PROJECT ONE

LEAD PAPER

PARTNERSHIP: THE NATIONAL FRAMEWORK

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The title "technician" is one of several undefinable titles in the industrial hierarchy. The reasons are that technicians are trained in many types of institution and do a great variety of jobs. Moreover, the institutions are at several levels in the hierarchies of national systems of technical education and the jobs at many levels in an industrial organization.

The Title

Most attempts at defining the title "technician" end up in negatives. A technician is not an engineer - he is trained at secondary or post-secondary level but below that of a university; he has a job at the "sub-engineering" level but is not a "skilled worker" since he has received a "higher", more theoretical, level of training than the latter.

A few legal definitions of the term "technician" do exist. As a rule they relate the technician title to graduation from a particular institution or group of institutions in the system of technical education. Thus, graduates of technical secondary schools (lycees) in France are referred to as technicians (techniciens) while the graduates of intermediate post-secondary technical institutes are given the title higher technician (technicien superieur). Similar provisions are found in Belgian legislation. These definitions are, of course, only valid nationally and attempts to internationalize them (e.g. within the European Economic Community - EEC) have not been successful. Graduates of technical schools at similar levels in the German-speaking countries, for instance, are normally given the title "engineer" as are their counterparts in the Scandinavian ones.

The Job

As regards the job the confusion tends to be even more pronounced. A repair and maintenance mechanic would in most countries be referred to as a "mechanic". A radio and TV repair man, on the other hand, is often referred to as "TV technician" although he may have about the same level of education as the automechanic. Three people with the same background, and in principle, the same job may have three different titles: the man on the factory floor repairing machines for his employers would be called a "skilled mechanic"; if he does the samejob for a client he might be called a "service technician"

and if he works for the sales department he might be referred to as the sales engineer. Obviously in this case, it is not a question of the level of the job or of the educational background of the man but of the image of the firm.

Technicians are found in a great variety of departments within an industrial organization. Research, development and design departments are great consumers of technicians and so are planning, work study, and control and testing departments. Repair and maintenance and service after sales are also fields in which many technicians are employed. There are normally fewer technicians in direct production, although many production engineers and foremen have a technical education at a technician level.

As shown already by this short enumeration, job types and job requirements vary greatly at the "technical level". Some require highly developed skills in drafting combined with extensive technical knowledge at the level of applied technology. To others reading of industrial drawings, schemata and lay-out patterns is largely enough since the central tasks in their case relate rather to the assembly and disassembly of complex machinery or instruments which require extensive knowledge of practical mechanics and highly developed manual skill in the use of tools. Technicians in planning, work study, etc., like their colleagues in control and testing, are often highly specialised; they apply a limited number of techniques over a broad range of operations with which they should have some familiarity but need not necessarily have first-hand operational knowledge.

The Training

The traditional technician in the United Kingdom and in many other English-speaking countries is a man who has served his apprenticeship for the full period of four to five years (or has served an abbreviated "graduate apprenticeship") and, parallel to this, has followed advanced courses at a technical college. This type of combined training and technical education ("dual" system) remains an important source of technicians in several countries. In German-speaking countries completed apprenticeship (mostly 3 to $3\frac{1}{2}$ years) and the highest marks in the skilled worker examination are often basic qualifications for entry into a technician training institution (a technicum or ingenieurschule).

"Dual" systems of technician training are the exception rather than the rule. In France, the United States and the USSR, the Scandinavian countries and in most Latin American countries, a great majority of technicians working in industry have received their diploma or certificate at a technical secondary school, a post-secondary technical institute or a similar institution of full-time technical education for which a completed 8-10 year basic schooling (starting at age 6 or 7) is a principle entry requirement. Technical education at this level is generally integrated into the secondary school system or grafted on to it as a line of further education. Often two distinct levels exist, one a two-to-three year technical education (starting at age 16 or 17) and the other a three-to-four year higher technician education, starting at about the same age.

Not all technicians come out of the technical secondary schools however. A great number of workers with experience in industry take technician training through correspondence courses or at night schools; although work experience is an important entry requirement in many of these courses, formal training as a skilled worker is not a pre-requisite.

These statements about initial training and technical education should be qualified by stressing that in most developed countries employers usually do not consider the training of a technician as terminated when he enters into employment. It is common practice in most large and middle sized undertakings for technicians to go through a comprehensive "graduate" training, more or less systematically arranged, in which they gain experience in such basic technician tasks as drafting, tool and jig construction, production planning and control, work study and other industrial engineering tasks before settling into a longer-term job in production or elsewhere within the factory. This "graduate" training in many cases takes even longer than the basic technical education the technician has received at school and in most developed countries it is considered as indispensable "second apprenticeship" although it is seldom registered or even formally arranged as such.

The Legislative Framework

In the "dual" systems there are two sets of laws to take into account if one is to get a clear picture of the rules governing the training of technicians: a set relating to the training of skilled workers and one relating to technical education more generally. In the United Kingdom and in other countries which have more or less adopted or adapted to their own needs the British legislative and administrative arrangements relating to vocational and technical training and education, the training legislation governs training in employment while the essential provisions for part-time and full-time technical education are found in the education Acts relating to further education and higher education generally. In the Federal Republic of Germany training for skilled worker qualifications is governed by a federal vocational education Act; technician training comes under State (Land) provisions for technical education.

In Eastern Europpean countries technician training is largely assimilated to secondary or higher education and falls under the legislation governing such education, and is administered by the educational authorities. However, large numbers of technicians are also trained in technical schools belonging to the various technical ministries (the ministries for heavy industry, mining, the chemical industry, etc.).

In Sweden, which previously had a separate board of vocational and technical education and training, independent of the Board of Education, all vocational and technical training and education is now co-ordinated by the Board of Education and the legislation relating to both forms part of the general educational legislative provisions.

Arrangements vary between developing countries just as much as between the industrialized ones. There are some standard patterns which, with certain important modifications, have been constructed on perceptions of what has been evolved in France, the United Kingdom and the United States. Adaptations of the British patterns are thus found in most Commonwealth countries, while French patterns have largely been followed or adapted in the francophone areas. In Latin American countries, where institutions for vocational and technical education have developed rapidly over the past two-to-three decades, a distinction is generally made between the system of training of skilled workers and the system of technical education through which technicians receive their training. Both French and United States models have played a significant role in the evolution of each of the systems in this region.

Training Legislation

Some kind of training legislation exists in practically all countries of the world. Its quality, validity, scope and purpose vary greatly, however. A wide range of countries merely have traditional apprenticeship provisions written into their Labour Code setting out in some detail the differences between an ordinary labour contract and an apprenticeship contract, and adding the usual provisions about the mutual responsibilities of employer and apprentice in a traditional apprenticeship.

Although such provisions continue to be adopted the trend over the past few years is clearly away from writing training legislation of limited scope into the labour codes towards the adoption of special training legislation. The United Kingdom Industrial Training Act of 1964 provided the foundation for new training legislation adopted by many countries not only within the Commonwealth but also outside it. Similarly the training legislation adopted by Brazil in the 1940s (there were separate Acts for industrial and commercial training respectively) have been used as a model by several other Latin American countries. Unlike the UK Industrial Training Act, the early Latin American Acts related primarily to apprenticeship, i.e. training to skilled worker level under an employment contract. Several countries are to-day changing this approach to a training contract rather than an employment contract.

As legislative practices differ greatly between countries it is difficult to make any generalisations on a regional, let alone a world-wide, basis. The enumeration below should therefore be taken as indicative only.

Latin America. Most countries have separate training Acts providing the legislative basis for the activities of national training bodies. These bodies are concerned, in the first instance, with the training of specialized and skilled workers but in many cases are today branching out into such areas of activity as the organization of special courses for underprivileged population groups, including persons living in urban as well as rural areas; advice to undertakings on the organization and programming of training within the firm; upgrading courses for workers to become technicians; courses of further (but not initial) training for executive and management staff in undertakings. The legislation in most cases includes provision for a levy to be paid to the national training body by undertakings over a certain minimum size.

Africa. Several countries in anglophone Africa (e.g. Kenya and Nigeria) have introduced training Acts on the pattern set by the 1964 UK Industrial Training Act. Provisions for levies are included and national training bodies have been set up within the framework of this legislation. Studies with a view to similar arrangements are being undertaken in other countries.

Although legislative practices differ and the models are not the same, the general trend appears to be fairly similar in the francophone countries of Africa. In the Ivory Coast and Tunisia national offices have been set up for employment and vocational training to deal with all matters related to the training of workers. In the Gabon, too, recent legislation provides for the setting up of a national training agency responsible for both initial and further training. In the Malagasy Republic formal apprenticeship legislation has been operative since 1964 and many of the francophone countries have apprentice training levy provisions similar to those applying in France. A number of the francophone countries of Africa, however, do not have more

than traditional provisions for apprenticeship inserted into their labour code. Where training levies exist the sums collected normally go straight into the state budget and do not influence the planning of the training system.

Europe. The picture is similarly varied in Europe. The Scandinavian countries have gradually and increasingly integrated provisions for training into their educational legislation. Separate legislative texts exist for the education and training of young people and adults respectively. Important provisions for the training of adults are also found in the employment policy legislation. With one exception, the recent introduction of a special levy for adult training in Sweden, there are no provisions for training levies, but state grants are provided for many forms of training for both youth and adults.

The major provisions for training in Belgium, France and the Netherlands are found in the education Acts. Special apprenticeship legislation exists in all countries, combined, in France, with an apprenticeship levy system. New legislation was recently introduced in France relating to adult training (and further education) with provision for a special levy for such purposes.

In Germany (Federal Republic) a new apprenticeship Act is under discussion and is likely to be adopted next year. The debate on the proposed Bill has largely centred on two of the proposed provisions: the introduction of a levy and the transfer of a considerable part of the responsibility for training from employers (and their organizations) to the educational system and to the State. As the matter now stands, it is unlikely that a levy will be introduced and that some of the proposed "scholarisation" of training (i.e. the integration into the school system) will probably not be retained in the final text.

Eastern European countries have comprehensive provisions for training in their national plans, for the most part integrated into the chapters relating to education. The training systems are conceived as part of the total educational programme although some Eastern European countries, e.g. Eastern Germany, and the USSR, have separate administrations for education and vocational training respectively.

Asia. Asian countries provide a highly diversified picture. Some, like India and the Philippines, have national apprenticeship legislation implemented under the auspices of the Ministry of Labour or by independent offices reporting to that ministry. Generally speaking, however, Asian countries do not have central legislation covering the whole field of training. Levy/grant systems have been discussed in most countries but none has been adopted.

Legislation Governing Technical Education

It may be said, as a broad generalization, that technical education at secondary school level (and thus the legislation governing the training of technicians) forms part of the educational legislation in most countries. Technical education is seen as an integral part (and as a set of streams within) secondary education. Efforts are made to achieve equivalence between graduation in general, technical and commercial secondary schools respectively.

Part-time related instruction and further education for skilled workers (Facharbeiter) is the subject of separate legislation in the Federal Republic of Germany and Switzerland.

Organizational and Administrative Structure

Since the systems vary greatly between countries and since responsibility for the various aspects of vocational training and technical education is normally shared between several bodies it is difficult, if not impossible, to suggest any generalizations concerning the administrative set up.

In countries with highly centralized educational systems, as for instance in Scandinavia and in France, the Ministry of Education has the dominant role in the administration of all school and college based activities. Some representation by employers and workers is normally provided at management level and in such functions as the setting of curricula and examinations. Industry also participates in specialized commissions on standards relating to particular branches of industry. In Sweden, for instance, the employers and workers are represented on the Board of Education and so is the Labour Market Board. In France a network of technical committees participate in the setting of curricula which often form the subject of agreements with the representatives of the various industries. Similarly, in the USSR, both the vocational training and the technical education systems have extensive arrangements for consultation with industry on curricula, the approval of textbooks and other teaching material. However, the final decision normally rests with the central educational (or training) authority concerned.

This might be contrasted with the highly decentralized system existing in the United Kingdom where the technical colleges in principle are free to set their own curriculum but are largely guided by recommendations issued by professional bodies and by specialized bodies such as the City and Guilds of London Institute.

Outside the United Kingdom and the Commonwealth area professional bodies of a corporate character generally have little to say in the development of vocational and technician training and education. As entry requirements, syllabi and examinations are determined and controlled by government authorities - chiefly the ministries of labour (for vocational training) and education (for technical education in the school system), the role of professional organizations of this type is mostly limited to making suggestions or to submitting comments along with those of associations and federations representing the industry, trade unions and other organizations, before the decision is taken at the appropriate ministerial level. In the Federal Republic of Germany, and also to some extent in Austria, corporate bodies of another character, namely the chambers of industry and commerce and the chambers of artisan trades, play much the same role as the professional bodies in the United Kingdom. Until recent legislation the chambers of commerce and industry together with the Confederation of German Industries and the German Confederation of Employers had essential control over the vocational training programming and examination systems (although the relevant ministry had the right of final decision). This has, however, now changed and the state authorities have been given a more central role in these matters. The proposed new training legislation is likely to lead to a further increase in the control exercised by the public authorities over the training system and, at the same time, to a closer co-ordination between education and vocational training policies.

The Financial Framework

Generally speaking, the more centralized the system the larger is the par played in it by public financing. Technical education within the general school system is practically everywhere fully financed out of the state budget.

In federally organized countries the general rule is that it is the individual state "Land", province or canton which finances the educational system, often with some contributions from the federal authorities.

The same generally applies to the provision of related instruction for apprentices in countries where this is considered a separate form of secondary education, as for instance in the Federal Republic of Germany, the Netherlands and Switzerland. Similarly, the school element in co-operative education is considered part of the total educational pattern in Canada and the United States. In Eastern European countries all educational expenditure, including expenditure on vocational training, is charged to the state budget but an important share of the cost is also charged to the accounts of the undertakings which have special relations with a particular school.

Levy/grant systems can be said normally to contribute little to the operational budgets of institutions of vocational and technical education. Even in the United Kingdom where the technical colleges are the principal providers of courses paid for under the levy/grant system, income from such sources constitutes only a part and often an insignificant part of total expenditure. In France the revenues under the apprenticeship levy system go straight into the general budget and are not specifically accounted for in the technical education budget.

The situation is somewhat different in some of the Latin American countries where the whole financing of the vocational training system is based on levies in industry. Here, the training centres and the central services are entirely paid for by revenues from the undertakings under the levy systems. Other income received by the national bodies - in most instances an insignificant part of the total - usually is constituted of payment for services rendered or state appropriations for running particular programmes (e.g. for urban and rural poor) and other programmes not directly related to supplying the manpower required by the fee-paying industry.

Concluding Remarks

The foregoing pages merely provide a general and a much simplified sketch of what is a very complex subject. One thing is abundantly clear: technician training is not a single concept. It has many facets and therefore cannot be provided for by a single system. Consequently both the training and the technical education systems are needed in order to supply qualified personnel to perform the many types of function and multiplicity of tasks required of the technician.

To achieve a harmonious blending of the two systems one must first have a clear picture of their respective roles. The training system, with its emphasis on practical skills and employment, should operate within a broad framework of the promotion or upgrading of workers and of recurrent education and training. It is from this system that will emerge, by and large, the personnel with the highest level of skilled-worker qualifications, with industrial engineering skills, the basic qualifications needed in work study, applied methodology, organization and methods. From the technical education system, with its emphasis on theory as opposed to practical skills, will tend to be drawn the technicians who will eventually gravitate to the drafting offices, technical laboratories, design bureaux, testing and control offices, etc. The two streams of technician activity are inter-dependent, therefore the two systems of technician training must be complementary.

For each system to be truly the complement of the other, however, certain prerequisites have to be met.

Firstly, there should be a comprehensive training legislation encompassing the whole training function, and in particular, co-ordinated planning so that there will be a logical and easy flow between sectors or branches of activity and also between levels of training. A piecemeal approach is unlikely to bring about the desired results. There is therefore strong evidence of the need for an overall planning body which will be in a position to establish the necessary equilibrium and see that the system is inserted into a framework of recurrent education and training.

Secondly, the technical education system must also be given a clear-cut definition of roles and responsibilities. This, too, can usually best be provided through a sound legislative basis which should include a separate section relating to technicians.

Thirdly, there should be joint planning of the two systems, and effective co-ordination of them throughout the structure. This will require co-ordinating machinery which will include representation of all the parties concerned: education, vocational training, industry, agriculture, professional bodies, the unions, to name a few. This concept of partnership is particularly important in certain areas, for instance in the setting of training standards, in supervision of the quality of training, in determining the occupations for which formal training is required and in keeping training and school syllabuses up to date on technical developments, and on changing requirements in employment.

In this connection the attention of participants is drawn to the terms of the ILO's Convention and Recommendation concerning Vocational Guidance and Vocational Training in the Development of Human Resources which were adopted by the International Labour Conference in 1975. The Convention will come into force in July 1977. The scope of the Recommendation is much wider than that of the Commonwealth Seminar/Workshop on Technical Education and Industry but the organizational principles enunciated therein should provide the general framework for a harmonious development of technician training in both industrialized and developing countries all round the world.