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Background paper

TRAINING FOR SMALL MANUFACTURING ENTERPRISES IN DEVELOPING COUNTRIES

Paper prepared for the Symposium

Presented by the International Labour Office

Contents

Introduction

1. In a paper entitled "Education and Training Programmes for Industrialization"[1/] prepared for discussion under agenda item 3 (c), "Industrial Manpower", an analysis has been made of policies and practices of human resource development for industrialization in developing countries. The paper deals with the fundamental issues underlining the mobilization of manpower and with policies that public authorities should pursue to provide manufacturing enterprises with skilled personnel at all levels of the undertaking; the paper therefore is not particularly concerned with the effect that variations in size of establishment may have on training. The present paper is an attempt to focus attention on a number of problems peculiar to small-scale manufacturing undertakings in developing countries, in so far as they will influence design and execution of training programmes to raise entrepreneurial, managerial and technical skills of small industrialists as well as shop-floor operators.

2. The telescoping of a variety of functions for which specialist personnel is available in large enterprises into a single individual creates a pattern of work for the small industrialist that is quite different from that of persons who manage large establishments. This obviously will have impact on the attitudes and skills required for the effective execution of functions in the two sectors and the manner in which the process of skill formation for either group will be designed and organized. Equally, the scale on which production in small manufacturing enterprises is carried out influences what type of production know-how and technical skills are in special demand for the operation of a small undertaking. Especially in developing countries, the low level of applied technology as a distinct feature of the small enterprise will affect the scope and intent of technical training programmes. These and other factors justify special attention being paid to the question of training of small-scale industrialists.

3. For the purpose of this paper, small industrial enterprises are defined as establishments for manufacturing, processing and servicing (installation, maintenance and repair). They differ from large undertakings by a significant lack

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1/ Document ID/CONF.1/33.

of specialization in the entrepreneurial, managerial and technical functions. Such small undertakings vary from handicraft and cottage industry establishments in which the self-employed owner works together with his family, to the artisan workshops employing hired labour and using simple tools and equipment and the mechanized factory which may employ up to 100 workers. The common denominator between them is that a single working proprietor or manager has to exercise all the entrepreneurial, technical and managerial functions himself, with the help of one or two staff personnel, such as a shop-floor supervisor, a book-keeper or a salesman, at the most.

4. This paper is divided into two main parts. The first deals with the training of small industrialists in the skills they require to discharge effectively their entrepreneurial and managerial functions as well as those related to certain specialist tasks of a non-technical nature which, in lesser or larger degree and depending on circumstances, the small industrialist has necessarily to carry out himself without the aid of specialist personnel. Training related to all questions of production technology, including operative skills in manufacturing techniques for both working proprietors and workers is examined in the second part. Thus, while technical training questions are examined as a substantive subject that influences the pattern of work of both the small industrialist and the workers on the shop-floor, the question of entrepreneurial and managerial training is being approached from an occupational point of view as it has necessarily to be focused on the person of the small industrialist. Finally, a few concluding observations are made.

I THE TRAINING OF SMALL INDUSTRIALISTS IN ENTREPRENEURIAL AND MANAGERIAL SKILLS

The nature of the small enterprise

5. For a clear understanding of the subject of skill formation of small industrialists, it is desirable first of all to get an appreciation of the person involved, the tasks he performs and the difficulties he encounters when operating his enterprise. The growth of modern industry in developing countries, and in particular the introduction of manufacturing activities that constitute a technological break with traditional handicraft industry, has given rise to the emergence of small industrialists whose origin may be traced back to a diversified entrepreneurial background. In most of these countries, small manufacturing enterprises are established by:

(a) Skilled artisans, such as the village blacksmith and carpenter and the urban automotive repair man who combines technical skills, rudimentary business talent and small savings that enable him to expand his workshop gradually into a small manufacturing unit. It is especially in such trades as metal and wood-work and leather tanning - trades characterized by piece and batch production, where the "financial threshold of entry" 2/ into small-scale industry can be rather low - that small factories emerge from the handicraft sector;

(b) Merchants who are familiar with the marketing function in industry, and who are generally aware of the opportunities for profit that are the reward of domestic production of imported consumer goods. This group is particularly active in the process industries, such as soap manufacture and textile weaving, which have a low to medium financial entry threshold and do not require high technical expertise for successful operation;

(c) Landlords and farmers with large holdings including rural traders who control agricultural output and/or trade and who are frequently engaged in agricultural processing industries such as grain milling, oil pressing, cotton ginning, logging and saw milling: these industries require a good understanding of produce marketing but rather modest investment and limited technical know-how;

2/ The amount of money required to establish an industrial enterprise of minimum economic size. Obviously, the financial threshold of entry varies considerably according to manufacturing activity. Whereas in developing countries the establishment of a small but adequately equipped automotive maintenance and repair shop may require the investment of as little as $US5,000 approximately $US1 million has to be invested in a new cement plant of economic size; such investment amounts naturally create an effective barrier to participation of small entrepreneurs in the latter type of manufacturing activity.

(d) A very heterogeneous but far from negligible group: retired civil servants and members of the armed forces with administrative experience and leadership talent; young graduates of technical schools who establish themselves as independent small businessmen, particularly in the modern skill-intensive and technologically progressive industries, such as precision engineering; skilled workers and foremen in large factories with some savings and a desire to branch out on their own; educated persons with rather specialized technical knowledge (such as pharmacists) that can be profitably invested in small processing units (including the pharmaceuticals and toiletries industries).

6. This brief summary suggests a considerable variety in background and experience of those establishing and operating small enterprises. For many small industrialists, experience accumulated prior to joining the small-scale manufacturing sector relates to technical skills without, however, the required complement of marketing knowledge. Others may be experienced in marketing operations, which is, however, not always an appropriate preparation for successful management of an industrial establishment. Still another group, like those with a civil service or military background, while familiar with general organization may lack the feeling for, and understanding of, commercial operations. Some groups, like urban merchants, are likely to welcome innovation and change, while small industrialists emerging from the traditional artisan sector are generally more conservative in outlook. This peculiar pattern of entrepreneurial origin, and the corresponding imbalance in knowledge and skills will naturally influence the design of training programmes for small industrialists.

7. The very nature of the small enterprise further complicates training. A small enterprise has its own peculiar structure; it is not a reduced model of a large enterprise. No functional specialization is possible, neither are the functions of the working proprietor comparable to those of the managing director of a large firm, although the small entrepreneur also has to plan, organize and control. While he must deal with questions requiring thorough technical knowledge such as the choice of equipment, he cannot be compared with the works engineer who specifies equipment for a large enterprise. The training and motivation of employees of a small enterprise require a different approach from that of larger enterprises. The small industrialist, therefore, has to assume many, sometimes conflicting roles, which would seem to fall into four broad categories.

8. First, the small businessman is an investor earning an income, and eventually a profit, from his business. While a shareholder may have a relatively detached attitude towards operations in a business venture, the private and occupational life of the small industrialist is often directly influenced by investment decisions.

9. Second, he will generally possess to a greater or less extent certain entrepreneurial qualities - energy and drive, physical stamina, willingness to take risks, and a strong desire for independence. Those abundantly endowed with these qualities will be interested in the growth of their businesses; those less endowed, in maintaining operation at a level which provides them with an adequate income.

10. Third, the working proprietor is the person who manages the enterprise and who plans, co-ordinates and controls operations. This management function is rudimentary in a very small establishment: essentially, management is the art of getting things done through people, and obviously, an enterprise operating with only a few workers leaves limited scope to exercise the managerial function. When, however, the enterprise grows in size, management becomes an increasingly important activity which, in very large enterprises, requires the full-time attention of the one or several persons in charge of the undertaking.

11. In the fourth place, there is what might be called the question of the specialist function. Because of the absence of functional specialization in the operational activities of a small enterprise, the working proprietor is engaged in a number of activities which require a greater or lesser degree of specific knowledge and skills for their effective execution. By far the most important of these activities is the one related to all questions of production technology, ranging from a general understanding of the manufacturing process in which the enterprise is engaged to the ability to carry out on the shop-floor specific operational tasks. He is also directly concerned with buying and selling, financing and managing his money and maintaining accounts and other records. These activities are inseparable from management and in larger firms are carried out by specialist staff.

12. The effective performance of so many, often conflicting roles by one man requires a balanced view of priorities. For instance, the craftsman in him may resist a lowering of quality standards which his sound management thinking knows is

the only answer to declining profit margins. He must concentrate on several functions at the same time, both long and short term. If he wants to adjust to changing conditions, he may have to select, instal and test new equipment, plan the instruction and training of personnel to work this equipment, while at the same time carrying out routine tasks such as quality control, scheduling, maintaining relations with suppliers and customers, and having consultations wit government authorities. He must give attention to each aspect in the proportion in which it is necessary. It is this difficulty of balancing these activities which is the basic restraining influence in the growth of small enterprises. In any training programme for small industrialists, therefore, the question of priorities and the balancing of tasks must be given a great deal of attention.

13. It would appear that three variables basically influence the nature, scope and intensity with which the small industrialist carries out his functions.

14. The first variable which affects this activity is the nature of the manufacturing process. Some processes require the active and continuous participation of the proprietor in all questions of technology, while others more or less run themselves and the emphasis is on marketing. The first group includes engineering where the technical function looms large in the activities of the small industrialist. On the other hand, in industries such as flour-milling, oil-pressing, sawmilling and cotton-ginning, success depends rather on commercial skills.

15. The second variable is the size of the enterprise expressed by one or more factors - number of employees, capital invested, power, production value, volume of turnover - which, coupled with applied technology, is probably the most important factor influencing the work pattern. A broad distinction of the small enterprise sector places this question of size in perspective.

(a) Household manufacturing undertakings with less than ten persons to a unit, located in or near the home of the skilled craftsman-owner who works on the shop floor and whose main objective is to earn a livelihood;

(b) Pre-factory enterprises situated near the home of the technically skilled owner whose main objective is to earn a living but who is beginning to think in terms of profit rather than income. There is a rudimentary division between technical production and other activities;

(c) Small-scale factories (of thirty to a hundred persons), where the proprietor is increasingly thinking of profit maximization, and where, although he is very much involved in techniques of production within the limits of the technology, it is entrepreneurship and management which dominate the successful operation of the enterprise.

16. Thus, when moving up this scale, patterns of work are affected by the metamorphoses of the working proprietor. In small establishments, he will generally devote an increasing proportion of his time to planning, co-ordinating and controlling operations. The growth of the enterprise will change him from a technician with managerial responsibilities into a manager with technical responsibilities. As operations expand, the firm is prepared for further growth into a medium-scale establishment by the emergence of a management structure.

17. The third variable which influences his functions is the business environment. In developed countries, the owner of a small enterprise benefits from a highly developed system of infra-structural facilities and services. He is assisted by specialized trade associations, by industrial supply firms who provide technical advisory services to clients, by institutions accustomed to dealing with people of modest financial needs, and by numerous public and semi-public agencies whose sole purpose is to relieve him of certain operational responsibilities and to help him participate effectively in the economic life of the country. For example, by paying a small fee he can obtain management control data without having to specialize in this or to engage a highly paid employee to do so. This network of supporting facilities is denied the small industrialist in developing countries where the economic organization is insufficiently developed.

18. Summarizing, it would appear that a number of variables determine on the one hand what skills the small industrialist requires to work effectively, and on the other what skills he brings when entering the manufacturing sector. To operate a small enterprise, he needs technical, commercial, financial, administrative, entrepreneurial and managerial knowledge, and the extent to which he uses these skills effectively will depend on the nature and size of his manufacturing activity, and on the infra-structural facilities and services available. Further, unlike his counterpart in industrialized countries, he has to cope with the additional burden of a low level of applied technology. Finally, problems arising from operations carried out on a small scale cannot be solved by raising the levels of skills of those concerned; the solution lies rather in building up institutional facilities which encourage mutual support between small and large enterprises.

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All these factors call for an imaginative, highly diversified and flexible training programme for small industrialists.

Current training practices

19. Like so many other training programmes, those specially designed for the systematic development of entrepreneurial, managerial and other non-technical skills have really started in the developing countries only since the Second World War with the establishment of an increasing number of industrial development institutes and productivity and management training centres, partly with assistance from the International Labour Organisation and the United Nations Development Programme (UNDP). Courses offered by these institutions, for managing directors down to first-line supervisors, are generally designed to meet the training needs of personnel already engaged in all types and size of enterprises and deal not only with general management subjects but also with such techniques as production planning and control, marketing, accounting, personnel management. There is very little provision made for consultancy or extension services after the completion of courses, although centres established with ILO co-operation emphasize the intrinsic need for in-plant training, and much of the training is "position-oriented", with the aim of upgrading the skills of specialized personnel such as works engineers and accountants. Such courses are frequently supplemented by "problem-oriented" training programmes dealing with such common problems as labour-management relations, staff training, communications within the enterprise, and interpretation of statistical information.

20. This emphasis on specialist training is particularly useful for professional managers and technical and administrative personnel employed in larger enterprises with a functional management structure; its usefulness is however progressively reduced when it concerns the smaller enterprises where small industrialists, together with their few assistants, invariably carry out a number of tasks for which the larger enterprise has specialized staff at its disposal. Moreover, the organization of training programmes for small industrialists faces a number of problems which are significantly different from those generally encountered when management development programmes for personnel employed in larger enterprises are

being designed. A recent ILO meeting[3/] has identified some of these problems as follows:

(a) Lack of interest in, and lack of appreciation of, the value of training;

(b) Low level of basic education;

(c) Extremely wide variety of technical subjects to be covered together with a wide range of levels on which business management and technical training is needed. This militates against the adoption of a common programme and requires a wide range of teaching skills;

(d) Difficulties encountered by small entrepreneurs in leaving their enterprises in order to attend training courses held during working hours some distance away;

(e) Lack of funds to pay for the cost of training: even if training is provided free of charge, expenses for travel, board and lodging while attending institutional courses may be a burden. Even if funds are available, the small entrepreneur may be reluctant to spend money upon training which, to him, has an intangible value;

(f) Lack of training personnel which are unavailable locally in the numbers needed, and if available, often have inadequate knowledge;

(g) The high cost of providing institutional training on such a variety of levels and subjects.

21. In the latter part of the 1950's several countries, particularly in the Asian region, realizing the difficulties experienced by existing industrial development and management training institutes in running courses for small enterprises, set up special programmes for training in entrepreneurial, managerial and technical skills, often with UNDP and ILO assistance. As far as possible, training is organized by manufacturing activity - usually offered free of charge and held in the evenings - in such public agencies as small industry service institutes offering an integrated system of research, training and advisory and extension services. In addition to courses considered useful for small plants, such as

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3/ ILO: Technical Expert Meeting on Development of Managerial and Entrepreneurial Resources in Africa, Addis Ababa, December 1966, Conclusions on Small Enterprise Development in Africa document Man.Dev./Africa Meeting/33, mimeographed. While this meeting examined the question of training problems for small industrialists in relation to Africa, most of its conclusions are relevant to developing countries at large.

inventory control, work study and cost accounting, these sessions are also frequently used to upgrade skills or to acquaint small industrialists with new manufacturing equipment and processes and with government policies and plans for the small industry sector, for example, loan and credit facilities or provision for modern workshop space on industrial estates.

22. With a few exceptions, training courses run in developing countries for small industrialists would seem to suffer from two defects: first, they are, by and large, "miniaturized" versions of training courses prepared for management personnel employed in larger enterprises or are "rehashed" material taken from courses prepared in industrialized countries, with some attempt at adaptation; and second, insufficient attention is being given to relate the course material to the operational requirements peculiar to a particular manufacturing activity. The effectiveness of such training efforts is therefore reduced, particularly since very little literature exists on operational practices, structure, needs and stages of development of small industries in developing countries, and on effects of particular production technologies on operational arrangements in such enterprises. This area presents a wide field for useful research in the interest of the design and execution of training programmes for small industrialists.4/

Guidelines for training of small industrialists in entrepreneurial and managerial skills

23. The previous analysis of the nature of the small manufacturing enterprise and the problems it is facing in developing countries would suggest a number of guidelines for the design and execution of training programmes for working proprietors. They may be briefly summarized as follows:

(a) Training of small industrialists demands a comprehensive approach to assisting them, both in developing the attitudes required to cope effectively with problems of change and growth as well as in upgrading their business

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4/ Useful material such as case histories, describing specific operational practices in small enterprises in developing countries, are being collected by various small industrial development agencies that operate in collaboration with the ILO; arrangements are currently being made to collect, classify and interpret this case material for the preparation of an authoritative handbook on management practices and training needs of small industrialists in developing countries, to be published as a companion volume to the ILO publication Services for Small Industry (Studies and Reports), New Series, No. 61, Geneva, (1961).

skills. To this end, three main training methods should be employed: classroom instruction, field observation and training within the enterprise;

(b) To be fully effective, training should be supported by programmes to raise the general educational level of the small industrialist so that he may better understand the environment in which he works, the social, economic and technical forces to which his enterprise is subjected, and the contribution he may make, alone or in co-operation with other small industrialists, to the progress of his business. Adult education programmes, adjusted for the purpose, may be suitably applied;

(c) Given the generally low educational level, most small industrialists will find it difficult to translate abstract concepts explained in the classroom into practical action in their enterprises. Training programmes should therefore make ample use of modern methods imparting knowledge in small, graduated steps, at each of which the trainee can check whether he has absorbed the information before proceeding to the next. Use should also be made of visual aids of all kinds, situations experienced or witnessed rather than simulated; on-the-job training, group visits, in-plant training exercises, marketing clinics and other forms of training by participation are preferable to desk study;

(d) As far as practicable, instructional staff should be recruited from specialists working in industry as such persons will bring to the programme an understanding of business operations which professional teachers seldom possess; brief teacher training courses may be organized to develop the required instructional and pedagogical skills;

(e) Ideally, all training programmes should be designed around a single manufacturing activity, in order to integrate a variety of skills into a single operational tool. In this way, the small industrialist is better able to see interrelationships of various terms with which he is familiar. Further, this approach will provide the small industrialist with a better understanding of how critical a factor is interplay of commerce and technology. For instance, he will see how production processes affect commercial practices and how advanced production techniques may increase profitability of the enterprise;

(f) Advanced entrepreneurial and managerial skills can make their full contribution to the progress of the enterprise only if reinforced by other measures taken to promote the undertaking, such as the introduction of modern equipment, joint action between small enterprises to benefit from the economies of scale, and in general, Government measures to create an environment that is congenial for the development of small enterprises. Therefore, training should not proceed in isolation but be designed as an intrinsic part of an over-all effort to develop one particular manufacturing branch. In this way the effectiveness of certain promotional measures will be enhanced: for example, instruction in elementary accountancy, including the preparation of financial statements required by banking institutions, will usefully support a loan scheme for small industrialists;

(g) The preparation of training programmes should commence with systematic research into current operational practices in the small industry sector. Groups of small enterprises engaged in similar manufacturing activities should be examined with certain purposes in mind:

(i) To identify the technical, economic and managerial problems facing the enterprise and to assess what measures should be taken to develop the manufacturing branch as a whole;

(ii) To determine what changes should be effected in the current pattern of management practices and what additional skills the small industrialist needs to make operations more effective;

(iii) To design a suitable training programme, including the selection of the most effective training method, according to the educational level and previous experience of the trainees;

(h) Training programmes should come up for revision at set intervals so as to determine what course material has become superfluous or has to be replaced because of developments in the manufacturing branch concerned; particular care should be taken to omit information that is not directly relevant to the operational needs of the enterprise so as not to burden the small industrialist with knowledge that cannot actually be applied to his undertaking;

(i) All training programmes for the promotion of small enterprises initiated by public authorities should be carried out in close co-operation with associations of small industrialists and representatives from industry and the manufacturing branch concerned, so as to determine the effectiveness of the programmes and changes that should be effected. Since this training should ultimately be carried out by the trade associations themselves, with the co-operation of the public authorities, the formation of such associations should be actively promoted, possibly through a suitable system of incentives;

(j) Training should have three broad objectives:

(i) To prepare enterprising persons who wish to participate in manufacturing industry as proprietors in the knowledge and skills they need for the successful establishment and operation of their business;

(ii) To raise the skills of existing small industrialists so as to enable them to utilize fully the resources available to their enterprises;

(iii) To assist small industrialists with growth potential to achieve a rational expansion of their enterprises;

(k) Training programmes to prepare potential small industrialists should start at school - technical and vocational training institutions. They should be organized in close co-operation with the public agency responsible for the

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promotion of small enterprises and should aim at giving the students an understanding of the responsibilities of the work and a chance to see at first hand under expert guidance actual operational conditions, both the handicaps and the advantages, in a small enterprise. He should also grasp the elementary procedure of establishing a new enterprise: obtaining sufficient finance, selecting and procuring equipment, supplies and materials, and making appropriate marketing arrangements;

(l) Training for prospective small industrialists may proceed in two stages:

(i) Short appreciation courses to provide an understanding of the nature and major aspects of an enterprise, and the operational skills required for its successful management. Such programmes, not necessarily designed around a single manufacturing activity, may help a prospective small industrialist to avoid mistakes frequently made by inexperienced persons such as starting out with insufficient operational capital or without acquiring the necessary technical knowledge;

(ii) Courses of longer duration to prepare prospective small industrialists for their future task, preferably organized for a single manufacturing branch. Ideally, courses should be designed to cover two distinct periods: the first, prior to establishing the enterprise, and the second during its initial phases. During the induction period, trainees should receive instruction in entrepreneurial and managerial skills including as necessary, specific technical and administrative skills. During a consecutive, second period, trainees established in business will bring to the classroom their day-to-day problems: these will be examined, solutions offered and, where necessary, additional theoretical instruction given to fill the gaps. This phase should particularly emphasize the application to the trainees' situations of theoretical instruction imparted during the first part of the training programme, ample use being made of in-plant training exercises;

(m) Training to enable existing small industrialists to fully utilize resources available to them may proceed in three stages:

(i) Programmes, organized preferably in small groups, would familiarize small industrialists with modern entrepreneurial and managerial skills, using the self-education process: discussion, under expert guidance, of common problems and possible solutions;

(ii) Sufficient interest having been stimulated in modern entrepreneurial and managerial skills, working proprietors and responsible staff of comparatively larger enterprises in the small industry sector would be further trained by specialized courses dealing with operational, administrative, technical, financial and commercial questions,

wherever possible drawn from their own experiences. They should also be given expert help in applying newly-learned skills to their own enterprises;

(iii) Small industrialists should be exposed to periodic refresher courses designed to give them information needed to adjust their enterprises to new developments in technology, management and general operational practices;

(n) Training of small industrialists who operate enterprises with significant growth potential should concentrate on identifying and eliminating bottlenecks and on preparing them for expansion of their enterprises by teaching skills necessary for managerial, as distinct from technical, functions. Field visits to larger establishments, organized on lines similar to circuit schemes often help to broaden outlooks;

(o) Consideration might be given to setting up and operating along commercial lines, in association with the public authorities responsible for training, a "model enterprise" where small industrialists can observe and practice management skills in day-to-day operations. Such a set-up would also provide teaching staff with the opportunity of carrying out action-oriented research;

(p) The utility of the "model enterprise" can be enhanced by organizing it as a "training enterprise" which in addition to setting an example for observation and study, will also provide training facilities to develop new industrialists and to upgrade existing ones. In such an undertaking, modern apprenticeship training methods for technical skill formation could be integrated with on-the-job training and related classroom instruction in entrepreneurial and managerial skills.

Some practical applications

24. As suggested earlier, entrepreneurial training efforts are likely to be more successful if conceived and implemented as an intrinsic part of an over-all plan of action to develop the small industry sector. This lack of an integrated approach is probably the most serious, widespread and persistent problem facing public efforts to develop small enterprises. For instance, new enterprises may be actively encouraged, while no provision is made for the steady flow of raw material; credit schemes are frequently initiated without appropriate guidance on how to invest the borrowed money wisely. In turn, lack of knowledge of the operational practices of the small industry sector and lack of organizational machinery for consultation with small entrepreneurs on the preparation and execution of public policies and programmes being designed in their interest, lead to

disappointing training results; badly timed action brings about frustration on the part of the entrepreneur and his subsequent distrust of the efficacy of publicly sponsored training schemes.

25. When attempts are made to develop a nation-wide, integrated system of promotional services to assist all types of manufacturing enterprises, irrespective of size or location, so many administrative difficulties arise that a more effective approach might be training for groups of enterprises, by geographical area, identical business and technical interests. Those responsible for such training, together with an interested group of small industrialists, would plan and execute enterprise group training programmes within the framework of the industry group as a whole. This would call for the investment of a number of inputs - human physical and institutional, preferably expressed in quantitative terms - which would yield pre-determined output targets within a specified time. To assure the effective utilization by industry of the available inputs, special planning, co-ordinating, motivation and control systems will have to be developed, so that the quality and scheduling of the programmes will ensure a number of planned output targets, such as the creation of new employment.5/

26. While the most important human input would undoubtedly be that of raising levels of skills of small industrialists and workers alike, the corresponding institutional input would be the organizational form of such training programmes, for example, co-operative training societies. The advantages of such an integrated training approach to small enterprise promotion are evident. For instance, training in improved foundry techniques would reduce wastage of raw materials frequently requiring the outlay of scarce foreign exchange resources. Funds formerly tied up in stock would thereby become available for other more productive purposes and this, in turn, would require training in financial management and the rational selection of investment alternatives.

27. Finally, the concept of the "training enterprise" mentioned earlier, might be particularly useful in countries in the early stages of industrial development and lacking a craft tradition, including countries in Africa below the Sahara. There special "live situation" programmes will be required, to train small industrialists in entrepreneurial and managerial skills and modern production technology. This

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5/ A model for such planning and control systems may be found in the operational practices of large multinational corporations that control a number of geographically dispersed manufacturing establishments.

might be done by establishing "training enterprises" with adjoining training bays within the industrial development programme of the country, each catering to one specific manufacturing sector and operating as a bona fide commercial undertaking with its own capital and profit and loss account. Responsibility for keeping losses to a strict minimum and running it as a training-cum-production centre would be vested in an instructor.

28. The courses would reproduce traditional European apprenticeship arrangements, providing integrated on-the-job training in both the technical and managerial aspects of the enterprise. Each trainee would be selected according to set minimum requirements regarding technical qualifications and experience, and he would work in a "training enterprise", with people of closely related interests, under the close guidance of the instructor. The programme could be based on the actual tasks and functions of the owner-manager of the particular branch of activity, the length of the training period varying accordingly and trainees would assume, in turn, the role and functions of the working proprietor, including administration, record-keeping and costing. Supplementary classroom instruction would be given in the training bays. At the end of the training period - which might last up to two years - the graduate would be assisted to establish himself as a small entrepreneur, possibly on an industrial estate so as to facilitate the follow-up service provided by the government extension service. In this way, he would have the benefit of continuous advice and guidance as well as common technical and service facilities to help him operate his undertaking efficiently and profitably.5/

II. THE TECHNICAL TRAINING OF SMALL INDUSTRIALISTS AND WORKERS

Present situation

29. On-the-job training is by and large, in industrialized as well as in developing countries, the main method through which workers acquire the knowledge and skill necessary for effective participation in manufacturing industry. Such training is normally supported and reinforced by technical schools and vocational training centres, particularly with regard to occupations with a high skill content like those concerned with the metal and electrical trades. In these institutions young people are being introduced to basic industrial skills prior to, or in conjunction with, their receiving on-the-job training under actual production conditions in the enterprise. Training programmes are mostly organized along occupational lines; only in a few instances are training facilities designed around a particular technology to be applied in small enterprises as a distinct type of industrial organization. In the developing countries, training of the latter type is largely directed towards improving handicraft skills for the development of the pre-industrial manufacturing sector, such as handloom weaving and pottery. As regards the modern small-scale enterprise sector, isolated efforts are made to raise levels of skills in certain occupations, normally in short supply, that constitute a bottleneck in the growth of small enterprises, such as training in blueprint reading, heat-treatment and metal-coating for the light engineering trades, chrome-tanning to supplement the traditional vegetable-tanning techniques, and the like. Promotional agencies like the small industry service institutes are particularly active in the latter type of training.

30. Notwithstanding the efforts of the public authorities in developing countries to expand technical training facilities in order to meet the increasing need for skilled personnel at the shop floor level, the demand for such persons invariably exceeds their supply. Moreover, the training systems in these countries are conceived to serve the requirements of government technical departments, middle-sized and large-sized industry, and commerce. The same normally applies to the activities of the vocational and technical education branches of the educational system. In view of this it is not surprising that the existing training system hardly contributes to the progress of the small enterprise sector.

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31. The low technology employed in the small enterprise sector further complicates the usefulness of the prevailing training system. Low technology restricts the earning capacity; invariably, therefore, wages including fringe benefits paid in large undertakings for selected occupations are appreciably higher than earnings of workers similarly engaged in small establishments; wage levels in large, modern manufacturing complexes are often twice or even three times those found in small industrial units located in backward rural areas. Under such circumstances, it is understandable that young workers on completion of their technical training and after having been exposed to modern patterns of behaviour and thought, are most reluctant to spend their working life in small enterprises where earnings are low, working conditions, welfare facilities and social security coverage sub-standard, and where opportunity for advancement under progressive management are invariably limited.6/ Moreover, those few people who join a small enterprise will quickly discover that the level of applied technology does not provide them with the

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6/ For example in Japan, the wage differentials, as measured by cash earnings according to the size of the establishment, for 1961, were as follows:

Number of workers employed	Wage index
500 and over	100.0
100 to 499	74.5
30 to 99	61.7
5 to 29	49.3

To some extent the wage differentials reflect the skill differentials implicit in the scale of operations. But detailed investigations have shown that the wage disadvantage of the employee of a small-scale undertaking is real. A Ministry of Labour enquiry in 1954 showed, for example, that in a rolling mill a male roller aged between thirty and thirty-five, with five to ten years' experience in the trade, would earn 100 in an establishment employing 1,000 or more workers, but only 66 in an establishment employing ten to twenty-nine workers. These disparities are all-round and relate to economic and social conditions of workers in small-scale and large-scale enterprises: they cover not only wage levels but also working conditions, hours of work, security of employment, social security, and welfare levels. Cf. Fifth Asian Regional Conference, Some Labour and Social Aspects of Economic Development, Report of the Director-General, ILO Geneva (1962), p. 68.

opportunity to exercise their skills because their previous institutional training has been related to technological practices and organizational methods prevailing in larger industrial undertakings. This will obviously lead to frustration and disillusion and so a desire to seek employment elsewhere.

32. In addition to getting trained personnel from the public training system, an increasing number of large-scale manufacturing enterprises in developing countries provide opportunity for new **entrants** to acquire or to upgrade their skills under special training arrangements within the undertaking. Such training is being organized in "training bays" or "vestibule schools". These are training units, set up as an integral part of the enterprise, in which the equipment actually used on the shop floor is duplicated as closely as possible so as to provide training and skills actually needed in the undertaking concerned. Obviously small enterprises do not have the opportunity to establish their own in-plant training centres. They could, however, overcome this disadvantage by joining together and organizing their training needs on a co-operative basis. Unfortunately, such co-operative training arrangements, which are widely practised in Japan[7/] do not exist in developing countries. This is partly due to an absence of effective joint action among small employers, and between trade associations and vocational training centres located in the vicinity of the small enterprises; and partly because of a lack of understanding of, and guidance in, matters of skill formation with special regard to the training needs of small industries under conditions of continuous and accelerated technological change.

33. As a result, small-scale industry in developing countries still resorts to the age-old informal apprenticeship system whereby the worker learns the necessary skills and patterns and habits of work by observation, helping and imitating skilled operators until he has learned to do all the jobs of the trade. Only in the very small enterprises and in the typically creative handicraft shop will the workshop owner, generally a skilled person himself, endeavour systematically to initiate in the skills of the trade members of his family when they join the enterprise, or young people specially apprenticed to him to learn the job. The informal apprenticeship training system has no doubt performed a useful function in the past when levels of applied technology were largely static and when generation after generation of craftsmen used the same tools, equipment and materials to manufacture

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7/ Keiji Soejima, "A Break with Tradition", Training for Progress, Vol. 3, No. 1, (ILO, Geneva, 1963), pp. 6-11.

largely identical products for a traditional consumer market. It is, however, becoming an increasingly ineffective system, for now the workers have to be prepared for productive employment in a dynamic society, characterized by rapid technological progress, by changing consumer preferences, and by continuously evolving organizational patterns in commerce, trade and industry.

34. These informal apprentice-training arrangements have several limitations: they tend to perpetuate rather than correct, defective and obsolete methods of work; they do not equip the young with the skills required to modernize the industry; and they do not contribute to standard performance in manufacturing. This latter disadvantage is particularly unfortunate since it hampers production arrangements mutually advantageous to both small and large enterprises, and places the small plant at a disadvantage when competing in non-traditional markets. The present informal apprenticeship arrangements must be reinforced and expanded by modern systems of education and training if small industry in developing countries is to be rejuvenated by young, well-trained workers with new attitudes and skills.

35. Like the small enterprise workers, small industrialists are also at a disadvantage when compared with their counterparts in industrialized countries. They, too, generally lack systematic training and formal instruction in technical skills since those with sound technical education prefer, for reasons already explained, to seek employment in other sectors. Those with an artisan background have the advantage of shop-floor experience, but they lack the education needed to upgrade themselves by self-study or other informal instruction. The absence of a technically well-educated class of working proprietors, apart from a small minority of graduates of technical schools, naturally inhibits rapid technological change in the small enterprise sector.

Technical training needs of small enterprises

36. When deciding what arrangements would be best suited to meeting the technical training needs of the small enterprise sector, a brief reference may be made to operational differences between smaller and larger enterprises.

37. In the first place, there is the need for versatility of the workers in small enterprises. In large establishments, especially those engaged in mass production, workers are obliged to work one machine, set to perform a specific task. By

contrast, the very nature of piece or batch production by the small enterprise leaves much to the workmanship of the operator who may not proceed according to a predetermined schedule of operations and who often has to use several different machines in order to produce the finished article. Obviously, a worker who has to operate under such conditions should possess a wider range of skills than the operator in a large engineering works performing only one job under continuous and close supervision. With this greater skill versatility should go certain corresponding human qualities, such as imagination and the ability to shift quickly from one operation to another.

38. In addition, because of the small scale on which operations are carried out, the small enterprise generally utilizes, side by side, production technologies of varying degree of mechanization and technical sophistication. To take an example from the small machine shop: while the nature and volume of work may warrant the purchase of a drilling machine, the volume of milling work may be too small for a separate milling machine, and a lathe may have to double up for the purpose by equipping it with additional accessories.

39. The position is further complicated in developing countries. There technology is varied not only within a single enterprise but also between small enterprises belonging to one manufacturing branch, and even more so between undertakings of different sizes. As a result, there is a wide gap in technological levels between smaller and larger enterprises. This gap is the result of a variety of factors. Whereas in developing countries, capital is dear, it is even more expensive for small working proprietors who have limited access to institutionalized credit and who therefore have to avail themselves of informal credit arrangements against significant higher interest rates; this obviously will restrict the introduction of modern and more expensive equipment. Additional factors that contribute to a low level of applied technology in the small enterprise sector include a lack of technical information and production know-how; lack of skilled personnel; and above all, the fact that most modern equipment available on the market is designed for use in industrialized countries with radically different resource endowments from those prevailing in developing countries.[8/] In spite of all these limitations,

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8/ This question is examined in detail in another paper prepared by the ILO, "Progressive Industrial Technology for Developing Countries", (document ID/CONF.1/B.17).

there is ample room to introduce advanced technologies into small enterprises, but this will demand a far more accelerated rate of skill development than their gradual introduction over a longer period of time in larger enterprises called for. Thus, the carpenter in a developing country who manufactures furniture by joinery work and hand assembly will require substantial retraining when he has to operate more complicated equipment such as the combined chisel and chain mortizing machine, or when he has to cope with veneer-finishing instead of using brush and paint.

40. Furthermore, unlike the large enterprise sector, technical training is not limited to workers but will have to include small industrialists as well. To operate his enterprise efficiently the working proprietor has to possess, in greater or lesser degree, a profound knowledge of the technology in which his enterprise operates, as well as manual and operative skills. The extent to which such knowledge and skills are required will depend on the type of manufacturing activity and scale of operations. Further, in very small enterprises, the working proprietor may frequently have to join production on the shop floor if the scale of operations does not justify employment of a full-time technical specialist, or if he has to supplement certain operative skills lacking in his workers. While it may be sufficient for the working proprietor of a large foundry to keep abreast of advances in foundry technology, the small proprietor often requires training in certain skills.

41. Finally, there is the important feature of the proprietor himself being generally responsible for the training of his workers for a continuously changing situation which demands new types of products and corresponding changes in applied technology. The need for, and implications of, accelerated change and adjustment should be understood, not only by the working proprietor but also by his workers in order that eveyone involved realizes the mutual necessity of co-operation in modernizing the enterprise. The large establishment has ample opportunity to manipulate labour productivity successfully by selected organizational and managerial techniques and the utilization of capital intensive technologies. In contrast, the small enterprise has to rely for its profitable existence largely on the attitude and motivation, knowledge and skills of its working community, from the proprietor to the workers. Progress in the small enterprise is essentially a function of social and technological change; while technological level is a critical factor for the future of small business, even more will depend on the personal initiative,

the ability to adjust, the desire to innovate and to progress, the wish to learn new things and to abandon obsolete notions that will gradually lead to a more rational system of industrial organization. To be really effective, a technical training programme cannot ignore the problem of developing in the working community of the small enterprise the attitudes required to exploit to the full advanced technical skills. This will require a pedagogically justified training system that will blend technical instruction with personality development, which in turn will enable the working proprietor to carry out his training task in the best manner possible.

Guidelines for technical training

42. The previous analysis of the current position would suggest that in framing a national policy for technical and vocational education and training in support of industrialization efforts, care should be taken to ensure that it meets the conditions and requirements not only of larger but also of smaller manufacturing industry. In the design and execution of training programmes, therefore, consideration might be given to the following guidelines:

(a) Technical training programmes for the development of small enterprises should be fully integrated in the training policies for both smaller and larger manufacturing industries. To ensure full and undivided attention to the training needs of the small industry sector, it might be necessary to establish one or more separate organizational units within the public authorities responsible for education and training in both techniques of production and management of the enterprise. Such a unit should be primarily concerned with providing counselling services to government agencies for small enterprise development and other public and private bodies, such as trade associations or co-operative training societies, in all matters of technical and managerial training, for all levels of the labour force of small manufacturing enterprises;

(b) Technical training of working proprietors should be integrated with training in entrepreneurial and managerial skills in order to ensure that any large-scale public training effort should be initiated only when the small enterprise/owner has been convinced of both the need and the advantage of technical training for industry; this will enable him to utilize fully higher levels of labour skills in his undertaking. Moreover, training schemes should provide the working proprietor with a full understanding of the interplay of management and technology and the contribution that a progressive technology may make to the profitability of the enterprise. In particular, they should provide him with essential advanced skills;

(c) Technical training for working proprietors, foremen and operatives should be designed to the largest extent possible around a particular manufacturing technology, rather than organized along occupational lines. This will not only create a common interest among trainees in the skills being taught but will also aid learning by references to production processes with which they are familiar. In addition, it will increase their skill range and thereby contribute towards technical versatility required for successful operations in a small establishment;

(d) Because the resources in terms of funds and specialist manpower required to design and execute such training schemes are necessarily limited, priorities should be established: first, regarding the manufacturing branch or branches to which training efforts should be particularly directed, and second regarding the types of enterprise (largely coinciding with establishment size) that are likely to benefit most from public training programmes;

(e) Under conditions where the demand for skilled personnel exceeds the supply by a wide margin, and where the larger enterprise will command a premium over small establishments when employing workers with adequate vocational preparation, it is unlikely that the normal education and training system will contribute in significant measure to raising skill levels in small industry. Technical training efforts, therefore, should be directed primarily to training of workers already employed in small industry, rather than providing vocational preparation for new entrants to the labour force who will continue to find employment in large manufacturing industry. The success of training programmes for employed workers will largely depend on the direct and visible contribution that higher skills can make to the productive efforts of the small industrialists who are required to participate in such publicly sponsored training schemes;

(f) Since on-the-job training without vocational preparation will remain for years to come the machinery for technical skill formation in small industry, training programmes should aim at gradually reinforcing and completing the traditional informal apprenticeship system through raising the technical content and adding elements of modern apprenticeship training practices, including the introduction of trade testing, the provision for related classroom instruction and the upgrading and standardization of conditions of employment. As the working proprietors (including supervisors, foremen and key-workers on the shop-floor engaged in the larger-sized establishments of the small industry sector) are the main agents for technical progress, steps should be taken to equp them fully with the knowledge and skill required to initiate and carry out such training;

(g) Particular care should be taken to design the training programmes by taking into account likely changes in applied technology, methods of work, product choice and job content, rather than to base them on existing manufacturing practices in small industry;

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(h) In respect of new manufacturing activities, emphasis should be placed on integrated technical and managerial training of groups of prospective small entrepreneurs and key-workers for the industry. Such training programmes might be conceived on an ad hoc basis, leaving it to a few established industrial pioneers to set the pace for entrepreneurial imitators who, induced and supported through suitable incentive and extension schemes, would further expand the industry by setting up additional enterprises.

Some practical applications

43. Earlier in this paper mention has been made of the need to promote the development of small enterprises by executing an integrated programme whereby investment in a number of inputs are expected to yield a number of predetermined outputs. In projects of this kind, technical training would feature as a prominent input. The effectiveness of a training programme organized on a group basis is likely to increase greatly as the training effort will be supported and reinforced by complementary measures taken in the interest of the enterprise group as a whole. Such group training may be arranged under a scheme whereby several undertakings associate, for example to provide related instruction; to ensure the full training of apprentices by rotating them among firms and employing a full-time instructor or training officer for the planning, organization and control of training. But most important is that such group training will recuperate some of the advantages of the journeyman system, customary in traditional European apprenticeships which constitute a period of rotation designed to give the trainee a broader comprehension of his trade, versatility in skills, knowledge of new methods and an understanding of the differences in operating conditions applying to his trade in different areas.

44. The successful operation of joint training co-operatives requires facilities to provide related classroom instruction in theoretical and manual skills. This could be provided by technical schools and vocational training centres. The great majority of these institutions are operating in the same manner as that practised in industrialized countries: they generally follow the normal scholastic pattern of day-time instruction with a weekly rest day and interspersed with periodic holidays. Such an operational system may be justified in high income countries, but in developing economies it would seem to constitute a waste and a serious under-utilization of an important resource. In these countries the technical

schools and training centres probably could double their output with little increase of investment in fixed plant if geared towards the training needs of small industries. This would also save appreciable amounts of public funds invested in premises and equipment, including foreign exchange.

45. Obviously, numerous practical difficulties will have to be overcome before these institutions can be fully utilized for the purpose: additional equipment, more suitable for small enterprise operations, may have to be added; special teaching aids will have to be developed to facilitate the training of people experienced in industry but with little or no general education; extension service units will have to be located in these institutes to maintain close liaison between training and industry and to ensure that all training activities are integrated in over-all small industry promotion; additional instructors will have to be employed and specially trained to cater to the needs of a different group of students accustomed to handling less sophisticated manufacturing processes; and the like. But the problems involved to effect these necessary adjustments would seem minor as compared with the considerable benefits that will accrue when an apparently neglected resource in the national vocational education and training system will be fully utilized.

46. Moreover, technical and vocational education and training institutions, utilized in the way as suggested above, could easily double as technical and managerial extension and information centres for small enterprises. Training in advanced skills is not enough; a considerable amount of technical follow-up is necessary in order to ensure that the trained people, both working proprietors and the operatives, will fully apply their skills under conditions prevailing in their own enterprise. Certain elements of applied technical know-how are best introduced in industry through in-plant instruction. Apart from the advantages for the enterprises thus assisted, it is likely that closer contacts between training centres and industry will give the teaching staff a better understanding of operational conditions in industry, which will consequently better equip them for their training task.

47. One might further visualize a development whereby the technical education and training institutions would include plant and equipment for common production facilities, for example jobbing services in heat treatment or buffing in leather

processing, that the small enterprise cannot perform by itself for reasons of cost or lack of specialized skills. Such common production centres could also be used to provide in-plant training for small industry personnel, thus allowing more intensive utilization of available staff and physical resources of technical schools and training centres.

48. Further, with little additional effort, other facilities existing in large firms and in the military establishment, could be utilized in the interest of technical training for small enterprises. Many large undertakings, including those operating in the public sector, such as railways, public works departments and the like, maintain sub-contracting arrangements with small enterprises, or could easily develop such arrangements by promoting the creation of small units to provide them with the parts and components they require; action of the latter type is being taken by public sector enterprises in India with apparent success.9/ Technical training schemes would fit in logically in any sub-contracting arrangement. This is particularly so since skill levels required to manufacture a product successfully are best determined in co-operation with the parent firm which establishes specifications for the products to be sub-contracted.

49. Similarly, large firms manufacturing or distributing industrial supplies could usefully co-operate in government training schemes for personnel engaged in small enterprises. For example, raw material processing plants (like aluminium processing) and trading firms for the distribution of supplies (like those that market synthetic dyes) frequently maintain as a part of their sales promotion and marketing efforts industrial advisory services of which the small firms particularly take advantage. Co-operation could be sought with these services in the setting-up

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9/ Under a scheme initiated by the government-owned Hindustan Machine Tools Ltd. in Bangalore, India, highly skilled craftsmen are being selected and given additional training so as to prepare them to operate small (ten to twenty employees per establishment) light engineering shops located on an industrial estate adjacent to the factory. These small enterprises manufacture under sub-contract certain parts and components for assembly in the parent factory. Through periodic retraining arrangements the small working proprietors are being kept up to date in technical and managerial skills.

and execution of training schemes for small plants, thereby taking advantage of an existing machinery which will save effort and reduce cost. In all those instances, training programmes will establish an organic link between smaller and larger firms; this will either improve performance in the manufacture of the sub-contracted products or provide for a more efficient utilization of supplies marketed by large firms.

50. Further, the many training facilities available in military establishments may also be used in the interests of promoting small enterprises. Through technical training during military service many skilled people such as mechanics and electricians, needed in the armed forces for their own operations, are regularly added to the civilian labour force. It would appear that existing arrangements could be improved and expanded to supply the small enterprise sector with skilled personnel, without imposing undue burdens on the military establishment. First, consideration may be given to introducing into the military establishment training in occupations and trades that are in short supply and which particularly restrict the growth of the small enterprise sector. The required skills could be identified in joint consultation with the national manpower planning authorities and government agencies for the promotion of small enterprises and the necessary training provided during their military service. Second, special training in entrepreneurial and managerial skills could be given to military personnel who have been developed as skilled technicians, and who, during military service have shown organizational ability and leadership talent. Such additional training would help them to establish successfully and operate as working proprietors small enterprises in their particular technical specialities, upon their discharge from military service; such programmes would make a real contribution to the development of small enterprises if the entrepreneurial and managerial training were supported by industrial credit schemes. In this way profitable use could be made of a large number of hours of low military productivity of an army in peacetime.[10/]

10/ C.P. Kindleberger, Economic Development, Second Edition (New York 1965), pp. 109-110.

Conclusion

[illegible]. The preceding discussion of the process of skill formation for small manufacturing enterprises in its various aspects will indicate that such training is still a developing concept requiring special efforts to ensure that it will fully meet the objectives for which it has been designed. Training of this kind is also an expensive activity. This is obvious with regard to technical training programmes, since these require for their proper execution rather costly equipment and materials for the trainees to work on. But it equally applies to training in entrepreneurial and managerial skills in view of the scattered nature of the industry, the variety of manufacturing processes carried out on a small scale and the expense involved in associating capable staff with such programmes. In addition, experience shows that training programmes which do not fully meet the practical needs of the small industrialist invariably lead to disillusion with the concept of training itself and to rejection of the idea that the development of the enterprise can be accelerated through the acquisition of advanced knowledge and skills. Therefore, in order to ensure that monies spent and efforts made in the design and execution of training programmes will fully obtain the set objectives, regular evaluation exercises should be carried out of the aims of training and its practical effect at the level of the enterprise. To be fully effective, such evaluation should be a built-in activity of the authority responsible for training for small manufacturing enterprises, and it should be supported by an appropriate administrative machinery. Evaluation carried out through the application of cost-performance analysis systems is useful not only to correct defects and omissions as they become evident in programmes under review, but also as a means to collect the elements for the preparation of future training programmes.

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