**

In India there is an acute shortage of skilled and trained workers for a number of industrial occupations and a majority of workers suffer from low efficiency, which necessarily means that the rate of skill formulation has been low. Besides, factors like social attitude to industrial work, differentials between the income of skilled and unskilled workers, and the training and educational system has been responsible for this state of affairs. To bring about any change in these is an uphill task. But for rapid industrial development, the provision of training facilities for workers is the need of the hour. This training pre-supposes a sound basis of universal literacy, proper planning and utilization of trained personnel, and properly designed training programmes. Needless to say training leads to efficiency and increased labour productivity, less wastage, reduced supervision, higher employee earnings, reduced accidents, increased organizational stability and flexibility, heightened morale and vertical job mobility.\(^{15}\)

To build up the career of young persons and to supply a constant stream of trained personnel to industries, the Director General of Employment and Training (DGET) has designed a number of training programmes. A few important programmes are:-

I. Craftmen’s Training Programme.
II. Craft Instructor’s Training.
III. Advanced vocational Training.
IV. Foreman’s Training.
V. Apprenticeship Training Scheme.
VI. Part-Time Training for Industrial Workers, and

VII. Vocational Training Programme for Women.

The study group of the National Commission on Labour has made many observations on the working of the training schemes for workers. Some of the important ones are:

i. Substantial training capacities have remained unutilized.

ii. No new trades have been added.

iii. The training programmes do not take into account local and regional needs.

iv. There has not been adequate expansion in some trades in which there has been persistent shortages.

v. The selection of trainees is made by inexperienced and non-technical persons and considerations other than the suitability of the candidates become important.

vi. Many instructions do not have any experience of working conditions and production techniques in industry.

vii. The quality of training is poor, which may be due to lack of counseling arrangements.

viii. The training provided does not conform to the needs of industries and the rapid expansion of the training programme.

Training an improvement of skills is a continuous process and has to pervade throughout the working life. It is in the interests of the employers to train workers to handle their tools and machines properly for increasing the productivity of the enterprise. Once a worker has been at work for some time, there should be a system of granting him study leave to equip himself for senior levels of responsibility.

**Impact of Training on Labour Productivity**

Our analyses investigates several dimensions of the relationship between training of workers and labour productivity. We have examined whether training has different returns for workmen and employers, by comparing the effect of training on
direct measures of labour productivity with the results obtained from the corresponding wage equations. We have also checked the robustness of the results in the baseline specification, by allowing for different types of labour and by focusing on sub-samples defined on the basis of firm’s characteristics (size, industry, location.)

We have also been able to account for the duration of training by constructing an indicator of “effective training intensity- the average number of days of training per worker-and comparing its effects on productivity with those of the training intensity indicator commonly used in the literature. Besides, the comparison of the impact of training programmes on labour productivity and wages allows the assessment of the role of labour market rigidities in determining how the returns to training are shared between the firm and the workers.

Our results indicate that the training intensity defined as the share of employees participating in training activities over the previous year, has a positive and significant effect on productivity at firm-level. When training intensity increased by 1 percentage point, productivity increases by about 0.07 percent. Training intensity also has a significant impact on wages, but using wages as an indirect measure of productivity leads to substantially under-estimate the impact of training programme. Using an indicator of training that does not account for training duration may lead to underestimate the effects of training on productivity.

Wages provide as an indirect measure of productivity as trained workmen are getting significantly higher earnings. The real wage rate is assured to be equal to the marginal productivity of labour if the labour market is perfectly competitive and under restrictive assumptions about training programmes. More generally, the benefits of training programmes are shared between employer and workmen depending on labour market imperfections whether training is specific or general and who pays for the cost of training, so that wage equations do not provide an appropriate indication of the effects of training on productivity.
USE OF COBB-DOUGLAS PRODUCTION FUNCTION

The econometric analysis in the study follows the literature in assuming that technology at firm level can be characterized by a Cobb-Douglas production function:

$$Y = \alpha L^a K^b$$ ........................................ (1)

where

- $Y$ = value added
- $L$ = labour
- $K$ = capital
- $A$ = technological progress
- $\alpha$ = elasticity of value added with respect to capital
- $\beta$ = elasticity of value added with respect to labour.

Under the assumption that trained and untrained workers have different productivities, effective labour can be written as:

$$L = N^U + \frac{Y}{\alpha} N^T$$ .......................... (2)

where $L$ are more productive than untrained workers.

- $L$ = effective labour
- $N^U$ = untrained workers
- $N^T$ = trained workers
- $\alpha$ = a parameter that characterizes trained workers relative productivity

$Y$ will be $> 1$ if trained workers are more productive than untrained workers.

Substituting equation (2) in equation (1) we obtain

$$Y = A \left[ N^U + \frac{Y}{\alpha} N^T \right] K^b$$

$$a = A \left[ 1 + \left( \frac{Y - 1}{N} \right) \frac{N^T}{N} \right] N\alpha K^b$$ .............................(3)
where \( N \) is the total number of workers and \( \frac{N^T}{N} \) is the fraction of trained workers over the total. Under the assumption of constant returns to scale \((\alpha + \beta = 1)\) we can write the production function in intensive form and express labour productivity as under:

\[
\frac{y}{N} = A \left[ 1 + (Y - 1) \frac{N^T}{N} \right] \left( \frac{N^T}{N} \right)^\beta \quad \text{(4)}
\]

Applying a log transformation and approximating around 1 we obtain:

\[
\log \left( \frac{y}{N} \right) = \log(A) + \alpha(Y - 1) \frac{N^T}{N} + \beta \log \left( \frac{N^T}{N} \right) \quad \text{(5)}
\]

If trained workers are as productive as untrained workers \((Y = 1)\), the coefficient of training intensity will be zero.

Following a similar approach, we can obtain an expression for labour productivity with different types of workers (e.g. by occupation, gender, etc.). Assuming two labour inputs:

\[
L = N^U + y_1 N^T + y_2 N^T \quad \text{(6)}
\]

So that the production function can be written as under:

\[
y = A \left[ N^U + y_1 N^T + y_2 N^T \right] k^L \left( \frac{N^T}{N} \right)^\beta
\]

\[
y = A \left[ 1 + (Y_1 - 1) \frac{N^T}{N} + (Y_2 - 1) \frac{N^T}{N} \right] \left( \frac{N^T}{N} \right)^\beta \quad \text{(7)}
\]

As above assuming constant returns to scale, applying the log-transformation and approximating around 1, we obtain:

\[
\log(y) = \log(A) + \alpha(Y_1 - 1) \frac{N^T}{N} + \alpha(Y_2 - 1) \frac{N^T}{N} + \beta \log \left( \frac{N^T}{N} \right) \quad \text{(8)}
\]

More generally, with \( M \) labour inputs:
Turning to the empirical specification, we estimate the baseline equation in (5) and the multi-factor specification in (9) allowing for differences in labour quality (technicians, skilled, semi-skilled), while controlling for a number of other factors affecting productivity, captured in A, such as innovation (proxied by research and development and patents expenditures), export activity, and a number of other firm characteristics (size, industry, location, age, part of a group and listed status). The resulting equation to be estimated can be represented as follows:

\[
\log(Y) = \log(A) + \alpha \sum_{k}^{K} \left[ \frac{y_k - 1}{s_k} \right] + \beta \log(\mu) \quad \ldots (9)
\]

Where \( Y \) is the log of labour productivity, \( \chi \) is a vector of (potentially endogenous) time varying regressors that include training intensity; \( z \) is a vector of time invariant firms’ characteristics, \( \epsilon \) is the error term, \( i \) is the individual (firm) index and \( t \) the time (year) index.

We assume that the error term includes a time-invariant individual component (\( \alpha_i \)), an individual-invariant time effect (\( \Gamma_t \)) and an idiosynchratic component (\( \eta_{it} \)):

\[
\epsilon_{it} = \alpha_i + \Gamma_t + \eta_{it} \quad \ldots (11)
\]

In addition in the presence of perfectly competitive labour market it is possible to derive, from equation (5), a wage equation by equalizing the real wage to the marginal product of labour.

**DATA**

To collect information on training programmes and workers’ performance, 30 large scale industrial units were selected through a stratisfied sampling method so that representativeness of the population may be ensured. Main emphasis in selecting
these samples units was on nature of product manufactured. Ten workers from each sample unit were selected taking into consideration their skill level and nature of job. In this way the sample covered 300 workers in all as per table given as under:

Table 2.1

<table>
<thead>
<tr>
<th>Large Scale Industries (with name of manufactured product)</th>
<th>No. of Labourers Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td>30</td>
</tr>
<tr>
<td>Paper Products</td>
<td>30</td>
</tr>
<tr>
<td>Glycols</td>
<td>10</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>20</td>
</tr>
<tr>
<td>Polyester Film, chips</td>
<td>20</td>
</tr>
<tr>
<td>Confectionary Items</td>
<td>20</td>
</tr>
<tr>
<td>Healthcare Items</td>
<td>20</td>
</tr>
<tr>
<td>Electronic Items</td>
<td>10</td>
</tr>
<tr>
<td>Electrical Items</td>
<td>30</td>
</tr>
<tr>
<td>Edible Oil &amp; Vanaspati Ghee</td>
<td>20</td>
</tr>
<tr>
<td>Automobiles &amp; Auto-parts</td>
<td>40</td>
</tr>
<tr>
<td>Plastic Products</td>
<td>20</td>
</tr>
<tr>
<td>Heavy Engineering Equipments</td>
<td>10</td>
</tr>
<tr>
<td>Household Durables</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>300</strong></td>
</tr>
</tbody>
</table>

Information on workers’ characteristics were collected through schedules which were filled-up at the time when they were not on their duty and were available at their residences. The sample contains all large scale industrial units that compiled the section on training in the questionnaire for at least three consecutive years over the period from 2009-10 to 2011-12.

The information on training activity was made available by the firms themselves as a whole, and disaggregating by gender and by occupation (technicians, skilled and semi-skilled). The survey also provides information on the type of
training activity (internal and external courses, on-the-job, self-learning) and the average duration of training. The empirical analysis presented is based on two main indicators of training activity. First, training intensity, defined as the share of labourers who have taken part in formal training activities in the previous year. Second effective training intensity, defined as training intensity times the average number of days of training per worker. The information on occupational shares (shares of technicians, skilled and semi-skilled workers over total employment) and skill intensity (ratio of technical personnel over total employment) were also collected for analysis. Besides, database on value added capital, labour, R&D expenditure, size, industry, location, age and other firm characteristics also has been prepared through survey. Productivity is defined as value added per worker. Capital is measured by the book value of total fixed assets. R&D intensity is ratio of expenditure for research and development and advertising over capital. The wage is calculated as the total wage bill divided by the number of labourers.

ACCOUNTING FOR TRAINING DURATION

One of the major drawbacks of the use of training intensity as an indicator of training activity, is that it does not take into account the duration of training, thus implicitly assuming that every worker is trained the same number of days per year in all firms. In fact, not only training duration varies consistently across firms, but also the variability of training duration is far greater than the variability of training intensity. It is therefore necessary to assess whether not accounting for training duration could bias results and in particular whether the impact of training on productivity may be under-estimated by using a purely quantitative indicator such as training intensity.

Table 2.2 Reveals descriptive statistics of sample large scale industries:
Table 2.2

Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Intensity</td>
<td>0.28</td>
<td>0.32</td>
</tr>
<tr>
<td>Average Training Duration</td>
<td>8.85</td>
<td>2.13</td>
</tr>
<tr>
<td>Log Productivity</td>
<td>10.69</td>
<td>0.70</td>
</tr>
<tr>
<td>Log capital per labourer</td>
<td>9.98</td>
<td>1.53</td>
</tr>
<tr>
<td>Technicians share</td>
<td>0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Skilled Workers Share</td>
<td>0.42</td>
<td>0.32</td>
</tr>
<tr>
<td>Semi-skilled Workers share</td>
<td>0.56</td>
<td>0.33</td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td>0.37</td>
<td>2.31</td>
</tr>
<tr>
<td>Firm’s Age(years)</td>
<td>17.67</td>
<td>6.32</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.62</td>
<td>0.50</td>
</tr>
<tr>
<td>Agro-based</td>
<td>0.33</td>
<td>0.22</td>
</tr>
<tr>
<td>Forest-based</td>
<td>0.05</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Source based on survey and data calculation

Further table 2.3 exhibits training intensity and duration: within and between contribution to overall standard deviation.

Table 2.3

Training Intensity and Duration

<table>
<thead>
<tr>
<th>Variable</th>
<th>Between</th>
<th>Within</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Intensity</td>
<td>78%</td>
<td>66%</td>
</tr>
<tr>
<td>Training Duration</td>
<td>76%</td>
<td>72%</td>
</tr>
</tbody>
</table>

CONCLUSION

Training has a positive and significant effect on productivity at firm level. A one percent increase in training intensity is associated with an increase in value added per worker of about 0.07 percent. We also find that training has a significant effect on wages. Using wages as a proxy for productivity may lead to significantly
underestimate the impact of training on labour productivity. More generally, our results indicate that failing to account for unobserved heterogeneity leads to overestimate the impact of training on productivity. However, the results also indicate that failing to account for potential endogeneity of training leads to underestimate the impact of training on productivity.

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CHAPTER II

RELATIONSHIP BETWEEN LABOUR WELFARE MEASURES AND LABOUR PRODUCTIVITY

- HEALTH SERVICES AND LABOUR PRODUCTIVITY
- WORK ENVIRONMENT AND LABOUR PRODUCTIVITY
- IMPACT OF ILLUMINATION ON LABOUR PRODUCTIVITY
- IMPACT OF NOISE ON LABOUR PRODUCTIVITY
- IMPACT OF FATIGUE AND BOREDOM ON LABOUR PRODUCTIVITY
- NON-STATUTORY WELFARE MEASURES AND LABOUR PRODUCTIVITY
- JOB SATISFACTION AND LABOUR PRODUCTIVITY
- DIFFICULTIES IN THE SEGREGATION OF STATUTORY AND NON-STATUTORY WELFARE EXPENDITURE
- WORKERS’ EDUCATION & TRAINING AND LABOUR PRODUCTIVITY
- WORKERS’ TRAINING
- IMPACT OF TRAINING ON LABOUR PRODUCTIVITY
- USE OF COBB-DOUGLAS PRODUCTION FUNCTION
- CONTENTS OF WORKERS’ DURATION
- ACCOUNTING FOR TRAINING DURATION
- DATA
- CONCLUSION
Industrial progress of a nation alongwith other factor is the outcome of its committed labour force. The health and contentment of working class alongwith good relations are crucial to the management. In this regard the importance of labour welfare was recognized as early as 1931, when the Royal Commission on Labour stated that the benefits go under this nomenclature are of great importance to the worker who is unable to secure by himself. The schemes of labour welfare may be regarded as “a wise investment” which should and usually does bring a profitable return in the form of greater efficiency. After independence, in the year 1951, the Planning Commission realized the usefulness of labour welfare measures, when it observed that increase in production is not possible without the contribution and cooperation of laboring class. To achieve higher amount of production, working conditions require to be improved to a large extent. The workers should at least have the means and facilities to keep themselves in a state of sound health. Sound health would result in increase in efficiency. Increase in efficiency would result in enhancement of productivity and enhancement of productivity would lead to increase in production which is the indicator of industrial progress.

It is in the interest of the enterprise that the workers at least have the means and facilities to keep themselves quite fit for work so that required efficiency level may be maintained. This health and efficiency of the workers may be achieved only by adequate nutrition and suitable housing conditions. The working conditions should be such as to safeguard the health of the workers and protect them against occupational hazards. The work place should provided reasonable amenities for their essential needs. The workers should also be equipped with the necessary technical training and a certain level of general education. The Labour Investigation Committee preferred to include under welfare, “anything done for the intellectual,
physical, moral and economic betterment of the workers….”³ This definition shows that increase in labour productivity may be possible through good health, high moral and social values, good economic condition and required level of knowledge. Through labour welfare measures all these may be improved for the enhancement of productivity.

The purpose of providing labour welfare amenities is to bring about the development of the whole personality of the worker- his social, psychological, economic, moral, moral, cultural and intellectual development to make him a good worker, a good citizen and a good member of the family.⁴ The labour welfare activities are not only intra-mural but also extra-mural, not only statutory but also non-statutory. These are undertaken by any of the three agencies- the employers, trade unions or the government. These welfare amenities aim at physical and mental development of the workers, both as a part of the production process and also to enable them to sustain and improve upon the basic capacity of contribution to the processes of production.

Now the relationship between various labour welfare measures and the productivity is being discussed taking into account the sub-groups of welfare activities given as under:-
Health Services and Labour Productivity

The need for the labour welfare arises from the very nature of the industrial system, which is characterized by two basic factors; one, the conditions under which work is carried on are not congenial for health; and secured, when a labour joins an industry, he has to work in an entirely strange atmosphere. It takes much time to adjust a worker in this new atmosphere. It affects the health of the worker adversely. In industries the working environment is injurious to the health of the workers as there is excessive heat or cold, noise, odours fumes, dust and lack of sanitation and fresh air etc, which lead to occupational hazards.

The health services provided by the industries help in maintaining the health of its workers. These health services include:

(a) Factory health centre; playgrounds; health education; medical examination of workers and health research.
(b) Factory dispensary and clinic for general treatment; treatment of individual diseases, fatigue and treatment of accidents.
(c) Women and child welfare work, anti-natal and prenatal care; maternity aid; infant welfare; crèches; women’s general education; health and family welfare.
(d) Workers’ recreation facilities; playgrounds, outdoor life; athletics, gymnasium and women’s recreation.
(e) Education: provision of reading rooms; libraries; circulating library; visual education; pictorial education; lecture programmes; debating unions; study circles; education of workers’ children, nursery schools; primary schools; women’s general education with emphasis on hygienic, sex life, family planning, child care, domestic economy and home handicrafts.
(f) Cultural activities include; musical evenings and circles; art circles; folk songs, the arts and stories; histrionics, folk dancing and festival celebrations.

Productivity is measured as volume of output per man hour. Enhancement of productivity is the combined result of labour efficiency technology, plant & machinery and other input factors. It is very difficult to measure the share of labour in this productivity. Yet, all are agreeing on the point that higher the efficiency of labour higher would be the productivity. The efficiency of labour is the end result of high morale, level of knowledge, attitude and training alongwith good health. If the workers enjoy good health, they would not feel irritated or tired at the place of duty. They would be able to work for long periods. A healthy person may bear higher responsibilities of work and take sound decisions. A sound mind lies in a sound body. So, good health of workers is of utmost importance in the development of an industrial enterprise. The healthy and happy workers work with heart and soul together. They are self-motivated resulting in increase in productivity which in turn increases total production.

**Work Environment and Labour Productivity**

Two important factors have potential to effect the performance of a job: provisions of appropriate working conditions and the physical environment of work. What changes in performance are brought about by changes in performance are brought about by changes in the work environment? A word of caution is necessary here. When changes are brought about, two things might happen: there is a changed environment; and there is a response to change in general. The second is often also called “the Hawthorne effect.” This means that a change in physical working environment brings about a temporary improvement in morale leading to increased productivity. This is a response to change in general and should not be taken as a response to specific changes. Hence a manager increase has to be careful in generalizing from the temporary increase in productivity.
In a world of changing values, where ideologies are rapidly undergoing transformation, rigid statements about the field of labour welfare need to be revised. Labour welfare work is increasing with changing opportunities and needs to meet varying situations. It is also increasing with the growing knowledge and experience of techniques. An able welfare officer would, therefore include in his welfare programme the activities that would be conducive to the well-being of the worker and his family. The test of welfare activity is that it removes, directly or indirectly, any hindrance, physical or mental of the workers and restores to them the peace and joy of living the welfare work embraces the workers and their families. The following list gives us an idea of the conditions of work environment inside and outside the work place:

(a) the workshop sanitation and cleanliness must include the regulation of temperature, humidity, ventilation, lighting, elimination of dust, smoke, fumes and gases, convenience and comfort during work, operative postures, sitting arrangements etc; distribution of work hours and provision for rest times, meal time, breaks, and workmen’s safety measures.

(b) The factory sanitation and cleanliness must consist of: provision of urinals, lavatories and bathing facilities; provision of spittoons, water disposal, disposal of wastes and rubbish, general cleanliness; white-washing and repairs of buildings and workshop; ingress egress, passage and doors; and care of open spaces, gardens and roads.

(c) Provision and care of drinking water;

(d) Canteen Services;

(e) Management of workers’ cloak rooms, rest rooms and library

Various features of physical environment have been manipulated in both field and laboratory experiments to understand their effect on output. Such physical
features as illumination, noise, vibration, colour and music have been experimented with extensively. We will discuss illumination and noise to give an idea of their impact on productivity. The discussion will take into account research generalization without going into details of methodology.

**Impact of Illumination on Labour Productivity**

Daylight is the best illumination for work. In the absence of daylight, artificial light does not approximate daylight it might put a severe strain on the eyes of the workers on duty. Two characteristics of light have been found to be important – intensity and distribution. The intensity of light should vary according to the nature of the task. Tasks requiring precise manipulation require more intense illumination than tasks involving the manipulation of large objects. Distribution of light is equally important. A situation where illumination covers the total work environment rather than concentrating on single aspect of the work area is better. In the case of later, whenever the visual field is shifted to a poorly illuminated surroundings it dilates the pupils. Excessive papillary activity causes fatigue and eye strain. In this way it is clear that poor illumination puts adverse effect on efficiency of the workers. The strain and fatigue caused by poor illumination or artificial illumination result in low productivity.

**Impact of Noise on Labour Productivity**

Noise is generally considered a distractor. When the noise level at the work place is high a worker has to concentrate more or exert greater efforts to perform the task in hand. Similarly, if the noise is intermittent greater efforts are required unlike a situation where it is constant. In fact, the constancy of noise reduces its distracting characteristics and the person adopts himself to its more easily. In such cases sudden silence may become more distractive than continuous noise. However, if noise is part of the work, it does not affect workers as much as it does when it is extraneous.
A typist, for example, may not find the clatter of the type-writer distracting unlike the person sitting next to him.

In addition to illumination and noise, such factors as colours, vibrations and music have also been found to affect productivity as well as performance. Whether it is noise or bad illumination, the maintenance of productivity is at the expense of the worker. He must exert additional efforts to maintain his output. Noise and bad illumination, for example, lead to increased muscle tension and metabolic rate. The physiological change brings about accumulation of waste products and depletion of carbohydrate reserves leading to fatigue with a consequent effect on output.

**Impact of Fatigue and Boredom on Labour Productivity**

Both fatigue and boredom are important phenomena because of their effect on industry. Their effect often becomes apparent in increased spoilage and decreased output in addition to a greater possibly of accidents and high absenteeism. Fatigue is rather complex to understand, particularly because muscular fatigue, which is an effect of prolonged muscular activity, may not correspond with the subjective feeling of fatigue. Thus a person fatigued physiologically may no feel tired and may continue to work and maintain his normal level of productivity because of his strong motivation and desire to complete his work. Conversely, a poorly motivated person may get a subjective feeling of fatigue and his output may reduce. An age-old method to measure the effect of fatigue is to plot the output curve every half an hour. The curve will show an initial “warm up” period rising to peak performance and then a steady decline in output suggesting that finally fatigue is setting in. This method is useful where output can be plotted as in piece-rate jobs with countable units. White collar, secretarial, and other jobs do not tend lend themselves to this analysis. Therefore, the existence of fatigue has to be verified differently.
The physiological component of fatigue is usually measured by a device called an ergograph which consists of a recording system with cord for suspending weight. The weight, which can be increased or decreased, is pulled by the individual using one finger. The recording called an ergogram shows the changes in performance.

The reduction of fatigue is of extreme practical importance to industry. Several methods have been tested and operated to alleviate fatigue. Since people have different fatigue levels, efforts are made when selecting and placing individuals, to minimize fatigue by reducing the length of work periods, introducing several rest pauses, job rotation, job enrichment and work teams.

Boredom, sometimes referred to as “mental fatigue” refers to the subjective aspect of fatigue. It results when an activity is perceived to be boring, monotonous, repetitive, and not requiring much attention. Boredom is highly specific, unlike fatigue. Fatigue is generalized. A physically tired person will not be able to carry out any other work effectively while a bored person may show tremendous increase in output because of a change of job. The character of the work determines, to a large extent, the feeling of boredom. Less challenging jobs de-motivate the individual and induce boredom.

Some of the measures to reduce boredom have been limited by varied factors such as the level of intelligence, complexity of the task, and the personality of the employee. Extroverts tend to experience boredom more easily because of their dependence on outside stimulation, while older employees and those who prefer regularity in their activities are less bored doing repetitive work. Work that does not provide job satisfaction in most cases has been found to cause boredom. Again, job enrichment workers’ participation, job enlargement, etc; are some of the ways to increase both job satisfaction and productivity.
Non-Statutory Welfare Measures and Labour Productivity

As earlier stated, labour welfare measures in India can be classified as statutory and non-statutory. Statutory welfare comprises those provisions whose observance is binding on employees by law. These welfare activities related to certain essential working conditions and standards of health. Non-statutory welfare, on the other hand, concerns those welfare activities which are undertaken voluntarily by employers, e.g; housing, education, recreation, transportation and cooperatives. Although the variety of non-statutory welfare activities is large, their effectiveness in achieving productivity is not very well established. Most organizations in India either have contributed money to these activities to maximize welfare programmes for them.

In India the public sector the private sector and the multinationals have provided following welfare programmes to their workers-

- housing facilities by undertaking extensive constructive programmes;
- providing of loans to workers to construct their own houses;
- medical and educational facilities;
- reimbursement of expenses on severe diseases like cancer or expenses on artificial limbs provided by outside hospitals;
- free education to the children of workers;
- easy availability of car, scooter and cycle loans with long-term interest-free payment plans;
- programme to promote social and welfare activities, to foster fellow feelings among employees, to create a social security fund and to render financial assistance to nominees in the event of the death of a member, irrespective of the cause or place of death;
- night shift allowance;
- uniform for all seasons;
leave travel assistance;
benefits for the families of the workers on long leave and leave because of sickness;
canteen facilities at heavily subsidized rates or free of cost;
free gifts of the products manufactured or produced by the industry;
long service award;
establishment of labour welfare fund trust or people policy, for which bonus amount is deposited in the scheme;
benefit programmes like gift to newly weds, gift on the birth of children, gift on daughter’s marriage;
festival advance coupled with the company’s contribution;
payment of group insurance premium by the employer

Whether it is a welfare fund trust or any other form of voluntary benefit, a welfare policy strives to foster a sense of financial well-being, ownership and job satisfaction amongst workers. Although many non-statutory welfare activities either started as paternalism or on account of the aggressiveness of unions in India, the workers and unions today take them very seriously as an important compensation for their work. In some cases they have almost become proper rights and any hint of eliminating them causes serious concern and frustration among the workers, often leading to go slow, gheraos, and strikes. The management, thus, has to be concerned with the efficacy and cost of non-statutory benefits.

The management has to assess the motivational effect of non-statutory welfare measures on work and other productive behavior. What sort of reactions do these benefits elicit? Are they desirable from the point of view of management? Are non-statutory benefits taken for granted by workers or do they mentally add it to their wages? These are some important questions that require consideration. No study has been done in India, so far, to assess the impact of non-statutory welfare measures. The cost of these amenities is on growth which warrants indepth studies to
understand, and possibly predict, the effect of non-statutory activities on labour productivity.

In qualitative terms it may be concluded that the non-statutory welfare measures result in a sense of gratitude and loyalty among laboring class and motivate them to work hard. Generous benefit might, however, create a sense of over-dependence among workers; they may not leave the organization, causing a large workforce stagnation. This might create problems such as considering seniority rather than merit for promotion, perceiving jobs as dead ends and consequently loosing interest while at the same time blocking the entry of fresh blood into the organization. The management has to ensure that non-statutory welfare measures help the enterprise to grow and not retard its growth by kicking back and defeating the very purpose for which it was created. However non-statutory welfare is composed mainly of hygiene factors and not of direct motivators, and the capacity of these factors by themselves to elicit increased productivity is matter of debate and discussion.

**Job Satisfaction and Labour Productivity**

A new model is suggested to orient non-statutory welfare activities from a different perspective. The purpose is to make such activities more meaningful for organizational productivity. The management's more concerned with labour-productivity and not job satisfaction. The human behavior experts opine that job satisfaction and labour productivity are synonymous, or that high job satisfaction will lead to high labour productivity. But the results of our survey, point to the contrary. The two are very different and one does not necessarily determine the other. In fact, even the conditions that determine the two are very different.

A. **Hafeez**\(^7\) has listed six broad categories of factors that govern job satisfaction of industrial workers in India:-

1. Personal adjustments of worker
2. Nature of work
3. Relationship with other workers
4. Nature of supervision
5. Set-up of the undertaking and its relationship with unions
6. The social status of his job in the community

**Labour Productivity**, on the other hand, has been found to be determined largely by the quality of machines and raw materials, R&D, industrial relations, institutional set-up, ability and skills of work force, incentive system, etc.

It has also been experienced by the personal discussions and interviews with the workers on duty that they are motivated to achieve certain goals which result in satisfaction. Labour productivity is seldom a goal itself but is more a means to goal attainment. In most of the cases, labour productivity and job satisfaction are not related to each other except when labour productivity is perceived as a path to certain important goals. Thus with this discussion it may be put that job satisfaction is more broad-based and encompasses various conditions and situations and sometimes labour productivity is also included in it. However, evidences got from majority of the workers suggest no relationship between job satisfaction and labour productivity. As labour productivity is always a matter of prime concern to an enterprise, discussion here would be of labour productivity not of job satisfaction.
Difficulties in the Segregation of Statutory and Non-Statutory and Welfare Expenditure

No publications in India are available which may give a clear picture of expenditure on statutory and non-statutory welfare measures. No demarcation line may be between both the welfare measures. Most of the data available are an amalgam of the expenses of both statutory and non-statutory welfare activities. In India major welfare activities of railways which have highest number of workers are housing, education, co-operatives, cooperative credit and stores in addition to health resorts and holiday houses. Railway has incurred heavy expenditure on labour welfare activities not directly related to labour productivity. H.D. Goyal suggests that these are investments in men which are expected to bring a change in their attitude, which may in turn be reflected in turnover and absenteeism. They are compensations, or a price to reduce the worker’s alienation from work.

The model that is followed for non-statutory welfare is represented below:

![Diagram]

In true sense, company satisfaction is a state positive feeling towards the company. This feeling is expressed in loyalty, faith and an attitude that the company is concerned with the welfare of its workers. This model emphasizes that welfare measures will generate company loyalties, and assumes that such allegiance will lead to labour productivity. It is a paternalistic approach. In this way, the non-statutory labour-welfare measures are made to produce a pride and satisfaction with the enterprise, an enterprise which is generous enough to be concerned with the “Care” and “Well-being” of its workers.
Although increased labour productivity is one of the objectives of non-statutory labour welfare measures in Indian Industry by and large, the motivation for such measures has been philanthropic; a feeling that workers suffer from poverty and need to be taken care of. It is felt that if they are properly looked after, they will be loyal to the organization. Thus, non-statutory welfare measures have been perceived to bring allegiance to the enterprise that has bestowed facilities to the workers. The assumption generally has been that increased allegiance and loyalty to the enterprise will result in high productivity. Through our survey we came to know that there is a high degree positive correlation between company satisfaction and non-statutory labour welfare measures. But it is very difficult to establish relationship between company satisfaction and labour productivity. Several surveys and studies on the relationship between company satisfaction and labour productivity have given very inconsistent findings. Some have found no relationship between the two while others have found some indication of a positive relationship mediated through moderator variables.

The above analysis shows that in the existing model, though it may be true that non-statutory labour welfare measures lead to high company satisfaction, it is doubtful if high company satisfaction will necessarily lead to high labour productivity. Hence if the organization is with increasing productivity, the above model has to be modified. The revised model here reverses the position of labour productivity and company satisfaction. This revised or new model is given as under:

This new model suggests that non-statutory welfare will directly influence labour productivity. Once this relationship is established, high labour productivity
may lead to high satisfaction. Through out discussions with workers of different large scale industries of Kumaun region, we have found that non-statutory welfare, in addition to providing the usual social benefits, should be linked with such concepts as workers’ participation in management and job enrichment. This calls for a shift in emphasis. Let an increase in productivity be not the indirect function of welfare but a direct outcome of this measure. The welfare concept needs to be changed from social service to job contents. If the industrial units are genuinely interested in the workers’ welfare they have to provide meaning in their jobs by increased participation and greater discretion and variety. The workers be encouraged and be able to contribute to the overall effectiveness of the enterprise. Holter, H. has reported industrial experiments in U.S.A, U.K., India (Engineering, Coal Mining and Textile Industries, respectively) showing that the democratic sharing of power at the lower grades of industrial workers can be stable and effective because it furthers the ends of both workers and the employers.

Majority of the industrial enterprises now pay attention to job enrichment as a process of making a job more meaningful. Job enrichment has the potential to enhance labour productivity and worker satisfaction if changes in jobs are perceived as opportunities rather than as demands. As a process of making a job more interesting and providing opportunities for achievement and growth, it concerns discretion and contents of the job. Increase in both leads to variety, less boredom, and less alienation. Experience with this process in both Indian and foreign industries has been very encouraging. It has shown a definite increase in productivity and employee to include job content orientations, its viability for increased labour productivity will be enhanced manifold. On the other hand, its purpose of decreasing alienation- both physical and psychological- and increasing the general well-being of the working population can be more meaningfully achieved.

**Workers’ Education & Training and Labour Productivity**

All of us accept the fatigue that the workers of a country are the most significant component of the Community and they need to be socially and psychologically
satisfied by providing for their opportunities for education and training. Simon Kuznetz has aptly said, “The major capital stock of an industrially advanced country is not its physical equipment, it is the body of knowledge amassed from the tested findings and the capacity and the training of population to use this knowledge effectively.”

The term “workers’ education” connotes different meanings for different countries on account of developing countries like India, the term, “workers’ education” is used in its wider connotation and aims at making the worker a better citizen.”

The workers’ education has to take into consideration the educational needs of the worker as an individual for his personal evaluation; as an operative for his efficiency and advancement; as a citizen for a happy and integrated life in the community; as a member of a trade union, for the protection of his interests as a member of the working class.

**Contents of Workers’ Education**

As the cultural outlook, historical background, availability of resources (both human and non-human) and stage of economic development differs from country to country, the contents of workers’ education may not be put in watertight compartments. In general, the scope and content of workers’ education should be determined according to environment, level of industrialization and union development. It should cover different types of education, ranging from general education to trade union education, and include vocational guidance, technological training, literacy and artistic studies, and the manner of conducting conferences and seminars. The syllabi are designed to inculcate among the workers a sense of duty and social responsibility while making them aware of their rights. In the new curricula, population education, functional adult literacy and productivity education occupy a place of special importance.

To boost labour productivity, the Seventh Plan laid emphasis on “upgrading the quality of training imparted to the workers at different levels…. Training has to suit the requirements of industry and should be of the best quality. This will also help in increasing quality output of industrial goods and raise their competitiveness,
both in the domestic and international markets. The workers’ education is the education of the worker. It stimulates the workers’ awareness of their rights and responsibilities and enables them to perform their functions effectively through commitment to workers’ organizations for the defense of common interests.

**Workers’ Training**

In India there is an acute shortage of skilled and trained workers for a number of industrial occupations and a majority of workers suffer from low efficiency, which necessarily means that the rate of skill formulation has been low. Besides, factors like social attitude to industrial work, differentials between the income of skilled and unskilled workers, and the training and educational system has been responsible for this state of affairs. To bring about any change in these is an uphill task. But for rapid industrial development, the provision of training facilities for workers is the need of the hour. This training pre-supposes a sound basis of universal literacy, proper planning and utilization of trained personnel, and properly designed training programmes. Needless to say training leads to efficiency and increased labour productivity, less wastage, reduced supervision, higher employee earnings, reduced accidents, increased organizational stability and flexibility, heightened morale and vertical job mobility.\(^ {15} \)

To build up the career of young persons and to supply a constant stream of trained personnel to industries, the Director General of Employment and Training (DGET) has designed a number of training programmes. A few important programmes are:-

I. Craftmen’s Training Programme.

II. Craft Instructor’s Training.

III. Advanced vocational Training.

IV. Foreman’s Training.

V. Apprenticeship Training Scheme.

VI. Part-Time Training for Industrial Workers, and

VII. Vocational Training Programme for Women.
The study group of the National Commission on Labour has made many observations on the working of the training schemes for workers. Some of the important ones are:

i. Substantial training capacities have remained unutilized.

ii. No new trades have been added.

iii. The training programmes do not take into account local and regional needs.

iv. There has not been adequate expansion in some trades in which there has been persistent shortages.

v. The selection of trainees is made by inexperienced and non-technical persons and considerations other than the suitability of the candidates become important.

vi. Many instructions do not have any experience of working conditions and production techniques in industry.

vii. The quality of training is poor, which may be due to lack of counseling arrangements.

viii. The training provided does not conform to the needs of industries and the rapid expansion of the training programme.

Training an improvement of skills is a continuous process and has to pervade throughout the working life. It is in the interests of the employers to train workers to handle their tools and machines properly for increasing the productivity of the enterprise. Once a worker has been at work for some time, there should be a system of granting him study leave to equip himself for senior levels of responsibility.

**Impact of Training on Labour Productivity**

Our analyses investigates several dimensions of the relationship between training of workers and labour productivity. We have examined whether training has different returns for workmen and employers, by comparing the effect of training on direct measures of labour productivity with the results obtained from the corresponding wage equations. We have also checked the robustness of the results in
the baseline specification, by allowing for different types of labour and by focusing on sub-samples defined on the basis of firm’s characteristics (size, industry, location.)

We have also been able to account for the duration of training by constructing an indicator of “effective training intensity- the average number of days of training per worker-and comparing its effects on productivity with those of the training intensity indicator commonly used in the literature. Besides, the comparison of the impact of training programmes on labour productivity and wages allows the assessment of the role of labour market rigidities in determining how the returns to training are shared between the firm and the workers.

Our results indicate that the training intensity defined as the share of employees participating in training activities over the previous year, has a positive and significant effect on productivity at firm-level. When training intensity increased by 1 percentage point, productivity increases by about 0.07 percent. Training intensity also has a significant impact on wages, but using wages as an indirect measure of productivity leads to substantially under-estimate the impact of training programme. Using an indicator of training that does not account for training duration may lead to underestimate the effects of training on productivity.

Wages provide as an indirect measure of productivity as trained workmen are getting significantly higher earnings. The real wage rate is assured to be equal to the marginal productivity of labour if the labour market is perfectly competitive and under restrictive assumptions about training programmes. More generally, the benefits of training programmes are shared between employer and workmen depending on labour market imperfections whether training is specific or general and who pays for the cost of training, so that wage equations do not provide an appropriate indication of the effects of training on productivity.

USE OF COBB-DOUGLAS PRODUCTION FUNCTION
The econometric analysis in the study follows the literature in assuming that technology at firm level can be characterized by a Cobb-Douglas production function:

\[ Y = A L^\alpha K^\beta \] ........................ (1)

where

- \( Y \) = value added
- \( L \) = labour
- \( K \) = capital
- \( A \) = technological progress
- \( \alpha \) = elasticity of value added with respect to capital
- \( \beta \) = elasticity of value added with respect to labour.

Under the assumption that trained and untrained workers have different productivities, effective labour can be written as:

\[ L = N^u + \frac{Y}{\alpha} N^T \] ........................ (2)

where are more productive than untrained workers.

- \( L \) = effective labour
- \( N^u \) = untrained workers
- \( N^T \) = trained workers
- \( \alpha \) = a parameter that characterizes trained workers relative productivity

\( Y \) will be > 1 if trained workers are more productive than untrained workers.

Substituting equation (2) in equation (1) we obtain

\[ Y = A \left[ N^u + \frac{Y}{\alpha} N^T \right] K^\beta \]

\[ \alpha = A \left[ 1 + (Y - 1) \frac{N^T}{N} \right] N^u K^\beta \] ........................ (3)
where N is the total number of workers and \( \frac{N^T}{N} \) is the fraction of trained workers over the total. Under the assumption of constant returns to scale (\( \alpha + \beta = 1 \)) we can write the production function in intensive form and express labour productivity as under:

\[
\frac{Y}{N} = A \left[1 + (Y - 1) \frac{N^T}{N} \right] \left(\frac{X}{N}\right)^g \tag{4}
\]

Applying a log transformation and approximating around 1 we obtain:

\[
\log \left(\frac{Y}{N}\right) = \log(A) + \alpha(Y - 1) \frac{N^T}{N} + \beta \log \left(\frac{X}{N}\right) \tag{5}
\]

If trained workers are as productive as untrained workers (\( Y = 1 \)), the coefficient of training intensity will be zero.

Following a similar approach, we can obtain an expression for labour productivity with different types of workers (e.g. by occupation, gender, etc.). Assuming two labour inputs:

\[
L = N^V + Y_1N^T + Y_2N^T \tag{6}
\]

So that the production function can be written as under:

\[
Y = A \left[ N^V + Y_1N^T + Y_2N^T \right] \left(\frac{X}{N}\right)^g = A \left[1 + (Y_1 - 1) \frac{N^T}{N} + (Y_2 - 1) \frac{N^T}{N} \right] \left(\frac{X}{N}\right)^g \tag{7}
\]

As above assuming constant returns to scale, applying the log-transformation and approximating around 1, we obtain:

\[
\log(Y) = \log(A) + \alpha(Y_1 - 1) \frac{N^T}{N} + \alpha(Y_2 - 1) \frac{N^T}{N} + \beta \log \left(\frac{X}{N}\right) \tag{8}
\]

More generally, with M labour inputs:
Turning to the empirical specification, we estimate the baseline equation in (5) and the multi-factor specification in (9) allowing for differences in labour quality (technicians, skilled, semi-skilled), while controlling for a number of other factors affecting productivity, captured in A, such as innovation (proxied by research and development and patents expenditures), export activity, and a number of other firm characteristics (size, industry, location, age, part of a group and listed status). The resulting equation to be estimated can be represented as follows:

\[ \log(Y) = \log(A) + \alpha \sum_{k} \left( \log(Y_k - 1) - \frac{1}{N} \right) + \beta \log(Y) \]  

\[ (9) \]

Where \( Y \) is the log of labour productivity, \( x \) is a vector of (potentially endogenous) time varying regressors that include training intensity; \( z \) is a vector of time invariant firms’ characteristics, \( \varepsilon \) is the error term, \( i \) is the individual (firm) index and \( t \) the time (year) index.

We assume that the error term includes a time-invariant individual component \( (\alpha_i) \), an individual-invariant time effect \( (T_i) \) and an idiosynchratic component \( (\eta_{it}) \):

\[ \varepsilon_{it} = \alpha_i + T_i + \eta_{it} \]  

\[ (11) \]

In addition in the presence of perfectly competitive labour market it is possible to derive, from equation (5), a wage equation by equalizing the real wage to the marginal product of labour.

**DATA**

To collect information on training programmes and workers’ performance, 30 large scale industrial units were selected through a stratisfied sampling method so that representativeness of the population may be ensured. Main emphasis in selecting
these samples units was on nature of product manufactured. Ten workers from each sample unit were selected taking into consideration their skill level and nature of job. In this way the sample covered 300 workers in all as per table given as under:

**Table 2.1**

<table>
<thead>
<tr>
<th>Large Scale Industries (with name of manufactured product)</th>
<th>No. of Labourers Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td>30</td>
</tr>
<tr>
<td>Paper Products</td>
<td>30</td>
</tr>
<tr>
<td>Glycols</td>
<td>10</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>20</td>
</tr>
<tr>
<td>Polyester Film, chips</td>
<td>20</td>
</tr>
<tr>
<td>Confectionary Items</td>
<td>20</td>
</tr>
<tr>
<td>Healthcare Items</td>
<td>20</td>
</tr>
<tr>
<td>Electronic Items</td>
<td>10</td>
</tr>
<tr>
<td>Electrical Items</td>
<td>30</td>
</tr>
<tr>
<td>Edible Oil &amp; Vanaspati Ghee</td>
<td>20</td>
</tr>
<tr>
<td>Automobiles &amp; Auto-parts</td>
<td>40</td>
</tr>
<tr>
<td>Plastic Products</td>
<td>20</td>
</tr>
<tr>
<td>Heavy Engineering Equipments</td>
<td>10</td>
</tr>
<tr>
<td>Household Durables</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>300</strong></td>
</tr>
</tbody>
</table>

Information on workers’ characteristics were collected through schedules which were filled-up at the time when they were not on their duty and were available at their residences. The sample contains all large scale industrial units that compiled the section on training in the questionnaire for at least three consecutive years over the period from 2009-10 to 2011-12.

The information on training activity was made available by the firms themselves as a whole, and disaggregating by gender and by occupation (technicians, skilled and semi-skilled). The survey also provides information on the type of
training activity (internal and external courses, on-the-job, self-learning) and the average duration of training. The empirical analysis presented is based on two main indicators of training activity. First, training intensity, defined as the share of labourers who have taken part in formal training activities in the previous year. Second effective training intensity, defined as training intensity times the average number of days of training per worker. The information on occupational shares (shares of technicians, skilled and semi-skilled workers over total employment) and skill intensity (ratio of technical personnel over total employment) were also collected for analysis. Besides, database on value added capital, labour, R&D expenditure, size, industry, location, age and other firm characteristics also has been prepared through survey. Productivity is defined as value added per worker. Capital is measured by the book value of total fixed assets. R&D intensity is ratio of expenditure for research and development and advertising over capital. The wage is calculated as the total wage bill divided by the number of labourers.

ACCOUNTING FOR TRAINING DURATION

One of the major drawbacks of the use of training intensity as an indicator of training activity, is that it does not take into account the duration of training, thus implicitly assuming that every worker is trained the same number of days per year in all firms. In fact, not only training duration varies consistently across firms, but also the variability of training duration is far greater than the variability of training intensity. It is therefore necessary to assess whether not accounting for training duration could bias results and in particular whether the impact of training on productivity may be under-estimated by using a purely quantitative indicator such as training intensity.

Table 2.2 Reveals descriptive statistics of sample large scale industries:

<p>| Table 2.2 |
| Descriptive Statistics |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Intensity</td>
<td>0.28</td>
<td>0.32</td>
</tr>
<tr>
<td>Average Training Duration</td>
<td>8.85</td>
<td>2.13</td>
</tr>
<tr>
<td>Log Productivity</td>
<td>10.69</td>
<td>0.70</td>
</tr>
<tr>
<td>Log capital per labourer</td>
<td>9.98</td>
<td>1.53</td>
</tr>
<tr>
<td>Technicians share</td>
<td>0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Skilled Workers Share</td>
<td>0.42</td>
<td>0.32</td>
</tr>
<tr>
<td>Semi-skilled Workers share</td>
<td>0.56</td>
<td>0.33</td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td>0.37</td>
<td>2.31</td>
</tr>
<tr>
<td>Firm’s Age(years)</td>
<td>17.67</td>
<td>6.32</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.62</td>
<td>0.50</td>
</tr>
<tr>
<td>Agro-based</td>
<td>0.33</td>
<td>0.22</td>
</tr>
<tr>
<td>Forest-based</td>
<td>0.05</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Source based on survey and data calculation

Further table 2.3 exhibits training intensity and duration: within and between contribution to overall standard deviation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Between</th>
<th>Within</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Intensity</td>
<td>78%</td>
<td>66%</td>
</tr>
<tr>
<td>Training Duration</td>
<td>76%</td>
<td>72%</td>
</tr>
</tbody>
</table>

**CONCLUSION**

Training has a positive and significant effect on productivity at firm level. A one percent increase in training intensity is associated with an increase in value added per worker of about 0.07 percent. We also find that training has a significant effect on wages. Using wages as a proxy for productivity may lead to significantly underestimate the impact of training on labour productivity. More generally, our results indicate that failing to account for unobserved heterogeneity leads to overestimate the impact of training on productivity. However, the results also
indicate that failing to account for potential endogeneity of training leads to underestimate the impact of training on productivity.

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