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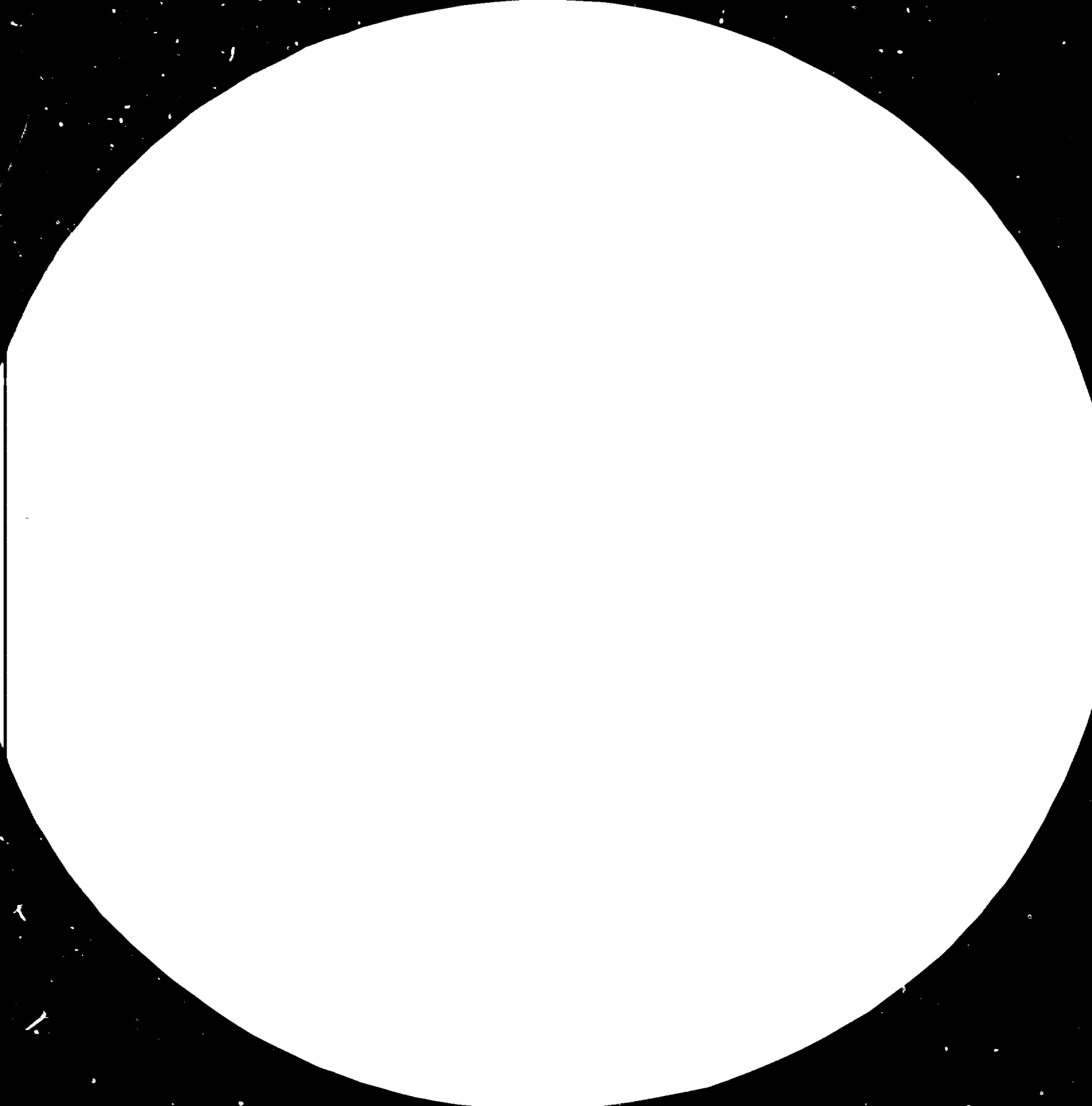
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2.8



3.2



4.0



5.0



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INDUSTRIAL MANAGEMENT AND MANAGEMENT DEVELOPMENT
IN THE DEVELOPING COUNTRIES *

- Problematic and Some Fundamental Considerations - .

by

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UNIDO

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1. Introduction

When comparing the developing with the developed countries, one finds that the single, most relevant difference between them is the degree of their industrial development. Naturally, there are other factors as well, none of which, however, are as significant by themselves as the absence of the manufacturing sector, surely one of the main causes of the relatively low level of per capita income in the developing countries. (Within the context of this paper under "industry", the manufacturing industrial sector is understood.) Industry generates most of the value-added income through processing of mineral and agricultural raw material resources and producing finished products and consumer goods. (The exceptions within the current world economic contexts are chiefly the oil producing and some food and other raw materials exporting countries, whose main income derives from the sale of raw materials). Industry helps to make agricultural production more efficient resulting in sufficient quantities of food, providing housing and clothing at lower cost, producing the medicines for health care and generally increasing the purchasing power of the population; all essential for improving the quality of life and for increasing the standard of living.

When looking at the developing countries as a whole, their industrial development lags far beyond that of the industrialized countries, currently with a share of only about 11% of the total world industrial output. This is far below the target of 25% to be reached by the year 2000, as promulgated in the Lima Declaration and Plan of Action of 1975, considering that the developed countries are also further expanding their industrial base. The developing countries have, therefore, much catching-up to do during the next 20 years if they hope to reach the 25% target, particularly if one considers that 70% of the about 3% increase achieved since 1975 in world industrial output was concentrated in only ten developing countries.

One of the reasons for this low share in world industrial production is that the developing countries do not have enough installed industrial capacity. The other, well documented impediment is the low capacity utilization realized by existing manufacturing facilities. This is a problem that must be tackled vigorously and without delay as it represents a constant drain on the developing countries' economies, while it offers the possibility for increasing the share of the developing countries in world industrial production quickly and with little added investment. Furthermore, whatever the causes of low productivity, measures found effective for their elimination will also help ensure that new industrial capacity will be efficiently utilized as well.

But what exactly are the factors which impede industrial manufacturing productivity in the developing countries? Surely there must be different causes, such as lack of markets for products, lack of raw materials, energy shortages, lack of maintenance and spare parts, etc. But none of these are as frequent, critical and universally acknowledged as the lack of qualified manpower needed by industry at all levels and functions. This is the reason why numerous Resolutions of the United Nations General Assembly and of other United Nations Bodies and Conferences have repeatedly emphasized the need for human resources development in general and for industry in particular.

Much research has been carried on the subject, which shows that in most cases clearly not unskilled labour is lacking (with the exception of some of the oil producing countries), rather people having specialized skills, knowledge and experience without which industry cannot function efficiently. The specific needs vary from country to country, industry to industry and factory to factory, but they fall into three distinct categories: skilled industrial manpower (those who know how to operate specific machines or processes or carry out specialized tasks such as maintenance, quality control, etc.), the respective supervisory staff at

the factory floor level and particularly experienced industrial managers (as opposed to those having had management training but little or no management experience). The "management gap" is particularly serious because it is the managers who organize all the inputs (i.e. material, labour and the manufacturing process itself) for attaining the desired efficiency, ensuring overall financial and economic success, and for planning properly the future of the enterprise. In short, albeit oversimplified, one can say that there are really no financial, production, marketing, maintenance, quality or other problems, only a management problem. Good managers know how to deal with or find solutions for such problems and how to ensure through proper planning and action, that such problems do not arise in the first place.^{1/}

One can, therefore, conclude that there is a shortage of experienced industrial managers at all levels and disciplines in the developing countries and this is considered to be one of the root causes of industrial inefficiencies. An interesting observation is that for the highest levels of management functions (i.e. general management), qualified managers are more readily available than for middle and lower level management functions. The explanation for this apparent contradiction is that all developing countries have at least a few outstanding and experienced individuals suited for the relatively few, high-level responsibilities. But even

^{1/} It should be noted that there are two different management disciplines which concern industry. One is "project management", i.e. managing the physical establishment of new industrial facilities (factory erection), which is concerned with engineering and architectural/civil engineering design, equipment specifications, construction site management, supervision of contractors' performance, etc., all the way to start-up operations. The other is managing the operations of existing, established, industrial enterprises and factories. Managers are usually specialized, with experience in only one of the above areas, and rarely in both and, because of the different nature of the tasks involved, they are not "interchangeable". Normally, the two management disciplines must interact and closely co-operate during the start-up phase of a new industrial facility. While there are management deficiencies in the developing countries regarding project implementation and management resulting in cost and time overruns, the greater problem having longer-lasting effects is the unsatisfactory utilization of installed industrial capacities and low productivity. This paper is concerned with the management of established, operating, industrial enterprises and factories.

these outstanding individuals cannot effectively manage industrial enterprises if good second-tier and middle level managers are not available, who, in turn, cannot achieve the desired results without experienced supervisors at the necessary skilled labour. Still, sound management is a primary prerequisite not only in the developing, but also in the industrialized countries for industry to operate efficiently. As the next step, it is, therefore, necessary to examine what type of management specialists manufacturing industry needs and how these managers are "developed".

2. Industry's Management Requirements

Manufacturing industry, as opposed to service and other industries, is a very unique case of society's organized activities, different in its nature from all others. The difference lies in the manufacturing process itself, where people and machines interact in a single or multiple step, simple or complicated process, to produce new materials and goods. This complex activity is the essence of industry and mastering it is vital for the industrial enterprise to succeed.

There is a number of other criteria which has to be met by the enterprise to be successful, depending on the circumstances. For example, under the competitive environment of market economies the product has to meet customer needs, otherwise it cannot be sold irrespective of the efficiency of the manufacturing process. Or, if the factory is located too far from the raw material sources or its customers, exorbitant distribution costs can endanger its viability. If the manufacturing process, however, is inefficient, it precludes the economic success of the enterprise or factory involved. Consequently, the efficient management of the manufacturing process is imperative for manufacturing industry to become and remain productive and financially successful as so well demonstrated by Japanese industry, whose mastery of the production process is the example that the rest of the world, including the industrialized countries, now aim to emulate.

Production management, therefore, in its totality and with all its sub-disciplines (i.e. the management of the technology itself, of production scheduling, maintenance, quality control, inventory control, etc.) is at the core of industrial management. The task in the manufacturing (as well as other) industries is basically the same everywhere, in all countries, namely, to optimize the utilization of all available resources for which the manager is responsible (i.e. raw materials, plant and equipment, manpower resources, working capital) to produce the best quality goods possible, at the highest achievable productivity levels, at the lowest possible cost. Naturally, all the other major management functions (e.g. marketing and sales, finance and accounting, R and D, process and design engineering, etc.) have to be adequately covered for the industrial enterprise to succeed. This includes top management's responsibility for the planning function, which is important for the future welfare of the enterprise.

The developing countries are aware of the existing "industrial management gap" and are taking various measures to rectify the situation with varying degrees of success. In order to gain insight as to where the problem lies it behoves to examine first how industrial managers are developed and trained in the industrialized countries.

3. The Source of Industrial Managers in the Industrialized Countries

The educational and career route to become an industrial manager in the industrialized countries varies to some degree from country to country and from industry to industry. But, there is one element in common everywhere: industrial managers are developed within the industrial enterprises themselves where they acquire the necessary experience through gradual advancement into positions of increased responsibilities. It appears that the educational background of industrial managers is quite varied and education in industrial management or business administration is

not predominant.^{1/} For example, about 80% of business school graduates in the United States of America do not end up in industry but go to work for other types of businesses and institutions, such as insurance, transportation, energy, banks, consulting, etc. Conversely, approximately the same percentage of industrial managers do not have their basic, initial education in business administration or management per se, rather in the sciences, engineering and economics, among others. One should add though that many industrial managers, whose basic education was not in management or business, have completed some form of specialized management training or attended relevant courses during their professional career. Since the number of business schools is even less in other industrialized countries, one can conclude that industry itself develops most of its managers through experience (i.e. on-the-job training). Moreover, the large and medium sized, well-established, well-managed industrial enterprises are the purveyors of industrial managers for smaller industrial enterprises as well. As the young college or university graduates entering large companies mature and advance into more and more responsible management positions, opportunity for further advancement becomes less frequent as the "management pyramid" becomes narrower. The result is that some of the more impatient, aspiring managers leave to assume more responsible, higher level management positions in smaller enterprises, which do not have the size and depth to develop themselves all the management talent they need. The reverse movement, from small enterprises into large ones at middle or high management levels, is much less frequent.

There is a logical explanation for industry developing its own managers. Industry was long established and functioning in the developed countries by the time the concept of management education was conceived and the first

^{1/} Although the conclusions described in the following are mainly based on experience in the market economy countries, to a large extent the same appears to be true in the countries having centrally planned economies.

business schools were established around the turn of the century, when there were few and far in between. In fact, industry developed its mechanism for developing its own managers as industrialization progressed as business schools have really started proliferating only after the Second World War. While industry in the developed countries presently does not seem to be the main beneficiary of management schools, this does not mean that management education does not fill a genuine gap. There are many enterprises other than industry in need of management talent, which draw heavily on business school graduates. Industry also hires from business schools, mainly for non-technical functions, concentrated in marketing, sales, finance, accounting and personnel management, where the knowledge of specialized management techniques and skills is important and familiarity with the technologies involved is of limited relevance.

Production management, however, is a different area where knowledge of the technology involved is crucial. Since industry has been and still is generating most of its own managers for production-related functions, business school curricula developed according to demand, with emphasis on non-production management-related subjects. Operations management is usually taught only in general terms, mainly of relevance to future general managers. Production management-oriented curricula are concentrated in relatively few universities with strong industrial engineering departments and the number of such institutions and the number of their graduates is small compared with industry's demand.^{1/} Nevertheless, the universities and colleges specializing in industrial engineering play an important role in developing production management and related management techniques, which are essential to advance the state of the art in this field. The currently voiced criticism of the traditional business schools that these

^{1/} Because the industrial engineering (i.e. work study) curriculum is specialized and limited in its scope, concentrating on facilities lay-out and task and work organization, mainly applicable to the engineering and "fabricating industries", it has little relevance to the materials producing "process industries", such as the metallurgical, chemical and petrochemical, food processing, cement and similar industries. Moreover, industrial engineers just out of school must first acquire through on-the-job experience the knowledge of the technology of the particular industry in which they work, without which their effectiveness is limited.

"do not concentrate sufficiently on the basics" (i.e. production and operations management) is, therefore, not fully justified because, as outlined earlier, industry has been and is taken care of itself in this regard.

Summing it up, it can be said that because industry in the developed countries is well managed, it produces good managers and because it has good managers, it is well managed. At the same time, the validity of the statement must be questioned that management is a profession per se and that managers can "successfully shift from one industry to another" under the assumption that "once they know how to manage an enterprise they know how to manage another". This might be true in case of very large, multi-divisional, multi-sectoral enterprises where sector- and technology-specific aspects of management are dealt with at levels below (i.e. division managers). Experience shows, however, that at the level of operations management and the factory (i.e. plant manager) sufficient knowledge and experience in the particular technological field is a prerequisite and cannot be substituted by general management knowledge only.

4. The State of Industrial Management in the Developing Countries

Assuming that the foregoing conclusions regarding how industrial managers in the industrialized countries are developed, is essentially correct, the situation in the developing countries can be formulated as follows: because the developing countries do not have well-managed industrial enterprises, they are not able to develop their managers and, conversely, because there are no experienced industrial managers available, their industries are not operating as efficiently as they should. It is a vicious circle, which must be broken as quickly as possible.

The problem is generally recognized inside and outside of Governments of the developing countries but its nature is perhaps not fully understood, thus making difficult the formulation of practical approaches to quickly

overcome shortcomings and to accelerate the development of their urgently needed industrial manpower base. In essence, it is a "generation" problem, a question of time needed for a developing country to reach a self-accelerating level of industrialization. Once this level is reached, the country begins to "generate" its own industrial managers, as demonstrated by industrially more advanced developing countries, such as India, Brazil, Mexico and Egypt, among others. Excellent industrial managers are now coming out in these countries, although perhaps still not in sufficient quantity needed for their quickly expanding industrial economies. But, if this industrial-management-development mechanism is correct, it implies that the less a country's industry is developed the more it lacks qualified industrial managers. Thus, the least developed countries are having the most serious problems in this respect.

Management training in the developing countries shows the same shortcomings regarding industrial management development as in the industrialized countries, only its effects are much more pronounced and critical. The reason for this is that most schools of management and business administration in the developing countries were established on the pattern of those in the market economy countries, particularly the United States of America, and have similar curricula. This is not to say that these management and business schools do not serve an excellent purpose. They provide future managers for many enterprises, businesses and institutions other than industry and for industry they are the source of managers specialized in marketing, finance and accounting, personnel management and related general management functions, just as in the industrialized countries. Nevertheless, lack of production and operations management-related disciplines, which are most needed by industry, have a much greater negative effect in the developing countries.

Training and education in management sciences and techniques equips

the future manager with an intellectual base, but it cannot and does not compensate for experience. To expect from a young graduate just coming out of the university to take over the management of a factory and to run it efficiently is asking too much. If he is put into such a position, he will have to learn on-the-job the "how-to-do" aspects of management, and it should be no surprise that under the circumstances the performance of the factory will not be up to expectations. Later it can be difficult to correct the problem after inadequate work organization and management systems become entrenched. For comparison, in the industrialized countries it takes considerable time and experience for a young graduate just entering industry to become a full-fledged plant manager. The time required depends on the nature of the particular industry, the size of the plant and other factors, but it is rarely less than 5 years and can go up to as high as 20 years.

This brings us back to the initial problem, which is that, in the developing countries there are few opportunities for aspiring young managers to gain the necessary experience. The task is to find new and better approaches for quickly developing qualified industrial managers, who, in turn, will efficiently manage the factories and industries of the developing countries.

5. Accelerating Development of Industrial Managers to Improve Industrial Productivity in the Developing Countries

Helping the developing, and particularly the least-developed, countries to improve the performance of their existing industrial enterprises and factories is one of the most urgent tasks facing the international community. Since the performance of an industrial enterprise and the productivity of manufacturing plants depends to a large extent on the competence of its management, raising the level and increasing the number of capable industrial managers in these countries is an essential prerequisite for achieving improved capacity utilization and productivity.

Three key factors needed to be considered to arrive at meaningful, practical approaches for accelerating industrial management development:

- a) education and formal training in relevant management subjects is advisable because it provides the future manager with the underlying concepts and techniques; it should be recognized, however, that training alone is of limited utility without practical experience;
- b) meaningful management experience can be only gained in the environment of well-managed industrial enterprises and factories;
- c) full understanding of the underlying technology in addition to management experience is indispensable for industrial managers responsible for operations and the management of manufacturing facilities.

It follows that, in order to improve industrial management capacity in the developing countries, all production management-related subjects must be emphasized in formal education, and management consultancy capacities related to production management needs to be reinforced whenever possible.

Accordingly, a three-pronged approach should be pursued to strengthen industrial management capacities in the developing countries: through appropriate education and training, by providing specialized management consultancy services and through on-the-job training.

6. Industrial Management Development Through Education

The educational approach of the developing countries (as well as of the industrialized countries) for training industrial managers needs some re-thinking and re-adjustment to serve better the needs of industry:

a) Emphasizing Production Management and Related Subjects

Re-adjustment of the curricula of existing schools of business administration and management should put emphasis on industrial management and all its aspects, particularly if such institutions and universities are located in areas of industrial concentration.

b) Introduction of Mandatory Management-Related Courses at Engineering Schools and Technical Universities^{1/}

Since most production and factory managers are engineers by education, production management-related courses as part of the regular engineering curriculum should be introduced. This would enable young graduates to acquire the theoretical base needed in their future management positions. Universities with new educational approaches should be also developed.^{2/}

c) Provide Opportunities for Industrial Managers to Attend Specialized Management Courses

Possibly the most useful type of management training is when practising industrial managers (and engineers) attend intensive specialized courses of short (1-4 weeks) duration. Because of their experience they will be able to relate theory to practice and "distill out" their applicability relevant to their positions. Organizing and conducting such training courses in the developing countries is, therefore, strongly recommended. These could be offered by universities, business schools or by various consulting organizations and institutions or be "brought in" from the out-

^{1/} The introduction of mandatory production management-related subjects in the engineering schools of the industrialized countries on a much broader scale than presently practiced should also be seriously considered by the respective educational policy makers, since relatively few graduate engineers receive such training. Students of engineering disciplines associated mainly with manufacturing industries (i.e. mechanical, electrical, chemical, etc.) should receive training in production management while those associated with facilities planning and erection (architecture, civil engineering, etc.) in project management (i.e. factory erection).

^{2/} In this context, an engineering education approach pioneered in Mexico is worth mentioning. The Centro Nacional de Enseñanza Tecnica Industrial (CENETI) with its main campus in Mexico City, was established with UN assistance (UNESCO) about 20 years ago. The engineering education is very practical-oriented with a unique educational approach: next to civil engineering it offers a curriculum only in industrial engineering but specialized in 8 fields, mainly related to metal working, foundry, electrical machinery, plastics and graphic arts. The full curriculum runs 9 semesters, with lower level degrees granted after 6 semesters. The industrial engineering orientation coupled with technical specialization appears to be particularly well suited for the developing countries as its graduates seldom end up as "desk-top engineers".

side if such courses cannot be made available locally. Having industrial managers to attend such intensive specialized courses outside their own country is another viable approach.

7. Management Development and Productivity Improvement through Consultancy

Management consulting support to industry is an indispensable ingredient of an industrial economy. Actually, the more advanced a country's industry, the better it can utilize consulting services as it takes good management to put into practice the recommendations of consultants. Nevertheless, management consulting has a somewhat different, but just as important, role to play in the developing countries.

Management consultants in the developing countries should not only analyse the problems of enterprises and make recommendations for corrective measures but, because of the lack of experienced industrial managers, they also have to help implement such recommendations. Therefore, the nature of consulting in the developing countries should be much broader than in the industrialized countries with strong emphasis on "hands-on" services and the provision of respective training support. While the same functions are performed by consultants in the industrialized countries as well, the ratio of implementation and training assistance to advisory services should be much higher in the developing countries.

Due to the critical role of production management in industry, consultancy capacities in this field need to be strengthened and specialized consultancy institutions, entirely oriented towards industry, or such units and departments in existing institutions, created.

8. Industrial Management Development through On-the-Job Training

As described earlier, industrial managers in the industrialized countries are in actuality "developed" through on-the-job experience and gradual advancement, at times augmented by enterprise-internal, formal training in case of a few very large corporations having their own training

facilities. The emphasis, however, is always on knowledge gained through experience. Since opportunities for advancement into management positions in the industrialized countries can occur only when positions become open, usually through attrition, there is little incentive on the part of the enterprise to accelerate the management development process. In fact, many a potential manager has the capacity to take on higher responsibilities sooner than the opportunity arises. This is not the case, however, in the developing countries in view of their industrial manager shortages. Here the "experience process" must be accelerated and this should be possible using various approaches which simultaneously result in improving the performance of the enterprises and factory involved.

a) On-the-Job Training in the Industrialized Countries

Whenever feasible, industrial managers of the developing countries, should be provided the opportunity to work (not just be an observer) in industrial enterprises in the developed countries. Here, within a well-managed environment, they will be able to absorb the practical "how-to-do" aspects of management to carry back to introduce in their own countries. It has to be recognized, however, that such opportunities are limited since enterprises are not anxious to take on management trainees to invest time and effort, knowing that they will leave. Nevertheless, providing such opportunities should be considered as a genuine, much needed assistance to the developing countries. The reverse approach now being pioneered by the United Nations System is to bring back experienced managers of the developing countries who have immigrated and have progressed in industrial management positions abroad. Every experienced industrial manager returning home will have a multiplier effect by introducing sound management practices in his home country and help develop local managers.

b) Providing Experienced Management Advisers to Enterprises in the Developing Countries

This approach is practiced most frequently by the United Nations System, including UNIDO. The services of experienced industrial managers

are provided to work within industrial enterprises and manufacturing plants. A sufficient number of management experts covering all essential management functions is necessary in order to be able to demonstrate how experienced managers operate as a team, and the assistance has to be of long enough duration to have a permanent on-the-job training effect. In many cases, technological expertise also must be provided (at times by the management experts themselves) for overall effectiveness, and augmented by formalized training courses conducted by the management experts or otherwise made available.

c) Integrated Full-Scale Assistance at the Plant Level

This is a highly intensive form of the above, comparatively low-input, mainly management-oriented assistance, whereby not only the management staff but all key personnel needed to efficiently operate the manufacturing facility is brought in.^{1/} The most frequent cause for the developing countries' factory start-up and initial operational problems is the lack of experienced staff, not only managers, but also those who have the experience and the technological mastery of the process. The developing countries, recognizing their initial shortcomings are using with increasing frequency the "management contract" or "management agent" approach where an outside company (consulting or otherwise) from an industrialized country is given the responsibility for operating an enterprise or a factory. The method is costly but usually effective. Special care must be taken that staff training and management elements are clearly stipulated in order to have a lasting effect. It should be mentioned that UNIDO has been and is successfully implementing such projects, the latest case being the operation of a large cement plant where the stage has been reached that the functions of many of the originally provided

^{1/} This is basically the approach the transnational corporations are practising since they have at their disposal all the staff needed for efficient operations, including skilled workers and supervisors. Usually they start up their new factories in the developing countries with such experienced key staff assigned from their other operating units, phasing them out as soon as the local staff gains sufficient experience to take over their functions.

expatriate specialists have been taken over by the now experienced national staff. This approach has the potential to become a very effective method of assistance on behalf of the least-developed countries in particular. Under such a scheme industrialized as well as industrially more advanced developing countries would provide the entire team needed to bring a specific factory quickly to efficient operating level (i.e. key operating, supervisory and management personnel) and phase them out gradually as the national staff is able to take over the respective responsibilities. Specialized and management training should be also included.

9. Epilogue

Having given a bird's-eye view on the problems of the developing countries as regards industrial capacity utilization and productivity, relating these to the lack of industrial management capacities and outlining approaches to remedy the situation, it is essential to reiterate once again the importance of the other manpower requirements of industry, namely the skilled workers and factory level supervisors. The need of the developing countries in this respect is enormous, even greater in quantitative terms than in case of industrial managers and all the "human ingredients" are indispensable for an industrial enterprise to be successful and operate efficiently. But, it is the managers who have to develop the management systems and approaches suitable for the particular enterprise and compatible with the country's culture and its social and political structures. For this reason, the industrial manager problem was highlighted because of its primary organizational and planning role and because of the complexity and multi-faceted, abstract nature of the tasks involved. For ultimate success the developing countries must strengthen their industrial management capacities simultaneously with their skilled and technological manpower base. It should be possible to shorten the time needed for industrial development in all developing countries using the right approaches, as can be judged from the experience of some of the countries having achieved considerable industrial success.

