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PRODUCTIVITY

CONTENTS

Role of Management and Labour in Industrial Development and Productivity Improvement

NN Wanchoo*

A fruitful partnership between management and labour is an essential requirement for sound industrial development with a high level of productivity. Apart from introduction of sound techniques of management, the management has the prime responsibility of ensuring good industrial relations, which can be achieved by paying special attention to the development of Workers and Supervisors. The workers have not only to be trained in the proper techniques but a psychological atmosphere has also to be fostered. The best way of securing their willing cooperation is to make them feel that the prosperity of the organisation means greater economic benefits to them too. Another method of securing the whole-hearted cooperation of workers is to give them a sense of participation in management. We have to search for what is called "intermediate technology"—a technology which while being modern does not go to the degree of automation or capital-intensiveness as would seriously affect its employment potential. Properly-directed productivity programmes should enter into any basic thinking on export promotion. Because of their greater employment potential and as a medium for development of backward areas, small scale industries have also to be encouraged.

THE subject of Industrial Development has assumed special interest because of the slow-down in the pace of industrial growth in recent years and the drive towards self-reliance which has now become a major goal of economic policy. This country started off planned economic development with a low capital base and a poor infrastructure hardly 20 to 25 years ago. Except for certain jute and textile products and a limited quantity of iron and steel, by and large, most of the requirements of the manufactured goods of consumers, irrespective of whether these were boot polish, baby food or bicycles, were imported from abroad only 20 years ago. Today, almost the entire range of the consumer goods of our people are produced within the country and the number of registered factories is 9 or 10 times of what it was in 1948. In the overall picture, in some areas our successes have been beyond expectations, in some areas just modest and in some areas well below our expectations. India's size, the pressure of population on the land, the socio-economic conditions that she inherited from the past, the low capital base of her economy, the lack of requisite infrastructure with which she started her economy and, above all, the poor state of her agriculture and its dependence on rainfall must be kept in view in understanding our achievements and failures after independence.

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* Chairman, National Productivity Council, New Delhi.

labour. A good climate for industrial relations is also essential to the attainment of the best results. Both management and labour, however, function in an environment which is the general economic environment in the country and in which Government plays an important role. In evaluating our achievements in the field of economic development in the past and in assessing prospects for the future, we have, therefore, to consider not only the role of management and workers but also the part played by Government in creating a favourable environment.

Administrative Framework

To consider first the administrative framework within which our industrial development is taking place, some of the Government's policies have been criticised by the bigger industrialists on the ground that they curb individual freedom and initiative. It is also said that we have a large mass of regulations and an industrial licensing system which has been held in some quarters as being responsible for slowing down the growth of industrial development. While some of this criticism has validity up to a point, it is admitted on all hands that the Government is wedded to the goal of economic development, which includes industrial development, alongwith social justice. Accordingly, while its policies are oriented towards development, they are at the same time designed to ensure that development does not lead to further accentuating the disparities between the rich and the poor.

We are still suffering from serious foreign exchange shortages and in order to ensure the most beneficial utilisation of the available foreign exchange in the interests of the national economy a degree of control has to be exercised, which some find irksome. Despite controls and some regimentation, positive action has, however, been taken by Government in numerous directions so as to give a direct fillip to development. For instance, special solicitude has been shown towards the growth of small-scale industries which has indeed registered remarkable progress in the last 15 to 20 years. Similarly, special incentives have been provided for export promotion schemes and measures have been taken with a view to narrowing down the foreign exchange gap. Likewise, special incentives have been provided for the growth of industries in the less developed areas. At the same time, the infrastructure facilities, whether of communications or of power are being developed rapidly so as to create conditions favourable for industrial growth. Practically the only sphere in which Government's policies are somewhat restrictive is in relation to the larger industrial houses, and here too the objective is to ensure that the goal of social justice is not overlooked in the drive for industrial development. All told, despite criticism, by and large, the policies of the Government have been directed towards creating an environment in which industries can develop.

Role of Managers

Management is becoming more and more divorced from ownership and is now becoming a profession. Many of our larger industrial units are being run by professional managers who are not the owners of the units. This is not only a development in this country, but a development which is going on throughout the world. An important feature of industrial growth in the second half of the twentieth century is that everywhere it is now being more and more recognised that management is both an art and a science and the science of management is professionally taught in many institutions. The size of many of our industrial units is now so large that reliance on empirical methods and plain commonsense alone will no

longer suffice. The complicated nature of modern industrial activity, therefore, has resulted in the creation of the new science of management which can be taught. Nevertheless, there is still a sense in which management is an art rather than a matter of learning tools and techniques. The tools and techniques are indeed essential, but they are, in the last analysis, merely aids to a good manager who must have a feel of a unit if he is to make a success of his job.

Modern managerial techniques include such items as Materials Management and Handling, Marketing Management, Production Management including Production Planning and Control and Plant Layout, installation and operation of a system of Cost and Budgetary Controls, Programme Evaluation and Review Technique, Work Study, Preventive Maintenance, Quality Control, Organisation and Methods, Fuel Efficiency, Personnel Management, and so on. These are the tools and the techniques which the managers can be taught and which are essential for discharging the responsibilities of good management. Apart from all these, the top managers have also the responsibility of developing and grooming the middle and lower level managers so as to fit them for the performance of more responsible duties later. Most of the items enumerated are strictly a managerial responsibility, although, of course, a degree of cooperation by the workers is essential. But no amount of concentration on these techniques will produce maximum efficiency in an industrial enterprise unless industrial relations are reasonably good. And this is where the art of the manager lies.

Apart from the employment of sound techniques of management, it is a prime responsibility of the management to ensure good industrial relations, which can be done only by paying special attention to the workers' development and to the development of supervisors. The management of personnel has to have a key place in the striving for industrial efficiency. Good techniques will not get the maximum cooperation of the worker unless a proper environment and atmosphere is created in which the worker begins to feel that he is a partner in the enterprise and willingly gives of his best; otherwise, all the elaboration of techniques can be frustrated in no time by means of '*gheraos*' and go-slows. While therefore, the science of good management has an important place in modern industry, at the heart of good management lies the art of management, viz., good industrial and personnel relations.

Role of Workers

Good industrial relations lie at the heart of industrial efficiency. But what makes for good industrial relations and how is the worker to be properly motivated so as to give of his best? Partly, this is a question of educating and training the worker for which again the responsibility is that of the manager. Not only have the workers to be trained in the proper techniques but a proper psychological atmosphere has also to be created. The worker is also an economic being and is interested in the improvement of his own lot. One of the best ways of securing his willing co-operation, therefore, is to make him feel that the prosperity of the concern will mean greater economic benefit to him personally.

How is this to be secured? One of the ways which has been tried in advanced countries is that of profit-sharing, viz., that if the efficiency of an enterprise increases and results in greater profit, the worker will directly share in those gains. Share in the gains of improved productivity and efficiency must not, however, be looked upon as a meticulous mathematical exercise in

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which elaborate calculations have to be made of the contribution of each factor of production in the improved efficiency. It is this rather rigid attitude which has led to a lot of trouble in the past. Sharing the gains of productivity should rather be looked upon as a philosophy of management in which it will pay the managers to be generous. In order, however, to secure proper economic growth it should be realised that there are three beneficiaries to any gain resulting from improved efficiency and productivity. Two are obvious, viz., the labour force and the employer. But there is a third party involved, viz., the community as a whole—the consumer and the country. The gains of productivity should be equitably shared between all three, otherwise the masses of the people will not benefit; only the employers and the actual workers in an industrial unit will do so.

Another method of securing the whole-hearted cooperation of workers which has been tried in some countries is to give them a sense of participation in management. Many schemes have been evolved to secure this in a number of countries. There has been some resistance to inducting workers on the Boards of Management of enterprises, since it is felt that many of them do not have the proper training and competence to be on such Boards. There is also the drawback that once the worker is nominated to a Board, his links with his fellow workers weaken and gradually he begins to be identified with the management so that the advantage of his presence on the Board is soon negatived. The answer to some of this criticism is that the worker has to be associated not only with the top Board of Management but also at every level in an enterprise. Various schemes have been devised with the objective of giving the worker a greater sense of participation in the management of an enterprise. Having regard to the level of education of many of our workers, while it may not be possible to have a full-fledged scheme of workers' participation in management in this country, it would be worthwhile experimenting at various levels so as to create the proper atmosphere.

Multiplicity of trade unions, which is an important factor in our industrial situation at present, has seriously bedevilled industrial relations. The fact that the competing trade unions are affiliated to different political parties, each of which tries to win greater support for itself by making extravagant demands, is well-known. The answer really lies in having a single union representing the workers in each enterprise. But in the present conditions, both political and industrial, in this country, it is probably too fanciful to imagine that such a solution will be reached in the near future. Nevertheless, an attempt has to be made to secure some reduction in the multiplicity of trade unions which prevails at present. At the recent Seminar at Bangalore on this subject, His Excellency the President of India also referred to the importance of reducing the tension created by the multiplicity of trade unions in industries. Here again a great deal of education will be necessary before the goal can be achieved, but there is no doubt that too many trade unions have contributed to increasing industrial unrest.

Unemployment Problem

Another powerful element in the Indian situation which must greatly influence our approach as well as the approach of labour and trade unionists towards industrial efficiency and improved productivity, is the question of growing unemployment which represents a most serious problem for the Indian planner. We have no shortage of manpower, though we have a serious shortage of capital. Now, in economic terms it is essential for us to maximise the use of our scarcest resources and we can afford to be a little more liberal in our use of the manpower resource. This means that what is most suitable for many Western economies which have serious shortages of manpower, but are comparatively well-off for capital, is by no means the most appropriate for us. Hence the importance given in India to small-scale industry, the employment potential of which per unit of capital employed is larger than for bigger units. Hence also the search for what is called "Intermediate Technology", a technology which while being modern does not go to that degree of automation or capital-intensiveness as would seriously affect its employment potential. Hence also the opposition of Indian labour to the idea of automation. All this does not mean that we should be content with inefficient methods of production, that we should forgo the economies and efficiencies of large scale production, but it does mean that in any given instance we must not uncritically accept methods and scales of production which may have been found to be the most efficient in the West in the totality of circumstances prevailing there.

It is not surprising that in the Indian context automation is a bugbear to labour, for they see in it a denial or lessening of employment opportunities. Labour sometimes sees a conflict between employment and higher productivity. While higher productivity, by providing for increased economic growth, *in the long run* leads to more employment, the question that labour often asks is what happens in the short run? In the long run we are all dead. It is not much use telling labour that in a matter of four to five years more, improved productivity will lead to higher employment by way of accelerated economic growth (as has been the experience of all developed countries), if meanwhile unemployment increases. Most productivity schemes in India, therefore, must proceed on the basis that there will be no retrenchment; which means that our aim must be not to produce the same amount of goods with the employment of a smaller number of men, but rather the aim should be to produce a much larger amount of goods with the employment of the same or a proportionately less large labour force. Or, if we are going to employ immediately a smaller work force, then alternative gainful and useful employment must be found for the rest. Thus it is

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abundantly clear that techniques and methods which are most effective abroad have to be modified for adoption in this country to suit our conditions.

Export Promotion

Export promotion has for many years past now occupied a place of key importance in our national development. India needs to earn foreign exchange and to improve its balance of payments position as well as terms of trade. We face stiff competition in the export markets, both with respect to quality and prices. The continuing upward movement of domestic costs and prices in recent years has adversely affected the competitiveness of Indian goods abroad. A sheltered position in the domestic market coupled with the ease with which increased costs could be passed on to the consumers has made domestic markets so attractive as to seriously reduce the incentive for exports. Whatever may be their situation in the domestic market, it is clear that Indian business and industry face the need for urgent cost reduction and improvement in quality for a successful export drive. Apart from quality and competitiveness of price, prompt delivery and after-sales service are also of importance in export promotion. Therefore, for a successful export promotion drive these aspects should receive adequate attention at the unit level. For all these reasons, properly-directed productivity programmes should enter into any basic thinking on export promotion.

Small-Scale Industry

Considerable proportion of our growth in industry has to be by way of encouragement of small-scale industry. Apart from its greater employment potential, small-scale industry affords much greater opportunity for the development of backward areas. These areas are backward partly because they have an inadequacy of industrial resources and partly because they lack entrepreneurial development. It is impossible to set up giant industries in all parts of this country, but small-scale industries do provide scope for development of even our backward areas. To ensure this, however, we have to have proper schemes for the development of entrepreneurs in these areas. Unfortunately, too many of our graduates from engineering colleges are still motivated to look for jobs. It is essential to develop schemes for self-employment of these entrepreneurs. Both governmental and non-governmental agencies are now paying greater attention to this subject and schemes are being devised which will facilitate the development of entrepreneurship, thereby leading to a more balanced development of industry throughout the country.

Productivity

Productivity is strictly a relationship between inputs and outputs. If, with a given set of inputs and by a more efficient use of them, you can produce more, i.e., your output increases, then your productivity improves. Productivity also improves if with relatively smaller inputs you get a proportionately larger output. It may be emphasised that inputs may be of different kinds

—there can be inputs of labour, of capital, of plant and machinery, of technology, etc. Productivity is not merely the output per worker or the productivity of labour alone. The manager is as much concerned with increases in productivity as labour. If productivity is generally confused with labour productivity, that is surely because ultimately it is the human factors which govern and organise all other factors. Capital and technology by themselves cannot produce goods. It is some human agency which has to organise, control and utilise the plant and machinery or the raw materials or the better technology. In this sense, the human factor has a primacy over the other factors and, therefore, in the last resort, it is the human factor in an enterprise, viz., the management and the workers who are at the root of the most efficient utilisation of all other factors of production. Realising all this, the National Productivity Council of India has conducted several training programmes for managers and workers. Realising further that preaching is not enough, the Council provides consultancy services to the industries with a view to improving their efficiency and to demonstrating the practical utility of what it preaches. In particular it has undertaken two important schemes, viz, a scheme for the training of Industrial Engineers and a scheme for the training of Supervisors. The object of all these schemes and training programmes is to provide proper motivation for both managers and workers and to arm them with the necessary skills so as to improve efficiency. Productivity is, however, not something which is the concern of the National Productivity Council alone. It is and should be a national endeavour.

There are many other aspects of productivity and industrial development to which one could refer. For instance we need greater awareness of quality control. Production and Productivity do not mean the larger production of goods of any shoddy quality. Then there is the importance of technology, particularly of borrowed technology. Indiscriminate borrowing will hurt us. On the other hand, in our striving for self-sufficiency we must not cut ourselves off from improved techniques and processes developed abroad. A proper balance has to be struck.

Considerable proportion of our growth in Industry has to be by way of encouragement of small-scale industry which offers greater employment potential as well as greater opportunity for development of backward areas.

In the context of the roles of managers and workers in accelerating industrial production, it must be reiterated that the heart of the problem lies in improving the quality and motivation of the human factors. Special tools and techniques for management and workmen can be taught with comparative ease, but bringing about changes in attitudes is a more difficult business, in which leaders of all sections of the community must play their part and in which indeed lies the art of management. It is this alone which will secure for us a prosperous future. □

(*Based on the speech delivered at the All India Conference on Industrial Development organised by the Association of Company Secretaries, Executives and Advisers at Calcutta on 2nd July 1972.*)

How to Bargain for Productivity :

*A Case Study**

Philip Lynch

The concepts associated with productivity-bargaining are fast becoming outmoded, for reasons such as the advent of the Industrial Relations Act, the abandonment of a prices and incomes policy, and the rapid rise of a wage inflation which companies cannot hope to contain within realistic increases in productivity. Yet the productivity-bargaining concepts have never been more fully developed nor more successfully applied than they are today. This article examines in detail one such productivity bargain in a medium-sized company, describing its experience over 18 months in developing and implementing a comprehensive approach to industrial relations, wage systems and efficiency.

AN increase in productivity of nearly 10% had been achieved by the end of 1971; and the company has been able to contain labour cost increases very successfully. It achieved a complete change of wage system from individual and sectional piece-work to what is essentially measured daywork on a variable rate—and did so at negligible cost (note that British Leyland and a host of other companies were and are prepared to pay substantial sums to buy out piece-work, a system which in the engineering industry can he a source of almost unlimited wage drift). There have been consequent vast improvements in industrial relations since the major source of conflict (i.e. the wage system itself) has been removed from the arena. To quote just one statistic, there have been no wage claims for over two years in the company, when it would normally be expecting to negotiate on wage claims continuously throughout the year: no less than 11 claims were in the pipeline when the deal started in March 1970.

Management has consequently found that it has much more time on its hands to get on with the positive aspects of management (rather than manning the barricades). The managing director suggested that he himself and most of his senior management team spend only half the time they used to on industrial relations—although setting up the deal did involve a lot of management time initially. But freedom to manage and innovate successfully has helped the managing director to push through a significant organisational change. Departmental and senior management, instead of being very functionally organised (engineering, technical, production, finance, etc), now has a manufacturing and project management basis. The management team has also been able to concentrate on expansion plans, which are now a little ahead of schedule.

The work-force has also benefited. The total wage increase of about 28% over the two years compares favourably with the national average of around 23% over the same period. There are now few internal dissensions and the works convener has been re-elected unopposed for an-

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other two years, which is a measure of the popular support accorded to the senior stewards. The latter have also won a large measure of joint control, through a committee structure, in the running of their departments and the company as a whole. The system of joint control has many parallels with the better kinds of industrial participation on the Continent.

This approach differs from the traditional productivity bargaining in many respects. But the crucial difference is that a mechanism has been introduced for increasing wage rates which does not depend solely on productivity. If a work-force is to be persuaded to abandon piecemeal wage claims and to accept the control implicit in linking earnings to productivity, then such a mechanism has to be negotiated as part of a total agreement. The 18-month operating period is significant; it coincided almost exactly with the largest increase in national earnings recorded in recent times in Britain (23% over two years), followed by escalating increases in the cost of living, high unemployment and a drop in the general level of economic activity, with short-time working, a feature of the industrial scene.

The company is a member of a large engineering group, located in a post-war factory in the East Midlands. The manufacturing process is semi-continuous, and the 800-strong work-force is grouped into four major manufacturing departments and several service departments. The work-force is represented by one union, the TGWU, although there is individual membership of other unions, The record of industrial relations is good, with no strikes in the history of the company and few serious disputes.

Before the start of the pay and productivity deal, the union and management had successfully negotiated a works transfer and promotion policy, and rationalisation of the minimum time rates, while union dues were deducted direct from the payroll. Wage bargaining was conducted on a sectional basis with each pay-group separately, and several sectional productivity deals (mainly concerned with reductions in manning) had been negotiated. The effects of sectional bargaining in creating anomalies in the wage structure had been well appreciated, and the company had on three occasions attempted to rationalise the wage structure through job evaluation. For a variety of reasons these initiatives had not been successful.

However, at the beginning of 1970 three important features in the situation made it necessary for the company to take a new initiative. First, as a result of piecemeal bargaining a wide disparity of earnings between jobs had grown up. The first analysis of the wage structure showed that earnings bore little or no relation to job value, whether measured in terms of minimum time rates (basic rates), or in terms of the original grades established from a previous job evaluation exercise but never put into effect. Second, the fact that job evaluation had been tried before and not implemented meant that any further attempt had to be implemented successfully within a reasonable time-scale and with full participation of the work-force.

Third and perhaps the most important feature in the situation was a dispute in the hot mills during January and February 1970. Following the claim of the Ford workers, a similar demand for a £ 10 a week increase had been lodged and an overtime ban imposed. The men finally settled by a narrow majority for a £5 a week increase to be paid across the board for an 8% increase in gross output. The settlement had the twin effect of eroding previously-established differentials between grades in the hot mills and of creating a situation in which consequential

wage claims from other sections could be expected. It also meant that a steep-line incentive scheme was introduced, giving a very unstable earnings effect, in that small changes in output could produce dramatic increases or decreases in earnings week by week. All three features demanded an initiative to create a more rational wage structure, which the work-force was committed to sustain rather than exploit.

Accordingly, management and consultants from AIC met with the shop stewards' committee on 13th March 1970 to put forward proposals for a comprehensive pay and productivity deal, involving: (1) The creation of a job-evaluated wage structure by July 1970, towards which the company was prepared to put the sum of £80,000 expressed as an annual rate on the wage bill. (2) The establishment of a joint committee structure to carry out the necessary work to enable this to be done, in particular a main committee and a working party. (3) The assessment of productivity potential, using activity sampling, so that further pay improvements could be given in return for increased productivity after job evaluation had been implemented. (4) A standstill on wage claims, to operate up to job evaluation implementation and an agreed method of dealing with some 11 claims already lodged (mainly as a result of the hot mills settlement).

The shop stewards' committee accepted these proposals, and it was subsequently agreed in works committee that non-productivity pipeline claims would be deducted from the job evaluation 'kitty' of £ 80,000. The task of deciding whether pipeline claims were productivity-based or not introduced the first element of joint regulation to the wages situation on a site-wide basis: in total £70,000 was deducted from the kitty during the following months. The committee structure set-up to deal with the mechanics of job evaluation consisted of the works committee and three functional committees, covering production engineering and other services.

In accepting the proposals and carrying through the job evaluation exercise, the shop stewards were not committing themselves to more than participation in the mechanics. They realised that there were defects in the wages system, and that many of the differentials were quite unjustifiable. They were, therefore, quite willing to look at an alternative approach, provided their members did not suffer financially. An indication of their position could be gained from their insistence on a works vote before the new job evaluation system was implemented.

The first test would come later, when shop stewards would be facing their own members in the job evaluation appeals panels, and would be agreeing differential pay increases applying to the job groups to bring them up to the new grade rates. In both situations shop stewards came to accept the need to discriminate between their members and to take decisions on their behalf.

For the purposes of speed and to ensure a high level of participation, the 'direct consensus method' of job evaluation (developed by AIC) was used. The technique involves the paired comparison of jobs, and then ranking them with the help of a computer. The combined results of job evaluation produced a grade structure with seven grades, from the skilled tradesmen and top production jobs in grade I down to the canteen assistants and cleaners in grade 7. There was a considerable spread of earnings in each grade, to the extent that almost half the job evaluation kitty would have been spent in bringing indirect and time workers up to the current earnings level of the direct production workers in each grade. A single pay rate for each grade would therefore

have been too costly to implement; or else the spread of earnings in production jobs would have been little affected.

After much discussion in committee, it was decided to implement three pay rates for each grade, so that: (1) Production and other services jobs which came under production pressure appeared on the top pay rate (the 'A' line). (2) Engineering jobs all fell on a separately defined engineering pay rate in each grade (the 'E' line). (3) Non-pressure jobs appeared on the lowest pay rate (the 'B' line).

One of the main factors in the very wide spread of earnings—£15 per 40 hours—was the effect of the hot mills bonus scheme on earnings of both production workers and shift maintenance engineers. For example, engineering mates (grade 5 E) were earning in some cases several pounds more than skilled tradesmen or skilled machinists in grade 1 E). This meant that the grade rates had to be pitched at a level that was realistic in terms of the high mill earnings.

The main decision regarding the application of the job-evaluated rates concerned the way in which the rates should be paid. A decision was finally taken to pay job evaluation as a make up on the bonus rate. Although this had the advantage that existing incentive schemes could continue to operate, it made the adoption of new pay systems during the second stage of the pay and productivity deal more difficult to achieve in a situation where there was no commitment to change.

The stewards took a full part in committee decisions, and one member verified the calculation of pay make-up which each man should receive as a result of the new gradings. The stewards also had the task of sitting on the appeals panel to arbitrate on the appeals against grading by individual job-holders on the shop floor. By and large the judgments were objective, bearing in mind that each appeal agreed to would in many cases mean an immediate pay increase to the job-holders who appealed.

It became clear, after the new job evaluation rates had been published, that their cost exceeded the amount set aside for job evaluation. An agreement was, therefore, negotiated which sought to: (1) recover the overspending through natural wastage, (2) ensure that further increases in pay would only be obtained through productivity improvements, and (3) obtain a mandate from the shop floor to proceed into the second stage on the basis of the first stage job evaluation vote.

The whole agreement was put to the vote on 22 August 1970, and accepted by a very small majority over the 60% favourable vote needed to implement job evaluation. One of the reasons for the small majority was undoubtedly the lack of an effective communication structure down to shop floor level. Although nearly 80% of the work-force stood to gain financially out of job evaluation, there was a great deal of ignorance of what the new wages rates meant, and how they were to be applied. Many who had little to gain financially may also have felt that they were not prepared to give up the right to press individual or sectional wage claims in the future for a rather small wage increase now.

The work-force was at that time unable to benefit from effective communication and consultation at departmental level, through departmental committees which have since been set up in each of 10 major departments. These departmental committees, being much closer to the shop floor, have subsequently proved to be a key element in the successful development of the deal.

They provide not only a channel of communication, but a way of involving all the representatives of the shop floor very directly in decisions that are made. They have proved to be the instruments of change by fostering joint management-union commitment at departmental level.

After the signing of the works agreements, covering the implementation of job evaluation as the first stage, an appraisal was made of the strategy for the second stage. There were several reasons (detailed below) why the company was not certain about committing itself to an all-out effort to increase productivity and thus to provide further pay improvements as a result of productivity. First, the rate of wage drift already sustained, on top of the wage increase as a result of job evaluation, amounted to over twice the average annual rate of wage increase over the last five years. Second, productivity increases through reduced manning were not consistent with the expansion of the works planned for late 1972 and the creation of extra jobs. Third, repercussions were already being felt on the staff side and had already led to an unprecedented interim settlement; further increases could jeopardise the situation still further. Fourth, a revision of premium pay and working hours arrangements was felt to be necessary so that flexible shift and overtime working could be negotiated.

Accordingly, the company proposed a working hours agreement as the immediate task. Improved shift allowances were offered in return for flexible manning arrangements, staggered shift working and guaranteed overtime working. It was hoped that the agreement might go some way towards defraying the cost of the men's claim for shift allowances, which if met in full would have cost nearly the same as was put aside for job evaluation. The claim itself arose out of early recognition by the shop stewards that the only difference in pay between shift and day workers was the nationally agreed shift allowance—since traditional differentials between jobs of equivalent value on days and shifts had disappeared under job evaluation.

So far as the working hours agreement was understood at all, it was widely thought to be a means of limiting industrial action on the shop floor and an infringement of personal liberty (in overtime guarantees). As such the agreement was viewed with a fair amount of hostility on the shop floor. It even appeared that the whole agreement thus far might be torn up. A change of direction and a new initiative were therefore required to sustain and build up the new modes of participation through departmental committees.

Fortunately, some progress had been made on the original concepts of the pay and productivity deal, and the works committee had ratified an important paper outlining the principles of pay and productivity. In addition, a new group pay scheme conforming to these principles had just been started in one hot mill. The company, therefore, agreed not to press the working hours agreement on a works-wide basis. It put forward new proposals at the beginning of 1971 aimed at paying for further wage increases out of productivity savings, starting at the job evaluation rate as the minimum earnings level for normal working.

The proposals, subsequently ratified and incorporated in the works agreements, provided for (1) A rounding up of pay to the job evaluation rates for those whose bonus earnings (combined wih their basic pay) left them below the job evaluation rates. (2) The phased introduction of departmental pay and productivity schemes on

a planned timetable. (3) A target of 10% productivity improvement to be achieved during 1971. (4) An agreed sharing of productivity savings on a 75/25 basis in favour of the work-force so that 10% productivity would yield 7½% pay increase on the average grade rate. (5) The pay-out of the 25% company share immediately to improve shift premiums, in anticipation of the 10% target being achieved. (6) An interim award to be paid out to the groups last in queue to get their departmental scheme, or those who would remain unmeasured, but would eventually be linked to an overall works index of productivity. The award was calculated as half the increase gained by the measured groups. In addition, the agreement provided for sharing of earnings between those departments which were above the target and those which fell short of target, thus recognising that opportunities for productivity improvement were not the same for every department.

Seven departmental schemes were planned, covering 85% of the work-force. Of these, the first was already on trial, and the second was just starting. The remaining schemes were to be implemented within six months at the rate of nearly one a month. The schemes were designed to cover departments ranging in size from 15 men to 190 men, and were based on a common reference period, which was also the same period as that used for establishing the job evaluation rates. The average departmental performance achieved over this reference period was called 100 performance and was equivalent to the job evaluation rate.

Increases in performance above this 100 level yielded equal monetary increases to everyone in the department. Performance was measured by the simple index of—

$$\frac{\text{Standard hours produced}}{\text{clock hours worked}} \times 100 = \text{Performance index}$$

Thus all the output in the departments which was usually expressed in terms of tonnage or footage produced had to be converted to standard hours. This was done by converting sectional or individual standards to standard manhours per unit of output and accumulating these standards into a total value for a given route followed by the material. The route standards (and there could be up to 120 route standards in any scheme) were then adjusted so that total standard hours equalled clock hours for the reference period.

Seven departmental schemes are now operating on their own index. However, a works index comprising the weighted average of the schemes is being used to pay the unmeasured groups remaining (e.g., site service workers, cleaners, canteen assistants). The unmeasured groups are small, since the main engineering content of the work in the form of shift maintenance engineers is included in the manufacturing department they service, and they are treated under the schemes in exactly the same way as production workers

Any new plant or equipment installed within the seven departments is automatically incorporated into the scheme, and the whole departmental work-force gets the agreed share of the savings. Changes in method can be introduced on the same basis. Thus there is no reason to alter any of the standards relating to the schemes, although sections of individuals may improve performance enormously as the result of method or plant changes. The men themselves feel they do not need to argue about every method change and machine installation, as would have happened in the past, because both the share of the

improvement and the way it is to be distributed are built into the rules of the agreement, and are administered by the departmental committee.

Even with departmental schemes in which savings can be shared with the work-force in an equitable way, a complete rationalisation of the wage structure is not achieved. Some departments may produce greater performance increases than others because they are more willing and successful in achieving the potential for increased productivity at the start, and receive more management attention in terms of method improrovement, capital investment, etc.

In establishing a sharing arrangement across the works, the main works committee has been concerned not to penalise the most successful departments in terms of 'effort', but to attempt to iron out differences. In addition, the long-term goal is an overall works index from which everyone is paid. In progressing towards these ends a pooling arrangement has been negotiated (and has now been ratified). It entails the following provisions: (1) No department can be allowed to earn more than five points above the works index (the weighted average) without having to share. (2) No department can participate in the share unless its performance is less than five points below the works index. (3) The low performing departments have in addition to reach the works target of 110 before they can gain a share (whatever the works index), and the high departments can earn 120 before having to share.

Thus the limit on the pay of individual departments is not fixed, but can continually increase with an increasing works index. The monetary value of the excess points earned by the high performing departments is paid into a pool to be shared out among all departments qualifying.

Equitable wage increases through increased productivity cannot themselves hope to fulfil employee expectations about future wage increases. A mechanism is needed for the annual review of pay which reflects both the work-force's contribution to increased efficiency and comparison with national wage rates. The company has therefore begun negotiation on such a mechanism, termed an annual improvement factor. There are three main criteria on which the annual improvement factor is to be based: efficiency, prosperity and comparability.

The proposal is that these criteria should operate by comparing each year's improvement over the previous year, using where necessary the company's published results. The three factors are not intended to be mechanically applied, however, and the company will use the factors only as a framework for each year's negotiation. In a year of low efficiency and prosperity, for example, the company may have to fall back on a pay-out related to the difference between the rate of wage increase nationally and the rate of wage increase across the site over the previous year. Such a mechanism is crucial if an agreement of this kind is not to flounder, when available productivity has been used up. The shop stewards can only commit themselves wholeheartedly to the agreement so long as it works to the benefit of their members. Neither side would want a return to uncoordinated sectional bargaining, and this could happen unless management is prepared to share with employees the benefits of increased prosperity as well as increased productivity.

An agreement of this kind does not in practice have a distinct end, since both sides wish the

process of development to continue into the future. An important measure of achievement will be whether such an agreement can continue to be built upon the foundation of a better payment system, increased efficiency and greater participation.

One distinct feature of this new kind of productivity bargain is that the deal was comprehensive—covering the whole hourly paid work-force. Most deals in industry are sectional, covering only a proportion of the work-force, and usually leading to consequential claims from the groups outside the deal. Second, the deal was developed with full participation of the work-force; for example, it was the shop stewards' idea to start department committees and to go for a guaranteed hours agreement in the mills. Most comprehensive deals (including the most famous) are based on agreeing a price to buy out restrictive practices.

Third, the deal was angled at eliminating sources of conflict often inherent in piece-work systems while retaining a form of incentive system. Most of the deals where a vaguer sort of payment system have replaced piece-work have been less successful in maintaining output, while those retaining piece-work very soon find themselves facing wage drift or conflict over work standards.

Finally, the crucial difference in this case is the annual improvement factor. The philosophy is that once productivity increases start to 'run out', there is nothing with which to replace them. With this technique, which has now been successfully implemented, pay increases are related to the factors of efficiency, prosperity, and comparability; and rules are agreed for the application of the factors. In fact, the company will shortly agree to straight profit-sharing deal as a prosperity factor.

It is worth summarising, too, what such an agreement can achieve: (1) An increase in productivity sufficient to offset partially or completely the wage increases given. (2) A wage structure which can be sustained rather than exploited by both sides. (3) An end to sectional bargaining and leap-frogging wage claims, and the shop floor disruption which often ensues. (4) The consequent ability for management to plan both production and wage growth, to set realistic financial tragets, and to pay attention to positive aspects of management. (5) A sharing of information and decisions with the shop floor which leads to the removal of disputes centred around false or misinterpreted information. (6) An increased level of co-operation based on a mutual gain situation, which leads to favourable attitudes to change and the dismantling of restrictive practices. Such changes can have a profound effect on an organisation, resulting in a significant shift of organisation 'style' towards a more participative and forward-looking approach. □

BRITAIN HAD FEWER STRIKES

The number of strikes in Britain fell by 40 per cent in 1971 and the number of workers involved in strikes by 33 per cent, according to the latest issue of the National Institute Economic Review. As well as there being fewer strikes, a major feature of 1971 was that there was a smaller number of large strikes compared with the year before.

New Systems of Organisation in an Enterprise

Umberto Agnelli*

Organisational dimensions of the company are not to be considered in terms of rigid criteria. They should take into account as well the fact that the new generation of managers refuses to accept structures tied to systems of authoritarian management of power, but rather bases its fundamental philosophy on the concept of the conscious and creative participation of all the forces present in the enterprise. Modern enterprises have the tendency to arouse their members to participate more fully in the choice of those objectives which make up important company policies. In modern enterprises, committees which constitute an important application of group work are found to be ever-increasingly used. The complexity of contemporary organisational structures require the presence of a specific body within the enterprise to coordinate the sector's activity in an organic and autonomous way.

With technology rendered ever more perfect, with the tendency towards the concentration of industry and finance, the need to operate competitively on a national and international scale under conditions of continual political and economic transformation, the modern enterprise is incessantly stimulated to put into practice a constant improvement of the managerial techniques, and a rapid evolution in the very philosophy of entrepreneurship is promoted.

Flexibility in the Organisational Structures

The ability that the organisational structures have to adapt to the ever-changing internal and external requirements becomes, therefore, one of the determining factors in important company decisions, and the organisational activity, therefore, must take on the character of permanent creativity. Each kind of structure should be considered as a point of departure and not of arrival, because its crystallisation, however much it be suited to a determined historical moment in the enterprise, reveals the beginning of its obsolescence. Hence, to the contemporary way of thinking, the organisational dimensions of the company are not to be considered in terms of rigid criteria, taking into account as well the fact that the new generation of managers refuses to accept structures tied to systems of authoritarian management of power, but rather, bases its fundamental philosophy on the concept of the conscious and creative participation of all the forces present in the enterprise, in order to reach pre-established objectives. Moreover in our country this way of thinking finds a response in the new kind of relationship between the private enterprise and the social context in which it operates. If once upon a time the requests that

*Managing Director, FIAT, Torino, Italy.

society made on the enterprise took on a concrete form essentially as the creation of new places of work, today much more is asked of it: that is, an active and conscious participation in the management of the national resources, and a conditioning of its operative decisions by the economic, social and human consequences that such decisions have on society in general.

Greater Participation in Choosing Objectives

Modern enterprises have, therefore, in common the tendency to arouse their members to participate more fully in the choice of those objectives which make up important company policies, with, consequently, an increase in responsibility when they are achieved. This type of management postulates a structural plan oriented around the decentralisation of the functions and the responsibilities from the centre to the periphery, with the creation of product sectors put under the direct control of the General Management, and given a considerable autonomy within the area of company policy, ranging through the whole operative area— from research to projects, to production, to sales and after-sales to administration and personnel management. The decision-making process is, therefore, trimmed down and made quicker because it remains within the scene of action, while the top management remains above the merely executive and bureaucratic tasks, and is able to dedicate itself totally to its institutional functions (formulating policies, co-ordinating dependent bodies, checking on their operations). Of the managerial aspect we should emphasise then that the top management has the possibility of determining the operative efficiency and the profitability of the separate sectors, as well as precisely evaluating how to utilise the personnel, the finance, the plants and the work instruments. Of course, decentralisation means that a plan has to be put into practice and carried out concerning the future requirements of company members, the development of their leadership capacities, the co-ordination and management of the staff, all of which allows them to experiment their capacities and attitudes in various sectors and under different working conditions, through the application of a policy of mobility.

Modern enterprises have the tendency to arouse their members to participate more fully in the choice of those objectives which make up important Company policies.

It is clear that the more complex the operative conditions are in the enterprise, the more diversified are its products and the more fragmented are its phases of production, ever greater will be the need for a centralised reinforcement of the functions of assistance, co-ordination, direction and control, functions which are to be carried out by a specialised and quantitatively efficient body of staff. Such a body must give account of its activity both to the General Management, by supplying it with a valid support in the form of consultation and information on which to base its decisions, as well as to the operative bodies, by giving them assistance and by facilitating co-ordination, controlling their activity by evaluating the results obtained compared to the objectives aimed for, and finally by carrying out

Organisational changes must be graded through various stages of the structure, with scope for avoiding negative reactions which could occur in the organisational tissues of the enterprise—reactions provoked by too hasty reorganisation.

analysis of the discrepancies, and the actions to be taken to eliminate these.

Important Role of Committees

In modern enterprises, committees which constitute an important application of group work are found to be ever more increasingly used. They have a particularly prominent function in enterprises organised on an international scale with widely diversified production activities. Their activity can in fact have its outlet both at the level of top management by making important contributions to the formation of general company policies (strategic and financial decisions, trends to be followed in personnel management, planning, development etc.....), as well as at the level of the central bodies of staff to obtain a proper co-ordination with the bodies of the line, the analysis of problems, the study of the various objectives and the solving of questions which could otherwise give rise to a conflict of authority and competence within the organisation. The activity of these committees consequently lies within the framework of the vast basic problem of the creation of a communications system within the company, whose formation should guarantee a rapid flow of information both in a vertical and horizontal sense, and whose validity will depend on the frequency and content of the information provided.

The observations expressed above and the very complexity of contemporary organisational structures, require the presence of a specific body wihin the enterprise to co-ordinate the sector's activity in an organic and autonomous way. This specific body should have the constant support of the management acting as a formal and substantial guarantee of its credibility. The said body should regroup in a single entity the various sectors having general organisational tasks, as well as those systems which deal with information, elaboration of data, and work procedures, taking into account the close inter-relationships which it is opportune should exist in order to arrive at greater managerial efficiency in the enterprise. Lastly, it has to be pointed out that organisational changes must be graded through the various stages of the structure, with the scope of avoiding negative reactions which could occur in the organisational tissues of the enterprise, reactions provoked by a too hasty reorganisation. It must be remembered that behind the pigeon-holes of the enterprises' structure stand men with a wealth of knowledge and experience to be respected, preserved and put to good use. But this typical consideration by the participatory enterprise for the human element must not, however, give rise to its inconvenient opposite, which loses sight of the fact that the organisational structure must not be built around people but, while naturally taking into account the human element at its disposal, should be based on the requirements which come to light in a particular historical moment of the enterprise. If it were otherwise, each change of personnel would involve an organisational change. □

Management Productivity

JB Leslie*

Effective managerial leadership is basic to improvement in productivity. It is no longer enough for a manager to be technically competent. He must also be alive to the world around him, out of but impinging upon his business environment. It is also imperative to develop a positive productivity-oriented attitude throughout the company. Middle management must be encouraged to take initiative and should also be given authority relevant to their responsibilities. At the shop floor level, it is important that the workers are given, wherever possible, some direct productivity incentive. True motivation should arise from a general belief by all levels of employees that company policies encourage people to think and to act.

LET us start with definitions—productivity is the ratio of goods and services and the resources which have gone into it. Higher productivity is getting the same quantity or a higher quantity of goods and services from a relatively lower usage of resources. Generally there is unanimity that this is a desirable end to achieve except where radical changes resulting in reduction in the employment of labour are by-products of the change.

Management productivity is the direct contribution of management in creating higher productivtty. Resources are labour, capital, equipment and material, and optimum utilisation is management's responsibility.

Major Lines of Approach to Improved Productivity

Critical Examination of Job Methods—Is work being done on the basis "It's always been done that way", or is there systematic provision for review and are suggestions for innovation encouraged? Research and development should go on with greater emphasis on development. In anything but major business empires "pure" research may be too costly and may largely be concentrated in national institutes. A great deal can be and is being achieved, however, by practical development work which is concentrated on improving methods, machines, better utilisation of raw materials, improvements in maintenance, etc. This is a pragmatic approach but development work at the plant level can show worthwhile return on investment particularly if in a multiplant organisation a free exchange of information exists. It is helpful if there are few restrictions placed on this information flow—let it proceed at all levels of an organisation without having to go up and down through recognised channels which may delay or adversely influence the propagation of ideas.

Encouragement to Middle Management

Top management should help by discussing the objectives which are the aim of the organisa-

*Managing Director, Indian Aluminium Co. Ltd., Calcutta.

Management productivity is the direct contribution of management in creating higher productivity. Resources are labour, capital, equipment and materials, and optimum utilisation is management's responsibility.

tion. These objectives should originate with the producing units and be co-ordinated in joint discussions into an overall plan. It is largely from the efforts and enthusiasm of the middle management level that improved production will result and senior management should act in a supportive manner to see that middle management is given the materials, equipment and manpower necessary to achieve results. Often, senior management may find it necessary to be critical but there is a world of difference between helpful and constructive criticism and between finding someone to blame when things go wrong.

Need for True Motivation

If higher productivity is an objective, one must be prepared to try new paths, take justifiable risks, and acknowledge the possibility of loss and error. Nothing will discourage innovation more than witch-hunts conducted over responsibility for errors which were made in an honest effort to help a company's progress. This is not to advocate a *laissez faire* policy. There must be discipline at all levels, but true motivation should arise from a general belief by all levels of employees that company policy encourages people to think and to act. One frequently reads in newspapers that a loss has been made in such and such an undertaking and that the persons responsible should be sought out and punished. Where gross inefficiency or corruption exists this may be reasonable, but to demand error-free performance is the most certain way to stifle innovation and restrict productivity. It has been said that successful top management personnel may have a ratio of success to error in decision making of about 60 : 40 per cent. The successful manager takes great care in assessing his priorities – i.e. he reduces his percentage of error on important decisions by taking more time over them, he also learns rapidly by experience and considers he is at fault when he *repeats* an error. One must admit too, that in the complexity of modern business, decisions are frequently made and it is well-nigh impossible to state at a later date whether or not the optimum decision was taken or that an alternative could have been better.

Choice of Productivity Targets

Much has been written about the proper choice of productivity targets, the importance of not only "doing things right" but "doing the right thing". Increased production of a loss-making item does not help if the loss increases also; this entails intelligent use of budgetary controls and also attempting to involve accounting personnel in the productive aspects of the business undertaking. All too often, accounting becomes virtually a historical function which keeps management informed of past performance but too late to effect changes. The need for accurate accounts is self-evident, but there should also be a parallel system of "accounting by exception" which brings promptly to management's attention any unusual item.

Productivity Incentive to Workers

At the shop-floor level it is important that the workers be given, wherever possible, some direct productivity incentive. This cannot always be calculated in a highly scientific manner, but it should be production-related and kept as simple as possible so that every employee can recognise that portion of his pay-packet which is derived from extra effort. If one may generalise, workers have a great deal more practical commonsense than many managers give them credit for; they recognise fair policies which are applied without exception. The importance of showing a good example cannot be over-emphasised, there must not be any dual standard in dealings with workers and with supervisory staff. If the company has a reputation for basic integrity in all its relationships, both internal and external then in this itself there lies a very high degree of motivation as the employee will work secure in the feeling he is guaranteed a fair deal.

It is no longer enough for a manager to be only technically competent, he must also be aware of the world around him, outside of but impinging upon his business environment. He should be prepared to invest in socially necessary projects and to take an active interest in social problems. This is not only an ethical requirement but can also be seen as enlightened self-interest. A company with the highest rate of productivity and profitability cannot continue to exist if the long-term socio-economic framework of society is not ensured.

The foregoing represent somewhat random and unstructured thoughts on management productivity. To sum up, it is necessary to develop a positive, productivity-oriented attitude throughout a company: targets should be clear—results should be openly and promptly published, middle management should be actively encouraged to use initiative and given authority relevant to their responsibilities. Due recognition should be given to outstanding performance—under current economic conditions it is difficult to design an adequate reward system—but people get job satisfaction through feeling they have adequate authority and a real share in management.

It is largely from the efforts and enthusiasm of the middle management level that improved productivity will result and senior management should act in a supportive manner to see that middle management is given the materials, equipment and manpower necessary to achieve results.

Senior management assumes responsibility for long-term planning, for moving the whole company in the proper direction for growth. They must be seen to be decisive—delays at 'Head Office' lead to frustration and negative reactions, and prompt and effective leadership is basic to improved productivity. □

When looms weave by themselves, men's slavery will end.
—Aristotle

Management Productivity: Productive Use of Resources

Ram Agrawal*

Productivity implies optimum utilisation of all resources employed in an undertaking to achieve its objectives. 'Managerial Productivity', according to the author, is the collective productivity of all the resources put at the disposal of the manager. It depends upon (i) acquisition of technical and commercial knowledge about the business, (ii) acquisition of knowledge about the philosophy and techniques of productivity, (iii) concern for higher production at low cost, and (iv) concern for the people who work with the manager.

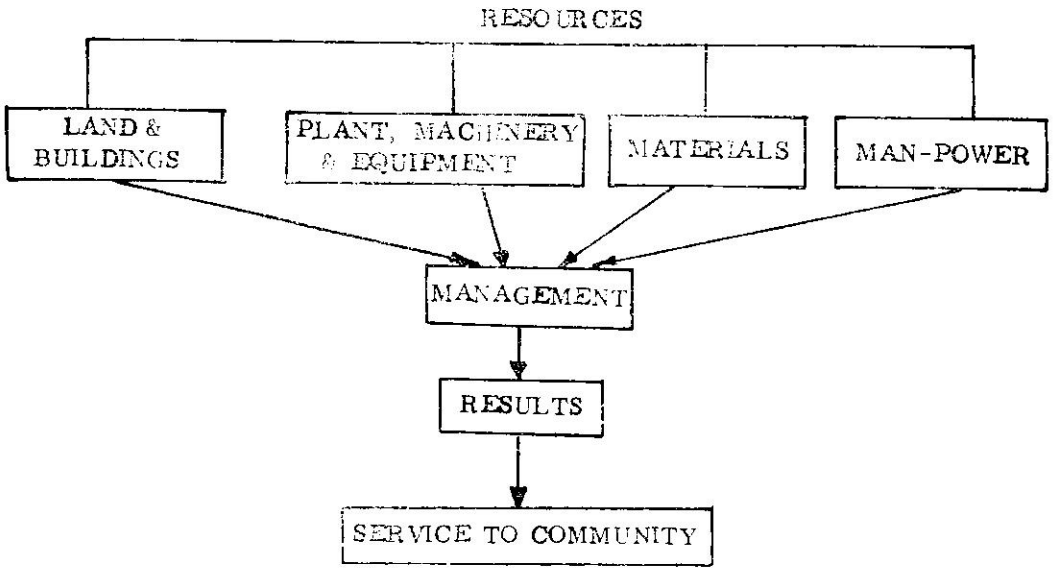
"INDIA has reached a stage in economic growth where the efficiency with which the country's productive apparatus is used can make a big difference to the final result." With these remarks the *The Statesman* greeted the launching of the "India-Productivity Year-1966" by the National Productivity Council. The Paper further said: "Indeed, there is now proof that by the application of proper techniques it is possible to increase productivity in industry by anything between 40% and 100%, save labour, economise raw materials and reduce the cost of production.... Yet much remains to be done.

The above remark holds good even today, after six years, and perhaps with greater force. To bring about increase in productivity is the function of management. In simple words it means that the management must be efficient which nobody can deny.

*Chairman, ALMECO, Bombay, & Vice-Chairman, NPC Governing Body.

Collective Productivity of Resources

Productivity is a generic term. It implies optimum utilisation of all resources employed and being employed from time to time in an undertaking, to achieve its objectives. These resources are: Land and Buildings; Plant, Machinery and Equipment, Materials and Manpower. Productivity of all these resources can be increased by a right approach. "Managerial productivity" means the collective productivity of all the resources put at the disposal of the "Manager". Here the term "Manager" is deemed to include the individual or a group of top executives who are individually or collectively, as the case may be, responsible for the functioning of the organisation and achieving its objectives. The role of the management is that of co-ordinating the overall efforts at optimising the productivity of all the resources into a harmonious and worthwhile "enterprise", as illustrated on page 349.



The results and ultimately the service to the community depend upon the quality of management.

The significance of this role has been very well expressed by the Duke of Edinburgh once, when he said: "We have now in this country literally to live by our wits; by the wit of the scientists and the engineers who can by their inventions start new industries: by the wit of the specialists and the experts who can improve the methods of production and materials: by the wit of the designers who can improve the product itself and its saleability; and finally and most important of all, by the wit of the managers who, alone can bring together and make use of the ideas of the scientists, the specialists and the designers."

Peter Ducker is reported to have remarked that an institution or an organisation is like a tune: it is not constituted of individual sounds but by the relations between them.

The role of a manager has also been described to be that of a symphony conductor who not only makes the boys work hard but also in harmony with each other and in harmony with the objectives of the organisation.

So much is the importance of managerial productivity that the Governing Body of the I.L.O. expressed the following view: "While Governments, employers and managers and workers all have responsibilities for, and can all contribute to, the raising of productivity, management is the key factor. A country cannot take full advantage of other forms of technical assistance, including other forms of training, unless it has the managerial ability to utilise the knowledge of the work-force. The development of management talent in under-developed countries on a scale sufficient to make widespread additional capital investment attractive is crucial to success of economic development programme."

Yet another forceful thought on this subject was given by John F Kennedy when he said "The role of management in our society is critical in human progress. It serves to identify a great

"The role of management in our society is critical in human progress. It serves to identify a great need of our time: to improve the standards of living of all peoples through effective utilisation of human and material resources."

—John F Kennedy

need of our time: to improve the standards of living of all peoples through effective utilisation of human and material resources."

Causes of Business Failures

A survey of business failures in the USA conducted some time back revealed the following:

(1) (a) 70 to 80% of the failures were due to management inefficiency or deficiencies.

(b) 10 to 15% were due to lack of adequate technical know-how.

(c) Rest were due to other causes like neglect, fraud, disaster, etc.

(2) Management deficiencies were:

(a) Inadequate: records, costs, controls, capital, etc.,

(b) Too much: investment, credit sales, etc.,

(c) Faulty : purchasing, marketing, quality control, personnel policies, etc.

In a PTI report, published in a New Delhi Paper some time back, it was reported that according to the estimates made by the S.Q.C. Unit of the Indian Statistical Institute, wastage in Indian industry was at a conservative minimum of 20-25 per-cent. S.Q.C. alone could increase the annual industrial production by about Rs. 400 crores without additional imported equipment or investment in indigenous machinery. The overall plant-utilisation was hardly 40 per-cent, according to the S.Q.C. Unit.

In a recent survey made by this writer, overall inventories of materials held by limited companies, both public and private and inclusive of Government Companies, were estimated around Rs. 4,000 crores. Inventories of about Rs. 1,000 crores could be easily reduced which could give a great buoyancy to the economy and lead to rapid economic progress. Apart from releasing Rs. 1,000 crores for productive investment it would save about Rs. 200 crores per year as recurring expenditure on such extra inventories by way of carrying costs.

In another article on the subject "Critical Importance of Productivity to India's Progress", this writer worked out that the present production in India of Rs. 12,000 crores could be doubled by improving productivity all-round which could bring in a gain to the economy of Rs. 4,200 crores instead of the present Rs. 600 crores only in the form of gross profit.

Need for Managerial Revolution

All these require a managerial revolution in the country which will increase managerial productivity. The subject of professionalisation of management is being discussed in India since some time past. The meaning and implication of professionalisation is, however, not fully understood by many. There just aren't enough of real "professional" managers in the country. Just as mere ownership of shares or stocks does not necessarily make one an efficient manager, even

a degree or post-graduate degree in engineering or accountancy or personnel management or in business management, automatically makes one an efficient manager. It is something which has to be learnt and yet it is not so much of a teachable job. A good "teacher" at best, could assist the learner to find for himself the right things he should know and adopt. The so-called "change-agents" in U.S.A., U.K., etc., who are "experts" in their own areas of specialisation, merely stimulate thinking and action on the part of the learners who have themselves to find solutions to the problems posed by them to themselves.

Leadership in Management may be acquired by heredity or contacts or knowledge and experience but it can be retained and would be retained only if the leader learns the art not of "leading" but of creating opportunities for his men to develop and encourages them to use them well.

Managerial productivity thus depends upon:

(a) acquisition of technical and commercial knowledge about the business;

(b) acquisition of knowledge about the philosophy and techniques of productivity

(c) concern for high production at low cost;

(d) concern for the people who work with the manager.

While, the first two attributes are teachable, the other two are a subject of one's "attitude", which one can develop by one's own volition only.

Development of management talent in underdeveloped countries on a scale sufficient to make widespread additional capital investment attractive is crucial to success of economic development Programme.

So far in India not enough progress has been made in providing facilities to managers where they could undergo the attitudinal transformation. They are mostly left to themselves to follow the hard way of committing otherwise avoidable errors.

For improving managerial performances it is essential that high level programmes are organised by business organisations with the help of the right people who may be available. At that level there is apathy and even smugness in many cases that they need no learning and that they know all the answers; it is their subordinates, they think, who need the training.

In the interest of managerial productivity, therefore, new ground has to be broken fast in India if economic prosperity and social welfare were to be achieved in the foreseeable future.□

WORKER RELOCATION

Experimental Relocation of unemployed workers to areas where they are able to find and keep jobs has proven highly successful, according to the U S. Department of Labour. A review of 18 relocation projects for 3,141 disadvantaged workers shows that 88 percent of the relocations were successful. The average individual allowance cost for the participants in these projects was $325.

— Training and Development Journal

Managerial Productivity : Maximum Utilisation of Resources

Dr PC Mehta*

If the cost-price-wage spiral in which we are involved is to be arrested, productivity of the various input resources used will have to be maximised. Effectiveness or productivity of management need to be judged at two levels viz., the policy-decision making level and the operational level. There is considerable scope for improving managerial productivity both by avoidance of delays in decision-making and implementation of the decisions as well as by use of sophisticated productivity techniques combined with delegation of necessary authority to the appropriate operating level.

THE process of economic growth in which developing Asia is engaged for the last decade or more is closely linked with and heavily dependent on productivity. Often growth is assumed to be equated to the quantum of investment. Unless, however, investment is productive and generates an adequate return in terms of income, goods and services, it does not lead to growth, at least to the expected level. Not only does unproductive investment become a burden on the economy, but by failing to produce enough returns, it decreases the amount of resources available, for subsequent investment. In other words, unproductive investment involves the hazard of decelerating growth. If the cost-price-wage spiral in which we are involved is to be arrested productivity of the various input resources used will have to be maximised.

The concept of productivity is frequently used in the limited sense of labour productivity, that is output per manhour. Applying the productivity concept in this narrow sense is of very limited value to developing economies. Productivity is a measure of the output from a given input of resources of men and machines, money and material. It may be that in the advanced economies of the West, labour is the most scarce resource and, therefore, attempts to raise productivity in these countries emphasise methods of increasing labour productivity. In developing countries, on the other hand, scarce resources are likely to be capital, mahinery and technical skills. It is, therefore, that detailed analysis often shows high speed automated technology developed in the advanced countries to be uneconomical under Indian conditions. When one talks of increasing productivity in these countries, maximising the output from a given input of these resources assumes at least as much importance as maximising productivity of labour.

Effectiveness of Management

This concept of productivity which requires maximising the effective use of all resources, viz., machinery, materials, money and men, is, therefore, essentially the effectiveness or productivity of management. In this context the effectiveness of management need to be studied at two levels, viz., the policy-decision making level and the operational level.

*Director, Ahmedabad Textile Industry's Research Association, Ahmedabad.

Policy Making Level

At the policy-making level, besides the wisdom of a particular decision, a major factor affecting productivity is the speed with which decisions are taken. Far too often, the popular adage "Time is money" is forgotten and ignored. This is particularly a case where decision-making and sanctioning of productive enterprises are vested in Governmental and public agencies. Between the submission of a detailed project proposal and its final sanctioning a time-lag of 2-3 years has been now accepted as normal. Such an inordinate delay increases costs in two ways. Firstly, due to the constant inflationary trends, the project cost would go up by 10 to 15% over a two-year period. Secondly, the country is deprived of the added value to the economy that the project if implemented would have contributed. In the classic example of the Narmada Project, it was recently estimated in a public statement that the increased value of agricultural and other production due to the project would be of the order of Rs. 1,000 to Rs. 1,500 crores a year. In other words, the protracted inter-State wrangles and disputes about this Project over the last 8 years have cost the country nearly Rs 10,000 crores!

The other major managerial contribution at a policy-making level is the manner in which a sanctioned project is implemented. Here again, it is not unusual to find that the actual time required for completing the project and bringing it to a production level is much longer than the estimates. Such delays in implementation not only involve extra capital costs due to inflation but also involve a direct loss due to locking-up of large capital and other resources unproductively. Use of sophisticated techniques such as PERT and CPM for Project Planning and Control have to be rigorously adopted especially when high levels of investment are involved. There have been several notable examples in the recent industrial history of India when use of these methods combined with delegation of necessary authority to the appropriate operating level have enabled even large projects to be completed well within the planned time schedule.

At the operational level, machinery maintenance, materials management, production planning, market strategy, etc. are typical areas in which management can make significant contribution in reducing waste, increasing machinery utilisation, reducing inventory, increasing sales and maximising profits.

Operational Level

At the operational level there are several areas in which the effectiveness of management can contribute to higher productivity. Machinery maintenance, materials management, production planning, market strategy, etc., are typical areas in which management can make a significant contribution in reducing waste, increasing machinery utilisation, reducing inventory, increasing sales and maximising profits.

A few examples would illustrate the extent of variation in performance amongst similar companies engaged in the same industry.

TABLE 1

Inter-Mill Differences in Spinning Productivity

(Production/spindle shift)

(Yarn Count : 28s Carded; Drafting System: Top Arm Cotton Quality and Package Sizes comparable; Machine Allocation : 4 sides per Tenter)

Maximum	103.3 g.
Minimum	76.2 g.
Average	92.4 g.
No. of Mills	14

Table (1) shows the magnitude of difference in machine productivity in the spinning department of textile mills using similar raw materials, employing comparable machinery and producing the same product. Systematic procedures of machinery audit and maintenance, and efficient. work organisation would considerably increase machine productivity and improve product quality without any additional capital investment.

Table (2) gives typical data on the efficiency with which cotton is converted into yarn and fabric in different mills. For the same product, it can be seen that the output as a percentage of input varies very widely and clearly shows the scope for improvements in productivity that can be achieved at a given technological level by increasing organisational efficiency and without substantial capital expenditure.

TABLE 2

Inter-Mill Variability in Yarn Output as percent of Cotton Input

Yarn Type	*Maximum*	*Minimum*	*Average*	*No. of Mills*
28s Carded	87.1	82.1	85.0	9
100s Combed	77.9	68.1	73.1	6

Table (3) gives a comparison of assets and turn-over ratios of a few selected companies in different industries for the period 1969-70 to 1970-71. These ratios have been derived from

TABLE 3

Assets and Turnover Ratios of some Selected Companies in different Industries for 1969-70/ 1970-71

Industry and Names of Companies	*Assets in lakhs of Rs.*	*Sales as % of assets employed*	*Sales as % of inventories*
1. *Aluminium*			
Company A	6154	57	264
Company B	5775	69	494
2. *Man-made Fibres*			
Company A	2459	60	585
Company B	1584	70	418
Company C	950	59	276
Company D	618	120	383
3. *Dyestuff*			
Company A	1880	67	276
Company B	1225	87	280
Company C	983	88	293
4. *Bearings*			
Company A	258	59	193
Company B	261	76	252
5. *Vegetable Oils*			
Company A	189	414	847
Company B	199	617	1163
6. *Metal Containers*			
Company A	128	120	249
Company B	97	246	599

Notes : 1. Assets figures represent value of total assets as per Balance Sheet less advance payment of tax. The average of opening and closing figures has been taken.

2. The figures of inventories represent the average values of opening and closing inventories as per Balance Sheet.

published figures available from *Economic Times* and the Bombay Stock Exchange Official Directory. Since the size of a company is one of the major factors affecting turn-over ratios, only those companire which have comparable values of assets have been chosen for the purpose of inter-company comparison.

These ratios measure output (i.e. sales) as a percentage of resources used in the form of inventories and total assets and are, therefore, indicators of managerial productivity and efficiency.

It will thus be seen from the examples quoted above that even at the operational level there is considerable scope for management to maximise productivity of available resources by improving and streamlining existing procedures. The most essential need for achieving this objective is to establish an effective management information and control system. Every industrial unit undoubtedly has a reporting and information system but unless it is carefully tailored to meet the needs of the complex organisation of modern industry, it may not serve its purpose effectively. Unless the right information is supplied in the right form to the right person at the right time, either deficiencies in performance will not be brought out or else the information will be only of historical value and not lead to corrective action. Far too often existing systems lack discrimination and supply the same information at the same frequency to various levels of management irrespective of the nature and area of their decision-making. This leads to a dual problem. The level responsible for overall control and policy-making gets over-burdened with far too detailed and frequent information of an operational character for prompt and effective action. On the other hand the operational level of management does not have enough delegated authority to take such action. At the same time, there may be areas important for policy decision-makng in which supply of information may not be adequate. Another shortcoming in existing systems in many industrial units is the absence of clear and realistic targets of performance which are accepted as achievable under the given conditions of the particular plant. Without such performance budgeting in production, sales and financial areas, it would be difficult to exercise effective and meaningful control.

Management Reporting

Ideally, a management reporting system should fulfil the following objectives:

1. It should enable top-level management to set performance standards, to compare current performance against these standards and to analyse reasons for any variance between the two. The concern at this level is to ensure that the expected quantity and quality of production is obtained within the expected time and cost. It should not generally be concerned with details of operational action necessary to maintain given targets, as long as these actions are within the social and legal code of the enterprise.

2. Information supplied must help management in formulating short-term and long-term policies of purchase, production, marketing and capital investments. This means that in addition to information about operations within the plant, management must also be informed about developments at the regional and national level. For example, consumer goods industries, in developing countries particularly, can use with advantage, information about agricultural production, population growth, shifts in income, family budgets in different regions of the country and sections of the community, trends in consumer preference, etc. □

Managerial Productivity : Some Issues in Measurement†

Dr P Chattopadhyay*

For a developing country like ours, an all round qualitative improvement in management is a *sine qua non* for successfully realising the national economic objectives. Significance of the theme of managerial productivity suggests itself in the context of the fact that after all it is good or bad management that makes or mars an economic, productive organisation, irrespective of the other factors. Productivity of management is a ticklish problem having remarkable facets for appraisal and measurement, each important in its own way. In this article, the author considers some of the measures of managerial productivity and the different ways in which such measurement may be made, keeping in view the various objectives behind such measurement.

As it happens generally in our country, the cult of productivity is more talked about than practised in industrial and commercial organisations. In the context of management, however, it is even talked about scarcely. Managerial scientificity is a matter for conscious cultivation in terms of the tools and techniques and objective, analytical approaches to decision-making. On cursory glance at the literature on the subject flowing from the advanced countries of the West, it appears that serious discussions on managerial productivity have been few and rather far between to say the least. These discussions have essentially been on the side of appraising managers individually, assessing their performance against set objectives and behavioural aspects arising from the exercise of leadership roles of managers in handling men to realise goals.[1] These assessments cannot be termed as managerial productivity stressing the effectiveness of managerial input as such vis-a-vis other inputs.

An Essential Factor

In India, there has not been much serious attempt to consider different issues involved in managerial productivity in an enterprise. Generally, however, it has been made out by several critics that quality of Indian management has been poor in both private and public sectors of the economy. Indices of managerial productivity would reflect trends in this regard. The significance of the theme suggests itself in the context of the fact that, after all, it is good or bad

*Director (Research), Institute of Cost & Works Accountants of India, Calcutta.

†This exercise is part of a more detailed empirical analysis in which the scribe is presently engaged.

1 Cf. Eliot D Chapple and Leonard R Sayles, *Measures of Management*. Macmillan, New York, 1961; W.J. Reddin, *Managerial Effectiveness*, McGraw Hill, London, 1970; and Raymond F. Valentine, *Performance Objectives for Managers*. American Management Association, New York, 1966, for instance.

management that makes or mars an economic, productive organisation, irrespective of the other factors. A study of reasons for sickness in several industries in India revealed that in major part management was responsible for it. For a developing country like ours, an all-round qualitative improvement in management is a *sine qua non* for successfully realising the national economic objectives.

In the present exercise, we restrict ourselves to a consideration of some of the measures of productivity of management and the different ways in which such measurement may be made, keeping in view various objectives behind such measurement. Incidentally, reference is not made here to the debate as to what constitutes management as against what is known as entrepreneur, organiser or executive or administrator. In a way, our discussion is lopsided to the extent that it does not make a qualitative distinction between different classes of managers or other people in this category. We do not consider that this is a matter of terminological variations or semantic confusion only.

A Ticklish Problem

Productivity of management is a ticklish problem having multiple facets for appraisal and measurement, each important in its own way. Right at the outset, one has to mention that by now management itself has become a rather generic term[2] signifying different levels of management in charge of different functions in the organisational hierarchy. Thus, one has to take into account the problems and performance of management of production, marketing, personnel, finance, design and development, maintenance, researeh, etc. These problems are apart from the purely human aspect of management which has been succinctly put by Professor Harold Koontz in the following words, "The manager, then, is an environment creator, and his job is to design and operate an environment where people, working together in groups, contribute, as individuals, towards attainment of group purposes".[3] Within each area, there would be different functional sub-divisions as under the care of perhaps deputy managers or assistant managers. Above the level of departmental managers in charge of the broad functions mentioned above, there would be the top management, i.e., the board of directors and the managing director or general manager as the case may be.

Effaceability

Managerial productivity does not leave out any of them while, at the same time, it cannot do justice to all of them whose functions are subject to different degrees of quantitative appreciation and even identification. It is important to stress both tangible and intangible aspects of managerial productivity. Here one confronts a serious problem. Like art lying in concealing art good management effaces itself and its roles. Thus, generally managerial productivity has innate capacity of long remaining in the thin air, beyond measurement in quantitative terms, unless deliberately the barrier is broken or scaled. It shows up in good or indifferent performance. of the other factors of production, such as land, labour or capital. When the performance of managers in one area, for instance, is better than in either other areas or in other units, it may give rise to conflicting claims in favour of either labour and capital. As long as the going is good, there appears to be little bother on the part of

2. Cf. Peter F Drucker, *Technology, Management and Society*, Heinemann, London, 1970, p. 28.

3. Cf. "Challenges for Intellectual Leadership n Management", *The California Management Review*. Summer 1965, p. 11.

managers to know about how management has been functioning and to assess managerial performance in different terms. In such situations, at least to an outside observer, interfirm variations would be a good indication of how management of one unit has distinguished itself against that of another.[4]

Multifarious Roles

Here one should remember multifarious roles that managers play as innovators, imitators, adaptors, thrusters or sleepers. All this, however, tends to crystallise in a *perpetual residuum.* Claims to distinction of management of particular units or areas remain subject to those of other factors. The managers themselves can do little to dispel any doubt in this regard without affecting adversely the interpersonal relations within the organisation, particularly the relationship between the manager concerned and his subordinates. Regarding interfim variations in the quality of management. it requires mention that extensive research by behavioural scientists has led to standardisation of questionnaires, assessment of variables and point-rating of factors hitherto remaining beyond the grasp of quantitative approaches.[5] However, purely human questions with which behavioural scientists have shown primary concern are but one aspect of the whole issue concerning managerial performance. While the essential focus of behavioural scientists has been laid on managers as human beings positioned in leadership function and authority roles vis-a-vis the work-environment, it is necessary to find ways of assessing such performance on other grounds as well. There is, however, little doubt regarding the imperative of assessing managers as managers.[6]

Criteria Required

There is an equal, if not greater, need for evolving criteria leading to an assessment of their roles in planning, coordination, motivation and control in the organisation. Secondly, and more significantly, it is necessary to determine quantitatively the "*residual factor performance attribution*" to management in terms of the performance of an enterprise minus the attribution of such performance to land, labour and capital. In assessing such attribution, interfirm variations should be supplemented by intrafirm variations over time. In fact, both are important for knowing and judging managerial performance. Management as a factor input is indeed difficult to properly locate in the totality of performance, but without such location, it is impossible to determine managerial productivity.

Management Thrusters

The difficulty referred to above arises in several contexts. The multiple roles of managers make it impossible to assess the effectiveness of each role in a distinct, water-tight compartment. Moreover, managerial effectiveness may not be easily identifiable in terms of immediate profitability while it becomes essentially an investment into future. Dynamic, thrusting management indeed lives in future. The present does not occupy as much of its focus of attention as in the case of sleepers[7] tending to thrive by hindsight. The present functioning and performance are in fact cumulative results of past decisions. While the quality of decisions taken

4. We made an attempt to stress this problem in a paper on "Interfirm Comparison of Intangibles" published in the previous issue of this journal, i.e., July-September 1972.
5. See Appendices II and III to Rensis Likert, *The Human Organization,* McGraw Hill, New York, 1967 Pp. 196-229.
6. Cf. Harold Koontz, *Appraising Managers as Managers,* McGraw Hill, New York, 1971
7. Cf. *Thrusters and Sleepers :* A PEP *Report,* George Allen & Unwin, London 1965.

earlier is an important factor in the determination of which the present offers a case example, dynamic management is not unnecessarily tied down to the mistakes of yesterday; it shows greater concern for the prospects of tomorrow. At the same time, seeing to the requirements of control with reference to various tools and techniques so that the productive factors do not go centrifugal, it is necessary for management to come down to earth to put factors right when they have gone out of track. These essential features of planning and control[8], of course, are a kind of role-conflict that one sees in management and, perhaps, a certain amount of tight-rope-walking also, two steps forward and one step back, or so it would appear. But not all managers are busy in controlling or in living in future.

Division of Labour

There is division of labour in management itself. This is crucial for management to succeed in the keenly competitive world for business. However, this division of role in management manifests itself in different ways. For example, strategic decisions and policies are matters for the board of directors and, to some extent, for managing directors or general managers. The implementation of these decisions and adoption of departmental or functional policies are for departmental and junior managers and executives. In organisations in which there are systems of management by exception in vogue, control is exercised through analysis of only significant variances from predetermined norms or targets. Futurity does not figure much in all this but within an acceptable limit of expenditure and facilities, long rope is allowed to some managers to deal with experiments.

Connectivity Criterion

In the context of management, productivity has and should have a particular connotation distinct from what is understood by the term in the cases of other factor-inputs. The difference is not only in the type of managerial input but also its quality, its multiple roles and the underlying forces of its contribution to the productive effort of an organisation. Any one index would appear to be inadequate in grasping in full measure the contribution that management makes to production and profitability. Several indices thus suggest themselves in the context of managerial productivity. These indices should reflect adequately the areas of performance under the purview of different managers belonging to different hierarchical levels in the organisation. In addition, to do justice to the performance of a manager which shows up in that of another, it is necessary to have *connectivity* criterion of managerial performance.

Creative Idiosyncrasies

It can be easily visualised that different indices of performance can be computed for different areas of management starting from the top downward, up to the level of assistant managers or even below in certain cases where such management levels exist. The assumptions under which these indices hold good would require to be clearly delineated so that proper interpretation of the trends in managerial performance can be made effectively and methods of improvement worked out on logical grounds. The effect of misinterpretation of indices would be disastrous, particularly in the context of the

8. For a detailed discussion on the subject, see the author's paper on "Control Dynamics" in *The Management Accountant*, December 1971, Vol. VI, No. 12, p. 680.

rather known idiosyncrasies[9] attached to innovation and managers causing it. Weightage for forward-looking, change-oriented policies and approaches requires to be given in adequate measure. The role that "trouble shooters" in management play requires appreciation and, if possible, reflection in the indices themselves. This is not only difficult but ridden with the problem of bias. On the basis of the sector performances, an aggregative index of managerial productivity for the organisation can be computed with reference to a base year reflecting the changes that have taken place during the period in view. A process of elimination for knowing and judging the qualitative differences in management in particular organisations or countries may be adopted on the basis of interfirm and intrafirm variations coupled with intercountry differences in management. Oddly enough, utilisation of external decision-asssistance is also an indication of the superiority of management of particular organisations in relation to others. In this respect, the following excerpt will speak for itself:

"There are many indications that the gap separating Europe and the United States may be due less to the magnitude of the media installed than to the way in which they are managed.

The ratio of 1 to 3 between expenditure on research and development in Western Europe and in the United States is really only 1 to 1.5 if we compare the number of engineers and technicians engaged on these activities. If the manpower is available, it might be said that the gap between the two continents is mainly due only to a difference in the amount of credit allocated to research, and all that would be needed to redress the balance would be to release the necessary funds. This would be over-optimistic. If comparison is made of the financing mechanisms for innovation and the operation of management techniques on both sides of the Atlantic, it might, on the other hand, be thought that people and organisations were mainly responsible for the lag and that the technological gap has been joined by a managerial gap.

It seems clear, in the first place, that the 'machinery for financing innovations' developed in the U.S.A. is more efficient than that of other countries, human media and funds invested being equal. In fact the American government relies more on the private sector, thus ensuring better dispersal of the applications of research through 'spin-offs' and commercialisation. Moreover, it tends more to concentrate its means, enabling certain thresholds, beyond which all research would be fruitless, to be by-passed.

The effects of this policy are amplified by the dynamism and efficiency of the companies themselves. In this sphere too there are perceptible gaps between Europe and the United States. Differences in the use of decision-assistance techniques are the main examples of this."[10]

INDICES OF MANAGERIAL PRODUCTIVITY

Overall Productivity

Like productivity ratios of other input factors, managerial productivity may be measured in terms of output raised per managerial manhour, output being measured either in terms

9. It has been a general experience that top grade technical ability and inventive nature affect the inter-personal relationship among managers, if not for other reasons, at least for the seclusion required for concentration. There are exceptions but such exceptions only prove the rule.

10. Richard Armand, Robert Lattes and Jacques Lesourne, *The Management Revolution : Management Consultancy and Computer-Aided Decision Making*, translation by George Ordish and Caron Shipton, Macdonald, London, 1972, pp. 191-192.

of standard-hour or constant or current values. The ratio of managerial productivity thus computed will show the changes in output over time with respect to management as an input factor. This ratio will be analogous to measurement of labour productivity in terms of output per manhour or capital productivity in terms of output per machinehour. From the point of view of internal management, this ratio remains sensitive to the changes that take place within the organisation over a period of time. Other factors being equal, changes in output per managerial manhour may show those in managerial productivity.

Managerial Productivity Index

Like the general index of labour productivity measured in terms of index of output divided by index of employment and multiplied by 100, managerial productivity may be measured in terms of index of output divided by index of employment of managers in the organisation multiplied by 100. This index may show the aggregative trends of effectiveness of managerial manpower in the organisation vis-a-vis output. The aggregative index is, however, a summation of the indices that may be computed for sectional or functional management in terms of production, marketing, personnel, finance, etc. Within each of the sections or functions, there would be different hierarchical levels of managers, each contributing in its own way to the overall sectional or functional productivity. For the purpose of management, even sectional or functional productivity indices may be prepared along with the aggregative index to show the overall trend as also the sectional or functional productivity trends. Being a measure of control, these indices would be workable guides for managers as one of the determinants of the effectiveness of the managerial input.

In measuring managerial productivity it is essential that the total effectiveness of the managers be viewed in terms not only of production or marketing performance but also of quality of decicions taken at various levels of the management hierarchy.

Differential Input

More significantly, however, managerial productivity may be measured in terms of the differential input factor. Like measurement of goodwill in terms of capitalised value of super profits for a number of years' purchase, the profit differential of a particular unit may be measured in terms of the changes that have taken place in management over time. Profit being the remuneration for organisation or management, the effectiveness of management may not be fully indicated by total net profit as such, profit being subject to very many external and internal factors. The differential, however, may be a good indicator of the marginal changes that have taken place over time. Thus measured, the profit differential may be duly weighted by the number of years for which such differential is predicted. This differential factor will be an index of the superiority of management of a particular organisation to that of others.

PACE

Performance And Cost Evaluation is a relatively new technique for measuring the effectiveness of human inputs. Though primarily designed for measuring the effectiveness of team effort

by workers, it can be suitably modified to suit the requirements of measurement of the management team in an organisation. It may be recalled here that PACE was developed by the Norair Division of the Northrop Corporation in the United States. PACE is a statistical analytical method, depending largely upon work sampling and effort rating. The PACE measurement index is as follows :

$$\frac{[N \pm L - (I+A)]}{N \pm L} \times E \times 100$$

N = Number assigned
L = Number loaned
I = Number idle
A = Number absent
E = Group effort rating

A detailed explanation of the PACE technique is not attempted here. However, it is necessary to mention that the PACE measurement index is based on four factors, namely, persons assigned to the task; persons idle; persons out of the task area; and the group effort rating. The PACE programme, which is a graphical analysis showing the PACE measurement index, has five related indices in view, namely, personnel requirements; budget realisation; scheduling; quality control; and parts shortages. If the focus on work group effort is changed for management collaboration, it is possible to adapt PACE measurement method for assessing managerial productivity trends. For this purpose, one requirement may be that the tasks of the PACE work group situation be substituted by management strategies, objectives and policies. The functional PACE indices in the areas of production, marketing, finance, etc., may be aggregated into an overall PACE measurement index[11].

Performance Against Objectives

The context of management by objective[12] applies to management appraisal as well, in the sense that the performance of an individual manager or the management group can be measured in terms of what he or the group was supposed to do vis-a-vis what he or the group has actually done. The objectives, as in the scheme of management by objectives, should relate to every level of managerial hierarchy and at each level the performance may be judged on the basis of the objectives-realisation criterion. Such assessments can then be aggregated in the form of the performance of the organisation vis-a-vis the organisational objectives. Incidentally, objectives, for the purpose of the present discussion, embrace objectives, strategies and goals, depending on the time period for which such assessments are intended and on whether such assessments relate to the continuous functions or any specific goals to be achieved. In the context of management by objectives, it is also necessary to remember budgetary control which is relatively older and perhaps hackneyed to talk about; it is, however, a truism that even this tool was not widely tried in our country. Almost side by side with the more catchy phrase of management by objectives, we have been hearing the typically management slant given to some of the relatively old-fashioned techniques of accounting and control such as managerial budgeting[13],

11. The technique has been described in some detail in Leonard W Hein, *The Quantitative Approach to Managerial Decisions*, Prentice Hall of India, New Delhi, 1972, Chapter XV, Pp. 261-288.

12. Cf. JW Humble, *Improving Business Results*, McGraw Hill, Maidenhead, (1968); JW Humble (Ed.), *Management by Objectives in Action*, McGraw Hill, London, 1970; and AJ Marrow, *et al, Management by Participation: Creating a Climate for Personal and Organizational Development*, Harper & Row, New York, 1967, among others.

13. Walter R Bunge, *Managerial Budgeting for Profit Improvement*, McGraw Hill, New York, 1968.

managerial standard costing[14], and perhaps managerial accounting. The growth of population of techniques in this respect seems to be explosive, to put it mildly. However, it is possible to apply some of these techniques, meant originally for use by management for assessing other people's performance, for its own performance also.

Performance Appraisal of Public Enterprises

In our country, in the public enterprises, an example of assessment of performance against objectives is the audit conducted by the Comptroller and Auditor General of India[15] through the Audit Board. In the cases of public sector enterprises, the performance review throws light on many different aspects of the running of the enterprises chosen for detailed examination, the like of which is not available for private sector organisations. In addition, some of the reports of the Committee on Public Undertakings are good examples of performance appraisal against objectives. Particular reference is made here to the horizontal studies of the Committee on Public Undertakings such as Management and Administration (Planning of Projects)[16], Townships[17], Guest Houses[18], Materials Management[19], Production Management[20], Financial Management[21] and Public Relations[22]. The Committee, incidentally, assessed the quality of decisions taken by managers in some of the undertakings examined by them; for instance, Bharat Heavy Electricals, Bhopal. In assessing managerial productivity, the studies so far made in the country would offer some good indications as to how to proceed with preparation of different criteria for assessing the performance of management.

Decision Appraisal

In measuring managerial productivity, it is essential that the total effectiveness of the managers be viewed in terms not only of production or marketing performance but also of the quality of decisions taken at various levels of the management hierarchy. A corollary of this requirement will be the scheme of delegation of power in vogue in an enterprise and the levels up to which the decision-making power is delegated. In the management literature, while one comes across a good deal of discussion and analysis on the application of decision-making tools and techniques and the need for high quality decisions for business successes, one hardly comes across decision analyses at depth, embracing the predecision analysis, selection from alternatives actually made and the impact created by such selection on the performance of the enterprise. However, one such study[23] is available which may be referred to with benefit. The study was carried on at the Manchester School of Business by Professors W Scott and BR Williams of ten enterprises in and around Manchester as regards capital investment decision. In the cases of some units in the study, depth analyses of decision-making brought to light several interesting facts as to how managers actually decided, partially brushing aside the findings of predecision analysis and adding on their own subjective choices to the process of decision-making. The impacts that these decisions created throw interesting sidelights on the subsequent performance of the units. □

14. J Batty, *Managerial Standard Costing*, Macdonald & Evans, London, 1970.
15. Since 1963, these audit reports (Audit Report 'Commercial') are available as separate exercises. 1970 onwards these reports have been issued in multiple parts, separate reports being for each undertaking examined in detail. For a detailed discussion, see *Eastern Economist*, 7.5.71 and 1.10.71.
16. Thirteenth Report, Third Lok Sabha, 1965.
17. Eighth Report, Third Lok Sabha, 1965.
18. Fiftieth Report, Estimates Committee, Third Lok Sabha, 1968.
19. Fortieth Report, Third Lok Sabha, 1967.
20. Sixty-seventh Report, Fourth Lok Sabha, 1970
21. Fifteenth Report, Fourth Lok Sabha, 1968.
22. Forty-seventh Report, Fourth Lok Sabha, 1969
23. W Scott and BR Williams, *Investment Proposals and Decisions*, George Allen & Unwin, London, 1965.

Productivity Through Effective Management

KN Sapru*

Managerial productivity has to be understood in terms of business as a group activity. It is important to judge managerial productivity from the way the enterprise conducts its operations and projects its image in the society. The new trends resulting from rapid technological developments and consciousness prevailing among workers place greater demands on the quality and strength of the management to effectively grapple with the changing pattern. A successful manager is he who is not only effective in a period of a change but has also the foresight and needed flexibility to meet the change. Managerial productivity has direct relationship with the optimum utilisation of the all-pervading human resources of an enterprise. The greater the satisfaction and motivation the higher the rate of productivity. Various factors by which managerial productivity could be measured and accelerated include discipline of the organisation, personal contacts, pride in the job, motivating human action, seeking out the best in the people and, above all, making sound and good decisions. Ultimately managerial productivity is revealed in the performance of those who are managed.

MANY years ago, Andrew Carnegie, the noted American industrialist emphasised the importance and potential of organisation when he said: "Take away our factories, take away our trade, our avenues of transportation, our money, leave us nothing but our Organisation, and in four years we shall have re-established ourselves."

He meant by Organisation people who have the ability to plan, organise, co-ordinate, direct, control and utilise the human and other resources with a view to achieving optimum results. A look at Germany and Japan would convince us as to how it has been possible to reconstruct a war-shattered economy within a short period of time, because of the competence of persons who constitute management. When the right type of managerial personnel are assured, no matter how severe the reverses are, an enterprise will manage to stand on its own in no time. A company which is haggard today can be the vanguard of progress tomorrow, depending upon the efficiency and productivity of the managerial team providing direction on the right lines.

*Chairman, National Small Industries Corporation Ltd., New Delhi.

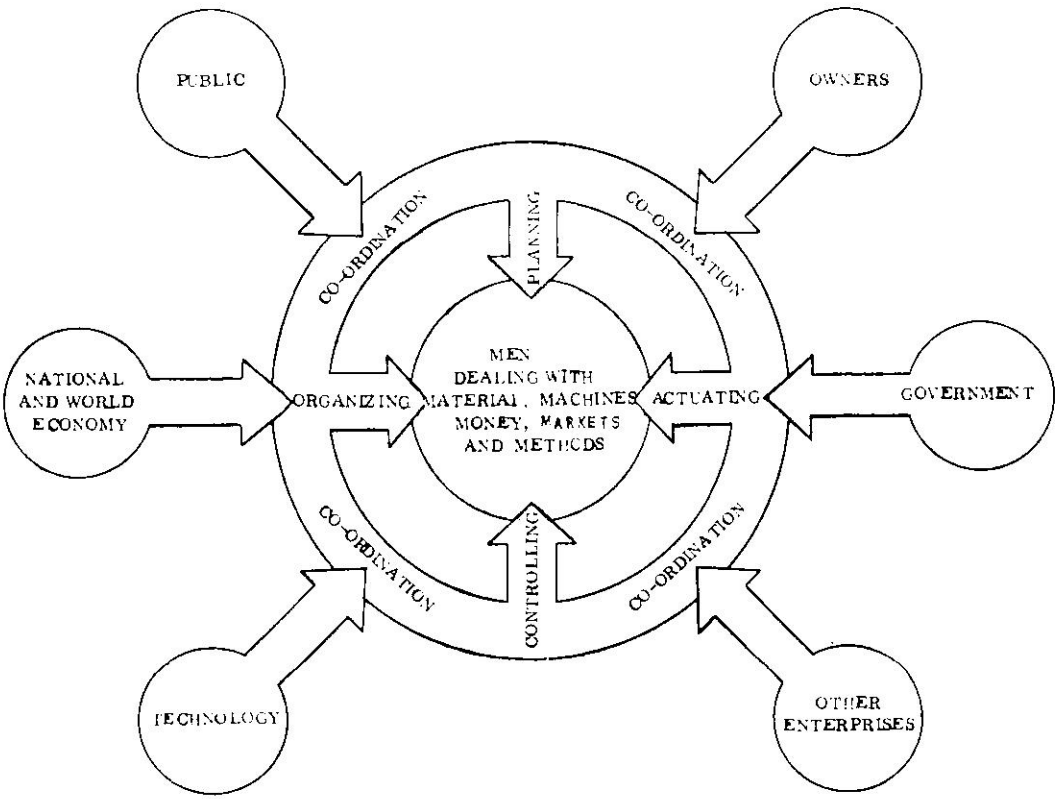
Measuring Managerial Productivity

Quantitative norms have been laid down for measuring a worker's productivity or a machine's productivity. It has also been possible to discover conditions as would improve productivity resulting in increased output, given the same amount of input. For measuring managerial productivity it is not possible to lay down any quantitative formulae because the job of a Manager is not only different but complex as compared to that of a worker or machine.

Business is a group activity. One cannot go the whole hog alone. It is only through the process of concrete group action that any venture comes to fruition. It is in this context that the managerial productivity is to be understood. The criteria for judging managerial productivity are not measures such as, performance, morale, lack of conflict or profit *per se*. These are, no doubt, important but insufficient criteria. We have, rather, to evaluate managers by the way they adapt themselves to the rapidly changing environments and give dynamic inputs to the enterprise. It is important to judge managerial productivity from the way the enterprise handles its problems and projects its image in the society.

Managerial productivity is to be measured by the conditions and environment prevailing in an organisation for high morale of employees, consciousness of costs and profits and other factors of economic efficiency. Such factors as workers' unrest, culminating in widespread lockouts and *gheraos*, uncertain behaviour of the market, acute shortages of industrial raw materials etc., place new demands on the managerial team. Further, as a result of rapid technological developments, business is getting more

MICRO AND MACRO ENVIRONMENTS OF AN ENTERPRISE



and more complex. The workers are today better organised than they were in the past for the purpose of exercising their demands through collective bargaining, conciliation, arbitration and adjudication. The State too is anxious for greater labour participation in management. There is also the general expectation of the public from within and without the enterprise that in the present-day society, an industrial or commercial enterprise must accept its social responsibilities and provide human satisfaction from work. These new trends demand that the quality and strength of management must be of high degree so as to be able to grapple with the changing pattern effectively. The organisation is exposed to forces external and internal as shown in the diagram.

Manager—A Leader

A manager gets his results by what he can accomplish through other people and not primarily by what he can do himself. The manager is the leader and his work is different from the work performed by the people he manages. A manager's task requires him to bring out and make effective whatever strength there is in his resources—and above all in the human resources. It requires the manager to balance and harmonise three major functions of the business enterprise:

1. Managing a business
2. Managing managers
3. Managing workers and work

A decision or action that satisfies a need in one of the three functions by weakening performance in another, weakens the whole enterprise. One and the same decision or action must always be sound in all the three areas. Management is not merely knowing and being knowledgeable. Management is not merely analysis of the results of an enterprise. It is also not the capacity to get elegant solutions to non-existent problems. Rather, management is practice of the art of getting effective group results towards the attainment of some goal that the group as an organisation of society sets before it.

Feasible Goals

To measure output, we must know in any enterprise what its objectives or goals are. Simply goal-setting as a formal drill *sans* feasibility of attainment thereof is nothing less than having a day-dream. So, we must have goals that are actionable and feasible, understandable and verifiable. Goals without these essential characteristics tend to become pious wishes and sermons towards which few people can work and none can know when they are reached. There are certain stumbling-blocks—discouraging but certainly not impregnable ones—casting a damper on the managerial productivity. First there is a problem of obtaining effectiveness in a period of accelerated change. A successful manager is he who is not only effective in a period of a change but has also the foresight and needed flexibility to meet the change. But the problems of flexible management are made extremely difficult by in-built inflexibilities. The second major challenge facing managers is the problem of assuring a balanced environment which promotes creativity where needed and conformity as required. The third major challenge is that of copying with increased sophistication in all aspects of management, but particularly in the areas of planning and control.

General overall environment in an enterprise is the base meter of how effective the management team is. In other words, managerial productivity has direct relationship with the optimum utilisation of the all-pervading human resources of an enterprise. The greater the satisfaction and motivation the higher the rate of

productivity. Some of the bases warranting manager's earnest attention in this direction are:

(a) *Environment*

A manager's role is not just getting things done through people but designing an environment for effective and efficient individual contribution. He is an "environment creator".

(b) *Objectives*

A manager's objective in any kind of enterprise should be to optimise output—in terms of group goal realisation—with given inputs.

(c) *Action*

A manager will establish a network of goals within the framework of the corporate policy of the enterprises. He will work out in a "link-pin fashion" each interlinking level of the organisation structure. Managers must search people who are able to perform their individual roles and attain goals. Managers should lead more by positive motivation, teaching on the job and by example, and then evaluate objectively their results and reward merit by promotion and other means.

Factors Promoting Managerial Productivity

There are various factors by which managerial productivity could be measured and accelerated. Some of the important ones are as follows:

1. *Discipline of the Organisation*

The overall discipline of the company is a sure appraisal of the management. There seems to be accumulating evidence that capable executives need not compromise courtesy in dealing with people and still be able to maintain high discipline and morale. Sloppiness, callousness and inefficiency are more often the product of indifference than of consideration. These thoughts seem to lead to one significant conclusion, that it is possible to be decent and courteous to people who are under one's daily supervision and still maintain a high degree of discipline and morale.

2. *Personal Contacts*

One of the most significant single measure of a manager's competency is his ability to get greater productivity from an organsation by making individuals able and willing to produce through creating better rapport between the management and the managed. The maintenance of personal contacts also helps in increasing the feeling of team-spirit in the organisation contributing to the achievement of the goals of the organisation.

3. *Pride in the Job*

There was a time when pride in his skill was everything to the workman; when pride in one's work was a greater satisfaction than amount of income. Conversely, looking at the present workman it seems to be a lost cause. Yet it is not a completely lost cause. It still exists and still can be brought about by creating the right sort of atmosphere in an organisation, the responsibility for which obviously rests with the managerial team. The potentialities of the Indian market are tremendous. What we have to do is to develop an organisation's capacity and spirit to go out and get our fair share of it. Inherent in our success is pride in the enterprise with which we are identified and pride in the quality of the product or service we have to offer. Pride will reflect itself in the use of skills and in the extending of certain courtesies to people which create the kind of situation in which customers like to do business.

4. *Motivating Human Action*

Management spends huge sums of money te obtain the services of personnel with expertise

and invests heavily in research and development to build up. This is true because no company now can survive, unless it keeps pace with rapid technological advances. An era is fast approaching where an understanding of the behavioural sciences is equally essential. One does not actually compete with companies, products and services but the competition in reality today is between the managers of organisations and their skills in motivating human actions.

5. *Seeking out the Best that is in People*

Organisations are made up of different kinds of people; their backgrounds vary; their convictions may be as wide apart as the poles; their ambitions and motivations are individualistic, their drives, ideas and thinking process follow separate patterns. The manager has to accept these differences and use them to guide the group towards the attainment of common goals. He cannot crush them and mould them in a uniform pattern but he can temper them, influence them and convert the organisation into a dynamic, hard hitting unit that attains its objectives. So it is very essential for an executive in an organisation to extract what is good in an employee and try to magnify that goodness in him to enable him to be more useful to the organisation, rather than overshadow his goodness and magnify his shortcomings which may harm him and the organisation as well.

Taking the Right Decision

One of the major tasks of the Managers in the context of complexities of today is to take a decision on which depends the success of an enterprise.

In making a sound and good decision, the following phases are involved:

(i) Defining and analysing the problem.

(ii) Finding relevant facts.

(iii) Developing alternatives.

(iv) Selecting the best solution.

(v) Converting the decision into effective action.

(i) *Defining and Analysing the Problem*

The decision-maker must separate the relevant from the irrelevant, the material from the immaterial, the important from the unimportant. Once the real problem has been identified, the decision-maker enhances the chances of a proper solution. The old saying 'a problem defined is a problem half solved' is more than true.

(ii) *Finding Relevant Facts*

For a sound decision, it is a must to have a system of reporting in a fashion that the data are available as and when needed in the form required. A decision should always be based on facts instead of guess and intuition.

(iii) *Developing Alternatives*

To solve a problem, we should keep an open mind to all possible and logical solutions and not just pose what we wish to consider or those which should tend to show up our own preconceived or pet solutions. One should find new ideas and new alternatives.

(iv) *Selecting the Best Solution*

The decision maker just makes value judgements about things which cannot be easily quantified, as well as those about which he is unsure. A Manager must go into and compare the merits and de-merits of each of them. Some criteria useful for taking a decision of the best solution are to evaluate the degree of risk, economy of effort, availability of resources and time required for implementation. While considering these aspects, it is also essential to see the impact of the decision on an individual, on a group and on the organisation as a whole.

(v) *Converting a Decision into Effective Action*

The solution should not be only a paper decision. Certain follow-up-action is necessary to make it effective. Vital decisions are often made by Managers but they are given effect to by subordinates. So the decision has to be communicated to them in clear and unambiguous terms. To enable a subordinate to put forth greater effort in implementing the decision, he may be called upon to participate in the work of developing alternatives. A decision has ultimately to become the decision of the people who have to convert it into action.

One of the most important factors in making a decision is the right judgement. In other words, timing in making business decisions is of paramount significance. It is not only to act that is of importance but when to do it—an old saying 'a stitch in time saves nine' is of vital importance in business decisions.

Justice

In an enterprise to maintain high morale, efficiency, loyalty, discipline and harmony, it is not only necessary to do justice but see that justice is done quickly. Grievances must be redressed justifiably at the appropriate time. Once a climate is created in an enterprise that the Management is objective, sympathetic and justiciable, the solution of problems are amicably found.

The central ideas behind management audit, which was developed by the American Institute of Management, are as follows:

(a) It should be comparative and historical.

(b) Weakness in any single direction or division reflects failure of the management as a whole.

Evolution of Management

The appraisal of the management is to be directed to look into the following aspects:

1. *Economic Function*

Management develops distinctive characteristics over the years and these characteristics derive from the purposes which the management attempts to accomplish and from its choice of methods as revealed by its habitual way of operating. The traditions, i.e. the habitual way of operating are important as they express the moral quality of the whole organisation, which in turn depends upon the relative importance of a company's purpose and service of the economy.

Briefly speaking, evaluation of the management in this context means determination of the public value of the company. This value is based on what the company has chosen to do, what products or services it produces, and how it does these things in the moral and ethical sense. This value is to be examined from the points of view of consumers, customers, shareholders, employees, suppliers, bankers, and the community in which the company operates.

2. *Corporate Structure*

There should be an audit to appraise the effectiveness of the structure through which management seeks to fulfil its aims. Each company develops its structure according to its own needs and no set rules, therefore, can be applied either for operation or for analysis. The essential test of an organisation is how well it meets the company's needs.

3. *Health of Earnings*

The growth of earnings, not the amount are the determining factors of health of earnings; but it is the ability of management to maintain

consistency of earnings and gainful utilisation of capital despite competition. The health of earnings will itself indicate the quality of management since healthy earnings cannot result from unhealthy management.

4. *Service to Shareholders*

The directors and managers of every company are charged with the responsibility towards shareholders that—

(a) their investments are safeguarded from unnecessary risks;

(b) the principal is enhanced as much as possible through wise use of undistributed profits;

(c) they receive a reasonable return on their investment in the form of dividend;

(d) keep them informed from time to time of company's progress; and

(e) Protect the shareholders through preemptive rights.

How a company satisfies these requirements determines its fairness to shareholders.

5. *Research and Development*

No enterprise can remain healthy without provision for originating and investigating new ideas, processes and procedures. So evaluation of a company's research process is crucial to a management audit.

6. *Fiscal Policies*

Through proper exercise of fiscal policy the management can develop strength and maintain its level of productivity to certain standards in times of stress and business depressions. Therefore, a constant watch on the fiscal policy is to be kept, failing which it is likely that managers may not be able to maintain the same standard of performance.

For this, three areas are to be covered:

(a) Analysis of a company's capital stru :ture.

(b) Analysis of its organisation for developing fiscal policy and controls; and

(c) Evaluation of the application of this policy and controls in different areas of company activity.

7. *Executive Evaluation*

Perhaps this is the most important function because all other functions are derived largely from the thinking and action of the managers and executive group, who must have integrity, ability, industry, foresight and alertness in grasping the changed conditions, ability to balance between flexibility and rigidity in adjusting the enerprise to change.

For that again there should be a constant plan for selecting and training of the executives so that they go on growing constantly. Without this the productivity of managers is likely to fall gradually and the company may ultimately be weeded out in this world of competition.

It is the belief of this writer that managerial productivity is ultimately disclosed in the performance of those who are managed. Effectiveness of a management team can be measured in terms of the impact it has upon the people in the entrprise leading towards goal congruity. Thus we need today, as we shall need tomorrow, managers who are conscious of their responsibility in the face of socio-economic changes in our country and are imbued with the spirit of service. On them will depend the survival of our industry and the success of our economic planning. □

Toward Measuring Managerial Effectiveness

Pramod Verma*

The question of managerial effectiveness has assumed considerable importance in the context of planned economic development in India. Growth of professional management has gathered significant momentum. Substantial portion of national resources has been invested in the development and training of managers through various institutes of managements, university departments and other institutions. Consequently there is a rising expectation about return on this investment. The need for measuring managerial productivity cannot be over-emphasised. However, it is to be recognised that there is no direct measure on managerial effectiveness. The objective of this paper is to raise for consideration some of the issues in connection with measurement of managerial effectiveness.

It is no exaggeration to say that the growth of professional management in India has picked up a certain momentum. The Institutes of Management at Ahmedabad and Calcutta have been producing graduates for some years now. Two more such national Institutes are in the offing. In addition to these, there are other institutions and University departments which are engaged in training managers. Besides, leading organisations in both private and public sectors are devoting increasingly more attention to training of executives. Although this effort is meagre compared to the international standards, yet a substantial proportion of national resources has been diverted to this activity. Consequently, there is a rising expectation about return on this investment.

The second aspect of the problem has to do with the efficiency of management in various sectors of the economy. Increasing output in agriculture, industry and services would require effective administrative infrastructure. Thus managerial skills and expertise have assumed importance in order to plan and execute economic activities in almost every sector. As is well known, in a planned economy there is much less uncertainty and *ipso facto* much less room for "entrepreneurial" activity than in a free enterprise system. Thus, it is management rather than entrepreneurship which would pave the way for increasing output and an equitable distribution of income in this country. This is yet another reason why we should begin to consider various aspects of managerial effectiveness.

*Professor, Indian Institute of Management, Ahmedabad.

Management as an Economic Resource

Some economists have emphasised the importance of human factor in the growth of output. It is known, for example, that a substantial part of economic growth in Western

countries cannot be explained exclusively by increases in the quantity of capital and/or the employment of labour. Technological change and organisational improvements have played a significant role in economic growth. The intensity with which managerial resource is utilised in an organisation would certainly differ in accordance with the problems it faces. Harbison and Myers have put forth the following propositions which merit attention in this context:

"1. Enterprises differ both in the size and the complexity of their activities and the more complex the organization the greater the intensity of use of managerial resources.
2. The larger the market and the more complicated the market structures and mechanisms the greater is the intensity of use of managerial resources.
3. Industries requiring large capital investments appear to require a correspondingly heavy investment in high talent managerial resources.
4. Innovations of all kinds require very heavy investment and high level managerial resources."[1]

These four propositions are as much relevant to a less-developed economy as they are to the more developed ones. It is known that with increase in size management becomes a bottleneck in the growth of a firm. Consequently, managerial resources have traditionally been considered as a limiting factor to the growth process. In India, a public sector enterprise is an example of a large and complex organisation and it is in such public enterprises that one needs to examine the effectiveness of management. Another problem which needs careful analysis is the distribution system. In the agricultural sector, for example, an efficient management of distribution will ensure the stability of prices of essential commodities. Given the market structures and mechanisms for these commodities, one would need to look at the use of managerial resources and see whether an efficient distribution system could be developed. Capital investment is yet another important aspect of the problem. It is known that huge capital investment has taken place in certain sectors of the economy and it is in these sectors that one wishes to study the effectiveness of managerial resources.

Finally, the role of research and development is fairly well-recognised in this country, although the investment on R & D is not as high as it is found in Western countries. The need to evolve an appropriate technology and to engage in import substitution cannot be overemphasised. It is essential that a cost-benefit analysis of R & D expenditure is undertaken in this context.

The problems relating to public sector, agricultural development and research organisations are only illustrative of the need for introducing modern management practices. It should be clear from this discussion that management as an economic resource needs to be looked at closely in various sectors.

Profits and Productivity

Economists have generally assumed that a major objective of the firm is to maximise profits. Under perfectly competitive situation, maximisation of profits assumes an efficient allocation of resources and optimisation of

1. Frederick Harbison and Charles A Myers, *Management in the Industrial World*, New York: McGraw Hill, 1950, Ch.2.

output. If a firm is not producing efficiently it will be forced to quit the industry. However, under the circumstances of imperfect competition the firm may continue to underutilise the productive capacity and yet may make profits. Economists have for long recognised this possibility and labelled such unutilisation as "wastes of competition. It is to be remembered that profit is the function of price and consequently dependent upon the market structure. Profit generation by itself, therefore, seems to be an inadequate measure of productive efficiency and consequently of managerial effectiveness.

In the present discussion, we are concerned with the productive efficiency in an enterprise and not with the value of output. To that extent, we should relate output with input. The ratio of output to input measures the total productivity of the factors of production. An increasing trend in this ratio would, therefore, indicate the efficiency with which the management allocates input resources with a view to maximise output.

Higher productivity would indicate lower cost, assuming that factorprices remain constant. Assuming this, one could discuss either the factor productivities or the behaviour of costs over a period of time. Holland has suggested an interesting approach to the problem.[2] He divides the productive employees into salaried staff and operatives on the one hand and the total production costs into direct and indirect costs on the other. While the direct production costs are incurred in the employment of operatives, the indirect costs are incurred in the employment of salaried staff. A general hypothesis proposed by Holland is that there will

Managerial skills and expertise have assumed great importance in planning and execution of economic activities in almost every sector.

be an inverse relationship between the changes in the ratio of indirect production costs in total production costs and changes in the unit total production costs. Over a period of time, there will be several possible combinations of direct and indirect costs available to a firm and yet there will be one combination which will yield a greater reduction in total costs. Holland maintains that a justification for increasing the ratio of indirect production costs to total production costs would be in terms of its contribution to reducing the unit production costs at least in the long run. Holland, therefore, implies that if the costs incurred on salaried staff do not eventually lead to a reduction in the unit production costs, such an expenditure cannot be justified in economic terms.

As has been pointed out earlier, the cost per unit of output reflects the productivity of the factors of production. Therefore, the ratio of indirect production costs to total production costs is dependent upon the proportion of salaried staff. One should, however, recognise the possibility of changes in technology as well as in the capital-labour ratio. Output could increase from these two sources in addition to the changing proportion of salaried staff among total employees. In other words, increasing productivity of factors of production would be

2. DG Holland, "Costs Productivities, and the Employment of Salaried Staff," *Bulletin of the Institute of Economics and Statistics*, Oxford, August, 1963

affected by (i) an increasing proportion of salaried staff to total employment, (ii) technological change, and (iii) increasing capital-labour ratio. The effect of increasing management resource on productivity, therefore, cannot be measured in isolation. Nevertheless, it can be said that given a certain technology and capital-labour ratio, the choice of a specific proportion of salaried staff to total employment is justified only if it contributes to increasing productivity.

System of Organisation

While increasing factor productivity indicates to some extent the effectiveness of management, the time period over which such a growth in productivity is achieved should also be considered. Besides, the style of management is a crucial element in the growth of productivity in the long run. Rensis Likert, a leading organisation theorist, has devoted considerable attention to this question.[3] In his view, a "high producing" manager is very often responsible for low productivity in the long run. Such a manager employs an authoritarian system of management. On the contrary, a manager in a more participative system of organisation is able to ensure high productivity in the short as well as in the long run. Likert has suggested a four-fold classification of management systems representing a continuum: Exploitative-authoritarian (System 1), Benevolent-authoritative (System 2), Consultative (System 3), Participative-group (System 4). The overall effectiveness of management can be studied by comparing the results of Systems 1 and 4.

The manager in System 1 adopts the technique of high pressure through tight work standards, personnel limitations and tight budgets. The compliance to this system is achieved on the basis of fear. Likert's suggestion is that this style of management is essentially dysfunctional. It leads to unfavourable attitudes, poor communication, low levels of influence, low levels of cooperative motivation, no peer performance goals and restriction of output. As a consequence, high absence and turnover rates emerge over a period of time leading to lower productivity in the long run. In Likert's analysis, the short-term increase in productivity is achieved at the cost of declining human efficiency in the long run. Likert argues that this short-term increase in productivity is spurious because the human cost of this increase is not included in the appraisal of a manager.

Likert favours a transition to system 4 which is characterised by the principle of supportive relationships and by group decision-making in multiple overlapping group structures. These organisational characteristics give rise to favourable attitude towards superior, high confidence and trust, high reciprocal influence, excellent communication, high peer group loyalty and high peer performance goals at all levels regarding productivity and quality of output. As a consequence of these attitudinal factors, low absence and turnover rates are found among the employees. High productivity is ensured in this system in the short run as well as in the long run.

It is clear from this analysis that an increasing proportion of salaried staff is a necessary but not a sufficient condition for increasing factor productivity. Another factor which seems important is the human element implied in the style of management. The effectiveness of management should therefore be measured in terms of, among other things, the minimisation of human cost in increasing productivity.

3. Rensis Likert, *The Human Organisation: Its Management and Value*, New York: McGraw Hill, 1967.

Statistical Problems

The following hypotheses are suggested by the preceding discussion: (1) Profits by themselves should not be considered as appropriate measures of managerial effectiveness in a situation of imperfect competition. (2) The increasing employment of managerial staff can only be justified if the unit production cost is reduced and factor productivity is increased. (3) While raising productivity of human resources, the long run cost of the method by which such productivity is increased should also be taken into account.

There are considerable operational difficulties in validating these hypotheses. Both economic and attitudinal data at the firm level would be required to measure the relevant variables. Such data are unfortunately not available from the published sources. Consequently, statistical analysis based on macro-economic data would have limited usefulness in the measurement of managerial effectiveness. Nevertheless, some macro-economic statistics are presented here with a view to illustrate the issues raised in this discussion.[4]

The data on salaried staff and productivity of labour are drawn from the census of Indian Manufactures and Annual Survey of Industries. These industrial surveys cover the organised business sector. The concept of "salaried staff" covers the administrative, technical and clerical staff. It is thus a rough approximation of "managerial manpower" in industry. On the contrary, productivity refers to net value added per *production* worker. The data on man-days

4. G.E. Dalehanty, *Nonproduction Workers in U.S. Manufacturing*, Amsterdam: North-Holland, 1968 Pramod Verma, "Growth and Compensation of Salaried Employees in Manufacturing Industries 1950-1964," PACT February 1972.

TABLE 1

Salaried Staff, Productivity of Labour and Strikes, 1950-1964

Year	*Proportion of salaried staff to total employees*		*Value added per production worker*		*Value added per worker deflated by wholesale price Index*		*Man-days lost through disputes*	
	Index (1)	*% change* (2)	*Index* (3)	*% change* (4)	*Index* (5)	*% change* (6)	*Index* (7)	*% change* (8)
1950	100		100		100		94	
1951	94	—6.0	121	21.0	129	29.0	100	6.8
1952	93	—1.1	109	10.5	117	—9.0	98	—2.0
1953	97	4.3	118	7.9	120	2.7	104	6.2
1954	106	9.0	126	6.7	149	2.6	110	5.8
1955	109	2.8	137	8.7	158	6.4	159	44.5
1956	110	.9	145	5.8	147	—7.4	176	10.7
1957	115	4.5	150	3.5	148	.7	162	8.0
1958	121	5.1	159	6.0	151	2.2	196	21.0
1959	126	4.1	156	—1.8	142	—5.4	142	27.6
1960	111	—11.9	173	11.0	148	3.7	164	15.4
1961	102	—8.1	183	5.5	156	5.7	124	—24.3
1962	116	13.7	200	9.2	167	6.5	154	24.2
1963	122	5.2	221	14.0	174	4.3	82	—14.8
1964	147	20.4	239	8.0	167	—4.2	194	136.6

SOURCES : Cols. 1,3,5: Annual Survey of Industries, col. 7 : *Indian Labour Statistics*

It is not beyond the tools and techniques of modern management to identify the problem areas and to offer appropriate methods of resolving them.

lost are derived from Indian Labour Statistics. Although these data relate to the 'economy as a whole, they roughly indicate the course of strike activity over the period.

Comparing columns 3 and 5 in the table it is found that the increase in productivity in real terms has been much less than indicated by the increase in value terms. While the value productivity increased by 139% over the period 1950 to 1964, the real productivity increased only by 67%. In other words, part of the increase in value productivity was due to the inflationary trend in the economy.

A comparison of column 1 and column 3 would suggest that while the proportion of salaried staff to total employees increased by 47%, the value productivity increased by 139%. The implication of this would be that the increase in salaried staff has led to a more than proportionate increase in productivity. However, such a conclusion would be erroneous. If one relates column 1 with column 5, it can be seen that real productivity increased only by 67%. Thus the true indicator of contribution of the salaried staff should be seen in terms of real productivity rather than in terms of value productivity.

The data also reveals an increasing human cost of growth in productivity. A comparison of column 5 and column 7 would indicate that there has been a two-fold increase in man-days lost through disputes, whereas productivity has increased only by 67%. It is clear that there is a substantial human cost to increasing productivity over this period.

Conclusions

The need for measuring managerial productivity cannot be over-emphasised. But it should be clearly recognised that there is no direct measure of managerial effectiveness. Since the function of management is to allocate resources with a view to optimising output, it is the growth in factor productivity which would indicate the success of management. At the firm level, the management should evaluate its success in terms of (a) the contribution of each factor of production to total output and (b) the kinds of human problems which arise in the course of implementing production plans. Having obtained objective data on these two critical variables it should not be difficult for the organisation to identify the problem areas.

Even though each firm has its own unique situation depending upon the conditions in product and factor markets, technology, size and locating, it is not beyond the tools and techniques of modern management to identify the problem areas and to offer appropriate methods of resolving them. But I am assuming that the managements are willing to undertake a review of their performance. Let us hope that the managerial groups in the country are alive to the needs of the society and are consequently willing to change. □

Managerial Productivity: Some Pre-conditions

PD Malgavkar*

In this article, the author has listed the difficulties in measuring the productivity of managers. He is of the view that it is easier to measure the overall productivity of top management. Some of the barriers to managerial productivity have been referred to and conditions for improving it have been suggested. Given the opportunity, the management will take up the challenge by pushing the industrial growth rate well beyond 10% without placing excessive demands on capital. It is well known that effective management can increase production by as much as 50% without any change whatever in the other factors of production.

MANAGERIAL productivity depends upon the skill, knowledge, and aptitude of the manager, the conditions within the organisation and the external environment prevalent in the country. The measurement of management productivity is, however, fraught with difficulties especially if one attempts to relate productivity to specific causes or activities. The level of management we have in view for measuring the productivity has also to be decided. To the managers below the top level, internal conditions (conditions within the organisation) will be more predominant in affecting their productivity whilst to the top management, the impact of external environments as also their ability to modify the internal conditions to meet the external challenges will determine their productivity. Even if the management has the overall responsibility for running an undertaking, it is difficult to measure the productivity of a specific manager, as the possibility of creating similar work situation without a manager to make a comprehensive study of the impact of the manager on productivity cannot be visualised.

It can be argued that the productivity of the managers below the top level is essentially the performance of the managers, and if the management organisation is so devised as to give opportunity to the manager to be in-charge of specific activity or performance which can be measured, it is possible to gauge his productivity in comparison with other departments as also in comparison with specific periods. The productivity of successive periods compared to the base period will decide how far the manager has improved the performance or otherwise.

Even in such a contingency, we are assuming that the production is effected in static conditions. However, the dynamics of industry postulate that if the enterprise is to grow and not stagnate or languish, the management must constantly upgrade not only the skills and techniques but also the technology and be innovative in its production, marketing and so on. It is difficult

* Principal Director, Small Industry Extension Training Institute, Hyderabad.

to measure the loss of productivity because of the manager not taking on to new technology and innovation.

When it comes to higher management, the predominance of external environments on the productivity of the management can be observed. The external environment may comprise economic, fiscal, credit and monetary policies, the national goals such as social justice, dispersal of industries, removal of regional imbalances, external aid, export incentives, import policies of outside countries, trade union movement and rivalries, political climate and philosophy, etc. To the extent the top management is in tune and harmony with the external environment, will it be in a position to develop situations conducive to propulsive growth within the industry, which again will have an impact upon the managers working under top management by giving them sufficient impulse, encouragement and support for improving their productivity. If, however, the top management feels it is at cross purposes with the external environment, or if it feels that the external environment is not conducive to its contribution, or if it feels itself helpless, frustrated and unwanted in the external environment, it would be difficult for it to gear its organisation to meet the challenges of production and productivity.

All the same, as the top management is finally responsible for the contribution from the different factors of production the overall impact of top management on the Indian economy may be measured by the industrial growth rate of the nation. The overall industrial growth rate in India is not very encouraging. Even forgetting years 1966 and 1967, when the overall index number of industrial production went down, the increase in the general index of production was 6.4% in 1968, 7.1% in 1969, and 4.5% in 1970. The 1971 index seems to have increased not more than 4% whilst lately we hear some pronouncements that the industrial production during the last six months has gone up at a rate of more than 6%. The overall growth rate between 1965 and 1970 was 3.5%. The picture somewhat improves when we take into consideration the 290 large public limited Companies, their value of production having gone up by 12.6% in the year 1966-67, 9.3% in 1967-68, 9.1% in 1968-69, 11.4% in 1969-70, and 14.5% in the year 1970-71.*

As the growth rate of the industry depends upon the capital, of which we are short, labour, whose overall skills need considerable upgrading and who is yet to commit itself to productivity and management and who can mould the other factors of production to suit the overall growth, it would be in the interest of the country to concentrate attention on management, as a small number of effective managers can have a striking impact on the overall economy. Management can alter the combination of inputs; it can create conditions which may make the workers hostile or involved in production; it may utilise highly capital-intensive or labour-intensive technology; or it may select location highly favourable to the profitability of the undertaking or which will ensure that the industry is doomed to failure.

A Delicate Plant

Managerial productivity is like a delicate plant, that has to be nurtured and developed both by conditions within the company and external environment. It should be constantly engaged in reducing costs, improving quality, increasing production, and modernising plant and machinery. It should endeavour to overcome the disadvantages of lack of capital resources and

*Reserve Bank of India Bulletin, February 1972.

sophisticated equipment and take full advantage of the ample manpower within the country. All this can be achieved firstly by an overall external environment; secondly, through company organisation and thirdly, through each manager being given the technical skill, the overall knowledge and attitude conducive to productivity.

Managerial productivity is like a delicate plant, it has to be nurtured and developed both by conditions within the company and the external environment.

Negative Factors

We now know a great deal about the negative factors that hamper productivity. Some of them are discussed here.

The manager is ultimately paid to think and to contribute by his intellect to the working of an organisation. This faculty in the manager can be developed only by giving him an opportunity to express his thinking on the problem for general consideration. A frustrating policy in many of the enterprises is that the thinking, if at all, is channelised into a set pattern, if not stifled, under rules and procedures, thus leading to the thinking apparatus of the manager engaged in the organisation gradually becoming rusty and obsolescent. In order to improve managerial productivity the top management should encourage rather than be afraid of new ideas. It is only when a person has been given an opportunity to think and to put across his ideas freely will he be able to make significant contribution.

Sometimes the top management behaves as authoritarian just to cover its ignorance. It insists that its dictates be obeyed implicity and blindly, thus stifling the contribution of any new idea, thinking or concepts. One can well imagine the impact of such behaviour on the managerial productivity.

There are others who believe in safety at all costs, while the essence of managerial productivity is to take calculated risk. The safety may be resorted to in construction design, marketing, research and development, production, or the utilisation of the resources. Such uncompromising resort to safety only leads to mediocrity in management.

Besides the individual ability, skills and aptitude of the manager and the internal conditions in the organisation, the overall environment in the country has considerable influence on the managerial productivity. The scarcity situation in the country which ensures safe and sure profits to an undertaking and demands only negative management skills, such as continuation of *status quo* and palm-greasing does not improve his productivity. If productivity has to be improved, it is necessary that goods are available in plenty. This will put the manager on his toes to improve quality and sales and reduce costs. Otherwise, no amount of exhortation will lead to improvement of managerial productivity. The policy of restricting industries in certain regions, areas or products has the same effect on managerial productivity because the manager need not think of those particular areas and products at all. Instead, if the policy-makers want to achieve

Besides the individual ability, skills and aptitude of the manager and the internal conditions in the organisation, the overall environment in the country has considerable influence on the managerial productivity.

these aims, they can make it more costly for a person to set up manufacturing capacity in an area or in a product and then leave it to the ingenuity of the manager to overcome the disadvantates of the initial (not continuing) extra costs.

As already stated, managerial productivity has to be fostered by giving opportunities to the managers to contribute by their thinking and ideas. If the top managers themselves feel that their ideas and initiatives are not appreciated by the policy-makers, if they feel themselves suspected or distrusted, they will naturally react in a similar manner against their subordinates.

Conditions for Improving Productivity

The manager, to be effective, must develop understanding and aptitude so that the programmes and policies he has developed through his mastery over techniques and comprehension about the overall system, are translated into well-knit programmes by the men who ultimately impelment his thinking into programmes, activities, products, and services. Unless he has the ability to coordinate the activities of others and to motivate others to give him willing support in the plans and programmes he has envisaged, no matter how efficient he is in his technical and analytical skill, he may not be successful in making himself effective, or, in other words, his managerial productivity will be low.

In order to increase his productivity, the manager should not spend his time and energy in doing work which can be entrusted to his subordinates. He should, therefore, constantly review as to what part of his work should be relegated to the subordinates. He should assign such of the additional responsibilities to the persons below him as they prove capable of carrying out.

The manager, however, is only a part in an organisation and if he is to contribute to the productivity of the organisation, the organisation has to be geared to corporate planning and management by objectives as only then will everyone in the organisation be conscious of the overall objectives, his personal targets and achievements or failures.

The top management has to modify its organisation policies and programmes to meet effectively both the external environments and internal conditions. Even if it has the will and expertise to do this, it can do it only if it has prompt access to reliable data and information on both external environments and internal conditions. Unfortunately both at the national level and at the undertaking level, sufficient significance has not been attached to timely dissemination of information so that corrective measures could be taken before it becomes too late, and speedy advantage is taken of the opportunities. The top management will have to ensure that its organisation is geared to have at least internal information speedily and promptly, and it should be prepared to impress upon the

outside agencies and if necessary, to contribute its mite to ensure that the external information becomes available promptly and is relevant. The decision to use a computer or not, should be judged from its impact on the timely information need which can help the industrial growth rather than its so-called immediate impact on employment.

The manager, to be effective, must develop understanding and aptitude so that the programmes and policies he has developed through his mastery over techniques and comprehension about the overall system, are translated into well-knit programmes by the men who ultimately implement his thinking into programmes, activities, products and services.

Impact of Technology

One of the basic elements of productivity is technology. During the years 1955 to 1966, technological processes accounted for 4.1% per year of economic growth in Japan, or almost half of the increase in the growth rate of Japan (9.4%) was accounted for by the impact of technology on industry. The top management, therefore, must not only be aware of the role of technology, but be always on the look out for better technology to improve the productivity of the organisation and the growth rate. One of the ways of ensuring this is a whole-hearted commitment to research and development and an open mind for testing and acceptance of new ideas and technologies.

Free Communication Channels

The industrial composition is rapidly changing towards industries which demand not only more skill, but more knowledge. It envisages not only expertise in doing a particular thing, but also an analytical questioning and informative attitude and willingness to absorb newideas and to translate them into work situations. The organisation to utilise knowledge is different from the organisation created for utilising labour or skill. The flow of knowledge is a flow of ideas which can only be ensured in an atmosphere free from suspicion, fear, frustration, animosity, or bitterness. To create such an atmosphere, the organisation must ensure freer communication channels and must be consultative in making decisions and implementing them.

With the rapidly changing composition of the industrial sector, in the next few years, electronic industry, petro-chemical complexes, chemicals and pharmaceuticals will be dominating the overall production in the industrial sector. This requires an innovative bent of mind and a management which accepts that the innovation to be commercially effective must be produced in an industrial set-up which will ensure production in plenty of quality products at constantly lesser costs. Unless the innovation develops a mass market for itself, it remains only as a gimmick for the affluent.

Dynamic Organisation

New concepts in organisation and running of industries are now being tried with success in different parts of the world. The flexible working hours concept, which was started in Germany has now gained acceptance in other parts of Europe and America. The behavioural scientists' orga-

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nisational approach, especially for knowledge industries, has remarkable impact on productivity, labour turnover, absenteeism and employee enthusiasm. One of the striking examples is the Advanced Devices Centre in Canada—a semiconductors manufacturing unit—wherein there is no time clock, no executive suites, no lunch buzzers and which achieved return on investment target of 1971 three years ahead of schedule. The Japanese industries believe that the most important task of the top management is manager selection, manager development and manager placement. In Mitsui of Japan, the Chief has one job only.

One of the things required of top management is its decision to abandon, for want of prospects or opportunities, its products, markets, personnel, equipment, techniques, etc. The fear of the unknown and the willingness to discard the superfluous, however, make them adhere to old systems.

The top management has the task of harmonising the organisation with the boundary conditions of the enterprise, mainly government, politicians, consumers, employees, trade unions, financial institutions, share-holders, raw materials, consumers, etc.

Ability to Anticipate

The top management should not only be aware of any change in the external environment but also anticipate likely environmental changes and pressures and develop strategies to optimise organisational effectiveness in the changing environment. Reference was earlier made to the overall low growth rate in the country, which has led us to conclude that the managerial productivity in the country as a whole is low. We are at the same time aware that the management training and the management development programmes are gaining ground in the country. It is difficult to reconcile the continuing fall in the growth rate of the industrial production with the increasing commitment to managerial training and development. We are led to believe that the managerial training and development is more concerned with the internal conditions whilst the external environment is having a growing influence on the overall industrial growth rate about which the management development and training seems to be silent. This writer is of the view that management training should take cognizance of the external environments especially as the industrial policy, programmes, finance, location, size, type of management, market, labour, etc., are being decided by external influences, and harmonise the management goals to fit in the external environment. It is equally important for the agencies which are responsible for the external environment to realise the predominant role expected of industries for the overall development of the country in creating increasing employment opportunities and in dispersal of industrial growth and the contribution that the top management can make to it if it is given the opportunity. If the top manager is to feel himself on solid grounds, he requires to be taken into confidence and given a feeling of importance. □

Managerial Productivity and Management by Objectives : An Approach to Measurement

SK Chakraborty*

In this article, the author attempts to suggest how to meaningfully measure managerial productivity. According to him, if managerial productivity is taken care of, capital and labour productivity will, by and large, fall in line. An MBO approach would be essential for assessing the value. While obviously quantifiable objectives can be readily figured out and weighted through mutual consensus, the MBO style should help this to be achieved for qualitative objectives and for staff activities as well.

IT is desirable that India today should be concerned with managerial productivity. And inasmuch as managerial manpower is still a scarce resource here, such emphasis might even take precedence over our efforts towards improving labour productivity. In western countries like the United Kingdom or West Germany, where labour has been a relatively scarce factor, preoccupation with labour productivity seems to be logical. To pursue exclusively this logic in our country would be insupportable because of two reasons. Firstly, the most direct and productive way of stepping up labour productivity is through use of more capital per unit of labour. Capital, however, is itself a scarce resource in our economy. It will appear to be more so as soon as we think of deploying additional capital for boosting the productivity of the huge labour force in the manufacturing sector running into an estimated 10 million by 1982[1]. Secondly, and this is normally a neglected dimension, deployment of more capital-intensive techniques makes much greater demands on managerial competence than on labour effort to get the best out of the enlarged scale of investment. That being so, increased labour productivity under such conditions will in itself turn around higher mana-

*Indian Institute of Management, Calcutta.

1. See *Monthly Commentary*, Annual Number, 1971, pp. 88 and 93. This author has made a crude attempt to project total capital (fixed and working) needs in the Indian manufacturing sector in 1982 by using the *Annual Survey of Industrial Statistics* (vol. 1) for years 1961 and 1965. Capital employed per employee rose from Rs. 7,660 in 1961 to Rs. 16,110 in 1965 i.e. by a little more than 200 per cent. Correspondingly, value added per employee rose during the same period by only 33% i.e. from Rs. 3187 to Rs. 4250. This means an annual average increase of 6.6% only. However, value added per rupee of capital employed dwindled from 41.5% to 26.4% only during the 5-year period. Assuming that value added per employee continues to increase at the rate of 6.6% per annum for the next eleven years, it would mean a value added figure of Rs. 7,862 per employee by 1982. If number of employees in the manufacturing sector is 1 crore in 1982, then total value added should be Rs. 7,862 crores. Supposing value added to capital employed ratio in 1982 remains at the level of 26.4% as in 1965, then total capital employed necessary to generate a value added of Rs. 7,862 crores by 1982 runs into Rs. 29,780 crores, against Rs. 6,444 crores in 1965.

gerial productivity. Thus, we cannot ignore the fact that underutilisation of capacity due to bad planning of materials, lack of maintenance, etc. reflects poor managerial productivity, although we may be conventionally expressing the results in terms of labour productivity. It is a pertinent observation that exclusive reliance so far on various kinds of labour productivity indices has had the unfortunate effect of camouflaging the effectiveness or otherwise of managerial manpower. If managerial productivity is taken care of, capital and labour productivity should, by and large, fall in line. And this is fully consonant with the trend towards treating management as a resource. In the following discussion, an attempt is being made not to suggest ways of bettering managerial productivity, but *to suggest an answer to an even more basic question : how to meaningfully measure managerial productivity ? Remedial steps can only follow reliable measurement.*

Managerial Input and Output

Presently we shall be confining ourselves to managerial manpower as a single aggregate. Problems regarding individual managers, as well as groups and levels of managers, shall be dealt with later.

As with all productivity measures, for any suggested index of managerial productivity too we shall have to use some quantitative articulation of output and input. For the enterprise as a whole two conventional aggregative measures of input appear to be :

(a) Managerial manhours expended, and
(b) Expenditure on managerial manpower.

These are counterprarts of direct labour hours and direct labour cost. Both adopt the "expense" viewpoint in defining managerial input—in one case it is the expensing of time, in the other that of money. Between these two measures of input, the choice would naturally fall on money expenditure to support managerial manpower, because aggregation of managerial manhours will not reflect hierarchical and age differentials in the managerial manpower mix. Later, a more refined measure of managerial input will be suggested.

As to output, in the first instance, we seem to be in a position to do no better than falling back on several aggregate measures of enterprise output :

(a) Net sales proceeds,
(b) Profit before taxes, and
(c) Value added.

In the absence of any direct measure of managerial output, each of these surrogate measures has something to argue for it. Conceptually, however, the 'value added' measure is the soundest. This is derived by deducting from net sales proceeds the throughput elements of business operation, i.e. materials and services bought and consumed from outside. Enterprise expertise and competence lie in generating *additional value* into the inputs absorbed from outside with the aid of its human, capital and knowledge resources. It is from this pool of value added that costs of human resources, capital, land, etc., will be met. Any balance left thereafter is the profit for the enterprise. To increase profits, therefore, the management of an enterprise must increase the fund of value added, particularly in times of inflationary cost increases. Value added can be increased by raising selling prices, by altering product-mix, by improving technical efficiency in the usage of materials and outside services like power and fuel etc. A judicious combination of these alternatives should be adopted in given circumstances for an enterprise. At this stage,

therefore, the suggested index for managerial productivity is :

$$I_{MP} = \frac{\text{Value Added}}{\text{Accounting Cost of Existing Managerial Manpower}} \times 100 \ldots (1)$$

A basic and obvious limitation to the index I_{MP} in (1) is that it reflects managerial productivity as if it were a homogeneous input throughout the organisation. For example, it does not tell how well the sales and marketing function has done, or how poorly the production function has performed and so on. Such a blanket measure does not possess sharp enough edges to pry open the hidden linkages of good, indifferent and bad performances in various layers and channels of enterprise activity. Indeed, 'value added' represents the final outcome of all kinds and levels of managerial performances over a period. The distinctive contributions or otherwise of specific managerial groups or individual managers are lost in the *pot-pourri* of 'value added'.

It might now be asked how does the I_{MP} index improve upon the more well-known index for assessing overall managerial performance, namely:

$$\frac{\text{Operating Profits}}{\text{Operating Capital Employed}} \times 100 \ ?$$

With respect to the numerators of the two ratios, the advantage lies clearly with the 'value added' figure. Firstly, the derivation of operating profit figure, depends as this does on wide-ranging interpretations and applications of accounting principles and conventions, is far less precise than that of 'value added'. For example, variations in depreciation and finished stock valuation methods, dubious allocations between capital and revenue expenditures and the like do not affect the 'value added' figure. Secondly, operationally it is more useful to monitor the 'value added' pool over years, to set off against it the various prior charges and to watch the resultant behaviour of operating profit[2]. Such analysis would throw up more searching questions on operating profit performance than would the conventional split of the operating profit/operating capital employed ratio into a series of subsidiary ratios.

Use of operating capital employed in the denominator is significant in its own right. This quantity represents aggregate input from the viewpoint of the business entity as a whole. It comprises the net physical and money assets of the enterprise. However, a basic conceptual, and in the long-run a serious, flaw in the above computation is the lack of consideration of the human resource base of the enterprise. There is a growing body of research—theoretical and empirical—attempting to look at the possibilities of quantifying human resources, especially managerial, as an asset capable of figuring in the Balance Sheet[3]. This aspect will be elaborated later in this article. So long as we do not 'assetise' managerial manpower, the nearest and conventional approximation to its valuation is the accounting costs incurred from year to year to support managerial resources. This is the expense viewpoint we had referred to earlier. While being aware of the limitations of such an approach to measure managerial input, this still appears to be a more direct measure

2. See Chakraborty SK. : 'Ratio Analysis and Inter-Firm Comparisons : Some New Emphases', *Productivity*, July-September, 1972.

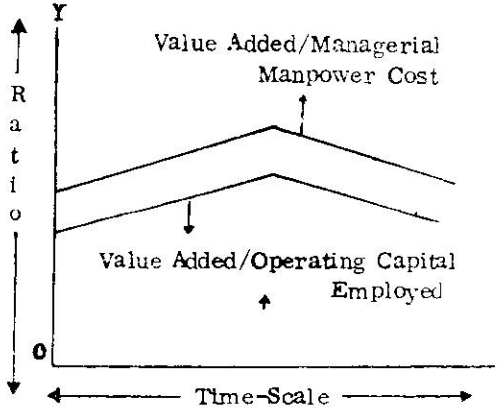
3. For example, E Flamholtz : 'Should Your Organisation Attempt to Value its Human Resources ?', *California Management Review*, Winter, 1971 ; JVC Butcher : 'Employee Evaluation,' *The Accountant*, 6th August, 1970; RL Brummet et. al. : 'Human Resource Management — A Challenge for Accountants', *The Accounting Review*, April, 1968; MH Gilbert : 'The Asset Value of Human Organisation', *Management Accountant* (U.S.A.), July 1970.

than operating capital employed. In the latter case we are directly assessing the productivity of aggregate net assets employed in business, and thence indirectly managerial productivity. But value added per rupee of managerial manpower cost is a direct measure of the effective contributions of enterprise management. *Indeed, I would suggest organisations to undertake a fruitful comparison of the trends in value added, operating capital employed and value added, managerial manpower cost ratios.* Comparative trends could be parallel—either in the upward or in the downward direction. This situation will expect a series of probes as to the various cause-effect relationships. Again, trends could have a tendency to cut across each other. This, in turn, will pose yet another series of relevant questions about managerial productivity *vis-a-vis* net assets productivity. Hypothetical trend behaviours of these two ratios are depicted below in the two diagrams.

Management by Objectives and Managerial Output

A major weakness of the I_{MP} index lies in its failure to shed light on the levels of performance productivity of various groups of management and managerial activity. In any organisation there will be *longitudinal* and *latitudinal* groups, besides individuals to reckon with. Longitudinal groups will comprise the whole chain of hierarchy in each functional area of management, e.g. in production from Production Director to General Foreman, in marketing from Marketing Director to Salesman. Latitudinal groups will comprise all managers from various functional areas who are placed at the same level in the hierarchy. An enterprise would be within its rights to know what has been the state of managerial productivity in each of its functional areas. Subsequent training and management development activities, and other steps would then be directed on a priority basis towards functional areas that are *objectively* and *measurably* poor in productivity. The same argument and analysis would apply to the question of managerial productivity at each management level. The matrix on page 387 for a hypothetical engineering firm brings out clearly the point made above :

The reader must have noticed the emphasis above on 'objectivity' and 'measurability'. Value added is, of course, a quantity that satisffies these two tests. Consequently, as a measure of



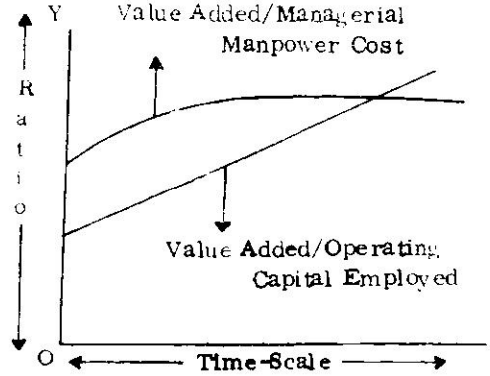


Table - 1

Composition of Managerial Personnel

Longitudinal / Latitudinal	Sales and Marketing	Production	Finance	Commercial	Personnel	Research and Development	Chief Executive	Total
Top Management	1	1	1	1	1	1	1	7
Senior-Middle	2	2	2	2	2	1		11
Junior-Middle	3	5	3	3	2	2		18
First-line	12	15	6	5	3	2		43
Total	18	23	12	11	8	6	1	79

output of the *entire* managerial team this is all right. But there is obviously no rational basis for allocating the value added pool to the various longitudinal and latitudinal groups suggested above. Hence, for deeper analysis of managerial productivity we have to seek such measures of output as will reflect the performance of specific groups or individuals we wish to assess. I shall attempt in this section to develop a workable system for such measurement on the basis of Management by Objectives approach.

Here is not the place to go into the various dimensions of MBO. This author has dealt with these at some length elsewhere[4]. Quite apart from some controversies centring around MBO, it is almost universally agreed that a system like MBO (there is nothing sacrosanct about this name so long as its basic philosophy and approach are identifiable) leads to more objective and fair evaluation of managerial performance[5]. MBO starts on the premise that explicit, quantified, verifiable and agreed objectives are the key to better performances for groups as well as individuals. The process of MBO implementation is such that managers are willing to accept the objectives set with, by and for them as standards for assessing their performance.

Appraisal under the MBO approach will consider actual year-end performance, although punctuated by quarterly or other intervening guidance reviews between the superior and subordinate, against quantified and verifiable objectives. Thus, for a Works Manager (senior-middle) the following key quantitative objectives may have been agreed upon with the Production Director for a year :

(1) Achieve 25% extra utilisation of plant capacity by 31st December, 1972.

4. Chakraborty, SK : 'Management by Objectives : Perspectives and Problems', *Productivity*, April—June, 1972.

5. For example see the British Institute of Management Information Summary 136, 1969, on *Performance Appraisals : What Managers Think.*

(2) Reduce materials scrap by 10% by 31st December, 1972.

(3) Reduce power consumption by 2% by 31st December, 1972.

(4) Arrange and get 4 foreman trained in a 2-week supervisory training programme by 31st December, 1972.

Similarly, for a Branch Sales Manager the following performance objectives may be set through consensus :

1. Increase total sales value by 15% by.. .....1972.
2. Reduce despatch time lag by 10% by.. .....1972.
3. Reduce the percentage of reminders from customers against orders placed by 10% by.....1972.
4. Get trained 5 field salesmen in XY Institute course No..., at a cost of...by .....1972.

At the end of 1972, questions asked about performance on these objectives will be of the 'how much' variety. It may also be perceived that relative weightages of these four objectives are not the same. Thus, failure to achieve the first objective of the Works Manager will surely have more far-reaching repercussions than, say, falling short of the fourth objective in the proximate future. Some system of weighting these objectives has, therefore, to be brought in. This will be done each year for each role through the same process of consensus as adopted in setting agreed objectives. These weightages should not only take care of the *consequential impact* of the objective, but the *relative difficulty* in achieving it as well. Let us suppose consideration of these aspects leads to assignment of weights 4, 2, 1 and 1 to the four key objectives respectively.

At this stage we have got to go back to Table 1 and suggest a practicable approach for specifying a quantitative base for assessing output from managerial personnel at each level. As a workable idea we start with the proposition that *salary remuneration earned at each level in the organisation structure is indicative of the extent of output expected of each person belonging to that level* : This appears to be a realistic hypothesis. The expected output level from each organisational level should, therefore, be proportional to the average salary level in that tier. Thus maximum expected output level from managers at each layer in the hierarchy can be expressed in *points* that will be proportional to average salary level for each layer. Let us suppose average gross salary per month for each manager (the range being, say, Rs. 7000 to Rs. 3000), is Rs. 5,000 in the top management group. Similarly, it is Rs. 3,000, Rs. 1,500 and Rs. 900 respectively for the senior, junior, middle level and first line managers in the imaginary firm mentioned earlier.

TABLE 2

Management Level	*Average Salary Per Month*	*Proportion*	*Expected Output Points Per Person*
	Rs.		
Top	5,000	49%	49
Senior-middle	3,000	29%	29
Junior-middle	1,500	14%	14
First-line	900	8%	8
		100	100

Thus, expected value of output for each member of the top management group will be 49 points, for a member of the next group 29 points and so on. So long as the relativity of salary structure remains materially unaltered, this system of points value of output can continue.

Picking up the case of the Works Manager from where we left it, we see output expectation from him is 29 points. Considering the weights attached to the four objectives he is working on, the points allocation among them are 14.5, 7.3, 3.6 and 3.6 respectively. At the end of 1972 it is revealed that the Works Manager has been able to achieve 60% of his first, 70% of his second, 90% of his third and 100% of his last objectives. This state of affairs is represented in the following Table.

TABLE 3

(1) *Objective*	(2) *Expected Output Points*	(3) *Actual Achievement of Objective*	(4) *Points Value of Output Achieved (2x3)*
1. 25% Extra Capacity Utilisation	14.5	60%	8.7
2. 10% Scrap reduction	7.3	70%	5.1
3. 2% Power-Cost Reduction	3.6	90%	3.2
4. Training for 4 Foremen	3.6 b	100%	3.6
	29.0		20.6

One obvious index that suggests itself immediately is :

$$I_{MP} = \frac{\text{Points Value of Output Achieved}}{\text{Expected Output Points}} \quad \ldots (2)$$

$$= \frac{20.6}{29.0} = 71\%.$$

However, I_{MP} in (2) above has an incestuous character. It is a ratio which uses output points both in the numerator and the denominator. But the denominator should be some measure of input. Going by equation (1) above, it should be the actual annual salary cost of the Works Manager (although we are aware that this is an imperfect measure of managerial input). The use of expected output points will be confined only to the derivation of actual output estimates. And, the points value of output achieved after being converted to, say, a thousand-point scale, is now expressed as a ratio to the annual salary paid to the Works Manager.

$$I_{MP} = \frac{2060}{\text{Rs. } 30{,}000 \text{ (say)}} = 7 \text{ output points per Rs. } 100\text{/-} \text{ of salary paid} \quad \ldots (3)$$

A trend can be plotted over successive years showing the behaviour of this ratio for each manager in the organisation. As a measure of individual managerial productivity this index has brought us a long way from the blanket ratios discussed earlier. And the credibility of the whole approach lies in the quality of MBO framework for objectives setting and review.

We have just finished offering a glimpse of an MBO-centred approach to individual managerial productivity. But an enterprise is also anxious to know the productivity of its various functions and levels in groups. In fact the MBO-approach is itself as much team- or group-centred as individual-oriented. So, we shall go back to Table 1 and attempt to translate it into a total expected output points matrix by entering relevant figures in each box. This is simple to do. In Table 2 we have already calcaulted the maximum expected output points from a manager in each of the four organisational tiers. We, therefore, multiply the expected output points relevant to each level by the number of personnel in each box pertaining to that level. Thus, in the junior-middle

Table - 4

Maximum Expected Output Points From Managers by Functions and Levels

Longitudinal / Latitudinal	Sales and Marketing	Production	Finance	Commercial	Personnel	Research & Development	Chief Executive	Total Expected Output Points
Top Level	49	49	49	49	49	49	49	343
Senior-Middle	58	58	58	58	58	29	-	319
Junior-Middle	42	70	42	42	28	28	-	252
First-Line	36	120	48	40	24	16	-	344
Total Expected Output Points	185	297	197	189	159	122	49	1,258

management level there are 3 persons in the sales and marketing function. So, the total expected output points in this box are 3 × 14, or 42. The resultant picture is shown in Table 4 above :

At the end of a year, output points evaluation would be completed for all managerial personnel, based on their respective attainments of verifiable objectives which have been duly weighted for their relative importance and difficulty. Total achieved output points could thus be derived against each row and column in Table 4 above. As done earlier, several series of *prima facie* indices of productivity may now be suggested :

(a) By rows—for each latitudinal group, i.e. by levels

$$= \frac{\text{Achieved output points}}{\text{Expected output points}} \times 100$$

(b) By columns—for each longitudinal group, i.e. by functions

$$= \frac{\text{Achieved output points}}{\text{Expected output points}} \times 100$$

(c) Aggregate Managerial Productivity

$$= \frac{\text{Total Achieved output points}}{1258} \times 100$$

However, as argued earlier, and for the sake of consistency with individual managerial productivity measurements, aggregate salary remuneration (although refinements to allow for value of various non-monetary perquisites could be done) for each level or function, as the case may be, should be substituted for the expected

output points in the denominators of the above ratios. The ratios can now be re-written as :

(a) By Levels

$$= \frac{\text{Achieved output Points}}{\text{Aggregate Salary Remuneration}}$$

(b) By Functions

$$= \frac{\text{Achieved Output Points}}{\text{Aggregate Salary Remuneration}}$$

(c) Aggregate Managerial Productivity

$$= \frac{\text{Total Achieved Output Points}}{\text{Total Managerial Salary Remuneration.}}$$

Achieved output points will in this set of ratios need to be converted suitably to a larger scale like a 1000-point one to yield meaningful points to salary ratios. Such ratios could help the organisation to see more clearly which managerial levels or functions are showing unfavourable productivity trends. Return on capital employed and similar ratios lack this incisive power.

An Alternative Basis For Computing Managerial Productivity Ratios

A passing reference was made above to the point that managerial salary remuneration too is not a perfect input base for calculating the productivity ratios. The weakness stems from the accounting convention of treating costs incurred on human resources as annual expenses charged off against annual income. While computing return on capital employed for assessing overall business performance, the base of the ratio is 'net operating assets' employed in business. The return is not calculated on aggregate operating costs. Unfortunately even this 'net operating assets' base does not include a measure of the much-vaunted valuable human assets of the enterprise. All expenditure relating to retention and development of human resources is absorbed as an annual expense. As already stated, a good deal of theoretical analysis and some empirical research have already accumulated, drawing attention to the need for having an asset-view of manpower resources by jettisoning the expense-approach. Otherwise, short-term goals of higher return on capital employed may be gained by liquidating the valuable human base of the organisation which could be the source for long-term effectiveness.

The author knows of a large organisation which in the recent past has eroded out a sizable section of its most talented and dynamic young executives, on the plea of economising current overheads, and showing better immediate profits. Perhaps the capital market of the country (as elsewhere) and its fiscal policy also encourage this tendency because stock exchange quotations attach more and immediate faith to conventional profit indices, and tax laws always make conventional distinctions between revenue and capital.[6] However, in the process of "bad money driving good money out of circulation" this company failed to lift its vision to the day when it might revive (if at all it does) and would then need to build around best and first rate talents. Had the accountants been able to offer to top management of this company a glimpse of the value of its human assets in terms of money, may be

6. Thus, in a recent decision the Allahabad High Court ruled that the payment of Rs. 7,200 by the defendant to TELCO for training the former's employees was a revenue expenditure. Earlier it was disallowed as by the C.I.T.—not because it considered the expenditure as raising the value of the human assets—but because TELCO used it for construction of a training campus which was a capital expenditure as per convention, see Motor Sales Lucknow i.e. C.I.T., U.P., in *Taxation*, April, 1972, p. 41.

the course of events would have been different. Like it would think twice before discarding a valuable modern piece of equipment, it might have taken a similar view of its human resources. The accountant's practice of showing all salary and other costs of personnel as annual expenses—and its resultant impact on current profits - was surely the main reason for the top management to adopt the methods it did. An asset-view would have treated human resources as any other physical asset. They would have appeared on the balance sheet as an asset (even though not for published accounts purposes as yet), with annual charges to income being confined only to something like depreciation on machinery and equipment. Profits would not then have shown up as poorly as they did. And top management may not have been scared into harakiri.

However, even with the inclusion of the human asset value in capital employed, the standard return on capital employed index does not yield a direct measure of managerial productivity. Even if it is accepted as an indirect measure—because it represents productivity of labour also—it remains an aggregate or blanket index. For effective monitoring and control of managerial productivity we need information about performance by individuals, levels and functions. It is in providing an analytical basis for such productivity assessments that the human asset concept will be useful.

What we propose therefore follows. The derivation of the achieved output points will be on the same assumptions and procedures as described in the previous section. The denominators of the respective sets of ratios shall, however, be in terms of a quantified value of the managerial manpower asset. Upon each area of action pointed out by the 'actual output points/managerial salary remuneration', the modified ratio of 'actual output points/managerial asset value' will cast more, lurid light. Thus, if we desire to gauge the degree of utilisation of managerial resources, an asset measure of such resources would be much more meaningful than merely managerial remuneration. Again, if the organisation desires to know the state of productivity after, say, a month's management development programme, then an asset base incorporating the value of the training effort would be a better denominator than just salary which ignores the outlay on management development. Similarly, the asset-base method, as explored below, will have a futuristic orientation about the value of managerial manpower on any date of comparison. To this extent, directions for future action will have a clearer focus compared to the remuneration-base which looks only to the salary of the immediate past period.

Of the various alternatives suggested for human asset valuation, the 'present value method seems to this author to be the most practicable one, without losing the conceptual logic of asset valuation from the viewpoint of future[7]. Following are the steps suggested in this approach :

(1) The future wage and salary payments for the next 5 years are discounted back to the present at the rate of return on owned assets in the economy in most recent years.

(2) An 'efficiency ratio' is calculated, expressing the firm's rate of return as a ratio to the average r.o.r. for the industry. In both cases earnings performance over the past 5 years is considered.

(3) The sum derived in (1) is multiplied by the ratio worked out in (2). This gives the value of the firm's human resources.

7. See MH Gilbert, op. cit.

In terms of our framework for assessing managerial productivity, the following observations on the three steps indicated above are relevant :

(1) The earlier basic assumption that salaries and wages represent indirectly the worth of expected effort from employees is built into the method suggested just now.

(2) A 5-year period seems to be quite pragmatic because most firms are now trying to work against the background of at least a five-year perspective. Five-year spans of the national plans have induced this pattern of thinking. Hence, estimates of salaries and wages payable over a 5-year period should be fairly easily available.

(3) The reason for recommending the use of r.o.r. on the owned assets of the economy as a whole as the discounting rate seems to be an attempt to assess the value of a firm's human assets against the broadcast perspective of national economic performance. By implication, lower the r.o.r. earned in the economy, higher will be the human assets value of a firm at given salary/wage levels. In the absence of a direct and accepted measure of national r.o.r., it appears correct to use the r.o.r. for the whole private sector of Indian industry as the discounting factor. This rate is more readily available from the various Reserve Bank of India and other similar studies now conducted regularly. While a similar separate r.o.r. for the public sector will be lower, it may be appropriate to use the private sector r.o.r. for discounting public sector salaries and wages also. This will lead to better comparative judgments about public and private sector managerial productivities.

(4) Calculation of the 'efficiency ratio' seems to allow for comparative judgment of the firm's performance in relation to the industry to which it belongs. A ratio greater than 1 will evaluate the firm's human resources at a proportionately higher rate than that of the industry, conversely.

(5) Having known the firm's efficiency ratio, and the r.o.r. for discounting, these two data may now be used to find the asset value of the firm's managerial personnel individually and by levels and functional groups.

The working of the above approach for our imaginary firm in the engineering industry is illustrated below. The average r.o.r. (gross profits, i.e., before tax and interest, as a ratio of total capital employed i.e. total net assets) for the private sector, public limited, non-financial companies over 5 years upto 1969-70 has been 9.2 per cent.[8] This will be the discounting rate used in our calculations. Let us assume that for a total managerial strength of about 80 to 100, the actual salaries etc. to be paid per annum for next 5 years, with corresponding present values, are :

TABLE 5

Year	*Salaries to be paid (Rs./lacs)*	*Present value on 1.4.72 @ 9.Q% (say) (Rs./lakhs)*
1972-73	18.00	0.92x18.00=16.96
1973-74	19.00	0.84x19.00=15.96
1974-75	21.00	0.77x21.00=16.17
1975-76	22.00	0.71x22.00=15.62
1976-77	24.00	0.65x24.00=15.60
		80.31

It appears, therefore, that on a 5-year future estimate, the total valuation of managerial

8. *Reserve Bank of India Bulletin*, April, 1972, Table 1, Part B, p. 524.

manpower is Rs. 80 lakhs. For the sake of simplicity we may now assume that the average annual value of managerial assets employed during the next 6 years is Rs. 16 lakhs. As a next step, from the same R.B.I. source it is found that average r.o.r. per annum over the past 5 years upto 1969-70 for the engineering industry (using the same definition of gross assets and capital employed has been 9 per cent. Let us assume that the firm's performance over the same period has been 12 per cent per annum. Therefore, the 'efficiency ratio' for the firm is 12/9 or 1.33. Let us suppose over the next 5 years the firm wishes to reach an efficiency ratio of approximately 1.45. So, multiplying Rs. 6 lakhs by 1.45 we get the final evaluation of aggregate managerial manpower as Rs. 23.2 lakhs.

The above estimate of asset value of managerial manpower will be used to show aggregate managerial productivity for the enterprise as a whole in the following form :

$$I_{MP} = \frac{\text{Achieved Total Output Points}}{\text{Asset Value of Managerial Personnel}} \quad \ldots (4)$$

The preceding exercise can be repeated in exactly the same way as above for computing subsidiary indices for various levels and functions in the management team. The asset value for each such group will be based on its respective estimated salary remuneration amount over the next 5-year period. The same discounting rate and efficiency ratio will be used as for aggregate valuation. Finally, achieved output points for each group shall be expressed as a ratio to the asset value derived above. And, of course, this process may be replicated for individual managerial productivity measurements as well.

Merits of the Alternative Process

There are a few conceptual and practical strong points about the asset basis described in the preceding section. Firstly, there is a built-in *systems-approach* in this methodology. At least two supra-systems are linked up with the organisational system. In the first phase the enterprise-system is coupled with the particular industrial supra-system to which the enterprise belongs. This is achieved by using the 'efficiency-ratio' mentioned above. In the second phase, the enterprise system is linked with the entire private sector of the economy to which the firm and the industry belong. The discounting rate used to convert the salaries to an asset basis creates this linkage. The perspective a firm is able to obtain about the value of its managerial resources in an overall scarcity-situation through such couplings is simply indispensable. Thus, if the 'efficiency ratio' for the firm is less than 1, then there is a proportionate reduction in the discounted asset value of managerial salaries. The implication is that the asset value of a firm's managerial resources is determined not solely by the level of remuneration enjoyed by them, but additionally by its comparative performance vis-a-vis industry average. Secondly, managerial productivity measured against an asset base is likely to lead to better management of human resources. When I_{MP} measured in equation (2) above is plotted over the years and it shows a declining trend two basic questions need to be asked: (a) Is performance against verifiable objectives sliding down—in aggregate, by groups, by individuals ? ; and (b) Is the firm over-manning its managerial ranks in numbers and in salary levels ? If the answer to (a) is 'yes', then of course, via the 'efficiency ratio', this is likely to have a sagging effect on the asset value base itself. But over-manning in ways mentioned above may more than offset this diminution in the asset value base. Also, declining rate of achieved output points may lead to incisive

questions about managerial training and development, besides those about other directly work-related problems. As to over-manning, questions may be raised regarding corporate plans postulating certain growth rates (and hence the need for more managerial manpower) which did not materialise. Lastly, even if there is a temporary situation of over-manning, the asset viewpoint of such resources against the total economic background—instead of considering these to be mere annual salary expenses—is likely to awaken the firm to the need for *conservation of human* resources. When things begin looking up, the firm should be able to commission these resources immediately, undeterred by the scramble of the market-place.

Managerial Productivity and Non-Quantifiable Objectives

Discussions in previous pages have centred around verifiable and quantified objectives. However, each such objective for a managerial position possesses some supporting qualitative result areas as well. Thus, for a Production Manager, increasing production by 15 per cent over last year is a neat quantitative objective. This is apparent and verifiable. However, an important qualitative objective attending the production objective is the manager's success in sustaining a high level of positive motivation among production personnel. Another such qualitative standard could be the degree of refinement and flexibility achieved in production scheduling. Such examples could be multiplied. In other words, the quality of various managerial processes like planning, organising, staffing, controlling etc. employed in reaching explicit end-results is also an important dimension of managerial performance. These elements of the management process distinguish a managerial position from a non-managerial one. Koontz, therefore, observes : ".....the ideal system of appraisal would be one that combines evaluation of performance against verifiable objectives and evaluation of performance as a manager."[9] Since it falls on the manager's superior to rate performance in these dimensions, it is essential that frequent formal reviews take place, covering all such aspects. This is not to imply that the superior should not be continuously sensitive to various managerial processes. What is meant is that a quarterly review should provide the occasion to take stock of the situation as a whole, rising above the routine matters, and to provide suitable signals for subsequent charting of action strategy. From this standpoint too the MBO-kind of system provides a systematic basis for such quarterly (or more frequent) reviews.

It may now be asked as to whether appraisal along the dimensions suggested above is any better than the commonly-adopted practice of going by criteria like judgment, initiative, integrity, cooperation, loyalty and so on. Only a little reflection will produce an affirmative answer. The doubt seems to be fed by the fact that apparently the processes of planning, organising, etc., are as non-tangible as the characteristics of judgment, integrity and the like. However, there is substantive difference in the two sets of intangible criteria. In the case of criteria like initiative and cooperation there is a very likely tendency for the appraiser to detach himself from the totality of the work situation and reach an assessment in vacuo. Even if this hurdle is overcome, the process of introspective examination lacks a firm base in one or more of the managerial processes. But, appraising by the criteria of staffing, controlling, etc., immediately opens up a systematic series of

9. Koontz, H : *Appraisal of Managers as Managers*, Mc-Graw Hill, New York, 1971, p. 102.

work-centred questions which are much more visible and perceptible than the personality characteristics referred to. Instead of asking direct, yet slippery, questions about a manager's ability for judgment, this is being tested by assessing his performance in various areas of planning, coordination, and staffing that need judgment. Similarly, regarding initiative, one need not make a frontal attack on this attribute. Instead, it is weighed by probing relevant aspects of the managerial processes that have revealed initiative or lack of it.

Arch Patton also uses qualitative objective in his examples of a comprehensive set of objectives for various management positions.[10] Thus, for a Manufacturing Director, besides suggesting the usual and obvious quantitative objectives, instances of qualitative objectives include: (i) speeding up of action on suggestions from shop floor; (ii) improving production planning on assembly floor, and the like. Two observations may be made with regard to these examples. Firstly, these do not belong to the category of questions Koontz has suggested for appraising managers as managers. Secondly, and flowing from the first, these qualitative objectives too are amenable to more specific quantification. For example, regarding the suggestion scheme the objective could be rephrased to read "give a trial run to at least 2 per cent or 2, whichever is more, suggestions during each quarter." When Koontz uses qualitative objectives in his examples, he does so in the sense I have just described.[11] However, both Patton and Koontz appear to include objectives in the qualitative group on the criterion of these not affecting immediate costs, revenues, profits etc. Thus, even our re-phrasing of the suggestion objective may not make it a quantitative one in the sense of current impact on company performance. Nevertheless, its *verifiability* has registered marked improvement. While all such qualitative objectives can be bettered in terms of their verifiability, this is not quite so for the altogether different set of questions for appraising managers as managers suggested by Koontz. As we shall see presently, greater verifiability of qualitative objectives as well will help our scheme for assessing managerial productivity suggested earlier.

There can also be qualitative objectives in a somewhat more literal sense of the term. Thus, a Production Manager may have during a period excelled his production quantity objective; but reports coming in a little later show that absenteeism in the shop-floor has increased, so has labour turnover.[12] Still somewhat later customers' complaints about products start streaming in. These latter examples also belong to the category of qualitative objectives. But they too are easily expressible in quantitative form.

Readers may have started wondering by now if the issue of service or staff functions is being side-tracked. Even though the emergence of post-industrial service society—as foreseen by many recent Western writers on the subject[13]—is as yet beyond the pale of recognition in our country, it is undoubtedly true that the so-called staff functions of personnel, engineering services, research and development, etc., are and will be assuming increasing importance in the

10. Patton, A : 'How to Appraise Executive Performance'—*Harvard Business Review*, Reprint Series, Part I, on Executive Development, pp. 93-100.
11. Koontz, op. cit., pp. 55-6.
12. This aspect has been touched upon in an earlier article by this author also : 'Appraisal of Management : Environment and Imperatives', *The Indian Journal of Public Administration*, April-June, 1971, pp. 177-8.
13. For an example see Gross, BM : 'Planning in an Era of Social Revolution', *Public Administration Review*, May/June, 1971.

current process of industrial development. Credit goes to overall management systems like MEO for exploding the pampered myth about the non-amenability of staff function objectives to precise delineation. Nothing strikingly original is claimed for such systems in this regard. Their success lies in inducing such a thought process in these non-tangible managerial functions as to make it possible to generate measurable and verifiable standards of performance.[14] Once initial hesitation and trepidity are overcome, quantification in some areas of these functions will come as naturally as for more obviously quantifiable functions like marketing, and production.

Finally, while we have so far been dwelling on the quantification of performance goals in various functional areas *within* an organisation, an important point should be made in the wider context of a range of production technologies adopted by various firms. In her pioneering work on technological determinism of organisational structure, Joan Woodward has produced empirical evidence about distinctive features of structure, coordination, control, motivation etc. in three basic type of industries—unit production, mass production and process production. At one point in her analysis of process technology she remarks that measurement of managerial performance becomes easier with advance in technology. Process production represented the most refined state of technology amongst the three types analysed.[15] If we accept this thesis, then the implication of our proposed method of productivity measurement is that it should start by carefully defining the basic production technology of the firm. This factor may have *ab-initio* an overall influence on the degree of quantification possible for various objectives. The very scale of quantification should perhaps be modulated to accommodate the technology characteristic. And this should provide valuable background knowledge in the interpretation and weightage of achieved objectives.

Summary and Conclusions

So far the following main points have been developed :

(1) As a measure of the value of managerial input it should be possible, without undue difficulty, to arrive at an 'asset' figure for this resource—both in aggregate and in suitable groups, as well as by individuals. A rolling 5-year evaluation of such an asset figure should be most appropriate.

(2) As a measure of the value of managerial output, 'achieved output points', on the basis of expected output points related to salary remuneration earned, can be computed in suitable detail.

(3) An MBO-approach would be essential for assessing output value in the manner stated in step 2.

(4) While obviously-quantifiable objectives can be readily figured out and weighted through mutual consensus, the MBO style should help this to be achieved for qualitative objectives, and for staff activities as well.

(5) Although Koontz has suggested a separate rating system for managerial performance in the areas of planning, organising, control and so on, as a pragmatic initial effort, this part of assessment of managerial productivity may be

14. Several such illustrations are provided by McConkey, DD., : 'Writing Measurable Objectives for Staff Managers', *Advanced Management Journal*, January, 1972.
15. Woodward, J : *Management and Technology*, HMSO, 1958, pp. 4-40.

While obviously-quantifiable objectives can be readily figured out and weighted through mutual consensus, the MBO style should help this to be achieved for qualitative objectives and for staff activities as well.

left out. Once better familiarity with the framework upto step 4 is developed, the next part can be tackled with greater assurance. In a sense it may be argued that good productivity as measured through quantified and verifiable objectives should, over a period, imply that these elements of the managerial process are also being taken care of.

One's mind must by now be bristling with several doubts about the feasibility and utility of the approach outlined above. I would try to anticipate some and respond to them.

Firstly, it could be argued whether salary remuneration should reflect expected output. To doubt this hypothesis would mean questioning the principal basis for the relativity of remuneration differentials. Howsoever imperfectly might salary levels be fixed in different firms at various points in time, I feel the implicit guiding factor remains an assessment of the varying levels of output contribution expected of the incumbents. This is not denying that other factors like age, qualifications do have an influence. But then these factors too, I suppose, determine output expectations.

Secondly, doubts may be raised about the validity of weightages given to a set of objectives during a period. To start with, there ought to be no misgivings about the weights so long as the same basic process of mutual goal-setting between the subordinate and the superior is adopted. If agreed-upon quantiatative targets can be set, why not the relative weights? But surely the main problem is that of inter-departmental distrust and suspicion about playing up respective departmental managers by subjectively attaching more weight to allegedly easier and less significant objectives. And insofar as this is so, it is not an indictment of the method outlined above. It is expected that the very process of going about the MBO process accompanied, if necessary, by an organisational development (OD) effort, will gradually create a more authentic and open climate within the firm. As a precautionary measure, therefore, it is advisable to adopt the productivity measurement approach presented here only after the MBO system has been working well and managers have built up faith in it. Lastly, if during a period there is a sudden serious bottleneck or difficulty arising in the way of fulfilling one or more objectives, then it is not necessary to disturb the existing weighting system based on normal immediate past experience. Additional allowance for such abnormal conditions may be made after computing achieved output points on the basis of weights earlier agreed upon.

Thirdly, another serious question may be: how are these laboriously derived measurements going to be used? There may be at least three basically different purposes which such measurements could serve: (a) performance improvement, (b) assessment of potential and (c) salary and promotion. Research and theoretical evidence highlights the necessity of preventing an overalp of purposes in a single measurement and

appraisal system. For our purposes, the primary emphasis is on improvement of performance and thereby stepping up managerial productivity. We should, therefore, during the first 3 to 5 years of implementation of such a system, scrupulously avoid mixing up salary/promotion and potential assessment decisions with those about increasing the effectiveness in the managers' respective present jobs at the same point in time. Some firms separate the fulfilment of these purposes through the same measurement reports by sufficient time lags to avoid 'halo-effects'.[16] Yet others link up these purposes simultaneously only after a lapse of sufficient time for the organisational system to get itself thoroughly imbued with and sensitive to the nuances of the measurement process.

Finally, I cannot help referring to a recent incident when, towards the end of a session on MBO for top-level managers of a Calcutta-based organisation, I was asked: "What are the incentives to be offered for managers to accept and work under an MBO-system ?" I thought it was a rank bad question to come from a top-level manager. Why should a manager, like a shop-floor employee, expect monetary incentives for managing his work in a more structured way than before ? In fact, he should appreciate the intrinsic immediate benefits of working more openly and systematically. At a somewhat later stage, of course, the relatively more objective productivity measurements will have provided a sound basis for correlating incentives to performance. But measurement remains the pre-condition. □

It is expected that the very process of going about the MBO process, accompanied, if necessary, by an organisational development effort, will gradually create a more authentic and open climate within the firm.

16. See 'Marketing Limited Case', reported by Merrett, AJ and White, MRM, in *Incentive Payment System for Managers*, Gower Press, London, 1968, p. 201. It is interesting to observe in this case that when appraisals for performance improvement are linked later to salary reviews, a numerical conversion process is done. This author has in fact laid out above a structured approach to such numerical rating.

The modern business leader must be better educated, in the broadest sense of the word, than his predecessor, and that a continuing awareness of the arts is as essential to wise business leadership as it is to any other kind of leadership, spiritual, intellectual or social.

—G A Spater: 'A New Mission for Business'

Research on Five Styles of Managerial Decision-Making

Frank A Heller*

What follows is a short description of a major research project on managerial decision-making, leadership. and a variety of situational variables. It is the first of a number of studies which are now taking place in six other countries using the basic design described here. The research tests a number of assumptions about participation and power sharing at two senior managerial levels in large companies. The hypotheses predict interactions between some personal and situational variables and the so-called styles of management. An alternative way of describing the work is to say that it examines the relationship between a specified number of different realistic management situations on the one hand, and participatory managerial styles on the other.

As is inevitable with all short summaries of complex research projects, the present report will be guilty of some over-simplification, imprecision, and exaggeration. (1) This first research was carried out in the United States. A similar project has recently been finished in Britain, with a closely matched sample of companies. (2) The British research deepened the enquiry by extending the measurements of situational and environmental conditions that are assumed to affect leadership behaviour, but all the measurements reported here were included and will later enable us to make some comparison between the matched American and British Companies.

A Third extension of this project started in January 1971, and will be carried out in five Continental European countries until 1974. (3) The Continental European research necessitates further refinements and additions to the project, but will nevertheless give us a seven-country sample on managerial decision-making and leadership.

As will be seen from the description which follows, the research method produces information which goes beyond that noramlly obtainable from questionnaire or interview studies, and consequently breaks new ground in the field of multinational managerial comparisons.

The Problems

The subject of leadership has for a long time occupied a central role in the study of organisation and administration. It all started innocently enough with psychological and sociological studies of the nature of leadership in very general terms. When simple explanations,

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in terms, for instance, of inborn personality traits, failed to account for the phenomenon, the subject became progressively more complex. One can discern three major trends in leadership studies. In the first place, leadership was analysed in terms of the person only, his behaviour, ability, dynamism, perceptions, and attitudes. Later, social scientists looked at the pattern of a leader's interaction with others; how subordinates perceive their bosses and *vice versa*, how members of a group organise themselves officially and spontaneously, and how all this affects organizational efficiency.

The third and most recent trend arose from the limited success achieved by the previous perspectives that sought to confine leadership analysis to simple socio-psychological measurements. The third step requires an analysis and measurement of those environmental factors that are thought to influence leader behaviour. Some parts of the environment are very close to a leader; for instance, the people who literally surround him. One way of measuring this influence is called the span of control, that is to say, the number of direct subordinates. Another aspect of environment is the amount and kind of skill a leader finds among the people who report to him. Job function is a third environmental factor; accounting, for instance, provides a different work setting from marketing or personnel, and these differences may have important effects on leadership and decision-making.

A little further removed from a leader are the uncertainties and pressures resulting from changes in the technology of work; the economic climate; trade union custom and practice; social, cultural, and political circumstances; and a host of others.

A variety of Environmental Influences Acting on a Leader

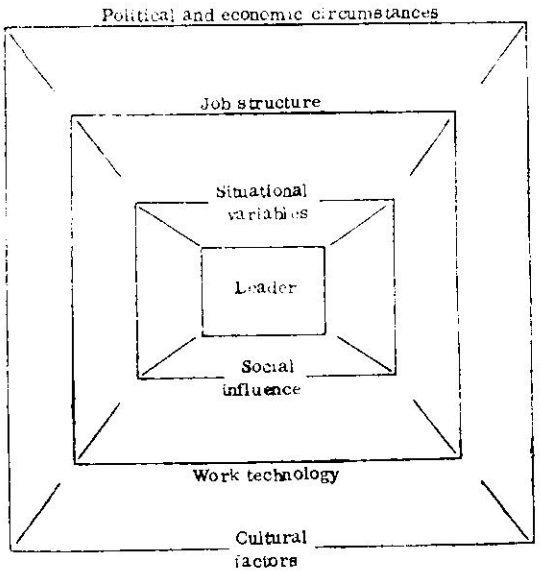


Fig 1

The multiplicity of environments that can exert influence on the leadership process are illustrated in Figure 1. Only some of the variables are labeled. Every business has to examine its own situation and decide what constitutes the critical aspects of its own environment. Cultural variables, for instance, will be of particular importance to a multinational business; political pressures may be of paramount importance in underdeveloped countries.

It is obvious that research becomes more difficult and costly as we move from the simple person-centred approach to a study of patterns of interaction and finally the inclusion of the environment. A major difficulty is to find suitable ways of measuring all the variables

one wishes to consider; it is easier to do this work in depth in one company than to study a more representative sample. Those who insist on large samples are often forced to use the weakest of all research methods, namely the impersonally distributed questionnaire.

The Research: Variables, Sample, Method

The present research has fairly successfully overcome most of the limitations that have just been described. The project concentrated on the process of decision-making between pairs of senior managers who stand in boss-subordinate relation to each other, but it was possible to include quite a number of the more immediate environmental variables. Fifteen large and successful American businesses and a total of 260 senior business executives participated in the study.

The research method is called GFA (Group Feedback Analysis), and consists of three steps. One begins by gathering a group of managers of the same level of seniority (in our case Vice-Presidents or equivalent grades) around a large table. A series of short questionnaires are explained and filled in. During the second stage, the research worker calculates the results of this inquiry by producing simple averages and a measure of the spread of individual answers around the average. The third and most interesting step is the feedback session. The group receives a summary of its own results and is asked to discuss them. Particular attention is paid to the interpretation the managers themselves give to their average answers in terms of the specific business circumstances to which they refer. The researcher gradually leads the group to discuss certain questions which enlarge the scope of the questionnaire material. This session is tape-recorded and later analysed. The method is powerful because it produces two kinds of information. In the first place, there are the answers from carefully prepared questionnaires which can be submitted to a sophisticated statistical analysis. The relationship between the statistical material and the feedback data is particularly close since the group discussions are based on the statistical material and help to extend it. The same procedure is repeated with a group of immediate subordinates.

The Main Research Questions

The research obtained answers to four groups of questions.

(1) What leadership methods do senior managers use in making various kinds of *different* business decisions. Do leaders use the same method irrespective of the nature of the decision or do they vary their '*style*' on some predictable basis ?

(2) What errors do boss and subordinate make in describing the leadership methods that operate between them? If a boss says he uses "prior consultation" on a certain problem before making a decision, does the subordinate agree, or does he see his boss as using a different style of leadership? In other words, how do pairs of managers perceive the amount of influence they have one ach other?

(3) How do boss and subordinate judge the skill requirements of their respective jobs and how do these skill judgments affect the senior manager's leadership method? For instance, do senior managers have a high or low estimate of their subordinate's managerial skill? In cases where they think highly of their subordinates, do they also give them more influence?

(4) What relation is there between different kinds of (a) jobs, and (b) environmental condi-

tions, and the previous three groups of questions? For instance, do managers with extensive experience use one leadership method, and those with less experience another? Do managers with a large span of control use decision methods that save time? Do accountants, sales managers, and engineers differ in their styles of leadership ?

Let us take the last question; accountants deal with facts and figures, salesman with people. Should one expect both groups of managers to behave alike? Is participation in decision-making as meaningful for one group of specialists as for another? Quite apart from personality differences, is the nature of the job an important influence in choosing a style of decision-making?

The Influence-Power Continuum

In order to deal with these questions it was necessary to evolve, standardise, and check a number of measuring instruments and in particular a scale for assessing the styles of leadership. The most widely used scales in current use assume a basic and simple split between democratic and authoritarian methods of leadership, and they use ill-defined positions in between the extremes. The scale used in this research is called IPC (Influence-Power Continuum) and uses five defined alternatives which are described below. Unlike most scales in current use, the IPC does not suggest that any of the five alternative styles is better or worse than any other. The instructions on the use of the scale clearly assume that each style has its *raison d'etre* and could legitimately apply to some situations. As the name implies, the scale measures varying amounts of sharing influence or power between two people. The five points on the influence-power continuum are as follows:

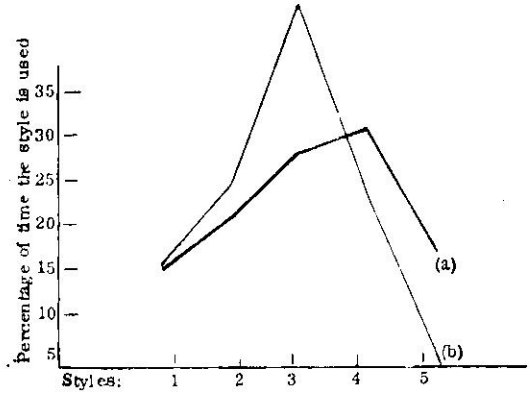


Fig. 2

Styles of decision-making as seen by (a) The Senior level (b) Immediate Subordinate. Average of 12 Specific Business Decisions.

Style 1. The leader makes his own decision alone.

Style 2. Having made his decision alone, the leader adopts a formal method of communicating the results.

Style 3. Prior consultation is used, but the decision rests entirely with the leader.

Style 4. The decision emerges as the result of joint boss-subordinate discussion in which both take an approximately equal share in the final determination.

Style 5. The leader delegates a decision to his subordinate.

The Main Research Findings

The following statements constitute a summary of the main findings ; the statistical details and the extent to which they are supported by previous research are discussed in Heller, 1971 (Chapter 4.)

(1) Senior managers in this sample use style 3, prior consultation, much frequently

than any of the four alternatives (37 per cent of the time) (see Figure 2). Delegation is the least frequently used style (7 per cent).

Styles 1 and 2 (where managers make important decisions on their own) together account for 36 per cent of the decisions.

Conclusions from this finding will depend on how we define power sharing. If we regard only Styles 4 and 5 as giving subordinates real influence, then power is shared in 27 per cent of the decisions taken. If we include prior consultation (Style 3), then power is shared in 64 per cent of the decisions taken. In practice, it is likely that up to half the decisions taken when a leader uses Style 3 will reflect a subordinate's influence. On this assumption, a remarkable measure of power is shared between senior managers and their immediate subordinates in nearly 50 per cent of all important decision that are taken.

(2) The above results are obtained by looking at the average of all the important decisions taken. However, the decisions can be broken down by two alternative classifications.

First, one can look at the difference between decisions a leader makes about his immediate subordinate only, compared with decisions he makes about lower levels of staff in his department. The findings show that leaders give their subordinates considerable influence relating to decisions about lower levels of staff. This means that subordinates have a wide measure of discretion on how to handle their own staff. By contrast, leaders use more centralized decision styles on subjects that affect only their immediate subordinates.

The second breakdown of decisions relates to their importance. Some decisions are particularly important to the company, others are particularly important to subordinates. It seems that managers vary their style very markedly in relation to this division of importance. Where a decision is important to the company, Styles 1 and 2 predominate and little influence is shared. However, where a decision is important for a subordinate, Styles 3, 4, and 5 predominate, giving him a wide measure of influence.

There can be little doubt, therefore, that managers do not use one preferred personal style of decision irrespective of the nature of the situation. This is an important conclusion and stands in opposition to most of the management literature on this subject.

(3) Boss and subordinate see the process differently. Although both are asked to describe how influence is shared in the same specific decisions, subordinates consistently *over-estimate* the amount of power they hold (Figure 2). For instance, when the senior manager reports that he uses prior consultation (Style 3) in a particular case, his subordinate may report that his boss gave him an equal share in the decision (Style 4) or he may even believe that the matter was delegated to him altogether (Style 5). These are not simple errors and other research workers have found similar evidence. It seems that the persistent overestimation of influence may have an important psychological function. It could be the consequence of a very strongly felt need for more self-determination and may therefore act as a compensation for being given less influence than the subordinate felt he could handle. This interpretation is in line with a considerable body of modern literature on the importance of self-determination as a basic need for managers at this level.

(4) There are several other important differences in the judgments of the two levels of management. Senior managers and their immediate subordinates do not agree on the amount of skill necessary at their respective levels of work. As expected, the senior manager thinks his level requires more of nearly every skill. The only exception is the need for technical skill, which he believes is more important for his subordinate. In contrast with this is the subordinate's judgment that, in seven out of twelve specific skills and qualities, more is required at his own level. Both levels cannot be right. Their different perceptions are very likely to influence the way they carry out their work, and the way they interact with each other. This is borne out in point 6 below.

(5) A similar gap is found when both levels of management are asked to estimate the time it would take the subordinate to acquire the skills necessary to take over the boss's job (on the latter's promotion, for instance). The senior level thinks that, on average, it would take the subordinate twelve months. The subordinate himself estimates five months; and the difference is extremely significant and supports the conclusion reached in point 4 above. That is to say, subordinate managers believe that they have a great deal more to give than their seniors give them credit for. Combining findings under points 3, 4 and 5, it seems that the subordinates are motivated to take on more responsibility and believe themselves to be capable of exercising it. We do not have independent evidence to decide whether the subordinate's optimism is more or less reliable than the senior manager's judgment. Because of the difficulty of measuring complex skills used at higher levels of administration, almost the only way to resolve this difference of judgment would be to give subordinates what they seem to want - let us say for an experimental period - and then see how well they measure up to their new tasks. Such an experiment goes far beyond the framework of the present research.

(6) There is a relation between perceptual gaps and the amount of influence shared between the senior manager and his subordinate. When the senior manager sees a big skill difference between himself and his subordinate, he uses centralized decision styles (i.e. Styles 1 and 2). When he sees little skill difference, he is more willing to share power with his subordinate (Styles 3 & 4). Of course, this makes very good practical sense; there is little point in sharing influence with a subordinate who is not thought to possess the necessary skills. Under such conditions, shared decision-making might be dishonest, since the senior manager would presumably not take any notice of the advice he received from a subordinate whose skill he did not value.

Two important questions remain to be answered in future research: (a) is the senior man usually correct in his judgment of skill? (b) if the senior man underestimates his subordinate's capacity, could this be the result of his using centralized decision-making? Or does his judgment on the available skill determine his style? The point about this distinction is that a boss who always uses Styles 1 and 2 may never find out how good his subordinates really are.

(7) Closely related to point 6 is the finding that the more experienced a senior manager is, the more likely it is that he will give his subordinate a moderate amount of influence in decision-making. Furthermore, where senior managers have experienced subordinates (measured by age and length of time in the company), they are noticeably more inclined to use delegation and to avoid centralised decision styles.

This finding too makes good practical sense, although it could mean that the pattern of participation is excessively influenced by experience and age rather than by other indices of skill. It is possible that young, highly trained people are not brought into the decision process as much as older people, although they could make very important contributions. This may be a serious loss to a company and could discourage the younger managers.

(8) If a manager has a large number of immediate subordinates, that is to say, a large span of control, he will use time-saving styles of decision-making. The styles that take up least time are Styles 1 and 5, and these are precisely the ones he will tend to use most frequently (see table below). This finding adds further weight to the contention that managers choose decision styles that match the needs of the situation (see point 2 above). This flexibility in the choice of styles has important consequences for training future generations of managers.

Correlations Between Span of Control and the Use of Five Decision Procedures

(N=82)

Decision Procedures Style	*Span of Control*			
	All Decisions	*Three decision composites*		
	SPEC	*EMP*	*DEPT*	*SUB*
1	0.33[2]	.38[2]	.23[1]	.17
2	—0.09	—.09	—.15	.02
3	—0.20	—.23[1]	—.07	—.08
4	—0.10	—.02	—.07	—.17
5	0.22[1]	.20	.13	.15

Note : significance levels.
1=p<05 2=p<01

SPEC refers to twelve decisions in relation to which managers describe their behaviour. The other abbreviations are composites of SPEC.

SUB are those decisions within SPEC which refer only to boss-subordinate decisions, hence SUB.

EMP are these decisions within SPEC which refer to the decisions relating to employees working under the subordinate and are two levels removed from the boss.

DEPT are decisions within SPEC that relate to the whole of the boss's department rather than to the interests of particular people.

(9) Managers who have no particular specialised functional responsibility and managers who specialise in the personnel function use power-sharing much more extensively than do managers in Finance and Production (Figure 3).

Sales and purchasing managers occupy an in-between position. This finding further supports the view that decision styles are influenced by "the law of the situation" and by the nature of the task.

(10) When managers discuss the reason for using "participation" and are asked to decide which reasons are most important, the following order of priority emerges : (a) to improve the technical quality of decisions; (b) to increase satisfaction; (c) to improve communications; (d) to train subordinates; (e) to facilitate change.

The fact that managers believe that the most important reason for participation is its effect on the quality of decisions gives support to the major theoretical assumption of this research. We believe that organisations can make better use of the reservoir of existing skills by adopting decision procedures which enable subordinates to influence their superiors where it is appropriate. The phrase "where it is appropriate" suggests that there are situations where influence-sharing is not appropriate and would not lead to a better utilisation of existing skills. This last assumption is supported by findings under 7 and 8 above.

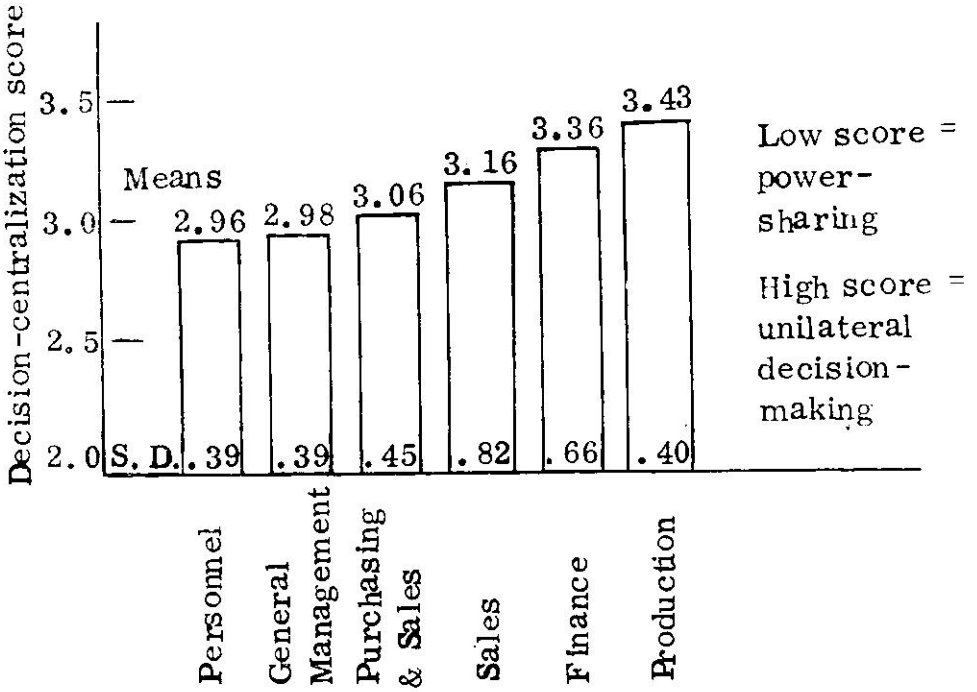


Fig. 3

Relation of Decision Style to Five Functions of Management
Decision—Centralisation Scores (Means and Standard Deviations)

An important distinction can be made between better use of skills that are already available and, on the other hand, training people to become more skilled. The former alternative is cheaper and produces results more quickly. It is interesting that when managers judge the value of "participation," they give only fourth place to training but first place to using existing resources.

Discussion

The fairly categorical statements of findings in this short article must be seen in relation to the more precise and carefully elaborated evidence in Heller, 1971. However, the main arguments are simple and practical even if they require further support from subsequent research.

In the rapidly growing study of organizational behaviour, there is a substantial body of literature on leadership and participation. The impact of this work is of considerable value both to the *theory* and to the *practice* of management. The present research claims to make a contribution to both.

Theory is essential for the adequate formulation of research problems, and this in turn decides the nature of the findings. Participation provides a good example of how this works. If one thinks of participation only in terms of behaviour that take splace between two or more people who are physically present in the same room, then the definition of the term is likely to underestimate the importance of Styles 1, 2, and 5 (see, for instance, Likert, 1961, 1967). These styles are best understood in terms of non-group behaviour. A moment's reflection will show that in any realistic organisational setting, some solitary behaviour is necessary and may even be desirable. In any case, the exclusion of non-group behaviour from the study of leadership seriously affects the theories that will serve as the basis for research projects. By shifting the focus of attention from participation to the phenomenon of sharing influence, one immediately opens up new areas of investigation and the need for new tools of research (such as the influence-power continuum). The shift of focus may seem slight but the consequences in terms of the conclusions one may derive from the research will be considerable. The term participation should be used sparingly, and we believe that influence and power are much more precise concepts than participation.

The interaction between theory and practice become even more obvious if one uses emotional terms like "industrial democracy." The very term prejudges what is "good" and what is "bad", and this leads, among other things, to the inclusion of a hotch-potch of unrelated practices under an approved label (Walker, 1970). A theoretical framework covering value terms like "democracy" must start off with a very rigorous examination of the ingredients around which the term is assembled (Emery & Thorsrud, 1969; Walker, 1970).

More important still is the effect of theoretical assumptions that link up concepts like participation and psychological satisfaction. A substantial part of the literature on leadership and participation has looked for a connection between participatory leadership practices and the consequent satisfaction of subordinates and or the improvements in their productivity. A connection of this kind often exists although the findings are by no means clear-cut. However such a theoretical framework permits or even encourages pseudoparticipatory practices, or manipulation, in order to improve morale and output (March and Simon, 1958, 1954). Why should this be so? The reason is that participation is easily counterfeited. If the counterfeit is not detected it may lead to higher morale and therefore higher output. This provides a great temptation to managers. However, if they use participation to increase the technical quality of decisions, to improve communication, or to train subordinates, then counterfeiting will not be successful. This is because success in those cases does not depend on producing a feeling of participation: success depends on the activity of participation itself.

The theoretical framework used in the present research requires genuine participation or influence-sharing. It is assumed that existing skills will be used more if influence is shared. To the extent that skills are present or perceived to be present at subordinate levels, a leader's willingness to use consultation, joint decision-making, and delegation would increase the quality of the decisions reached. This theory is more fully described elsewhere (Heller, 1969 (b) and 1971 (a), Chapter 2).

Conclusions

A major omission from the research literature on leadership is the detailed consideration

of situational, structural, and environmental circumstances which explain variations in leader style (Lowin, 1968). The present research produces evidence that legitimate and justified variations in leader style do occur.

The advocacy of participation is usually supported by evidence that people in general, and managers in particular, have strong autonomy motives and put self-fulfilment needs high on their list of priorities (Heller and Porter, 1966). But joint goal-setting or consensus decision-making is only one way of achieving these satisfactions. To give lower-level groups a real measure of autonomy, higher levels have to delegate some of their influence; if this were not so, lower levels would have self determination only over trivialities.

However, some organisational behaviour is clearly more effective if it is centralised. There are many administrative situations that require quick action; in other cases personal communication is physically difficult or excessively time-consuming. Another circumstance that may influence leadership style is the extent to which a job is predictable or repetitive. In all these cases, centralized decision taking is acceptable. Furthermore, there is evidence from the feedback of result that subordinate managers expect certain decisions to be centralized and prefer it this way. They would not respect senior managers who tried to involve them in situations that did not require their influence.

What emerges from the research is a picture of managers who are flexible and who vary their style of leadership in response to predictable organizational demands. Such a picture departs noticeably from the simple notion embedded in the concept of a one best managerial style. (4) Of course, this evidence is perfectly compatible with the belief that in many circumstances more power-sharing than is actually practiced would be beneficial. The present research was carried out with the assumption that power-sharing usually leads to a better use of skill and experience. But there is little value in having pseudo-participation with people who have little or nothing useful to contribute to a particular problem. At the same time it must be recognized that an important factor in the skill-utilization theory is something called expectation. If a manager has trust and confidence in people he will react differently from a manager who is suspicious. The suspicious manager probably believes that subordinates lack initiative, responsibility, imagination, and so on. There is some evidence that such a general distrust of other people can be quite unrelated to their real ability; in such a case the expectation is a misjudgment. Managers with such preconceived views are unlikely to spot the real talents of their subordinates and the behavioural consequences of such misjudgements are serious; the subordinates will be dissatisfied and the organization will lose the contribution of their skill. It is possible that managers who underrate the ability of their subordinates would revise their judgment if they could be induced to use more power-sharing leadership styles, because in this way they would get to know their subordinates better. This is one of the arguments of the participation advocates and, in relation to the attitudes of suspicious managers, the approach may be justified. Unfortunately, the participation school of thought has not stopped at this point and has frequently overstated its case to the point of ignoring the reality of situational and environmental variables. In reviewing the history of these thoughts it can be shown (Heller, 1971 (a), Chapter 2) that recent writings by some of the most influential advocates of the participation school

have moved further and further away from the conclusions we have just stated.

It is, therefore, evident that the research findings reported here should be of interest to a number of people; first, to teachers of organisational subjects; second, to consultants; and third, to those planning the introduction of organisational changes. Since the findings give support to the idea that existing skills can be more or less adequately used depending on the style of leadership, the findings should also be of interest to people who are responsible for training young technologists, scientists, and engineers. For the same reason the conclusions should be of some value to the users of trained manpower in industry and commerce, that is to say, the personnel function and those concerned with management development.

Notes

(1) Those who are interested in getting a better understanding of the relatively new method of research will find details in Heller, 1969 and 1971(a). The eleven hypotheses and details of the results tested by multivariate statistical methods are described in Heller, 1971(a).

(2) This project was supported by a grant from the Social Science Research Council of Great Britain during 1969 and 1970, and preliminary and partial results are available (Heller, 1970; 1971(b); 1971(c)).

(3) The major support for this multinational study comes from three sources. First, a further three-and-a-half year grant from the SSRC; second, an extensive research collaboration between the Tavistock Institute of Human Relations, where the author is responsible for the conduct of the study, and the International Institute of Management (IIM) based in West Berlin. This collaboration covers Germany, Sweden, and France; third, the Dutch Productivity Centre and the Dutch Economic University at Rotterdam are responsible for an extensive series of projects in Holland. The international research is directed and coordinated by the author.

(4) The idea of a one-best style is widely held, in both the research and the popular literature (see, for instance, Blake and Moulton, Managerial Grid, 1964). □

BIBLIOGRAPHY

1. FE Emery and E Thorsrud, *Form and Content in Industrial Democracy : Some Experiences from Norway and Other European Countries*, London, Tavistock Publications, 1969.
2. FA Heller and LW Porter, "Perceptions of Managerial Needs and Skills in Two National Samples," *Occupational Psychology*, 40, 1 and 2 (1966), pp. 1-13.
3. FA Heller, "Group Feed-Back Analysis: A Method of Field Research," *Psychological Bulletin*, 72, 108-117, 1969 (a).
4. FA Heller, "The Managerial Role in the Effective Use of Resources, "*Journal of Management Studies*, 6, 1-14, 1969 (b.)
5. FA Heller, *Interim Report to the Social Science Research Council*, London, 1970.
6. FA Heller, *Managerial Decision-Making : A Study of Leadership Styles and Power-Sharing Among Senior Managers*, London, Tavistock Publications, 1971(a).
7. FA Heller, "The Anglo-American Difference, "*Management Today*, July 1971 (b).
8. FA Heller, "British and American Managerial Skills," *Abstracts, Digests and Reviews*, 11, 33-35, British Institute of Management, London, 1971 (c).
9. L Likert, *New Patterns of Management*, New York, McGraw-Hill, 1961.
10. L Likert, *The Human Organization*, New York, McGraw-Hill, 1967.
11. A Lowin, "Participatory Decision-Making: A Model, Literature Critique, and Prescription for Research, "*Organisation Behavior and Human Performance*, 3, 68-106, 1968.
12. JG March and HA Simon, *Organization*, New York, John Wiley, 1958.
13. KF Walker, "Industrial Democracy: Fantasy, Fiction or Fact?" London, *The Times*, 1970.

Discriminating Power of Rating and Questionnaire Forms

KP Bhattacharyya, S Chatterji & M Mukerjee*

Questionnaire and ratings both are oft-sought and efficient implements of personnel assessment in any industrial concern. Often one or the other of them is employed for assessing different aspects of personality in other types of psychological investigations as well. Hence a natural query suggests whether both the tools are equally efficient in revealing individual variations or whether one should be preferred to the other. The present investigation endeavours to find out an answer to this query empirically.

Two types of rating forms were devised—a rating scale and a questionnaire. Five characteristics were assessed through these two forms and these were (1) accuracy in work (2) speed of work (3) knowledge of job (4) carefulness and work organisation and (5) ability to work without constant supervision.

The Study

In case of the rating form, each of these traits was clearly defined and the raters were requested to allot percentage marks for these five characteristics, whereas in the questionnaire form 46 statements were phased on these very characteristics, each characteristic having several statements with three possible answers regarding the applicability of the statement to the workers under investigation—'Yes' (applicable), 'No' (not applicable) and 'Does not arise'. The numbers of statements in different characteristics are presented in Table-4.

Both the methods of assessment were employed simultaneously by several supervisors in a large organisation in evaluating their subordinates. Data were available for five categories of workers namely (1) Computers (2) Machine Operators (3) Punch Card Operators (4) Office Clerks (5) Field Investigators.

The supervisors of the respective sections were supplied with two forms and were asked to give their responses on these without any bias or prejudice. It should be mentioned here that each category of workers was assessed by different supervisors. Though there may be difference in the standards of evaluation of the supervisors but in the present study that factor was not considered because assessment of all the workers by the same supervisor was rather impractical. Moreover, in many practical situations (for example in the essay type of examination where the marks given by different examiners are considered to be comparable) such difference in the standards' of evaluation is often being neglected.

*Indian Statistical Institute, Calcutta.

The number of workers and the supervisors who were approached for this study are shown in Table 1.

TABLE 1

Numbers of workers and supervisors in different categories of workers

Categories of Workers	*Numbers of Workers*	*Numbers of Supervisors*
1. Computers	62	23
2. Machine Operators	60	12
3. Punch Card Operators	41	6
4. Office Clerks	40	13
5. Field Investigators	15	5

In an earlier study [1], it was observed that the scores obtained by the two methods are highly correlated. It was proposed to investigate and to compare the discriminating powers of the two forms, i.e., how far these two tools were able to discriminate the ratees. The following two types of indices were calculated for this purpose (a) Coefficient of variation [2] (b) coefficient of discrimination [3].

Results

Coefficient of Variation: Coefficient of variation is a function of mean and standard deviation, i.e.,

$$\text{C.V.} = \frac{\text{standard deviation}}{\text{mean score}} \times 100$$

As the calculation of the coefficients of variation needs the means and the standard deviations of the ratings (marks) obtained through the questionnaire and the rating scale, these values were first obtained and were presented in Tables 2 to 5.

It is observed from the figures presented in these tables that the standard deviations of the scores obtained through the rating scales were of much higher magnitude than those obtained with the scores on questionnaire. But nothing

1. Bhattacharyya KP, Chatterji, S, and Mukerjee M—'Relation between rating scale and questionnaire with reference to personnel assessment.' (Mimiographed report.)
2. Bhattacharyya KP, Chatterji S. and Mukerjee M—Halo Effect in Personnel Assessment—A Factorial Approach. (Mimiographed report.)
3. Garrett HE—Statistics in Psychology and Education, Longman N.Y., 1958.

TABLE 2

Means of the scores obtained on five different traits in the rating scale for the five groups of workers

Category of Workers	*TRAITS*				
	Accuracy in Work	*Speed of Work*	*Knowledge of Job*	*Carefulness & Work Organisation*	*Ability to Work without Constant Supervision*
Computor	78.016	72.242	73.290	72.661	68.936
Machine Operator	81.350	75.549	75.665	72.531	71.198
Punch Card Operator	75.537	73.366	77.098	72.098	73.927
Office Clerk	80.225	73.500	79.425	73.000	76.625
Field Investigator	66.000	68.333	67.867	66.333	62.867

TABLE 3

Standard Deviation of the scores obtained on five different traits in the rating scale for the five group of workers

Category of Workers	*TRAITS*				
	Accuracy of Work	*Speed of Work*	*Knowledge of Job*	*Carefulness & Work Organisation*	*Ability to Work without Constant Supervision*
Computor	14.813	17.986	15.575	16.347	15.885
Machine Operator	10.341	21.008	13.748	19.506	19.690
Punch Card Operator	12.666	13.492	12.022	11.302	10.166
Office Clerk	14.840	16.815	11.647	16.412	14.247
Field Investigator	15.078	17.670	12.716	16.479	20.101

TABLE 4

Means of scores obtained on five different traits in the questionnaire for the five groups of workers

Category of Workers	*TRAITS*				
	Accuracy in Work	*Speed of Work*	*Knowledge of Job*	*Carefulness & Work Organisation*	*Ability to Work without Constant Supervision*
Computer	6.726	4.048	4.016	2.306	4.016
Machine Operator	7.617	4.917	6.633	3.433	6.183
Punch Card Operator	6.268	4.805	5.024	2.341	4.561
Office Clerk	6.775	4.400	4.150	2.675	4.500
Field Investigator	4.125	1.875	4.000	1.875	3.438
Maximum possible score	11	8	12	5	10

TABLE 5

Standard Deviation of scores obtained on five traits in the questionnaire for the five groups of workers

Category of Workers	*TRAITS*				
	Accuracy in Work	*Speed of Work*	*Knowledge of Job*	*Carefulness & Work Organisation*	*Ability to Work without Constant Supervision*
Computer	3.923	2.324	2.848	1.443	2.129
Machine Operator	3.550	2.753	3.540	1.216	2.866
Punch Card Operator	3.004	2.452	1.405	1.096	2.153
Office Clerk	2.697	2.211	2.104	1.233	2.410
Field Investigator	2.713	1.409	2.318	1.218	1.836

TABLE 6

Coefficients of variation obtained with Rating Scale and Questionnaire

Categories of Workers	*Accuracy in Work*		*Speed of Work*		*Knowledge of Job*		*Carefulness & Work Organisation*		*Ability to Work without Constant Supervision*	
	Rating Scale	*Questionnaire*	*Rating Scale*	*Questionnaire*	*Rating Scale*	*Questionnaire*	*Rating Scale*	*Questionnaire*	*Rating Scale*	*Questionnaire*
Computor	18.99	58.33	24.90	57.41	21.25	70.92	22.50	62.58	23.04	53.01
Machine Operator	12.71	46.61	27.81	55.99	18.17	53.37	26.89	35.42	27.66	46.35
Punch Card Operator	16.77	47.93	18.39	51.03	15.59	27.97	15.68	46.82	13.75	47.20
Office Clerk	18.50	39.81	22.88	50.25	14.66	50.70	22.48	46.09	18.59	53.56
Field Investigator	22.84	65.77	25.86	75.15	18.74	57.95	24.84	64.96	31.97	53.40

could be concluded about the nature of the variability of the two sets of scores as the maximum possible scores varied widely in these two forms. The coefficients of variation were found out for all the five jobs separately for the five aspects which are presented in Table 6. Table 6 shows that in all the jobs, the coefficients of variation were much higher in questionnaire than in the rating scales, which proved that the questionnaire form had higher discriminating power than the rating form. This was also supported by the values of the coefficient of discrimination obtained with the same data.

(b) *Co-efficient of Discrimination:* One of the main purpose of assessment is to find out the difference between the ratees. The scores (obtained through assessment) of two individuals may be same or different. It is desirable that the instrument used for assessment should be so designed that the number of relations of difference in score is maximum and the number of relations of equivalence (i.e., when the scores are same) is minimum, otherwise the purpose of assessment would be vitiated.

Ferguson[4] has derived one coefficient, termed as coefficient of discrimination, which depends upon the distribution of the scores.

$$\alpha = \frac{n^2 - \Sigma f_i^2}{n^2 - n^2/k+1}$$

where n=the number of individuals
k=the maximum possible score
f_i=the frequency of obtaining a score value i.

The coefficient will take values ranging from zero to one. It is zero when all individuals get equal mark, and it is equal to one when the number of relations of differences is maximum.

This coefficient was obtained for the two forms as before and the obtained values are presented in Table 7. As observed with the coefficient of variation, here also the magnitudes of the coefficients were higher for the questionnaire than for the rating forms for most of the cases.

4. Guilford JP—Psychometric Methods, McGraw Hill Book Co., New York, 1954.

TABLE 7

Showing the coefficients of discrimination obtained with Rating Scale and Questionnaire

	TRAITS									
	Accuracy in Work		*Speed of Work*		*Knowledge of Job*		*Carefulness & Work Organisation*		*Ability to Work without Constant Supervision*	
Categories of Workers	*Rating Scale*	*Questionnaire*	*Rating Scale*	*Questionnaire*	*Rating Scale*	*Questionnaire*	*Rating Scale*	*Questionnaire*	*Rating Scale*	*Questionnaire*
Computor	.91	.95	.91	.99	.92	.95	.91	.94	.91	.95
Machine Operator	.91	.93	.94	.94	.92	.99	.94	.91	.92	.97
Punch Card Operator	.87	.95	.91	.96	.98	.86	.88	.89	.88	.91
Office Clerk	.89	.94	.90	.96	.85	.88	.90	.92	.86	.95
Field Investigator	.83	.94	.83	.90	.85	.89	.85	.78	.89	.87

Conclusion

The two sets of coefficients of discrimination, however, reveal that the questionnaire was generally superior to the rating scale though the score range in case of questionnaire was much narrow in comparison with that of the rating scale. There might be several basic reasons underlying the fact.

In the case of rating form, though the characteristics were defined, perhaps the supervisors failed (to some extent) to grasp the main points or the activities which should be related to the characteristics and hence they were not so successful to discriminate their subordinates at the time of assessment. In the questionnaire, however, the situation was a bit different and the statements were directly related to the traits. The supervisors were to state whether the statements were applicable to the ratee in question or not. This helped the raters to judge their subordinates more objectively and fair degree of discrimination occurred in their assessment.

Moreover, the existence of 'halo effect' is more probable in the case of rating scale because if the supervisor does not have clear idea about the trait from its definition, he is more likely to give high or low rating to all the traits to the ratee who should get high or poor marks in one, two or more traits.

It seems from the above study that if one is to choose between rating scale and questionnaire form, it would be advisable to use the latter one because the assessment would be more fruitful in the sense that better discrimination would occur among the ratees. □

Forecasting Forging Plant Productivity with Product Schedule Variations

RP Khandelia*

In mass production industries like automobile and other engineering and forget industries, production schedule requirements necessitate many (each different) product schedule combinations to be run in a given period; management must have certain controlling and guiding yardsticks and other measures of effectiveness used for the evaluation of system parameters and operational configurations. Regression analysis has been used with advantage to establish association between variables of production in a forging trade to help forecast and appraise shop performance.

An attempt to identify and ascertain whether there prevails any evidence of functional or stochastic association between the operational parameters like (a) Average weight per piece of a forging, (b) Average forging weight per square inch of projected area viz., geometry of the work piece, etc., and quantum of production, i.e. forged tonnage or the total number of pieces produced in a given time on a forging machine tool (press or hammer) has been made.

A qualitative clue is provided by plotting scatter-diagram of the sample data. If this shapes into a well-defined locus of maximum dot-density tending to condense more and more to a curve, this curve can reasonably be assumed to be a smudged reflection of a *Functional Relationship*. If, however, the dots do not appear to cluster around towards some fairly definitely indicated curve, and yet are not randomly distributed all over the range of the sample, occupying rather a fairly well-limited region, there perhaps exists a stochastic/statistical relationship between the variates.

Strain rate, cooling conditions, interface friction, and the geometry of the work piece and other unpredictable, uncontrollable variations affect stresses and forces developed during forging and thereby the performance of a forging unit. A forging process produces a wide range of products with continuous product dimensions variability. Industries have been intensively searching to assess and evaluate the selective or cumulative influence of these important factors of production upon the production level in terms of numerical coefficients to *forecast production on a forging unit with product schedule variations* and appraise the forging shop performance.

Besides the above extraneous factors of product and operational parameters, the production level will also vary on a given forging machine and from one forging unit to the other, depending upon the forging process adopted

*Chief Standards Engineer, Hindustan Motors Ltd. P.O. Hindustan Motors, Hooghly, W. Bengal.

and the selection of machine tool for a given purpose viz.,

(i) Static forging on a press,
(ii) Dynamic forging on a hammer, or
(iii) A combination of the two (static-dynamic).

Also, the maximum force developed in forging will determine the size of the hydraulic press needed and will set the limits of elastic distortion permissible in mechanical presses; the energy requirement determines whether a given forging can be made on available hammers, etc. The difficulties of obtaining reliable yield stress and friction values, as well as the uncertainties introduced by differential cooling and metal flow make calculation of force and work in closed die forging difficult and, therefore, the more direct approach available is to measure the forces in the experimental forging of simple shapes and use the *specific force values* (Force developed divided by the projected area of the forging). Thus, projected area of a forging piece acts as a big capacity constraint for a forging unit irrespective of its weight. We shall, besides, have different weight *versus* projected area ratios for each different product being produced on the same forging unit. Also, average weight per square inch of projected area will vary from one forging machine tool to the other. Whereas it is generally acknowledged that there is a close relationship between the average weight of forged pieces and total production weight, the equipment utilisation is considerably restricted facilitated by the geometry of the work piece (the cross-sectional area of the forging, in the parting plane, complete with flash). The overall productivity level of a forge shop is dependent on these two factors to a marked degree. With this view, it was, therefore, examined if average forging weight per square inch of projected area bears a closer relationship with quantum of production than only the average piece weight.

Regression analysis was used to establish the probable relation between the variables, in our case, production figure values as a function that follows the condition represented by these values. It may, however, be seen that the statistical sample data may not result into a definite funcional relationship, but found scattered, between control limits, and a linear equation can replace them only with a certain amount of probability and accuracy.

Data for different forging units were collected as shown in Table-I. Four scatter diagrams for production figures of 1,300 Ton Maxi Press (taken from Table I), two each for average weight per piece of forgings and average unit weight per square inch of projected area for 50 shifts running were plotted to study their nature (Fig. A). The average weights were plotted on the abscissa and the production weight and quantity figures per unit of time (50 shifts in our case) on the ordinate. Similar scatter diagrams were plotted for the combined results of hammers and presses (Fig. B) to effect the change in the pattern of points distribution with the change in the machine tool. A certain statistical inter-dependency of variables will be evident by simple observation in spite of the scattered state of population points. Regression analysis, with the help of the method of least squares, provides an equation which most closely follows the plotted points.

A general two-factor linear regression equation is given by :

$$Y = A + BX$$

where, Y = Production level in Tons or Quantity.

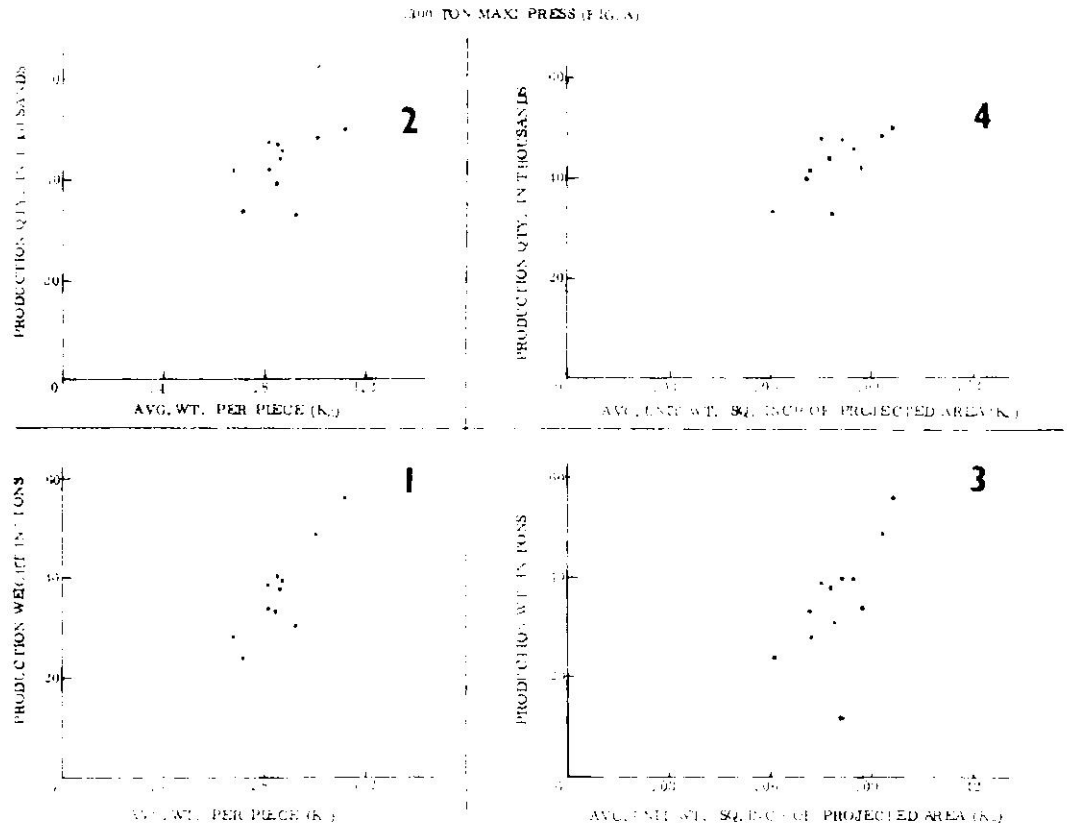


Fig A

A = Constant
B = Regression coefficient
X = Average weight per piece or average unit weight per square inch of projected area as the case may be.

Use is made of correlation coefficient (which gives the index of the relationship-strength) to characterise the degree of how the regression equation follows the data on the scatter diagram.

The correlation coefficient is represented by 'R' and its value varies between zero and 1. An absolute value of 1 shows a complete functional relationship of variables whereas any value smaller than 1 represents a partial relationship. If the value of 'R' lies between+1 and zero, the relationship between the two factors is positive, i.e. Y increases with an increase in the value of X. If the value of 'R' lies between zero and—1, the relationship is negative, so that Y decreases with an increase in X.

It will be seen from the results of SUMMARY TABLE NO. 4 that the value of 'R' illustrates a positive relationship when related with production weight in tons except in case

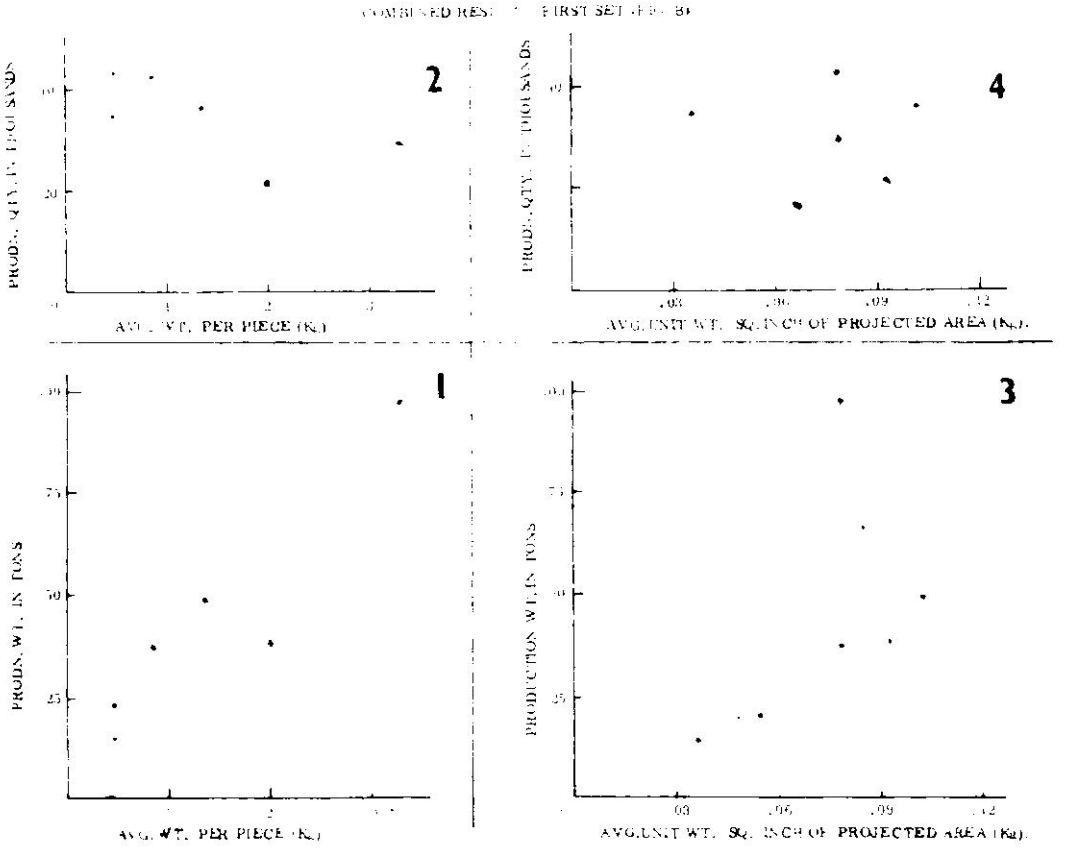


Fig. B

of 13,000 Mkg. Hammer. The individual presses, hammers, press group, hammer group and the combined results of presses and hammers bear the same relationship. A negative relationship is demonstrated between the factors when related to production quantity. This can be explained by the reduced strokes per minute available on bigger size forging units whether presses or hammers. It will be seen from Table No. 2 that strokes per minute available on 6,000-Ton Maxi Press are only 36 against 90 available on 500 Ton Ajax. Also, the average stroke utilisation reduces from 10 to 4 or 5.

Calculations

Data for different forging units and pairs of units are first compiled as shown in Table 3. Such tables are prepared for—

(a) Individual presses and hammers for a year's production monthwise,

(b) Press Group—Average monthly production for the year on each press separately,

(c) Hammer Group—Average monthly production for the year on each hammer, and

(d) Hammers and presses combined—Average monthly production for the year.

Table 3 will be used only for sample calculation. The total results are summarized in Table 4. Since there were in all 13 groups of values and for each group four different relationships were to be established, a total of 52 results were obtained for regression coefficient 'B' and correlation coefficient 'R'. All these values have been detailed in Table 4. The whole programme was taken up on computer to obtain results since manual calculations would have consumed considerable time. Besides, calculations for so many combinations and their comparison could not have been possible easily.

Refering to Table—3,

Column 1 —Indicates month code, forging machine code or the number of the examined pairs of values,

Columns 2 & 3—Indicate shop dates reduced to a common basis,

Columns 4 & 5—The deviations from the average values of X and Y,

Columns 6, 7 & 8 are self-explanatory.

Thus,

$$\bar{X} = \frac{\Sigma X}{N} = \frac{9.481}{11} = 0.861909$$

$$\bar{Y} = \frac{\Sigma Y}{N} = \frac{410.73}{11} = 37.339$$

The deviations from the average can now be calculated :

$x = X - \bar{X}$
$y = Y - \bar{Y}$ } Against each pair of values.

Further, the regression coefficient 'B' and the regression equation can be calculated in the following manner :

$$B = \frac{\Sigma xy}{\Sigma x^2} = \frac{9.8535}{.153312} = 64.271$$

and $A = \bar{Y} - B\bar{X} = 37.339 - 64.271 \times .861909 = -18.057$

and, therefore, the regression equation is

$$Y = -18.057 + 64.271X$$

and the value of R, the correlation coefficient is given by

$$R = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \times \Sigma y^2}}$$

or $$R = \frac{9.8535}{\sqrt{.153312 \times 818.760}}$$

Whence, $R = 0.879$

and $R^2 = 0.773$

The value of R shows a strong relationship between the two factors. The square of correlation coefficient, viz, R^2 will help examine the influence of factor X on the event.

Since $R^2 = 0.773$, it means that the production weight is influenced to the extent of 77.3% by the average weight per piece of the forging. This further indicates that on this unit, production weight is influenced to the remaining 22.7% only by other factors.

Fifty-two such regression equations and correlation coefficients can be written from Table 4. On examining closely this table, it will be seen that the results generally improve and evidence of strong relationship is found when average unit weight per sq. inch of projected area is considered instead of average piece weight only. A marked improvement will be observed when the results are correlated with production quantities. Besides, production on hammers is influenced by the average weight to a greater extent than the presses. In other words, the other unrecorded factors have only a limited

influence on the production quantities on hammers. This is a consequence of the different contact times; the rapidly cooling flash closes the die in the hydraulic press whereas the hot flash in the hammer presents little resistance. Shortened contact time, in case of hammers, avoids excessive stock cooling and reduces the total force developed and thereby, the resistance to deformation.

With separate regression equations available for each forging unit and machine groups it is now possible to forecast the production on each unit or a combination of these with product schedule changes. Knowing the values of coefficients 'A' and 'B' and 'X' for a given schedule, value of 'Y' can be determined and the performance evaluated.

Tables like No. 5 are prepared in advance for each forging unit to facilitate quick calculations. Average unit weight sq. inch of projected area is computed for a given schedule at a given time and the probable production quantity figure obtained from regression equations. The analysis helps further in deriving the following conclusions for each forging unit :

(a) The maximum, minimum and average unit weight or unit weight per square inch of projected area.

(b) The strength of the positive negative relationship in general.

(c) The production schedule of the product-mix which will result into the best equipment utilisation for plants like automobile industry where more than one major product forgings are made and product-mix changes in monthly schedule.

(d) Type of forgings to be chosen for outside orders to balance and utilise spare machine capacities so that maximum production can be achieved for the same machine hours availability.

(e) A comparative production loss study for utilising higher capacity machines for light forgings and vice versa.

TABLE 1

PRESSES

Month Code:	*No. of Shifts Run:*	*Average Wt./Pc. in Kg.*	*Avg. Unit Wt./Sq. inch. in Kg.*	*Production Qnty. for Shifts Run*	*Production Qty. for 50 Shifts*	*Prodn. Wt. in Tons. for Shifts Run*	*Prodn. Wt. in Tons. for 50 Shifts*
1	2	3	4	5	6	7	8
6000 *Ton Maxi Press* :							
04							
05	19.80	20.850	.193708	4532	11420	94.730	239.50
06	25.60	19.850	.218406	6563	12830	130.430	255.00
07	22.00	21.100	.196425	5649	12850	119.020	271.00
08	14.80	19.105	.175868	2903	9820	55.460	187.80
09	09.40	14.868	.171599	3060	16280	45.495	242.00
10							
11	12.21	15.807	.175185	4119	16850	65.110	266.50
12	14.40	17.400	.208436	5220	18130	90.850	317.50
01	18.64	15.774	.170675	6175	16580	97.402	267.50
02							
03	15.30	17.280	.107420	3612	11800	62.413	204.00
Yearly Average:		18.00	0.18		14062		250.00

TABLE 1 (*Contd.*)

1	2	3	4	5	6	7	8
2500 Ton AJAX Press :							
04	35.40	2.303	.069487	20737	29268	47.75	67.39
05							
06	43.50	3.402	.083927	20960	24093	71.39	82.23
07	40.00	3.856	.086407	21597	27225	83.29	104.08
08	47.40	3.420	.082960	27058	28520	92.52	102.47
09	31.00	3.180	.075584	24313	39215	77.31	124.55
10	41.00	3.387	.077427	21211	25875	71.83	87.63
11	45.00	2.844	.073450	26500	29440	75.36	83.84
12	51.00	3.127	.077722	30106	29500	94.14	92.23
01	46.40	3.926	.087077	20557	22253	80.71	89.01
02	40.40	3.295	.071593	23072	28520	75.51	93.44
03	32.70	3.461	.083234	27554	42205	95.40	146.05
Yearly Average:		3.291	.079352		29629		97.53
1300 Ton Maxi Press :							
04	45.00	0.710	.060409	30380	33760	21.51	24.00
05	34.00	1.115	.096513	33977	49920	37.95	55.80
06	36.30	0.845	.080664	34258	47200	28.97	39.92
07	50.00	0.860	.077220	43864	43864	37.65	37.65
08	49.00	0.675	.071668	40738	41600	27.46	28.00
09	39.80	0.812	.087148	33378	41920	27.09	34.00
10							
11	42.00	0.814	.073896	39960	47560	32.50	38.72
12	41.30	0.925	.079252	26760	32400	25.47	30.84
01	39.20	1.010	.093375	37758	48160	38.21	48.76
02	45.00	0.688	.084875	41083	45600	35.59	39.60
03	41.00	0.847	.071078	32393	39520	27.46	33.44
Yearly Average:		0.862	.079644		42864		37.34
1300 Ton AJAX Press :							
04	33.30	1.300	.096684	18600	27950	24.171	36.20
05	30.70	1.409	.111648	21245	34550	29.934	48.80
06	40.00	1.334	.104334	28140	35200	37.540	46.90
07	35.00	1.222	.094717	24197	34600	29.567	40.80
08	25.43	1.535	.100512	21685	42700	33.291	65.50
09							
10	27.40	1.397	.108676	19014	34750	26.559	48.50
11	32.40	1.349	.104392	22576	34750	30.458	47.00
12	31.60	1.312	.098820	21281	33700	27.922	44.20
01	38.00	1.466	.110873	36250	47700	53.134	70.00
02	24.70	1.250	.098903	18136	36700	22.670	46.00
03	28.40	1.452	.100129	18958	33400	27.524	48.40
Yearly Average:		1.366	.1027		36000		49.30

TABLE 1 (*Contd.*)

1	2	3	4	5	6	7	8
500 *Ton AJAX Press* :							
04	51.40	0.403	.040177	21005	20450	8.459	8.24
05	35.30	0.504	.058040	24275	34350	12.219	17.32
06	43.90	0.435	.060214	43030	49000	18.781	21.35
07	45.00	0.578	.064673	50410	56000	29.091	32.35
08	54.30	0.392	.044052	61563	56700	24.129	22.20
09							
10	26.80	0.513	.062331	27116	50500	13.903	25.95
11	49.00	0.405	.043807	42915	43800	17.383	17.75
12	47.30	0.550	.064039	38830	41100	21.400	22.60
01	47.40	0.525	.067227	29955	31600	15.720	16.60
02	60.00	0.477	.049154	59796	49800	28.581	23.82
03	47.00	0.388	.049712	44904	47800	17.403	18.50
Yearly Average:		0.470	.054857		43735		20.61
			HAMMERS				
13000 *MKG. Hammer* :							
04	27.50	1.088	.081470	26697	48600	29.04	52.80
05							
06	30.00	1.366	.089307	18072	30090	24.67	41.10
07	55.00	1.662	.084647	32103	29175	53.37	48.52
08	35.00	2.429	.094854	10605	15150	25.75	36.83
09							
10	49.57	1.947	.089685	15826	15975	30.81	31.08
11	53.50	2.318	.101337	10357	9682	24.01	22.44
12	43.40	2.203	.092073	12768	14715	28.13	32.30
01	26.80	2.678	.099099	9591	17850	25.68	47.93
02	36.40	2.169	.100876	10740	14775	23.29	32.03
03	30.00	2.377	.101721	10302	17175	24.49	40.87
Yearly Average:		2.024	.0935		21318		38.60
4000 *MKG. Hammer*:							
04	28.50	0.517	.034903	10912	19140	5.64	9.90
05							
06	32.70	0.373	.032668	18274	27995	6.82	10.45
07	40.00	0.277	.031860	33837	42245	9.37	11.70
08	31.64	0.763	.043234	18414	29150	14.04	22.22
09							
10	30.00	0.669	.041357	15840	26400	10.60	17.64
11	39.64	0.294	.032908	30893	38940	9.09	11.44
12	43.00	0.663	.040442	25712	29865	17.04	19.82
01	37.00	0.653	.040449	21329	28820	13.92	18.81
02	27.50	0.480	.034657	16183	29480	7.76	14.14
03	15.00	0.159	.029753	21723	72380	3.46	11.55
Yearly Average:		0.485	.036223		34441		14.77

TABLE 2

SUMMARY RESULT

UNIT	*Average Wt./Pc. in Kg.*	*Avg. Unit Wt./Sq. inch. in kg.*	*Prodn. Qnty.*	*Prodn. Wt. in Tons*	*Prodn. Qty. for 10 Strokes I min. utilisation*	*Prodn. Wt. in tons. for 10 Strokes/min. Utilisation*	*Strokes Per Min.*	*Ach. Prod./ Shift*	*Average Stroke/ min. Utilisation:*
			First Set		*Second Set*				
Press Group :					*Press Group:*				
6000 Ton	18.00	0.180	14062	250.00	28124	500.00	36	600	4 to 5
2500 Ton.	3.291	.079352	29629	97.53	29629	97.53	50	1250	9 to 10
1300 Ton Maxi.	0.862	.079664	42864	37.34	42864	37.34	80	1250	9 to 10
1300 Ton Ajax.	1.366	.1027	36000	49.30	36000	49.30	70	1560	10
500 Ton Ajax.	0.470	.054857	43735	20.61	43735	20.71	90	1500	10
Hammer Group:					*Hammer Group :*				
13000 MKG.	2.024	.0935	21318	38.60	26647	48.25	80/8	600	8
4000 MKG.	0.485	.036223	34441	14.77	3444	14.77	80/16	750	10

TABLE 3

Machine Code:—07—Machine Name:—1300 Ton Maxi Press

N	X	Y	X	y	xy	x^2	y^2
1	2	3	4	5	6	7	8
04	.710	24.00	—.151909	—13.339	2.0263	.023076	177.929
05	1.115	55.80	.253091	18.461	4.6723	.064055	340.809
06	.845	39.92	—.016909	2.581	— .0436	.000286	6.662
07	.860	37.65	—.001909	.311	— .0006	.000004	.097
08	.675	28.00	—.186909	— 9.339	1.7455	.034935	87.217
09	.812	34.00	—.049909	— 3.339	.1666	.002491	11.149
11	.814	38.72	—.047909	1.381	— .0662	.002295	1.907
12	.925	30.84	.063091	— 9.499	— .4100	.003980	42.237
01	1.010	48.76	.148091	11.421	1.6913	.021931	130.439
02	.868	39.60	.006091	2.261	.0138	.000037	5.112
03	.947	33.44	—.014909	— 3.899	.0581	.000222	15.202
11	9.481	410.73	—	—	9.8535	.153312	818.760

TABLE 4

SUMMARY TABLE

Mc./ Code.	Machine Description	Coefficients	Related to Production Weight Basis: Weight per Piece.	Related to Production Weight Basis: Wt/Sq.inch of projected area.	Related to Production Qty. Basis: Weight per Piece	Related to Production Qty. Basis: Wt/Sq. inch area.	Average weight per piece.	Average Wt./Sq. inch of projected area.
06	6,000 T. MAXI.	A	284.458	124.511	29,923.586	11,030.570		
		B	—1.909	698.635	—881.002	16,866.220	18.004	0.179747
		R	—0.115	0.584	—0.696	0.184		
		R2	0.013	0.341	0.484	0.034		
08	2,500 T. AJAX	A	34.70	0.959	38,886.180	44,543.266		
		B	19.094	1,222.703	—2,807.491	—188,592.432	3.291	0.078988
		R	0.394	0.348	—0.21	—0.192		
		R2	0.156	0.121	0.044	0.037		
07	1,300 T. MAXI.	A	—18.057	—21.522	24,072.279	14,589.657		
		B	64.271	739.040	21,802.442	35,004.620	0.862	0.079645
		R	0.879	0.858	0.468	0.648		
		R2	0.773	0.736	0.219	0.418		
09	1,300 T. AJAX	A	—63.312	—43.409	—5,786.224	—4,339.286		
		B	82.439	902.727	30,590.208	392,888.788	1.366	0.102699
		R	0.795	0.523	0.566	0.437		
		R2	0.632	0.273	0.321	0.191		
10	500 TON AJAX	A	—3.293	2.799	38,848.424	35,554.512		
		B	50.851	324.628	10,399.872	149,148.726	0.470	0.054857
		R	0.568	0.514	0.064	0.131		
		R2	0.322	0.264	0.004	0.017		
12	13,000 MKG.	A	54.931	105.459	61,338.493	141,120.346		
		B	—8.070	—715.011	—19,775.556	1281,218.816	2.0237	0.0935069
		R	—0.433	—0.459	—0.866	—0.804		
		R2	0.187	0.302	0.750	0.647		
13	4,000 MKG.	A	5.831	—16.620	59,688.249	100,545.740		
		B	18.432	866.500	52,076.628	1824,924.500	0.4848	0.0362231
		R	0.839	0.915	—1.02	—0.830		
		R2	0.704	0.838	1.041	0.690		
	HAMMER Group	A	7,260	—0.304	38,576.583	42,743.300		
		B	15.484	416.098	—8,526.969	229,160.366	1.2545	0.0648615
		R	1.00	1.00	—1.00	—1.00		
		R2	1.00	1.00	1.00	1.00		
FIRST	PRESS Group	A	31.713	—88.152	34,131.497	55,956.924		
		B	12.348	1,803.436	—182.062	—228,552.828	4.7978	0.0973146
		R	0.986	0.930	—0.387	—0.906		
		R2	0.972	0.865	0.150	0.820		
SET	HAMMER & PRESS COMBINED:	A	24.166	—73.396	32,087.693	47,554.441		
		B	12.793	1,631.695	—96.794	—176,964.096	3.78543	0.089471
		R	0.981	0.904	—0.056	—0.741		
		R^2	0.963	0.818	0.003	0.550		

TABLE 4 (*Contd.*)

M.c. Code.	Machine Description	Coefficients	Related to Production Weight — Basis: Weight per Piece.	Related to Production Weight — Basis: Wt/Sq. inch of projected area.	Related to Production Qty. — Basis: Weight per Piece	Related to Production Qty. — Basis: Wt Sq. inch area.	Average weight per piece.	Average Wt. Sq. inch of Projected area.
SECOND	HAMMERS	A	4.220	—6.411	36,897.202	39,371.896	1.2545	0.0648615
		B	21.754	584.634	—5.064.330	—136.102.744		
		R	1.00	1.00	—1.00	—1.00		
		R2	1.00	1.00	1.00	1.00		
	PRESSES	A	10.561	253.957	37,253.250	46,630.524	4.7978	0.0973146
		B	27.178	3,976.365	—246.540	—106.329.602		
		R2	1.00	0.945	—0.254	—0.708		
		R	1.00	0.893	0.065	0,501		
SET	HAMMER & PRESS COMBINED:	A	5.867	197.072	35,006.652	41,144.946	3.78543	0.089471
		B	27.426	3428.573	—136.107	—74,365.063		
		R	0.999	0.902	—0.126	—0.496		
		R	0.998	0.815	0.106	0.246		

TABLE 5

Machine Code:—07 Machine Name:—1300 Ton Maxi Press

Part Description:	*Unit weight in Kg.*	*Projected area in sq. inches.*	*Unit Weight Sq. inch of projected area in kg.*
Passenger Car:			
Clutch Lever	0.34	8.76	.038813
Selector 1 & 2 Reverse	0.17	7.65	.022222
Valve Rocker	0.17	5.085	.033432
Steering Lever	0.80	18.00	.044444
Eye Bolt	1.34	13.80	.097101
Vernier Brkt	1.17	12.37	.094584
Selector Top & 3rd	0.11	8.46	.013002
Connecting Rod	0.79	16.53	.047792
Connecting Rod Cap	0.64	7.48	.085561
Truck:			
Drop Arm (i)	2.27	28.60	.079371
Drop Arm (ii)	2.95	34.40	.085756
Pedal Shaft. Brkt.	0.68	16.43	.041388
Average:	0.9525		.0570

Creeping Legalism in Canadian Industrial Relations

SP Muthuchidambaram*

Excessive conflict, costly collusion, obstructionism toward economic progress, non-democratic and unethical practices, lack of appreciation of public interest are only a partial catalogue of the alleged paralysis afflicting industrial relations system across the country. The single remedy more often suggested by various publics, pressure groups and politicians for these problems is "there-ought-to-be-a-law". Further, it is suggested that as the judiciary has been and is capable of settling all kinds of disputes impartially and objectively in accordance with the principles of law and natural justice industrial disputes too can safely be left with the judiciary for an orderly, speedy and civilised way of settlement. The author attempts to examine the intellectual and historical origin of the above faith, to identify the assumptions behind the same and to establish the operational and behavioural implications of such remedies to industrial relations problems, in the light of the experience with the role of judiciary in industrial relations systems.

WHAT is legalism?[1] Legalism is the ethical attitude that holds moral conduct to be a matter of rule following the moral relationships to consist of duties and rights determined by rules. Like all moral attitudes that are both strongly felt and widely shared, it expresses itself not only in personal behaviour but also in philosophical thought, in political ideologies and in social institutions. Though this attitude is all-pervasive, it is not quantifiable; nonetheless it is consistently followed and concretely manifested as the standard of organisation and the operative ideals. It has served as the political ideology of the legal profession, both bench and bar[2]. It tends to make law a "science", as something "well-defined", "well-analysed", "discrete entity" that is "there". The same attitude toward law has served to isolate law completely from the social context within which it exists.

In fact this isolation of law from its social context, though apparent since the development of the Austinian Theory of Law, has been further necessitated, reinforced and accelerated by "specialisation" which is now a permanent feature of our intellectual life. Legalism and formalism are the inevitable by-product of the "legal science's" indifference to or separation

*Associate Professor of Administration, Faculty of Administration, University of Saskatchewan, Regina Campus, Saskatchewan, Canada.

1. The author has drawn heavily from the following works in developing this part :
Judith N Shklar, *Legalism*, Harvard University Press, Cambridge, Mass., 1964.
Harold J Laski, *Studies in Law and Politics*, Books Libraries Press Inc., Freeport, New York, 1968.
for Robert S Summers (ed.), *Essays in Legal Philosophy*, Basil Blackwell, Oxford, 1968.

2. Shklar, *Op. cit.*, Introduction.

from political science, economics, sociology and history. Intellectual isolation and legal positivism are inseparable. Paul C Weiler has observed that the philosophy of the judicial process will soon be of great practical significance for the Canadian legal scene; in his view, the traditional, inarticulate, legal positivism of Canadian lawyers and judges is becoming outmoded.[3]

It is necessary to make the phrase "legal positivism" more explicit so that one can have a better appreciation of Paul Weiler's statement. Legal positivism covers a wide variety of views including: (1) that law as it is can be clearly differentiated from law as it ought to be; (2) that only the concepts of existing positive law are fit for analytical study; (3) that force or power is the essence of law; (4) that law is a self-sufficient closed system which does not draw on other disciplines for any of its premises: (5) that laws and legal decisions cannot, in any ultimate sense, be rationally defended; (6) that a logically self-consistent Utopia exists to which positive law ought to be made to conform; (7) that, in interpreting statutes, considerations of what the law ought to be have no place; (8) that judicial decisions are logical deductions from pre-existing premises; (9) that certainty is the 'chief end of law'; (10) that there is an absolute duty to obey evil laws; (11) that there can be no 'higher law' in any significant sense; and (12) that law consists exclusively of hard and fast rules.[4]

Legalism as an Ideology and its Social Consequences[5]

These ingredients of legal positivism--however "inarticulate, traditional and outmoded" they may be--provide the necessary mysticism to any bar or bench. Over a period of time, specialisation, formalism and technicalities of rules become an end in themselves. That is the beginning of the idolatry of legalism, the symbol of twentieth-century clan worship. This idol of legalism becomes something apart from man himself, over and against him which he worships and to which he submits. This development of legal ideology has made Morris R Cohen to observe that :

> "It will help us to understand at least one phase of this difficulty, to wit, the psychology of clericalism, if we realize how much, its motives are like those which in this country make for legalism. By considering how fanatically the leaders of our legal profession oppose all efforts to take public issues out of the legal forum into the political forum, we can better understand the tenacity with which the clerical profession in Europe resists the secularization of education and similar measures. As both the legal and the clerical profession serve vital functions, they inevitably fall into the attitude that salvation even in political issues can come solely through them."[6]

3. Paul Weiler, "Two Models of Judicial Decision-Making", *The Canadian Bar Review*, Vol. XLVI, September 1968, No. 3; p. 406.

4. This is only skeleton of legal positivism. For further elaboration see Robert S Summers' Introduction to *Essays in Legal Philosophy*, op. cit., pp. 2-21 and in the same book see Ronald M Dworkin's "Is Law a System of Rules?", pp. 25-60. "Legalism" and "legal positivism" are used interchangeably.

5. It is unfortunate that some people are still allergic to the word "ideology". The following is the meaning this writer attributes to that word :

All ideologies contain four basic elements. The term ideology includes in its scheme a philosophy of history, an analysis of the present shape of man's development in the light of that philosophy, a projection of the analysis into the future and an analysis of the human actions necessary to hasten the inevitable outcome predicted in the projection of events into the future.

6. Morris R Cohen, *Law and the Social Order : Essays in Legal Philosophy*, Anchor Books, 1967, p. 157.

In fact the recent Canadian flirtation with the ideas of "Labor Court" is predominantly based upon this faith in achieving salvation through legal channel.

Once this monopolistic source of salvation is ingrained as the social ethos the attendant belief becomes obvious, i.e., that law is not only separate from political life but that it is a mode of social action superior to "mere politics". Aloofness from politics and impartiality depend upon avoidance of conflict with other, more powerful political agents. The politics of judicial legislation is exposed as such only when there is conflict.[7]

The ideology of legalism not only makes law superior to "politics" but also treats other forms of resolution of conflict, such as "compromise", "accommodation", "seeking a viable solution", "flexible policies" through non-legal or semi-legal or extra legal channels, as "inferior and imperfect". The political and economic theory of contractualism is the real foundation upon which the superiority complex of legalism is based.

Contractualism and Master-Servant Relations

The history of the trade union movement during the later half of the 19th century and the early part of the 20th century is a history of the various efforts made by the legislature to extricate industrial relations from the clutches of the judiciary which enforced contractualism of master-servant relations based on medieval concepts.

Contractualism in law implies that in an ideally-desirable system of law all obligation would arise only out of the will of the individual contracting freely; contractualism rests not only on the will theory of contract but also on the political philosophy of individualism. This in turn is connected with the classical economic optimism that there is a sort of pre-established harmony between the good of all and the pursuit by each of his own selfish economic gain.

7. Shklar, *op. cit.*, p. 11.

The ideology of legalism not only makes law superior to politics but also treats other forms of resolution of conflict, such as 'compromise', 'accommodation' 'seeking a viable solution', 'flexible policies' through non-legal or semilegal or extralegal channels as 'inferior' or 'imperfect'.

This politico-economic foundation of contractualism was further strengthened by the Benthamite hedonistic psychology, leading to Social Darwinism. Last but not least in importance is the theological foundation of contractualism, namely, the theological view that sin is an act of individual free-will, without which there can be no spiritual or temporal responsibility.

When one looks back to a century of interpretation and reinterpretation of contract, it is evident that the high priests of bench and bar have paid more attention to the formalism of the contract than to the most vital "free-will" or "agreement" ingredient of it. It is well known that the legendary "servants" we find in the legal literature never had free-will, yet legalism implied contract.[8] A more serious

8. For a thorough examination of economic, psychological, political, religious and metaphysical aspect of contractualism see Morris R Cohen, *op. cit.*, pp. 69-112.

It is the lack of social awareness on the part of the judiciary which made even Winston Churchill to say in parliament that it was impossible for trade unionists to expect fairness or understanding of the nature of social conflicts from the judiciary.

confusion of fact and fiction occurs when we speak of the "labour contract".

Labour Contract or Union-Management Agreement ?

Legalism, as defined earlier, conceives employer-employee relations as one of pure and simple contract. This view is based on all the socio-economic and political assumptions indicated previously regarding contractualism. Labour marketing, sale of labour, price of labour, factor of production are the various key concepts which underlie contract. It is based on the commodity concept of labour. From a legal point of view, there is no difference between the marketing of labour and the marketing of eggs. All relationships between the parties are assumed to be monetary relationships. These relationships can be translated into and regulated by written contract. Legalism equates labour contract with any other type of contract. It is based on the famous dictum of Maine that the progress of the law has been from status to contract and that whatever happens to be the outcome of history is necessarily for the best and cannot or ought not to be counteracted by any human effort. Any limitation on or alternation in the freedom of contract is an action against history and in favour of barbarism.

Not only does the marketing or contract concept of labour fail to focus attention on the question of power, politics and equity but it also suggests that the contract between parties is strictly and definably limited. The contract approach is static because it either ignores or minimises the continuity of relationships. This attitude is almost incapable of conceiving rights and obligations beyond those of the property, contract and market based ones. Legal positivism ignores the fact that the legal rights of private property confer only a control over things, not over people and carry no duty on the part of others to be managed.[9]

Not only does the "collective agreement" concept make this vital distinction between right over things and right over people but it also questions the following equation of contractualism: Property=Power=Right=Legitimacy.

The standard interpretation given by arbitrators and judges on the issues of "prior rights" of management is an illustrative case in point. What is "prior right"? What is the historical origin and foundation of "prior right"? Prior to what?

The answer to the last question is simple: prior to the recognition of a union as an exclusive bargaining unit. Here is the forthright answer given to the other two questions by an arbitrator.

> "At common law, the employer was vested with sole control over its business and management of its affairs. This unlimited control carried with it almost unlimited subsidiary rights, among which were the right to hire and fire, and discipline his employees for any reason, or no reason at all; to fix wages; job content and work schedule; to regulate promotions, transfers and layoffs and in general to determine where, when and how to do business without restraint by any private group or group of persons.."[10]

The very idea of management's bundle of "prior and residual" rights implies the inequality of power and rights between the parties who are supposed to bargain as equals and in good faith. The contradiction in this legal

9. NW Chamberlain, *Collective Bargaining*, McGraw Hill, 1951, p. 315; By the same author, *Labor Sector*, McGraw Hill, 1965, p. 344.

10. Pittsburg Tub Co., McCreary, 9 LA 834 (1948). Of course judges and arbitrators may not use such a naked language nowadays but the intent would be the same in interpreting the "management's rights clause".

doctrine is that it assigns unequal powers to one of the parties and at the same time it assumes that contract is based on free-will and consent". There can be no "free-will and consent" without the concomitant equality of power.

> "The collective bargaining idea exists in the knowledge that both labour and management are essential to operations and production and that they must come to terms before a settlement is reached. After they come to terms, we cannot now assume that some one party to the deal brings into a backlog of rights and powers it enjoyed in dealing with individual employees. A backlog of rights and practices and precedents does develop as the collective bargaining relationship continues, based not on pre-union history, but based on the period of the collective bargaining relationship."[11]

The bench and bar seem to be eager to read into the contract such medieval master-servant doctrines and impute, 'prior rights" based on pre-union history but are reluctant to look at the union-management relations within the total and changed context at present. Lawyers, in their eagerness to play the national game of Perry Mason, and judges in their willingness to witness such a drama, forget the fact that the contract might include matters and subjects which do not appear in cold print. They appear to read the collective agreement the same way they would read a criminal indictment, a deed for real property, a Bible, on a contract for the sale and delivery of nuts and bolts. These observations are elaborated further in the following section.

Legalism and Canadian Industrial Relations

At the end of the 1950's the question of legalism in Labour arbitration was raised in the *Arbitration Journal*[12]. Some of the problems recognised at that time were the growing super structure of legal trappings, a frustrating kind of legalism creeping into labour relations because the arbitrators had come to function like judges, the parties had begun to treat arbitration like litigation, with all the canons of construction familiar to the law of contracts. "The trend has, in fact, gone so far that unless it is reversed there is a serious danger that arbitration will lose the very characteristics of speed, economy and informality that causes companies and unions to prefer this method of grievance settlement above all others."[13]

There was a response to the above editorial: that response did not deny the above criticisms but confirmed and defended this trend with a title, "in Defence of Creeping Legalism in Arbitration."[14] Some of the highlights of this defence are as follows : If you believe that law is evil, *per se*, legalism is also evil. The trend toward legalism is not only inevitable but desirable. The role of arbitrator is the same as that of a judge. The parties often refer to the contract as the "Bible". Formalism, forensic and technicalities all contribute to the desired atmosphere of carnival and mystery. The arbitration process seems to be moving in the direction of the development of a mature legal system. Legalism is equated with "maturity".

A decade after Paul H, Tobias's defence of creeping legalism appeared, Professor Douglas V Brown, in his presidential address to the Twenty-Third Annual Meeting of the Industrial Relations Research Association, established his

11. Goldberg, in *Management Rights and the Arbitration Process*, the Bureau of National Affairs Inc., Washington, D.C., 1956, p. 118.

12. "Creeping Legalism in Labor Arbitration: An Editorial", *The Arbitration Journal*, Vol. 13, 158, pp. 129-132 and p. 161.

13. Ibid., p. 130.

14. Paul H Tobias in *Industrial and Labour Relations Review*, Vol. 13, No. 4, July 1960, pp. 596-607.

thesis "that industrial relations in the U.S.A. are suffering from a severe case of legalism, and that there are few, if any, signs that the patient is about to recover from the disease". In deploring this terminal disease of "there-ought-to-be-a-law" complex, Professor Brown has said: "All too frequently we do not want to work out solutions; we want to impose them. Imposition invites laws; laws invite litigation: and litigation invites legalism."[15]

What about the Canadian scene? Industrial relations suffer from legalism as much as, or even more than, American industrial relations. Unawareness of it is partly due to the limited research in this field complicated by the division of powers and partly due to the complacency based on the "these-things-cannot-happen-here" attitude. Interpretation and application of labour laws by the judiciary at various levels suffer from outmoded common law doctrine, dogma, fiction and myth. Courts' increasing willingness to review awards of administrative bodies without necessary judicial creativeness is viewed by experts in the field with misgivings .[16] The lack of judicial creativeness in this field seems to narrow the distance between the fountain of justice and legalistic witchcraft.

The dilemma involved in the role of the bench and the bar regarding the issues of conflict in industrial relations has been explained by AWR Carrothers as follows :

> "At one extreme the common law tries to pour the comparatively new wine of industrial conflict into such old bottles of the law of defamation, nuisance and inducing breach of contract; and at the other extreme it has invented and continues to use comparatively new and difficult containers such as the tort of conspiracy to injure and unjustified interference with freedom to trade. The result is a resort to doctrine in lieu of reasoning from first principles. The reason behind the doctrine becomes dogma, learned for its own sake and applied with little regard for its ineptitude. To fit dogma to new situations resort is made to fictions which add nothing but confusion to an already irrational body of law. Even the point of fictions becomes lost, at which stage we are left with the enormity of legal myths."[17]

The "enormity of legal myths", the antipathy of common law toward union and collective bargaining, the lack of judicial creativeness, the over-willingness of the judiciary to jump into the operation of the semi-judicial industrial relations administrative agencies and the assumed sanctity of salvation through litigation—all combined together have made the Canadian industrial relations as much legalistic as those of the U.S. The bench and the bar have made a significant contribution in converting the system of collective bargaining into a system of collective dilemma.

Paul C Weiler's study on the role of the Supreme Court in the Canadian Labour Relations indicates that the number of cases that reached the Supreme Court during the period of 1950-70 has shown steady increase.[18] There

15. Gerald G Somers (ed.), *IRRA Proceedings of the Twenty-Third Annual Winter Meeting*, December, 1970, p. 2.

Ibid., p. 8.

16. Alton W Craig, "Arbitration of Labour-Management Disputes in Canada", *Labor Law Journal*, November 1961, pp. 1053-1068.

17. AWR. Carrothers, "Labour Law : Doctrine, Dogma, Fiction and Myth", *University of New Brunswick Law Journal*, 1964, p. 4.

18. Paul C Weiler, "The 'Slippery Slope' of Judicial Intervention: The Supreme Court and Canadian Labour Relations, 1950-70", *Osgoode Hall Law Journal*, Vol. 9, No. 1, August 1971, pp. 1-79. This is an excellent study which can be used as a model to analyse the role of judiciary in industrial relations at the provincial levels.

have been fifty-one cases during the twenty-year period, less than three per year. However, there were only fourteen cases in the first ten years and there have been thirty-seven cases during the Sixties. Labour relations law is becoming a more important part of the work of the Supreme Court as illustrated by the fact that there were a total of fourteen decisions in the last two years of the period, the same number as in the whole of the first decade.

What is the nature of the contribution made by the Supreme Court in this area? In furnishing a framework of depicting and evaluating the actual work of the Courts in the last twenty years, Paul C Weiler has come to the following conclusion:

> "The Supreme Court of Canada views its primary function as heavily-oriented toward the adjudication of concrete disputes. It views each such case as raising specific issues which are discrete and unrelated to those posed by other cases before it. It does not utilize the form of legal materials—statutory, judicial, academic, royal commission, etc.—which would illuminate the general implications of the doctrines that it is creating by using them to solve concrete dispute. As long as this general attitude is pervasive in the work of the Court as a whole, one cannot realistically hope for substantial improvements in its contribution to Canadian Labour Law."[19]

The judiciary seems to have developed a tremendous capacity to separate the questions of policy, administration and law into watertight compartments; its interests appear to be exclusively and narrowly focussed on the question of law; many times the question of law is treated apart from as well as against the question of policy and administration. Rarely do we find individual judges and courts experienced in the industrial relations field. "The efforts of the courts continually betray the dangers of 'absentee management'; the adversary process in our courts is not aptly designed to overcome these deficiencies, even when they are recognized."[20] Their obsessional allegiance to nineteenth century doctrines and legal niceties are expressed in their verdicts with no functional or policy relationships to the industrial relations context.

Behavioural Implications of Legalism in Industrial Relations

Basic to the understanding of industrial relations is the realisation that "labour contract" is different in content, form and style from other types of contract and that the relationship between the parties is also different from other types of commercial as well as non-commercial relationships. Collective bargaining is more than just a change in the method of marketing labour. Bargaining performs not only a contractual function in a broad sense, but a normative function. Collective agreement creates a permanent relationship between two social groups. The industrial relations system has introduced far more of an institutional transformation than the legal positivists are willing to and capable of accommodating. Cooperation and interdependence between the parties based on an agreement does not deny the underlying conflict: on the other hand, the agreement

19. Paul C Weiler, ibid., p. 79.

20. Paul C Weiler, Ibid., p. 3. The abuses of the adversary process can be seen in the labour injunction field. "The trouble with absentee management by judges, though, is that they are not familiar with these implications of what they are doing and that they will not usually be troubled later on by what they have done. Yet, their authoritative statement is in the reported opinion, and its intrusive force may have consequences far different than were intended by the Court"—Paul C Weiler, ibid., p. 66.

All too frequently we do not want to work out solutions; we want to impose them. Imposition invites laws, laws invite litigation, and litigation invites legalism.

institutionalises and channelises that conflict. Collective bargaining agreement "is an armed truce in a continuing struggle, yet the armistice line has not been put on the map".[21]

To the legal positivists a contract is a self-sufficient document: in their view, once the conceptual distinction is made between the matters of rights and matters of interests, between the substantive and procedural issues, between issues of interpretation and issues of enforcement, the question of application of contract is a straightforward function. But they either fail to appreciate or at least underestimate the inevitable and imperceptible blend of these issues and concepts in the everyday working relations between the parties. In industrial relations, when and where the formal bargaining for the signing of an agreement ends, the informal bargaining and the fractional agreement making begins. In industrial relations what is "unofficial" or "non-contractual" or "extra-contractual" is not necessarily "unreal" or "illegal"; many times the "unofficial" is more significant and vital operationally than the "official". So far as the local industrial relations director and the union leaders are concerned, these activities are not invalidation but operationalisation of the agreement.

21. Archibald Cox, "Reflections Upon Labor Arbitration", *Harvard Law Review*, 72, 1959.

To a legal positivist, what has been said in the preceding paragraphs about negotiating and administering an agreement might appear to reduce the whole system of industrial relations to lawlessness, non-contract and non-rationality unless the question of rationality is considered in a concrete socio-economic context.

> "Perhaps the only way to avoid, or clarify these complexities is to use the term rational in conjunction with appropriate adverbs. Then a decision may be called 'objectively' rational, if in fact it is the correct behaviour for maximizing given values in a given situation. It is 'subjectively' rational if it maximizes attainment relative to the actual knowledge of the subject. It is 'consciously' rational to the degree that the adjustment of means to ends is a conscious process. It is 'deliberately' rational to the degree that the adjustment of means to ends has been deliberately brought about (by the individual or by the organization). A decision is "organizationally" rational if it is oriented to the organizations's goals; it is 'personally' rational if it is oriented to the individual's goals."[22]

The confusion of "rationality" becomes confounded in industrial relations because "management" is predominantly an economic-oriented organisation while the "union" is predominantly a "political" organisation;[23] by and large the former "acts" and the latter "reacts". The question of economy, efficiency, stability

22. Herbert A Simon, *Administrative Behavior : A Study of Decision-Making Processes in Administration Organization* ; The Free Press, New York, 1965, p. 76 and 77.

23. This statement is insufficient to explain what goes on between union and management in certain service sectors and public sectors; for a distinction between public and private sector collective bargaining see: Thomas M Love and George T Sulzner, "Political Implications of Public Employee Bargaining", *Industrial Relations*, (Berkeley), Vol. II, No. 1, February, 1972, pp. 18-33.

and predictability are viewed differently by these two social groups. In their continued actions and reactions the matters of law, of fact, of procedure, of substance, of policy, of administration—all overlap and intermingle in a given industry and at a particular plant. When "politics and economics confront one another, when such confrontation is brought before a "court of law", the legalistic dissection begins in order to isolate the "pure" question of law from the stated intermingling of issues. To put it bluntly, a verdict is arrived at by isolating the issue in dispute from the total context, without much appreciation either of the nature of the collective bargaining agreement or of the nature of the negotiation process.

One may not be able to appreciate the nature of the collective agreement, unless the components or subprocesses of negotiation are understood.[24] The first subprocess is distributive bargaining, its function is to resolve pure conflicts of interest. The second, integrative bargaining, functions to find common or complementary interests and solve problems confronting both parties. The third subprocess is attitudinal structuring, and its functions are to influence the attitudes of the participants towards each other and to affect the basic bonds which relate the two parties they represent. The fourth subprocess, intra-organisational bargaining, has the function of achieving consensus within each of the interacting groups.

The key questions for the negotiator in the above four processes, respectively, are: What commitment pattern should be employed in distributive bargaining? What degree of open communication should be used in integrative bargaining? What level of trust should be sought in attitudinal structuring ? What degree of control should be exercised over the organisation in intra-organisational bargaining? How, then, are these four questions interrelated? The question of rationality—objectively rational, subjectively rational, consciously rational, organisationally rational and personally rational—should be considered in the light of the above processes and behaviours. The by-product of these processes and behaviours is the "agreement". All these complexities compel the parties to keep the written agreement as flexible as possible, given the necessity for fractional bargaining which is to take place while administering the agreement.

The 'enormity of legal myths', the antipathy of common law toward union and collective bargaining, the lack of judicial creativeness, the over-willingness of the judiciary to jump into the operation of the semi-judicial industrial relations administrative agencies and assumed sanctity of salvation through litigation—all combined together have made Canadian industrial relations very much legalistic.

The strength of a labour contract lies in its weakness as a legal document. According to Peter Seitz, an arbitrator with wide experience, "A labour contract evidences a relationship of

24. Richard E Walton and Robert B McKersie, *A Behavioral Theory of Labor Negotiations : An Analysis of a Social Interaction System*, McGraw Hill, Toronto, 1965, Chapters I and X.

employer and union, there are many reasonable expectations that are indulged and assumed—expectations which if sought to be expressed in a document might lengthen it unduly and in any event, might better be left unsaid. The 'labour contract', typically, is a document with very expressive silences. On some occasions the fact that it is customary to include a certain kind of provision and that the parties have not done so might, in itself, have significance. The supreme test of the arbitrator's art is to read, interpret, and apply the cold words of the contract and then to know when it is suitable to consider other unexpressed circumstances and conditions as appropriate to a determination of what the reasonable expectations of the parties might have been when they looked at each other in the eye, struck a bargain and signed a document."[25] These are the reasons why industrial jurisprudence differs somewhat from what is normally known as jurisprudence.[26]

Many times the vagueness of the language of agreement may not be due to faulty draftsmanship by the parties but due to the inherent nature of the collective agreement; the continuing and dynamic relationships between the parties demand such purposive vagueness. The parties want to achieve orderliness through agreement but not deadly rigidity which would destroy flexibility and pragmatism. This desire for flexibility on the part of union and management is reflected even when they make provisions to have a "permanent arbitrator". In industrial relations the term "permanent arbitrator" is often a misnomer because, generally, a provision is added in agreement to the effect that he is to "serve until the termination of this contract, provided he continues to be acceptable to the parties". Hence some "permanent" arbitrators have found their tenure to be very impermanent.

The *ad hoc* as well as the impermanently-permanent arbitrators know (but our judges do not seem to know) the fact that union and management are a peculiar kind of adversaries. It is normal for adversaries to expect and fight for a victory in a case before an arbitrator or a judge. This is not always true in industrial relations. Under particular circumstances, one of the parties to an industrial relations dispute does worry more about the risks of winning than losing. This desire to lose is caused by one or more of the following factors: internal union politics, staff-line conflicts within management and possible adverse effect of a victory on future bargaining.[27]

In most other types of disputes between groups or individuals, once a judicial verdict is made, the parties to the dispute depart and may not meet each other ever again. On the other hand, the winner and the loser in an industrial dispute, invariably have to go back together, face each other and cooperate productively in their common venture. In this sense, a union-management contract may even be more binding and long-lasting than many matrimonial contracts, given the increasing rate of divorce. The relation between union and management is not purely and exclusively economic; it is a combination of socio-economic and political factors.

25. Peter Seitz, "Value Judgements in the Decisions of Labor Arbitrators", *Industrial and Labor Relations Review*, Vol. 21, No. 3, April 1968, pp. 427-430.

26. For an excellent analysis of industrial jurisprudence see HW Arthurs, "Developing Industrial Citizenship: A Challenge for Canada's Second Century", *The Canadian Bar Review*, Vol. XLV, No. 4, December 1967, pp. 786-830.

27. For further elaborating of these circumstances see Sumnar H Slitcher et al, *The Impact of Collective Bargaining on Management*, The Brookings Institution, Washington, D.C., 1960, pp. 799-801.

Once legal positivism takes root in industrial relations, the bargaining process is bound to reach a deadlock stage more often: the drafting of an agreement will be extremely laborious, legalistic, protracted and even futile. Agreement clauses will tend to become more and more detailed with a concomitant shrinking elbow room available for compromises. When the hair-splitting, jargon-ridden, doctrinal and nineteenth-century-precendent-bound interpretations of such a document takes place in a court, it is bound to be a national nightmare.

The operational and behavioural implication of an elaborate and legalistic contract at the work site seems to be more damaging and demoralising than what happens at the court. When extensive rules are made and enforced, the supervisors, the union representatives and the employees may not have much scope for mutual and on-the-spot accommodation and compromises. In fact, it will be almost impossible to distinguish between "working" and "working to the rule". Operationally, under these circumstances, there will be predominance of the letter over the spirit of the contract. The contract becomes a defense mechanism for everyday legal non-cooperation between the parties.

Conclusion

Whenever a particular profession or institution gains a special status in society, there is an inevitable tendency for it to fall into institutional inertia and surround itself with professional mysticism. The teaching profession and higher educational institutions in the 1960's were rudely awakened from their inertia and mysticism. In all probability, for the legal profession and judicial institutions, the 1970's will be a period of soul-searching. Industrial relations may not be the only field which is suffering from, what Paul Weiler would call, the traditional, inarticulate, legal positivism of Canadian lawyers and judges.

> "Law, by its nature, never changes as rapidly as the rest of our social habits: its need of certainty and stability always makes it lag behind the substantive requirements of a given period. By its nature, again, it is tough and technical: it is difficult to arouse public opinion either to the consciousness of its inadequacies or to the knowledge of how these may be repaired. Its practice is a mystery which rarely yields its secrets to the outsider; and its habits are defended by a trade union of experts more powerful....than any other defensive association in the modern world. It is an arduous task even to understand the operations of the legal system. It is not, therefore, a matter for wonder that men should be satisfied with that which does not seem to provoke public outcry."[28]

We are entering into the second Industrial Revolution but our mental habits and institutions are still based on the principles and requirements of the first Industrial Revolution. Our capacity for social innovation is far behind that of technical innovation. We need something more than a Bentham to goad his fellow lawyers and members of the bench into a reconsideration of legal foundations.[29]

28. Harold J Laski, Studies in Law and Politics, op. cit., p. 277.

29. In his *Fragment on Government*, Bentham had paid the following respect to lawyers and he pursued them throughout a long life with a reformer's rancor :

> "A passive and enervate race, ready to swallow anything, and to acquiesce in anything; with intellects incapable of distinguishing right from wrong, and with affects alike indifferent to either; insensible, short-sighted, obstinate: lethargic, yet liable to be driven into convulsions by false terrors; deaf to the voice of reason and public utility; obsequious only to the whisper of interest, and to the beck of power."—cited in George H. Sabine, *A History of Political Theory*, Holt, Rinehart and Winston' Third Edition' 1961, p. 683.

Distribution Channels

MPC Shetty*

Distribution costs form a major part of the selling cost of a product and any economy effected can bring down the total selling cost resulting in a cheaper price. Distribution channels are an important link between the internal organisation and the economic environment. Tbis link is as logical and pertinent an extension of the production unit as arms and legs are of the human body. The author discusses the various distribution channels and the changes that are undergoing in India, indicating the dynamic nature of a distribution system.

DISTRIBUTION channels are the various outlets through which goods pass so that they may reach the ultimate consumer in the right quantities at the right place. Even in a very small business, it is necessary to have outlets to achieve fundamentally two objectives :

(1) to supply goods to the largest number of consumers in right quantities; and

(2) to make these goods conveniently available to the consumers.

In the Indian situation these sales outlets are mainly agents, stockists, wholesalers, distributors, the manufacturer's own shops, retailers and street vendors.

Distribution channels are usually considered as separate and different from the organisation and not as a part or extension of it. However, this important link between the internal organisation and the economic environment is as logical and pertinent an extension of the production unit as arms and legs are of the human body.

*Manager, Glaxo Laboratories (India) Ltd., Okhla, New Delhi-20.

Marketing people and company administrators whose thinking has been oriented to the internal organisation are responsible for fostering this unnatural and unproductive gulf between the organisation and their distribution channels. An encouraging feature in this respect is the recently-developing tendency for organisations to discuss their policies and plans with their distributors, thus giving them the long-denied status of partners in a joint effort. This changing attitude is evident also in the way regular distributors' meetings that are now organised by various companies at frequent intervals.

Distribution Trends

During the past few years distribution channels have been undergoing considerable changes in India. These changes are a positive indication of the dynamic nature of the distribution system as a whole.

There are many reasons why changes have taken place in the distribution channels. Foremost among them has been the everpresent inflationary condition in the country. In addition, an increasing sophistication in product

design and style has played its part together with trends of urbanisation among the population. The significant changes that have taken place are :

(1) Functioning of sales outlets
(2) Extension of product-lines handled
(3) Drive for greater margin
(4) Size and location of outlet.

1. *Functioning of Sales Outlets*

Traditionally the wholesalers or distributors played the role of financiers to the producers and in some cases to the retail units. Their selling activity was confined more or less to the delivery function. Both these aspects have undergone change. Their role as financiers particularly to the manufacturing organisations has diminished considerably and the delivery function is being gradually replaced by a greater responsibility for promoting and effectively distributing the products. The impact of these developments, which are indeed of a progressive nature, will take time to be felt but one cannot deny the fact that a start has been made.

2. *Extension of Product Lines Handled*

Both retailers and wholesalers (particularly retailers), have been extending their product-lines. In fact it is becoming more and more difficult for the manufacturer to select the particular type of sales outlet that will suit his product because practically all types of products are finding their way into all types of sales outlets. It is not unusual to find a cigarette vendor at the street-corner carrying household remedies like digestive tablets and headache pills. This new development, arising out of the eagerness of the retailer to earn more money, means for the manufacturers that the selling efforts of the wholesaler or retailer will be spread over a large number of products. A concentrated effort on the part of the retailer to sell one, two or a maximum of three product-lines can no longer be expected.

3. *Drive for Greater Margin*

A drive for greater margin is dringing forth products with distributors' and retailers' own brands. Even in a relatively-small store in an average town in India it will be found that the retailer has arrangements with someone to repack various products in small or convenient packings under his own brand. Or, there may be some arrangement with a local cottage type of manufacturing unit for supplying commodities like ground condiments and dried vegetables, etc., with the retailer's brand-name. These are the things which suggest the type of changes that are forcing the retailers and wholesalers to diversify their activities into areas which give them greater margins. In the time to come, with the type of industrial growth India is following, one can expect to see a greater growth of this tendency with retailers and wholesalers coming into the market with their own brands.

4. *Size and Location of Sales Outlets*

With the extension of the product-line, it is logical to expect that more storage and shelf space is needed. Apart from this fact, greater attention is now being given to window display and shelf decoration. They increase the need for more space, resulting in bigger stores. If the population had been static and had not spread beyond the city boundaries, it was possible that the size of the stores would not have much expanded. But with urbanisation and the population spreading miles and miles beyond the city limits bigger stores with a larger number of product lines, shopping and speciality goods under one roof are becoming popular.

Selection of distribution channels depends on the type of product to be marketed and the extent of penetration into the market that the manufacturer would like to achieve.

If the producers understand the changing nature of the sales outlets, they will recognise the need for frequently reviewing their distribution arrangements. But very often the attitude is "Our distribution system has worked well for the last 15 years; where is the need for us to review or to change it?" Perhaps it cannot be disputed that the distribution system in practice for the last so many years has been highly profitable but in view of the changing conditions a review can suggest alterations which may bring in greater efficiency and profits to the organisation.

Types of Existing Channels

There are numerous types of sales outlets which can be classified as distribution channels. As seen earlier, with changes in the social and economic conditions, distribution systems undergo considerable change. The growth of street-vending establishments into small shops in rural areas and small shops into big stores or department stores in urban areas strongly supports this fact.

The following are some of the popular distribution channels in the country :

(1) Street Vendors
(2) Shops
(3) Mobile Stores
(4) Manufacturers' Stores
(5) Cooperative Stores
(6) Department Stores.

On the wholesale side the distribution ehannels are :

(1) Agents and Brokers
(2) Stockists
(3) Distributors
(4) Wholesalers

The selection of distribution channels depends on the type of product to be marketed and the extent of penetration into the market that the manufacturer would like to achieve. Broadly speaking, in this respect, the following classification is normally made :

(1) Industrial Goods
(2) Consumer Goods

Consumer goods are further sub-divided into the following areas :

(1) Convenience goods
(2) Shopping items
(3) Speciality goods.

Industrial Goods are defined as goods which are destined to be sold primarily for use in producing complex or rendering services as contrasted with goods destined to be sold primarily to the ultimate consumer They include equipment and accessories, component parts, maintenance, repair and operating supplies, raw materials, fabricating materials.

Relatively few goods are exclusively industrial goods. The same article may, in one set

of circumstances, be industrial goods and under other conditions consumer goods.

Consumer Goods are defined as goods destined for use by the ultimate consumer or household in such form as can be used without commercial processing.

The classification of consumer goods into further areas has to be well understood since it can have a considerable effect on the selection of the distribution channels. It may, however, be added that these classifications are not watertight and that these tend to converge into each other in respect of various ranges of products.

Convenience Goods are defined as those consumer goods which the customer purchases frequently, urgently and with a minimum of effort in comparison and buying. Examples of merchandise customarily bought as convenience goods are tobacco products, soaps, newspapers, magazines, razor blades, electric bulbs, etc.

In this definition particular attention needs to be paid to the words *frequently*, *urgently* and *minimum effort*. Whenever a customer needs any of the items under convenience goods he is inclined to make the purchase immediately from the nearest accessible store or outlet. Since the unit price of such items is more or less small, the consumer does not mind paying a little extra if it is made available to him in quantities which are convenient to him and at the time and place he requires.

Shopping Goods are those consumer goods which the customer in the process of selection and purchase characteristically compares on the basis of suitability, quality, price and style. Examples of these goods are furniture, used cars, domestic appliances, etc.

It may, however, be emphasised that a given article may be bought by one customer as shopping goods and by another as speciality goods and by yet another as convenience goods. The general classification depends on the manner in which average or typical buyers purchase.

Speciality Goods are those goods with exclusive characteristics and/or brand identification for which a significant group of buyers are habitually willing to make a special purchasing effort. Examples of these are photographic equipment, household electrical gadgets, etc. In respect of these goods price is not usually the prime factor in consumer choice but the special characteristics of the product desired.

From the above it can be seen that consumer goods are basically of three types :

(1) Those which the consumer may need in small units but needs immediately from easily accessible outlets;

(2) those for which the consumer is inclined to make special visits to the central markets and where the exact nature of the articles to be purchased is not clearly defined in advance. These purchases are not urgent and the purchasers are inclined to postpone buying them to suit their convenience.

(3) Those where the consumers more or less know what they are going to buy with the usual brand influence on their minds. They will go to the speciality shops and purchase their preferred brand.

From these data one can arrive at the safe conclusion that the convenience goods need to be distributed widely, and the shopping and speciality type of goods through display stores which are patronised by diverse types of custo-

mers. Usually such shops are situated at well-appointed central locations, but sometimes it will depend upon the type of goods. Such lines as sanitaryware, for example, which, though they can be classified as speciality, may have a store removed from the shopping centre and be located in an area where construction goods are centralised.

Selection of Channels

There are numerous factors to be taken into account while selecting distribution channels. Market trends, competition outlook and pricing policies are some of the important factors which will affect the decision regarding a particular type of distribution system. By and large, details of the following aspects are highly important :

(1) Product
(2) Consumers
(3) Market coverage
(4) Distribution work
(5) Financial limitations
(6) Decision.

1. *Product*

The type and nature of the product to be marketed must be considered. If it is a perishable commodity like tea, tobacco, butter, vegetables, etc., controlled and limited levels of distribution should be sought so that the goods reach the consumers in a fresh condition. At times it may even be necessary to use expensive distribution methods so as to ensure speedy supply to the outlets The same methods may apply to highly fragile products like glass or chinaware so as to reduce the handling stages to a minimum.

However, if products are not highly perishable or fragile, economies in distribution can be effected by using cheaper channels even though the flow of goods may take more time. Although stages in such cases are usually more than in the case of perishable or fragile items, attempts should always be made to close-structure the distribution system by reducing levels to the barest essentials. In this way better control is possible and also access to quicker and more reliable market feedbacks.

2 *Customer*

The type of customer to whom the product has to be sold should be studied next. Such considerations as to what age and income group the customer belongs, what sex and, in certain cases, even his vocation and religion may have to come under survey.

Information regarding which outlets are normally patronised by the customer for a particular type of product and the average frequency of the customers' purchases is also of considerable importance.

3. *Market Coverage*

The distribution channels vastly differ if the market to be covered is restricted rather than large. Some manufacturers may like to have regional coverage as opposed to national coverage. In such cases information about geographical market coverage is necessary.

4. *Distribution Work*

As in the case of organisation, activities have to be grouped or sub-divided. The total distribution work should be examined, grouped and then sub-divided for effective effort. The organisation may decide to do a certain share of the distribution itself with other parts delegated to various channels.

Organisation of this work will also take into account whether the distribution is required to be wide, selective or exclusive.

5. *Financial Limitations*

Financial resources play a large part in the selection of channels. If resources are limited, the best arrangements may not be possible. This is the bane of many small industries in the country. They produce good quality material at a reasonable cost but are unable to market their products through really effective channels for want of financial resources.

6. *Decision*

The final decision regarding the selection of channels would thus be taken after a close study of a number of factors some of which have been discussed above. The type of motivation required for the channels and then the means for keeping these under constant review and control along with a regular feedback system will also have to be carefully considered. This is an important factor, particularly in an economy where frequent changes are occurring.

Channels for Industrial Products

The definition of industrial goods has been given earlier and needs no repetition. Normally industrial goods have a larger unit value and are sold in bulk quantities. The manufacturers are inclined to market these themselves. Selling these items more often involves complicated technical discussions with the buyers and it is not always possible for the manufacturers to give such service through the distributors.

Goods of a standardised character and low price together with those not requiring such technical canvassing are in many cases sold through middlemen and distributors.

Channels for industrial products, as in the case of consumer products, are also further classified into :

(1) Vertical type of industrial products.

(2) Horizontal type of industrial products.

Vertical types are those which are required by a particular industry or the same type of industry. These products have to be sold in an intensive manner to similar types of buyers. In such cases, manufacturers are inclined to do direct selling themselves.

Horizontal types are those which have to be sold to a large number of diverse customers. For these, middlemen are useful and economical.

Distribution Costs

What are the distribution costs and which of these costs can be transferred to other marketing areas requires careful consideration. The system seems to vary from organisation to organisation. Some include promotional material costs like samples, brochures, display cards, etc., in distribution costs and others restrict their costs to cover only items like transport, warehousing and depots, etc. Allocation of costs is the function which every company performs in its own way to suit its purpose.

The terminology of cost accountancy defines distribution costs as the cost of the process which begins with making packed products available for despatch and ends with making the reconditioned returned empty packages available for re-use.

Analysis of distribution costs is important to avoid costing inefficiencies which can use a substantial rise in prices. Distribution costs form a major part of the selling cost and any economy effected can bring down the total selling cost, resulting in cheaper prices. Even the location of warehouses and distribution points have considerable bearing on distribution. □

Environmental Pollution: A Global Problem

RM Advani* RD Verma** & ML Tikhe***

This paper presents a brief account of various types of pollution occurring in the environment. These are discussed under various headings such as: (i) Water pollution, including oil spillage, thermal and mercury pollution (ii) Air pollution (iii) Land pollution, including solid waste problem and (vi) Noise pollution.

ENVIRONMENTAL pollution, in its widest sense, means air, water and land pollution as a result of emission of exotic gases, discharge of industrial wastes, radioactive waste, dwelling waste, nuisance from noise and so on. Contamination of this type has posed a very grave problem, particularly in big industrialised cities with heavy automobile and air traffic. It is felt that unless some quick preventive steps are taken, most of these places would soon be unfit for human and other habitation. Further, the problem does not remain confined to such highly industrialised cities only, because air is not bounded by any national or international boundaries and the contaminated air moves swiftly from place to place. Similarly, many of the important rivers flow from one country to another and a river contaminated at one place carries its effect to other places as well. The river contamination, besides being from industrial wastes, is also on account of discharges of dwelling wastes, particularly from religious centres located by the side of holy rivers. Many countries are aware of this problem and have taken several preventive measures including legislation to control the water pollution. It would, however, be better if necessary international standards are evolved and the various countries are made to adopt the same. A water pollution control bill has already been passed in India and steps are being taken to adopt an air pollution control bill as well. In U.S.A. both such bills have been passed and it has also been decided not to use SST planes for commercial purposes due to their noise nuisance.

*Principal, **Reader in Civil Engineering, ***Lectuer in Civil Engineering MR Engineering College, Jaipur-4.

Water Pollution

The Chief contaminants that pollute river and lakes are municipal, agricultural and industrial wastes. A flowing river cleans itself to some extent by what is known as the self-purification phenomenon. This self-purification largely depends upon the quantity of water in the waste-receiving water-body, the quantity

and quality of the waste being discharged, the speed of current and the organisms present in the receiving body of water. The discharges of many of our rivers vary from season to season and from year to year, and during low flows adequate dilution may not take place. Then the dissolved oxygen content may get reduced to such an extent that aquatic life may not survive. Last summer a number of fish kills in the Jamuna river near Delhi were reported.[1] Viral pollution of water due to leaking sewers laid over water mains and the inadequate sanitary facilities have been responsible for the outbreak of diseases like jaundice and typhoid. The river Rhine of Europe, which passes through many countries, is so much polluted that it is generally referred to as the 'notorious sewer' of Europe.

To reduce the pollutional load on waste-receiving water bodies, the waste is generally treated before it is discharged into the water. The conventional methods of treatment are : (i) *Primary:* which includes provision of devices like screens, grit chambers and sedimentation tanks. These units mainly remove floating and settleable suspended solids, (ii) *Secondary:* which includes biological processes such as trickling filters, activated sludge, oxidation ditches and oxidation ponds. These processes stabilise suspended as well as dissolved organic matter present in the waste. Some countries such as U.S.A. have introduced legislation that requires primary as well as secondary treatment of waste before it is permitted to be discharged into receiving waters. But many countries including India do not have any such regulation. As a result, in many cases, raw waste is dumped into the water courses enhancing the pollution problem. Water pollution problems due to domestic and industrial wastes have been discussed in detail in many text books of Sanitary Engineering [2, 3, 4, 5]. However, recently there have been some cases of water pollution due to (i) oil spillage, (ii) pesticides, (iii) mercury and (iv) thermal pollution as well, a brief account of which is given in the remainder of this section.

Oil Spillage

The Torrey Canyon[6] disaster which occurred in the year 1967, attracted the attention of the whole world. Torrey Canyon which was broken on the Seven Stones Reef off Cornwall, split her 118,000 tons of crude oil cargo into the sea for ten days before being bombed by Buccaneer jets. During that time 40,000 tons of oil on the sea became water-in-oil emulsion due to wave action, which resisted combution and tended to be self-extinguishing.

Oil pollution of the sea became a serious problem after World War I when oil, increasingly, replaced coal as fuel. Coal-burning ships were turned into oil-burning ones and large fleets of tankers were built to transport crude oil to America and Europe for refining. The Chief sources of oil pollution are both the heavy sludges which deposit at the tank bottoms and the tank washings contaminated with oil and oil/water emulsions. There are basically three methods to deal with the oil that has escaped from the tanker. It can be recaptured, set on fire, or can be treated with a variety of

1. News Letter, Indian Association for Water Pollution Control, May 1970
2. Fair, GM, Geyer, JC; 'Water Supply and Waste-Water Disposal" John Wiley and Sons, 1954.
3. Steel, EW.; 'Water Supply and Sewerage' McGraw Hill Book Company, 1960
4. Eckenfelder, WW; 'Industrial Water Pollution Control' McGraw Hill Book Co., 1966.
5. Ross, RD, 'Industrial Waste Disposal" Reinhold Environmental Engineering Series, 1968.
6. Pilpel, N: 'Oil Pollution of the Sea' Science Journal (U.K.) June 1967, p. 73.

chemicals which would make the oil, either sink to the bottom or disperse in the sea. It has been reported that as a result of oil pollution of British waters, about 10,000 birds die every year. It is feared that in the long run the chemicals that are used to destroy the oil may prove more dangerous than the oil itself. When emulsifying agents were used for 250 tons of spilt oil in Milford Haven, nearly 30% of the fauna in the immediate vicinity was wiped out[6]. In India, a stretch of the river Ganga caught fire a few years ago because oil from the Barauni refinery had gained access to the river.

Pesticides

Since the publication of Rachel Carson's 'Silent Spring'[7] which alerted people round the world, the effects of pesticides are being studied extensively. While pesticides are known to have improved farm yields spectacularly, they have also caused widespread destruction of wildlife and fish. In one instance, the application of one-half pound of DDT wiped out the production of young salmon of the entire year[8]. The organochlorine group of insecticides which includes DDT, dieldrin, heptachlor and endosulfan is seriously blamed for world-wide pollution. Organochlorines are slowly biodegradable and therefore generally are not removed effectively in the conventional treatment processes.

Mercury Pollution

Mercury is another contaminant which is causing concern. It has been found that ordinary mercury gets converted, through complex reactions in water, into deadly methyl mercury. Minute amounts are picked up by the microorganisms on which small fish feed. These are later on consumed by predatory fish. Such sea fish, primarily are tuna and sword fish, large quantities of which are canned after processing[9]. One family in New Mexico was seriously poisoned because of eating mercury-contaminated food[10]. In the Minimata Bay region of Japan, neurological disorders were caused among many people and 41 people were killed due to eating fish contaminated with mercury[11]. A complication of the matter is that the tolerance level for mercury has not yet been discovered. Oceans and rivers have been contaminated with mercury due to large scale industrial waste dumpings. Through investigations it has been found that the most serious offenders are paper production companies which use organo-mercury compounds for the prevention of slime formation and also chemical industries which use mercury to separate chlorine from brine solutions.

Thermal Pollution

It is felt that thermal pollution which is caused by waste heat being discharged into lakes, streams and seas by industrial activities, is having adverse effects on the populations of fish and other organisms that live in these waters. Steam electric power plants, either fossil fueled or nuclear, circulate huge amounts of cooling water through condensers, to extract waste heat from the steam leaving the low pressure side of the turbine. When this circulated water carries waste heat into the receiving waterbody it is transported by turbulent mixing and advective processes, and at the same time is dissipated, at the water surface, to the atmosphere. Meteorological conditions and the hydrodynamic

7. Carson, R., 'Silent Spring' Houghton Mifflin Co., Boston, Mass, 1962.
8. News Letter, Indian Association for Water Pollution Control, Sept. 1970.
9. *Times of India*, 23.12.1970.
10. News Letter, Indian Association for Water Pollution Control, Nov. 1970.
11. *Science Today*, Oct. 1970, p. 37.

characteristics of the waste heat receiving water body determine the distribution of water temperatures[12]. When the temperature of a waterbody is raised beyond a limit, certain adverse effects may result in aquatic life. These can be listed as (a) Metabolism of the organism is speeded up. It may, in certain cases, cause death (b) Susceptibility of the organism to disease or poisoning increases. Sometimes a pollutant that is harmless at a particular temperature to fish becomes fatal when the temperature is increased. (c) Ability of the organism to catch food reduces. (d) Reproduction of the organism is hampered. In addition to these specific effects, the interdependence of different species in the ecosystem of a water makes it sensitive to temperature changes. To meet the problem of thermal pollution, Dallaire[13] has suggested the following ways :

(i) To pass the heated water through cooling ponds, spray ponds or cooling towers before disposing it into the water,

(ii) To reduce the amount of waste heat by improving the efficiency of power generation,

(iii) To utilise the waste heat, and

(iv) To manage the receiving waters for decreasing the harmful impact of heated water.

Merriman[14] is of the opinion that the term 'thermal pollution' is misleading because it means that any amount of heating is harmful. In the case of Cunnecticut river, he has found that heating is not causing any harm. In such cases he feels that the term 'Calefaction' would convey the meaning more correctly because calefaction simply means state of being warmed.

Air Pollution

Pollution of air poses a different problem as compared to that of water. Once the pollutant is released into the atmosphere nothing can be done; dilution takes place only when natural air currents take away with them these emissions. The sources of air pollution are industries, automobiles, domestic fuel burning, steam locomotives etc. The different pollutants that are emitted by these sources are quite large in number. Smoke, dust particles, carbon monoxide, carbon dioxide, oxides of nitrogen, sulphur dioxide and unburnt hydrocarbons can be cited as a few examples. During discussions on 'Protection of the Environment' at the Second World Congress of Engineers and Architects in Israel held at Tel Aviv from 14th to 23rd December, 1970 the following example was cited, by Robert Feuer, an American engineer:[15]

"In 1968 vast amounts of smoke, fumes, gases, steam, dust and other contaminants have caused the death of numerous persons and undermined the health of a great many town dwellers, especially by causing respiratory disturbances. The city of New York is often enveloped in a heavy fog, composed of various poisonous substances, called 'smog'. In Los Angeles the city is covered by such a fog almost 300 days in the year. It has been proved that jet aircraft which fly over the cities produce vast amount of gases, ten times greater than the amounts

12. Edinger, JE., and Geyer JC; 'Analyzing Steam Electric Power Plant Discharges' Journal of Sanitary Eng. Division, American Society of Civil Engineers, Vol. 96, Year 1968, p. 611.

13. Dallaire, EE., "Thermal Pollution'—threat draw nearer' Civil Engineering, American Society of Civil Engineers, October 1970, p. 67.

14. Merriman, D., 'The Calefaction of a River' *Scientific American*, May 1970, p. 42.

15. Association of Engineers and Architects in Israel, Monthly letter to overseas members. Technical progress in Israel No. 84-85, Tel-Aviv., January 1971.

An increased rate of human activity and increase in the population of the world have resulted in the pollution of environment and have caused undesirable changes in the physical, chemical and biological characteristics of water, air and land.

given off by the 4 million automobiles in the city.

"School children in Los Angeles suffer from various disturbances and from lack of composure, when the amount of pollution in the city's air increases. Air pollution also reduces agricultural yields. Analysis has shown that polluted air contains many of the substances found in cigarette smoke. Smokers who live outside the city are less frequently affected by lung cancer than city dwellers who do not smoke at all".

It is also believed that the appearance of structures is damaged and their life is also reduced. The pollutants also attack cloth fibres and weaken them. On the whole the life of human beings gets reduced due to air pollution. It is claimed that the concentration of carbon dioxide is increasing, and changing the temperature of the atmosphere because carbon dioxide has heat-retaining capacity.

To reduce the air pollution, checking the emission of pollutants at the source itself becomes essential. The concentration of sulphur dioxide can be reduced by using scrubbers. The coal which is comparatively sulphur-free is adopted for combustion. Various types of dust collectors are used to reduce the emission of dust particles into the atmosphere. Greenery is maintained to decrease the concentration of carbondioxide. In America, automobiles are the main source of air pollution. Some modifications are being investigated in the automobile engine to reduce contamination. Recently Lear has invented such an engine[16]. It is a vapour turbine machine with low emissions hardly enough to measure. Since the combustion in the steam system occurs outside the engine, the fuel is burnt at a steady rate, emitting little of chemical residues that pollute the air. In the internal combustion engine which is presently used in automobiles, the fuel is exploded. This gives off undesired products in the form of incompletely burnt fuel which causes air contamination. Cars driven on batteries are also being tried.[17]

In India, the Central Public Health Engineering Research Institute has carried out a short-term air pollution survey of Bombay, Delhi, Calcutta and Kanpur. It has drawn the following conclusions[18]. In Bombay, where there is a favourable breeze throughout the year, Chembur-Trombay showed three to six times higher values of air contamination than the rest of the city. Although in the city as a whole the average sulphur dioxide in the atmosphere was not very high, there were 'pockets' of higher concentrations in some areas. Bombay also had high levels of sulphides which might probably be

16. Times of India, 2.1.1971.
17. Times of India, 8.11.1969.
18. Yennawar, PK; Dixit, SN; Pampattiwar, VL; Dave, JM and, Arceivala, SJ; 'Short term air quality surveys in 4 major cities of India", Environmental Health, Vol. 12 Oct. 1970, p. 355.

due to the marine environment and overloaded sewage conditions in some areas. In Delhi, the dust concentration was very high and an average of 700 micrograms per cubic meter was recorded compared to about 500 in Calcutta and Kanpur, 238 in Bombay and 150 in many western cities. Temperature inversions occurred frequently in the winter months from late evening to early morning, resulting in accumulation of contamination. There were pockets of sulphur dioxide contamination from coal burning locomotives and industries. Calcutta was comparatively the most polluted city. Meteorologically also it had lower wind speeds and frequent inverions. Sulphur dioxide levels were fairly high during the afternoon and evening hours. The carbon monoxide in the streets during the busy hours were as high as those recorded in western cities like Chicago and New York. Kanpur was also meteorologically similar to New Delhi and the average concentration of all pollutants were comparable to other cities. Here also, certain 'pockets' of high contamination existed.

Land Pollution

Land is polluted not only by sewage farming (i.e. disposal of sewage on the land) and due to animal wastes but also because of solid wastes disposal. In India at many places the sewage is disposed on the land without any treatment at all[19]. The pores of the soil get clogged with the organic matter present in the sewage, thus changing the structure of the pores and of the soil stratum. The pores filled with organic matter prevent free circulation of air, thus interfering with growth of plants. It is believed that this also changes the bearing capacity of the soil.

The organic matter gets bio-degraded with time and if aerobic conditions are not maintained, gives off foul odour. When the sewage infiltrates through the soil, the dissolved organic and inorganic matter present in it joins the ground water, thereby causing ground water pollution.

The disposal of solid wastes on land further pollutes it. A very common method of solid waste disposal is landfill. If a landfill is not designed and maintained properly, it will pollute the land as well as the ground water.

If sewage and other wastes are treated adequately before being discharged on land and if sanitary landfills are designed and maintained properly, land pollution can be significantly reduced.

Noise Pollution

Only recently it has been realised that noise is also a sort of pollution. Noise pollution differs from other types of pollutions in the sense that it is not persistent, is not transported over great distance and is not cumulative. Noise tends to die out as soon as the noise generation process is stopped. The sources of noise can be divided into three categories—Transportation noise, Community noise and Occupational noise.[20] People have started complaining against noise pollution, also called sometimes decibel pollution. In the current hearings in Britain by the Committee on Privacy, the Noise Abatement Society said that aircraft noise was a threat to the privacy of people living near airports. The fact is, as the Society rightly pointed out, 400,000 people near Heathrow airport (London) are

19. Saxena, KL; Nagbhushana, RS; Kumaran, P; Olaniya, MS, and Nawlakhe, WG; 'Diurnal variation in the Physico-chemical characteristics of sewage at Jaipur' Environmental Health, Vol. 12, Oct. 1970, p. 311.

20. 'Noise—Fourth form of pollution', Environmental Science and Technology, Sept. 1970 p. 720.

subjected to noise for about 15 seconds every two minutes during the day and slightly less frequently during the night[21]. Another British noise control consultant says that the employees of some 5,000 factories in his country are in danger of becoming deaf because of environmental decibel poilution. New York's Commissioner of air resources said rather dramatically, "I don't give a damn about aircraft, but I care about people" while he was supporting a bill to limit aircraft noise to a level which would virtually mean a death blow to the supersonic transport.[22] Possibly unless engineers reduce the take off noise drastically, the supersonic transport era will be delayed by some years. The seriousness of the decibel pollution should be recognised because the noise penetrates closed doors and even walls of the buildings, which are near the busy airports. It is also true that noise in certain nerve-tingling frequencies severely affects the health and comfort of people. Various methods of noise reduction are under investigation.

Summary and Conclusions

An increased rate of human activity and increase in the population of the world have resulted in the pollution of our environment and have caused undersirable changes in the physical, chemical and biological characteristics of our water, air and land. Initially the environment is impaired locally at or near the source of the pollutants. However, pollution effects may persist long enough so that the atmosphere or the ocean circulation may spread them over the whole earth. Thus the problem of environmental pollution is not only local or national but global.

During discussions at the Second World Congress of Engineers and Architects in Israel, the American Engineer, Robert Feuer[15], said that there was little sense in engaging in plans for a better world, when we are unable to do what is needed for the protection of the environment. Since the developing countries find it difficult to carry out projects for such protection, it is in his opinion necessary to find financial resources for drawing up world plans for solving the problems of air and water pollution. For this purpose it is necessary to conduct international negotations, to enter international conventions and to mobilize money for world arrangements to solve these grave problems. Mr Feuer proposed to set up a team of specialists out of the members of the International Technical Cooperation Centre, who could formulate proposals for dealing with prevention of air and water pollution.

"Popullution" is a newly coined word. It is formed by combining the words Population and Pollution, referring to the pollution due to excess population. Dr Lamont Cole, Cornell's Ecology Professor, who was in India in the month of August, 1970 said, "I don't know what's going to stop the population explosion. We could do it by rational means, but if we do not do it by rational means something else is going to do it. It may be famine, it may be epidemic or it may be nuclear war. And it may be a major upset in the environment, so that we begin running out of oxygen or something of that sort."[8] Obviously the capacity of the earth to absorb the pressure, which is being put upon her is limited. Scientists are in search of new ideas to reverse the galloping pollution, and are concentrating on 'closing the loop'. The life support systems of the earth could be revitalised by recycling liquid and solid wastes into new products. If we meet the challenge of environmental pollution boldly and sincerely, the prophets of gloom and doom would not have a field day. □

21. Times of India, 28.11.1970
22. Times of India, 9.1.1971.

PRODUCTIVITY AND ECONOMIC DEVELOPMENT by BN Bhattasali and G Bhattasali; Publisheb by Asian Productivity Organisation, Aoyama Daichi Mansions, 4-14 Akasaka 8-Chome, Minato-ku, Tokyo 107, Japan; Pages 120.

In recent years, much work has been done on the concept of productivity and its role in economic growth and development. But as Mr Morisaburo Seki, Secretary-General of the Asian Productivity organisation says, in his foreword to the Publication under review, "much of what has been spoken and written has essentially emanated from the economists and for the economists—often with a considerable amount of sophisticated academic basis."

Mr Bhattasali has, however, in mind not the economists as his audience (although, as the reviewer feels they too can certainly derive some benefit from a perusal of the publication) but other professionals like technocrats, social workers, and government officials, who in one way or the other are concerned with the economic development. Within the campus of 15 chapters, the book covers virtually all the important areas, which are in one way or the other, related to productivity and economic growth.

A special mention may be made of the effort made by the authors to clarify the conceptual confusion which one comes across in the discussions on productivity, economic growth, development, etc. Various factors which collectively or individually may retard or accelerate the productivity movement and/or the growth process have been elaborately dealt with. That Government, manpower, material resources, etc. play a key role in this change has been effectively brought out. Specific areas like productivity and agriculture, productivity and small and medium industries, etc. receive due attention. The significance of international co-operation in promoting productivity and economic growth is also equally competently stressed.

Productivity is not an end in itself. The goods and services produced must be capable of being sold in the market. People must have the purchasing power and the propensity to purchase and consume. "Whether in agriculture or industry, a much more equitable distribution of incomes would stimulate productivity, not only for absorbing enhanced levels of production resulting from higher productivity, but also by providing incentives to the workers". In the current controversy (or rather agreement) about growth *vs.* social justice the chapter on

distributive aspect of productivity would be read with considerable interest.

The book does make a significant contribution to the subject. However, the sequence of the chapters is not maintained, but it turns out to be an advantage in itself, each chapter taken separately stands on its own. The publication, however, is a very lucid exposition of apparently complex issues. It is precisely this lucidity of expression and simplicity of approach which mark the book distinct from similar works and command a wider readership.

—KSV MENON

APPRAISING MANAGERS AS MANAGERS by Harold Koontz, Published by McGraw-Hili Book Company, New York, 1971; Price $ 9.95.

The yawning gap that exists in the management literature today is regarding the evaluation of managers. A good lot has been said about performance appraisal of undertakings. A lot more has been said about how to measure such performance on the basis of individual factors of production such as labour and capital. The missing link in these exercises has been appraising the performance of managers not merely on the basis of notional attributes to management for whatever is not identifiable with respect to other factors. *Residualism* has characterised appraisal of managerial performance for a long time, particularly because of the inexact, unseen nature of such performance and the diffusion of such performance in that of the individual factors, more manifest in terms of turning out products or other output. This gap has been noticed in several contexts and various attempts have been made from time to time to fill it up. However, in the context of growing complexities of production and the technological revolution witnessed in the advanced countries of the West and the USA, particularly the multiplication of the number of enterprises engaged in different fields of economic activity, have together resulted in widening this gap rather than in filling it up. Groping in the dark has continued for effectively appraising managers in conditions in which their good efforts and hard work seem to show up in the better performance of either workers or machinery.

The present volume is sensitive to the existence of this gap and builds up a framework of appraising managers as managers on the basis of recognition of this weakness. Indeed, Professor Koontz approaches managerial appraisal as, in his own words, "Achilles' heel of management development". Reluctance on the part of one manager to appraise another has contributed not a little to the gap referred to earlier. He refers to the task of the manager as one of selecting goals and designing and maintaining an environment that makes possible—even unavoidable—the performance of individuals working together in a group to attain these goals. The manager must act in the light of the milieu on which he operates, conditioned as it is both by the internal atmosphere of the enterprise and the external environment in terms of economic, technological, social, political and ethical factors. It is underlined here that "to recognise and be responsive to these various environments is to be responsible in the manager's own self-interest." Explaining why appraisal is the key to management, Professor Koontz reiterates the key role of managers themselves in assuring enterprise success. The non-managerial factors may result, in certain cases, in initial success but in the long run the quality and vigour of management make the difference. His mention of the requirements for any program-

me of managerial appraisal will be appreciated by many. These programmes, according to him, should measure the right things; they should be operational and objective. These programmes for their success should be acceptable to the managers whose performance is being appraised. These programmes should also aim at improving the abilities and work of the managers. The purpose of such appraisal is not only to determine how well an individual has performed but also to suggest how well he can perform if certain conditions were established, including the ways of rectification of the present errors, omissions, etc.

In the light of the requirements, Professor Koontz suggests a detailed programme of appraisal of managers, including the questions to be asked, interpretation of the answers, point-rating etc. His examples of appraisal of performance of managers against objectives will be found highly relevant by managers in Indian enterprises who are invariably confronted with such tasks as would demand the best from executives under them, while, at the same time, they themselves are being watched as to their own performance vis-a-vis the objectives that they seek to realise in the organisation. The form of appraisal and the practical problems to be faced in this context are dealt with in some detail in the book. This exercise by Professor Koontz is no delving into theory. It is thoroughly practical and worthy of a try in any kind of creative activity in organisations in which the tasks performed by managers generally go by exception and there is widespread feeling that the proper person is not being rewarded for the good work done by him. The book commends itself to Indian readers in general, and students of management, teachers and managers in both public and private sector enterprises in particular.

—DR P CHATTOPADHYAY

TRANSFER OF TECHNOLOGY AMONG THE DEVELOPING COUNTRIES by BN Bhattasali; Published by Asian Productivity Organisation, Tokyo, 1972; Pages 94.

This is a monograph in the series on 'Economic and Industrial Development and Productivity' brought out by the Asian Productivity Organisation (APO). The author, who is well-known in the field of Productivity, is a Senior Advisor to the APO, having been formerly Executive Director of the National Productivity Council at New Delhi.

Transfer of Technology, which at one time was conceived in simple terms is now being recognised as a complex process whose success and effectiveness depends on many factors—Cultural, Social, Political and Technological. A mere transplantation of machines from one environment to another does not imply a transfer of Technology which needs to be assimilated and absorbed in the receiving system, if it is to be truly productive. International Organisations who in the early stages of their work were content to arrange such transfers merely through financial allocations are now recognising that this is not adequate and there is a need to probe deeper into such arrangements to ensure that they achieve their objectives.

The theme of the book is basically that "the successful transfer of technology, in the ultimate analysis, is predominantly a human problem—a man's mental and physical activity; his emotions, his expectations, love, fear and hate, his confidence and hope". Mr Bhattasali discusses the role of Nationalism, Social Structure and Economic Organisation for the successful Transfer of Technology as a spark plug for economic growth. He takes Japan, China and India as three typical case studies of traditional societies who have faced this problem each in its

own way. As the author rightly points out, the greatest lesson which Modern Japan provides to other Asian (incidentally, the author prefers to call them 'Asiatic') countries is that effective industrialisation can take place without breaking away from one's own cultural moorings. China and India are still in the early stages of industrial growth but both are demonstrating a capacity to integrate western ideals into a traditional framework without the need to accept the 'Protestant Ethic' which Max Weber had thought was essential to progress.

Mr Bhattasali then goes on to formulate some general guidelines for the transfer of technology: firstly, it should not run counter to the patriotic urges and cultural pride of the people: in fact, the author lays, what may seem to some, a somewhat undue stress on this aspect but there is no doubt that this is a vital factor in any growth process. Secondly, the technology should be ambitious and progressive in character—a somewhat self-evident proposition, except for the references to "Intermediate" or "Appropriate" technology which the author dismisses casually as of little utility and as merely attempts to 'palm off' second hand obsolete machinery on rather 'unsuspecting' developing countries. Such remarks by the author indicate that the concept of Appropriate Technology (which incidentally is not at all the same as 'Intermediate' Technology) is still unfamiliar to most persons since in the very same breath he pleads that in making a technological choice, "due regard must be given to make them as labour-intensive as possible" —which is precisely what the advocates of Appropriate Technology say. In fact, even his third criteria, viz., that automation techniques need to be highly selective is again in tune with the concept of Appropriate Technology.

Fourthly, the author pleads for the right mental attitudes in *adapting* (not mere *adopting*) foreign technologies; again, technological changes should be backed by appropriate organisational changes and as is rightly emphasised, Productivity and Prosperity are inter-linked through a socially acceptable pattern of distribution of the gains of productivity. Lastly, technological growth must provide a stimulus to the small and medium industry sector which forms the infrastructure of the national economies. It is refreshing to find the author championing the cause of the small sale sector not as a hot-house plant that is to be protected for ever, but as a lusty infant that must be encouraged to grow and cease to be small

In succeeding Chapters, Mr. Bhattasali discusses the need for a proper infrastructure for the Transfer of Technology to provide a suitable base for transplanation. In doing so, one must recognise that such transfer must have an impact on all the sectors—the primary, which is still of basic importance in most developing countries, the secondary whose importance is growing and the tertiary, which is as yet undeveloped but whose importance from the point of view of employment generation is only now being just perceived. The mechanism of the transfer of technology is normally through foreign collaboration—between individual enterprise or by setting up subsidaries of foreign companies. Such collaborations, however, are not always genuine transfers of know-how unless the agreements specifically provide for it and unless some prerequisites are satisfied. A better mechanism for transfer is through cooperation between Institutions arranged through international agencies.

The problems of Research and Development and provision of technical information services are rightly emphasised as essential to a successful transfer; the author cities the example of Japan as a model in this regard. The important

areas of Production Engineering, Design Capabilities and Working Facilities are underlined as being vital to a successful transfer. In fact, this is, perhaps, the biggest deficiency in many developing countries whose skilled manpower is mostly in basic sciences but far too little in applied technology. The importance of purposeful training is dealt with in a separate chapter where useful hints are given on how to organise effective training programmes, which draw heavily on the first-hand experience of the author in this field.

Ultimately, any continued transfer of technology depends on adequate institutional arrangements at various levels—national, regional, industry and the individual unit. Each of these has an important role to play and useful advice is given for the establishment and operation of such institutions. The author's plea for suitable administrative processes which cut down delays in decision-making will be echoed by many who have to deal with the protracted procedures of most governmental agencies in developing countries.

The subject of the book is indeed a vast one and one cannot be expected to cover all of it in a mere 100 pages. However, the author has dealt ably with many facets which makes it a thought-provoking study. The get-up of the book is attractive. The few proof-reading mistakes could, however, have been avoided.

—DR RAM K VEPA

AGRIBUSINESS MANAGEMENT RESOURCE MATERIALS (Vol. II), Edited by JD Drilon Jr., Published by Asian Productivity Organisation, Tokyo, December 1971; Pages xiv+304.

Edited by the author on behalf of the Inter-University Steering Committee for Agribusiness Programmes, Philippines, this volume presents case studies covering more advanced problem situations, while, at the same time, placing the reader in problem-solving and decision-making environment. Agribusiness studies provide a whole new dimension to planning, to agricultural development. The present study symbolises path-breaking effort in the field of teaching, research and assistance to economic decision-making units, recognising as it does the crucial mutual inter-dependence. The cases studied in the book mention the real situations that occurred in firms operating in the Philippines industries. They might serve in honing stones for decision-making faculties as also in replenishing the storehouse of information a management student or practitioner needs in order to develop insights of professional value. The micro-data and the parameters of agroindustries do project a bigger picture that might be relevant for other Asian countries as well.

Broadly, the livestock, poultry and corn industries of the Philippines have been examined in intensive case studies of as many as 15 companies. An agricultural industry takes a wide assortment of economic linkages and processes to move the product from the basic resource stage to the final consumer. Numerous firms of varying sizes and ownership are marketing food and other agricultural products, and they operate in a maze of complicated considerations and circumstances. Usually characterised by periodic price fluctuations, the agribusiness system is consumer-oriented inasmuch as the activities of farm suppliers, farmers, wholesalers, processors, retailers, government or private research institutions and other participants are all geared toward satisfying the ultimate consumer. Indeed, the efficiency with which an agribusiness system can meet the needs of the consumer depends on how effectively its components can

coordinate, integrate and perform the various functions involved in a commodity flow.

Analysing the case histories of firms engaged in cattle industry, it was found that meat production lagged behind consumption requirements. Cattle production in the 7100 islands of Philippines is carried on either in small units or commercialised ranching business. Beef cattle specialists have endorsed the idea of developing the beef cattle industry through improved quality herds developed domestically from genetically tested foreign breeds. Now there is a growing recognition for meat processing plants to act as a catalyst in order to make possible the integration of production and marketing activities in the industry.

As for the corn industry, it provides the staple food of about 21 per cent of the population of the country. Corn is used in the form of corn grits, green corn, canned sweet corn, corn flakes, food shortening, syrup, cream, popcorn and bakery products. The analysis shows that shifts are occurring in the food consumer markets toward a less percentage of the population taking to corn. Corn grain prices have followed more or less the same pattern since World War II. They have fluctuated from peak to peak and from trough to trough every 2 to 3 years. However, prices of corn grains are far below rice prices. The prices received by farmers and the spread between farm prices and retail prices for corn are affected by location, timing and levels of corn harvests, government support prices, availability of support-price funds, transportation facilities, the market information system, and the efficiency of marketing organisations. "Changes in these influence-factors could change the structure and behaviour of corn prices and could inhibit or enhance corn production." An important observation made is that increase in production cannot be expected to come from hectareage unless some areas presently cultivated with rice are converted to corn. It has been found that the local market for corn for human consumption had been increasing alongside with the population, probably at the rate of 3.2 to 3.4 per cent annually. And then the opportunities of increase in animal feed and starch markets, both in the Philippines and abroad, have to be taken into consideration.

In order to provide managerial service to agro-industries, a firm called Agro-industrial Management Company was incorporated in 1967 with the main object of bringing about self-sufficiency in rice industry. The case pertaining to this company has been elaborately handled in this book. Its functioning reveals that "What impresses the farmer is not so much yield per hectare as it is yield per hectare at what cost in terms of labour and additional material inputs." Editor Drilon Jr. very rightly points out that dramatic demonstrations produce dramatic results only if farmers find the new variety or new practices locally adaptable and economically profitable when transferred to the farm. Otherwise, we have a successful demonstration but no adoption, just as in the medical world, they say: 'The operation was a success but the patient died.'

—NAVIN CHANDRA JOSHI

MANAGEMENT OF ORGANIZATIONAL BEHAVIOUR—UTILIZING HUMAN RESOURCES, by Paul Hersey and Kenneth H Blanchard, Second Edition, 1972, Prentice-Hall of India, Eastern Economy Edition; Pages 209; Price Rs 12.00.

The rapid growth of concepts, insights, and empirical researches in the field of management poses a problem of integrating them into a

systematic and meaningful pattern. The classical approach to do so was to utilise Fayol's framework of managerial functions, viz. Planning, Organising, Motivating, Controlling and Coordinating. A large number of text books have been written on those classic lines, which draw heavily on logical approach to managerial functions. Attempts have been made to develop a theory of management and arrive at "principles of management" through this approach. Such "principles" have been challenged by several Behavioural Science research findings based on empirical studies.

The growing richness of Organisational Behaviour as a body of knowledge has been increasingly incorporated in Management theory and it is enabling a deeper understanding of human motivation, leadership effectiveness, and organisational health. As a result a new theory seems to be emerging, which has a more sound empirical base and in which there is greater component of Behavioural Science findings.

The book under review is one of the several recent efforts to synthesise various concepts and theories into a systematic conceptual framework. The authors describe this book as an effort in "Synthesising... significant behavioural findings into conceptual frameworks to help the manager understand why people behave as they do and to increase his effectiveness in predicting future behaviour". The authors have also mentioned that in this second edition of the book 'we move into how a manager can direct, change, and control behaviour'.

The book can be described as a Super-bazar of management concepts and theories. It hardly leaves out any well-known American study having bearing on Management field. But the attempt to integrate these studies into a systematic and well-knit theory has been consistently followed, culminating in the 'Life Cycle Theory of Leadership and Motivation', propounded by the authors.

In spite of a very wide coverage of concepts, the book is highly concise and easy to read, and the attempt at integration is fairly effective. In the latter part of the book however, one begins to feel that the authors are trying too hard to fit in various theories related to altogether different sets of phenomena into one single framework.

Although the authors do not claim much originality, there is no doubt that their conceptual framework to integrate so many different theories relating to motivation, leadership and change process is a valuable contribution. This book has an additional value in making available to the executive, and the student of management, a concise book covering a large inventory of concepts in management. At the same time, the authors have tried to demonstrate applicability of concepts and theories to practical situations, without which management theories do not have much appeal to the tough-minded manager.

There is a conspicuous absence of coverage in the book of the studies done in Great Britain and the Continent and several other countries, except for very casual references to a few of them. If this limitation is kept in mind, the book may be utilised as a text in management courses and training programmes, alongwith other supplementary material.

—DR ABAD AHMAD

AN INTRODUCTION TO PROBABILITY THEORY AND ITS APPLICATION, VOL. I, by William Feller, Published by Wiley Eastern Private Ltd., New Delhi; Pages 509; Price Rs 16.50.

This is a standard text book on the theory of probability. The subject is treated, using the

notion of sample space. The volume is restricted to discrete sample spaces. Probability has been dealt with in this book as a self-contained mathematical subject. But an attempt is made to describe the empirical background and indicate the wide field of applicability. The book begins in an elementary way but is developed sufficiently to include advanced topics like Branching Process, Markov Chains and DeMoivre—Laplace's Theorems. This book will be very useful for all readers interested in the theory of probability.

—BK SARKAR

MODERN PROBABILITY THEORY AND ITS APPLICATIONS, by Emanuel Parzen; Published by Wiley Eastern Pvt. Ltd., New Delhi; Pages 464; Price Rs 19.50.

"Modern Probability Theory and its Applications" is meant to provide the student the required background and confident techniques for solving probability problems. The reader is taught how to go about formulating probability problems in a mathematical manner to facilitate solution by adopting routine methods. While doing so the author has tried to present aspects of modern probability theory in such a manner as to suit students who do not have knowledge of advanced mathematics needed for following rigorous discussions.

The ten chapters in the book are broadly divided into three parts, the first six chapters requiring only a grounding in Calculus, the next two requiring slightly more mathematical background and the last two involving some rigorous derivations. Each chapter is divided into several sections, each section having a number of examples and practical exercises (theoretical exercises also added in some sections), answers to odd numbered ones among these being added at the end of the book. The author states in the Preface that answers to even numbered ones are available in a separate booklet. Over 160 examples, (the urn with balls of different colours has been used liberally in the examples), 120 theoretical exercises and 480 other exercises are distributed as between the different chapter sections, most of them, particularly the examples being concentrated, as is to be expected, in the first few chapters meant for the beginners.

In the first six chapters, the author has covered all that a beginner should know of modern probability theory. Having described random phenomena, the author, in Chapter 1, deals with sample description spaces of such phenomena and introduces probability as a function of events on such a space. Giving the intuitive description of an event the author goes on to define the same as a subset of the sample description space and discusses the calculus of events. Sampling with or without replacement is introduced in Chapter 2 whereafter the beginner is told how to formulate problems arising in applied probability theory mathematically. The notion of independence and dependence is discussed in detail in Chapter 3 in the later sections of which the concept of Bernoulli trials and theory of Markov chains have been dealt with.

Chapter 4 deals with the theory in cases where the sample description spaces of random phenomena are not necessarily finite. Introducing the notions of numerical valued random phenomena and probability functions the author tells how the former is described by specifying its probability function. The probability mass function, probability density function, distribution function and different probability laws are discussed in the Chapter. The average, expectations and moment generating functions are dealt with in Chapter 5, a later section of

which deals with the Law of large numbers. A table showing a variety of probability laws and their means and variances is included in this Chapter. The normal Poisson and related probability laws are discussed in more detail in Chapter 6, establishing the relationships also where applicable. At the end of the book, tables of normal, binomial and Poisson probabilities are added.

Chapters 7 & 8 are devoted to a somewhat rigorous definition of the notion of a random variable and a rigorous treatment of functions of random variables, probability laws of such functions and expectations.

The last two chapters, namely, chapters 9 and 10 which expect a higher standard of mathematics for the reader, deal with rigorous derivations of the law of large numbers and the central limit theorem using the characteristic function of a random variable as a major tool.

The treatment of the subject in the book is uniformally good and the notions used as well as derivations quite easily understandable. As the author claims in the Preface, it has been his aim to achieve a symbolism that is self-explanatory and that can be read as if it were English. The objective of giving a good grounding in Probability has been more or less fully achieved in the first few chapters. There are, however, a few sections which could have been elaborated a bit more from the point of view of the beginner, one such being section 1 in Chapter 4 where the author discusses probabilisable sets.

The large number and variety of examples in the book amply illustrate the different situations and the manner in which the Theory is applicable. Also having dealt with different aspects in good detail, references are given where the reader could find more details if needed. At a few places the author has brought in a few contradictions also to tell the student that the theory has to be used after carefully pondering whether the hypothesis of the theorem may be assumed to be satisfied in the particular situation.

—DR G RAMACHANDRAN

PERSONNEL MANAGEMENT & INDUSTRIAL RELATIONS, by Dale Yoder, Published by Prentice-Hall of India, New Delhi; Pages 784; Price Rs 17.50.

In the changing economic and social environment, management of human resources has become both complex and crucial. The main thrust of efforts has, therefore, to be directed to people working into any organisation. Only through the creation of a sense of belongingness, justice and fair play the organisation's activities can make a march. In the field of Industrial Management, particularly, the change is significant in terms of values which have thrown overboard the traditional concepts and beliefs. Another significant phenomenon influencing the functioning of organisations has been the organised strength of labour which operates as an important segment of social control systems. It has brought about an institutional set up in the form of Personnel Management at the enterprise level to tackle the problems and redress the grievances of the employees. The two are thus inextricably linked.

The sixth edition of 'Personnel Management and Industrial Relations' by Dale Yoder is unique in presenting the significant areas of change and particularly in incorporating selected short cases, providing thereby a clear insight into the varied and intricate aspects of Personnel Management and Industrial Relations. To the

Trainers and Instructors, the book provides a precious material in the form of teaching, exercises, discussion of live problems as well as handling of questions from an objectivity angle.

It is one of the best books on the subject and the most outstanding feature which singles out this publication from many similar ones is its treatment of the aspects of 'manpower management' both from the viewpoint of individual as well as group goals. The theme of group dynamics which is characterised as 'modern work theory' alongside psychological factors in human behaviour has been presented in a convincing manner and the more one reads the more he admires the imagination, lucid presentation and the logic in tackling complex Personnel and Industrial Relations problems. The sixth chapter which specifically deals with commitment and morale, employment communications, financial rewards, wage and salary administration, employee benefits and services deserves special reading.

—DR AN SAXENA

FUNDAMENTALS OF INCENTIVES AND INCENTIVE WAGE SYSTEMS FOR INDUSTRIAL UNITS by S Das Gupta; Published by NM Raychowdhury Co (P) Ltd., Calcutta; 1972; Pages 156; Price Rs 16.00.

Man, by nature, does not usually perform any work voluntarily unless there is some urge in him to do so and unless he expects a reward in return. This urge and reward may be for something he needs or desires for his physical or mental satisfaction. Incentives aim at creating that urge and stimulation among the workers to increase their efficiency and productivity and improve performance. Moreover, a worker who receives an incentive wage usually produces more than the other workers. Thus, incentive means a better wage for the worker—a satisfied workforce—more production for the employer and in turn more prosperity for a developing nation like ours.

Therefore, a knowledge of the fundamentals of various incentive systems is equally important to the workers, trade unions and the employers. Whereas by this knowledge the workers and trade unions will get more involved into the affairs of an establishment, the employers can try and apply different incentive plans and adopt the best one suitable in each individual case. To this end in view, Mr S Das Gupta has presented "Fundamentals of Incentives and Incentive Wage Systems for Industrial Units."

In the first two chapters of the book, the author has sought to explain the basic ingredients of incentives and incentive wage systems and has also defined various terms.

In the following nine chapters various incentive systems have been discussed: Time Rate Plans, Piece Rate Plans, Differential Piece Rate Plans, Premium Bonus or Bonus Sharing Plans, Group and Collective Premium Bonus Plans and Profit Sharing and Labour Participation in Management. The discussion on every system is followed by examples as well as a mention of advantages and disadvantages of a particular plan.

The book would, no doubt, prove to be helpful to employers as well as trade unions. However, the use of mathematical jargons and formulas throughout the discussions will restrict its usefulness to the general worker when we know the educational standards of an ordinary worker today.

The printing mistakes and the presentation leaves much to be desired.

—SD BAHL

SECOND NATIONAL CONFERENCE ON SAFETY, Published by National Safety Council, Bombay; Pages 350; Price Rs 10.

The National Safety Council sponsors the National Conference on Safety every year with a view to highlighting the urgency and gravity of the problems of safety in our industries and also to providing an opportunity to the practising specialists in the field of study to discuss in depth the specific safety problems in selected industries. The present volume is a report on the proceedings of the Conference held in Bombay from 5th to 7th April 1971.

The book highlights the importance of Safety, with particular reference to industries pertaining to Printing, Transportation, Textiles, General Engineering, Building Construction and Air Pollution. The report on the Plenary Session on Motivation for Safety brings out the importance of motivating the management and the labour towards safety. The proceedings of the Conference have been presented in a suitable manner to facilitate the readers to understand the safety problems pertaining to the specific industries covered under the Technical Sessions and also the growing menace of air poliution.

The book provides a framework which clearly characterises the various aspects of safety in Printing Industry. Published statistics of industrial accidents in printing industry provide ample evidence of the gravity of the problem. Enough data are also presented to show that the monetary costs of preventing accidents are generally lower than those of the accidents themselves.

The Paper on Safety in Transport, covers human factors of accidents. It also covers the causes of accidents on the road due to distractions on the road, over-eating, faulty night vision, alcoholism and justifies the investment on promotion of safety-consciousness. Transportation by air demands more consideration on safety and as such the book emphasises the importance of collection of air accident statistics to design air accident prevention programme.

An important aspect of this Conference was the safety in Textiles. It emphasises how accidents can be reduced in textile industries by training the workers, supervisors and managers in safe methods of work, necessarily complying with safety provisions of the Factories Act.

Another paper in the book covers the problems of industrial smoke, grit and dust, domestic smoke prevention, transport pollution and incineration. The paper presented in the Conference on Safety in Building Construction, urges that specific rules and regulations must be enacted to cover building and construction industries. This paper deals with hill road-construction and safety in building construction. It emphasises planning, rock-blasting, slide clearance and maintenance. The paper discusses vividly the importance and practices of framework and scaffoldings used in the building construction industry in our country.

It is true that motivating towards safety is a very challenging task for everyone of us and the feeling for safety should come from within an individual. This book will help all those who are dealing with safety in Indian industry. It will add useful information in the body of knowledge on Industrial Safety in Indian Industry.

—MRINAL KANTA SAXENA

THE BREAK-EVEN CONCEPT AND ITS PRACTICAL DIMENSIONS, Published by The Institute of Cost and Works Accountants of India, Calcutta; Pages 165; Price Rs 25

The credibility of break-even concept as a dynamic tool for deecision-making is well known. Application of this concept is yet to be tried out on a meaningful scale in our country as our Managers engaged in economic and industrial planning activities have not yet been exposed to the concept's practical ramifications. To bring forth the advantages of this concept, the Institute of Cost and Works Accountants of India sponsored a research project on 'Break-Even Concept and Its Practical Dimensions'. On culmination of the Research project, the Institution has rightly brought out its dissertation as a publication.

The book has been laid out in five distinct chapters. The first chapter traces out the evolution of the break-even concept and introduces different types of conventional break-even charts. There is an important pointer which sets aside the traditional notion that disaggregation of fixed and variable costs is an essential prerequisite for break-even analysis. Here attention is also focussed on the incidence of the break-even point and the ways in which the break-even point could be lowered for maximising the margin of safety.

The second chapter discusses the cost-volume-profit relationships individually and collectively to sensitise the management in diagnosing the behaviour pattern of the operations with regard to past, present and future. The distinct viewpoints of economists and cost accountants on marginal costing have been stressed to show that both these viewpoints tend to be the same at a certain point.

The third chapter deals with the various methods of managerial planning and control like improvising performance targets, appropriations of profit with respect to costs, revenues and capacity utilised, etc. An added feature being the depiction of under/over-trading noticed in many of our concerns in chart form, indicating capital break-even point.

While chapter four concentrates on non-repetitive decisions of management requiring more complicated analysis and understanding of corporal phenomena. The decision of management to choose a process from different types of processes; choice of manual, semi-automatic, automatic systems with respect to volumes of production over a period of time have been discussed. The charts included also cover economics of different incentive schemes, economies of multishift working, etc. This chapter portrays the extended application of the Break-even concept encompassing a wide spectrum of managerial functions.

The final chapter epitomises the empirical situation pertaining to Indian industries. The practicability of the Break-even concept has been dealt at length by including cases from soap, cement, bicycles, caustic soda, dyes and iron and steel industries. The assumptions made for drawing the Break-even chart along with the methodology adopted for arriving at the figures have been appended suitably. In the process, the adaptability of this concept in inter-firm, inter-industry and inter-product comparisons have also been clearly brought out.

A check-list to serve as a guideline for managers to apply this concept is given at the end. An extensive Bibliography is also incorporated for the guidance of those desirous of enriching their knowledge further. On the whole, the book makes interesting reading. It is a *must* for all managers at the policy-making level and a

boon for other Managers and Accountants who would find this book very valuable in solving many of their problems more realisatically and more forthrightly– for this book is not a mere theoretical digression or a paper exercise but holds out a healthy promise for well-intended practical situations.

—V RAGHURAMAN

INDIAN ENGINEERING INDUSTRIES: Published by the Engineering Association of India, Calcutta; Pages i—xxxii+628; Price Rs 25.

"Compilation of up-to-date factual information pertaining to any particular branch of industry is in itself an index of the progress made by it in the recent past". The kind of Directory that has been brought out is a revelation of the leads and lags providing a basis for further studies on the problems and prospects of the industry.

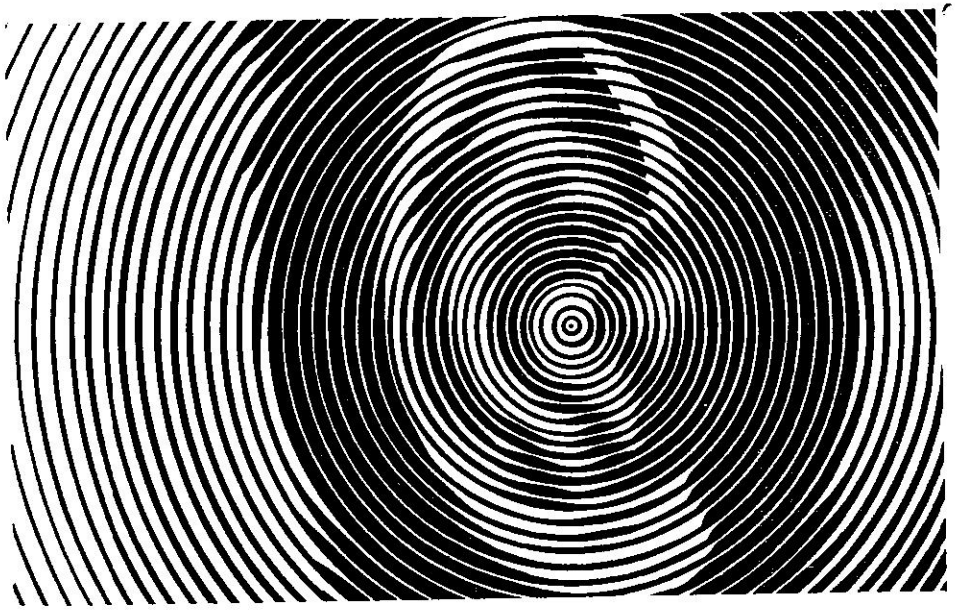
The basic purpose of the Directory is to enlighten audiences both at home and abroad on the tremendous diversification that has been achieved in the engineering industry in India over the years. The "Buyers' Guide" which is the most important section of the directory should serve as an effective link between manufacturers on the one hand and domestic buyers and overseas importers on the other. This section covers a surprisingly vast range of engineering products that are now being manufactured in India, most of which are available for export trade too.

Another innovation in the Directory—this has been published since 1945—is the section relating to 'Brands and Trade Marks of all leading firms together with their product range. This section is of utility par excellence to the consumer world.

The section containing names and addresses of important engineering firms should also prove quite useful in that it would enable Indian and foreign buyers to identify the sources of supply easily. It will also provide a comparative picture of similar firms engaged in the specific lines of manufacturing activity.

All in all, the Directory will doubtless be useful and should be added to the stock of all economic libraries and research centres as this is a publication which contains up-to-date and highly utilitarian information on the product range and manufacturing capability of India's Engineering industry.

—VDN RAO



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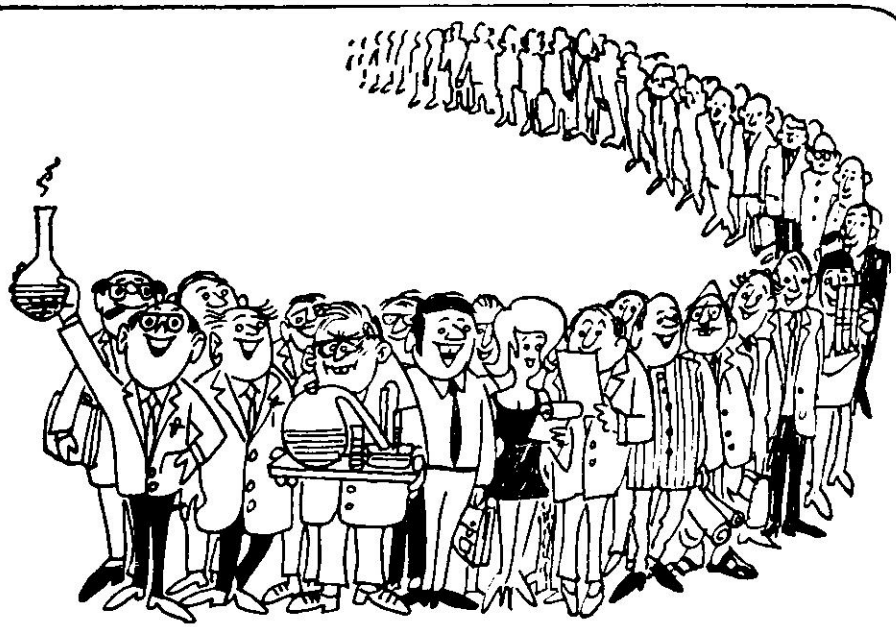

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