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MERCOSUR REPORT SERIES C.1

Report

Prepared under UNDP-financed TSS-1 facility

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FOREWORD

UNIDO's current work on MERCOSUR, under UNDP-financed TSS-1 facility, is focused on three main areas within a medium-term outlook:

A. A review of the situation of specific industrial subsectors in order to identify the implications of the MERCOSUR schedule for industrial restructuring.

B. An assessment of the past record and prospects of inter-industry MERCOSUR trade as a possible engine for trade creation and efficiency gains.

C. An evaluation of the experience of the EC from a MERCOSUR perspective in three specific areas:

(i) Manpower policies, with emphasis on vocational training;
(ii) Investment incentive regimes;
(iii) Competition policies.

UNIDO has already published a first background paper entitled **Trade Integration and Industrial Restructuring: The case of MERCOSUR** (PPD. 225 (SPEC.), 28 January 1993). UNIDO's MERCOSUR project includes seven additional reports, as follows

A.1. Medium-term Scenarios for Industrial Restructuring: the Pulp & Paper Subsector

A.2. Escenarios de Mediano Plazo para la Reestructuración Industrial: El Subsector Cuero y Calzado

B. Comercio Intraindustrial e Integración Regional entre los Países de MERCOSUR

C.1. Training Policies in the EC Countries

C.2. Investment Incentives, Subsidies and Related Regulations in the EC Countries

C.3. Competition Policy in the EC

D. UNIDO's MERCOSUR Project: Overview Report

The analysis contained therein spans a broad geographical and subsectoral coverage and is by no means exhaustive. Every attempt has been made to maintain neutrality of approach from a MERCOSUR point of view. However, conclusions have necessarily been drawn, which should not be seen as definitive, but rather as a contribution to the analysis of an ongoing process.

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EXECUTIVE SUMMARY

There is no single 'best practice' education and training model which provides a universal key to economic growth and international competitiveness.

Transferring policies which have been successful in Europe to MERCOSUR countries is desirable. But proposed policies need to be evaluated carefully in the light of political, cultural, social and economic conditions in those countries.

Vocational education and training systems can only be effective if the population has received sound basic education.

Other elements of the infrastructure and general attitudes in the society need to be appropriate. Reliable electricity supplies, transport systems and telecommunications infrastructures are essential prerequisites for a modern economy.

A coordinated vocational and educational training research system in each MERCOSUR country could play key roles in helping to develop policies and monitor implementation.

Training levy and apprenticeship tax systems inevitably lead to some waste. Nevertheless, on balance they seem to have made positive contributions to French training. MERCOSUR countries could consider options of introducing training levies.

All EC countries are short of the skills necessary to cope with new technology. All need to increase the educational attainments of their populations. These problems are particularly severe in Mediterranean countries.

EC economies are being subjected to intensifying competitive pressure especially from Japan and South-East Asia. Product cycles have shortened; new products are constantly being introduced and process technology is being improved continually.

Increasingly, manufacturers are putting in place policies embracing Total Quality Management (TQM), Just in Time (JIT) production and cellular manufacture. These trends lead to the need for supervisors and operators to receive more and broader training.

There are extensive needs for training and retraining in relation to Information Technology (IT), new materials, and the design and operation of processes to minimize their deleterious impacts on the environment.

Since the 1970s, the competitiveness of European industries has depended increasingly on the effective use of IT in both production processes and products. There has been a general shift from manufacturing to service employment, and both have become increasingly dependent on IT-related skills.

A reduction in routine and repetitive tasks has taken place. Unskilled jobs are often being replaced by higher level jobs based on knowledge and technical skills.

Demands for craft skills are falling. It is often advantageous, however, to train those with craft skills to use new technology as is common in Germany, rather than to seek to replace craft skills as is more common in Britain.

Multi-skilling is a general trend which applies right across the European economy. Workers require new IT-related skills in addition to traditional skills to enable them to use IT effectively.

The last 25 years have seen the emergence of new structural materials, whose use is likely to permeate the global economy. New industries are taking shape. These trends create needs for new skills.

Increased emphasis on environmental management requires engineers and technicians to design plants to comply with environmental standards. Operators need to learn to sample, monitor and regulate waste streams.

Participation by workers in decision-making about the introduction and use of new technology can result in better solutions to the inevitable problems.

It is EC's policy that the diversity of systems of education and training in EC countries should be conserved. It is too early to judge the impact of EC vocational education and training programmes.

Some of the best initial and continuing training systems in Europe are sustained by close cooperation between employers and trade unions.

German vocational education and training is sustained by values which are strongly held throughout German society. The dual training system, controlled by detailed legislation, provides systematic delivery of carefully considered curricula. College-based teaching covers theoretical aspects and practical training takes place in firms.

Major companies have increased their expenditure on continuing training sharply to cope with skills obsolescence caused by shortening product cycles. Tensions between the dual system and the changing needs of new technology are being coped with well by larger companies and the commercial sector, but less adequately in the small firm craft sector.

In both Germany and France, there are centrally funded vocational education and training research organizations. National politicians, central government departments, employers' organizations, trade unions and research workers all play important parts in formulation of research proposals. This ensures that research findings are translated into action.

Denmark's education and training system played a major role in transforming Denmark from an agricultural country into an industrialized economy supplying advanced manufactured products to niche markets. In 1977, an Education Act established vocational education and training with strong emphasis on the interaction between theory and workshop training. Unlike Germany, Denmark does not rely heavily on apprenticeship.

Emphasis on providing continuing training for semi-skilled workers should help

Danish industry to cope with changes in manufacturing organization which are placing more responsibility on operators for quality and output.

In France since 1971, employers of more than 10 workers have been compelled to spend a minimum of 1.2 per cent of their total payroll each year on training. Continuing education and training grew rapidly following this legislation. However, the response has been uneven. Larger firms and the public sector have increased training expenditure substantially, while small firms and industries such as building, civil engineering and agriculture do not exceed the legal minimum.

British National Vocational Qualifications and Training and Enterprise Councils are too new to evaluate. Frequent changes in policy make Britain a poor general example for other countries to follow. However, some individual innovations may provide useful models. For example, Group Training Associations plan and carry out training for small firms which do not have the resources to do so for themselves.

I. INTRODUCTION

The central aims of this report are to provide a critical review of EC countries' experience in relation to vocational training, skill upgrading and retraining policies, taking account of the pressures stemming from international competition and technological change; and to indicate how MERCOSUR countries can learn from this experience.

The next part of the report reviews the changing nature of international competition, and the key trends in technology and organization which are affecting skill needs world-wide and in Europe. The third part reviews vocational education and training of five of the twelve individual EC countries. The German and Danish training systems are very different from each other, but both are very good. Rapid rates of technological change cause difficulties in adaptation even for those countries. The French system is very different from the German and Danish systems and more complex. It is particularly interesting because of the successful use of training levies. The rate of innovation in British training policy has been high, but this has resulted in serious problems. The Greek case serves to illustrate some of the severe problems faced by the less developed regions of the EC such as those in the Mediterranean region. Spain has tackled such problems energetically and with some success, and Portugal also appears to be beginning to make progress.

The fourth part reviews European Commission initiatives on vocational education and training. The fifth and final part draws out some implications for MERCOSUR countries.

Undoubtedly, there are further important lessons to be learned from the experience of the other EC countries, but it was necessary to restrict the number of countries considered in order to highlight the more outstanding and relevant lessons from the perspective of the MERCOSUR countries.

The influence of Japan on the world economy is pervasive. In particular, Japanese technological development, manufacturing organization and techniques, and training policies are having important effects on training in Europe, perhaps most notably in Britain which has a heavy concentration of Japanese-owned multinationals. Although this report does not offer a systematic treatment of Japanese influences, it does deal with them at various points in the text where they are believed to be particularly significant.

II. IMPLICATIONS OF INTERNATIONAL COMPETITION, ORGANIZATIONAL AND TECHNOLOGICAL CHANGE FOR SKILL NEEDS

A. Sources of competitive advantage

Competitive advantage grows out of the ways in which firms create value for their customers through operations including buying raw materials, converting them into manufactured products and marketing finished products (or services). To gain competitive advantage, a firm must either provide comparable value but perform activities more efficiently than its competitors, or perform activities in such a way that buyers perceive that it is providing better value, and are, therefore, prepared to pay premium prices for its products or services. Firms gain competitive advantage from conceiving of new ways to

conduct activities, employing new procedures, new technologies, new products or services, new production processes, or different inputs (e.g. of raw materials or components).

A firm's competitiveness is affected by the efficiency with which it conducts its activities, and also by the effectiveness with which it combines and links them. It can be profitable for a firm to produce a more expensive product than its competitors, if that product offers advantages to purchasers.[1] For example, Japanese firms used new production processes embodying a higher degree of automation than competitors to produce more reliable TV sets which were more expensive at first. Customers world-wide were prepared to pay extra for them because they were more reliable.

B. Changes in the competitive environment

Since the 1970s, most sectors of EC economies have been subjected to intensifying competitive pressure. The principal causes have been slower market growth and strong competition from new market entrants - especially from Japan and the newly emerging industrial nations in South-East Asia. Competition is increasingly based on product differentiation, quick reaction to changing demand and the ability to identify and enter profitable niche markets. Product cycles have shortened; new products are constantly being introduced to compete with established products and process technology is being improved continually.[2]

C. Organizational change

Increasingly, influenced largely by Japanese management practices, manufacturing firms are putting in place policies embracing Total Quality Management (TQM) and Just in Time (JIT) manufacture. The general aim is to improve service to customers, at the same time reducing work-in-progress and inventories and increasing productivity and profitability.

Successful implementation of TQM and JIT demands improved communications and faster response times. This involves moving responsibility and decision-making to the point of action, and removes the need for traditional deep hierarchies of management. At the same time as reducing the number of layers of manufacturing management, firms are increasingly converting to cell production - aiming to increase speed of response and reduce work-in-progress, and transferring more responsibility for quality and output to cell leaders and their teams. This can have the effect of making the supervision function pivotal, and put increased emphasis on needs for supervisors and operators to receive more and broader training.[3]

Such changes may also involve erosion of the power of specialists such as personnel and training staff and industrial engineers, and transformation of their roles into provision of services utilized by manufacturing management and supervision.

D. Technological change

In the foreseeable future, three main technology 'clusters' will have important implications for skills, education and training in wide areas of the World Economy: Information Technology, New Materials and Biotechnology. There will also be extensive needs for new skills associated with the design and operation of processes to minimize their

deleterious impacts on the environment.

All member states of the EC are short of the skills necessary to cope with new technology. All need to increase the educational attainments of their populations. The problem is particularly severe in Mediterranean countries. Massive investment in upgrading the existing workforce will be necessary. A major effort is needed to combat 'technological illiteracy' of people with a non-technical background.[4]

1. Information Technology (IT)[5]

Rapid improvements in the performance and reductions in the costs of electronic components, computing and telecommunications have been occurring for several decades. The use of IT has been particularly encouraged by the availability of cheaper and increasingly powerful personal computers (PCs). Other important technical trends include the increasing use of computer networking and a convergence towards common standards. Communications technology and manufacturing technology embodying IT are used increasingly.

Since the 1970s, the competitiveness of European industries has depended increasingly on the effective use of Information Technology in both production processes and products. There has been a general shift from manufacturing to service employment, and both have become increasingly dependent on IT-related skills.

Implications of IT for Employment and Skills

As a result of the extensive diffusion of IT, employment opportunities will tend to grow for those who acquire IT-related skills. In addition to changing the numbers employed in each occupation, there is a general trend for the use of IT to affect the work done by those within occupational categories and to change boundaries between occupations. But it is important to note that there is often considerable scope for choice in relation to the way in which new IT-based technologies are used, and there are considerable variations between countries in this respect.

Within manufacturing, there is a shift from direct production work requiring manual skills towards jobs which require more cognitive skills. A reduction in routine and repetitive tasks has taken place and job losses are likely to fall disproportionately on the unskilled. Unskilled jobs are often being replaced by higher level jobs based on knowledge and technical skills.

There is a tendency for the demand for craft skills to fall. It is often advantageous, however, to train those with craft skills to use new technology as is common in Germany, rather than to seek to replace craft skills as is more common in Britain. In many respects, IT is having effects on construction similar to those it is having on manufacturing. The construction and maintenance of intelligent buildings requires people with new skills. So far, however, the impact of IT on skills has been felt more in relation to managers and professionals than at operative level.

There is a general trend for the use of IT in services to affect the nature of occupations and change their distribution. Professional and senior clerical jobs are

increasing, but demand for junior managers will decrease as IT reduces the need for routine supervision and coordination. Other junior management tasks will be taken over by senior clerical staff supported by on-line technology. Junior clerical jobs are declining, particularly in fragmented data preparation and data entry, and in the future many such tasks will be carried out by part-time staff.

Multi-skilling

Multi-skilling is a general trend which applies right across the European economy, from banking to telecommunications to manufacturing and construction. In both manufacturing and construction, skill shortages limit diffusion of IT and the realization of its economic potential. In many sectors, workers require new IT-related skills in addition to traditional skills to fit them to use IT systems and equipments effectively. The broadening of skills required often serves to blur traditional distinctions between occupations. The rapid increase in the amount of complex equipment installed in service and construction industries as well as in manufacturing is increasing the need for maintenance workers with multiple skills. The availability of sufficient suitably trained maintenance workers is a precondition for the effective introduction and use of IT-based equipments and systems.

Labour Mobility

On balance, wider use of IT is likely to lead to mobility of work in Europe to a far greater extent than it will lead to mobility of workers as, especially in relation to service work, jobs can be conducted at a distance.

Professional Engineers

Even though there have been rapid increases in the numbers of qualifications awarded, the general EC demand for computer software professionals still outstrips the supply. Specific skill shortages appear to vary from country to country. For example, France and Denmark are short of applications analysts, whereas Germany, Spain and the UK suffer from shortages of systems analysts. It is anticipated that growth in demand will continue during the 1990s, but at a slower rate than during the 1980s.

The view is quite widely held in European industry that university trained engineers have received too narrow a technical education, and are ill-prepared for the management and commercial world of the telecommunications industry. In particular, telecommunications manufacturers are likely to suffer from shortages of software engineers. They will face strong competition in the labour market from data processing equipment manufacturers.

Telecommunications equipment manufacturers and network operators are active in training and retraining people with high level telecommunications expertise, but trained people are often recruited by users and by data processing equipment manufacturers. Such people have to be trained on expensive equipment which becomes obsolete very quickly. Training is concentrated in major firms as the costs of such equipment are so high as to make it impossible for public education and training institutions to afford to buy and replace it as it becomes obsolete. In the engineering and motor industries, organizational developments together with the use of IT-based systems, have made it possible for senior managers

combined with a highly motivated and better trained workforce to undertake functions previously requiring the employment of junior managers.

Managers

There are rapidly growing needs in three areas:

i Managers involved with the introduction and management of IT-based equipment will need to become more competent technically;

ii With the growth of networking there is a rapidly growing need for high level courses for network managers and designers;

iii Telecommunications manufacturing organizations have pressing needs for marketing managers who can explain to customers how to use new equipment profitably.

Participation

Participation by workers in decision-making about the introduction and use of new technology can result in quicker solutions to the inevitable problems, and to more effective utilization. Throughout Europe, new IT equipment is often introduced into firms without adequate attention to staff training and work organization. Workers and management need to learn about new technology and its possible implications.[6]

2. New Materials

The last 25 years have seen the emergence of a range of new structural materials including advanced ceramics, polymer composites and strong engineering plastics. These offer opportunities for improving the performance of existing products and creating new products.

As with IT, the effects of the use of new materials are not likely to be confined to a few sectors, but are likely to permeate the global economy. Not only is production of the materials themselves growing, but so also are new industries, such as the production of ceramics manufacturing equipment and the design of materials specifically adapted to particular applications.[7]

The effective use of new materials demands major changes in manufacturing processes. Production processes have to be restructured if advanced products are to be used in finished products: firms have to buy new machinery, scrap old machinery and reorganize. But there are inertial forces that restrict changes. For example, some machine tool companies may find it difficult to adjust to the use of composite material in place of steel.[8]

The use of new materials creates the need for new skills in management, design, inspection and maintenance, and these often involve new combinations of skill. Just as there is need for hybrid managers who combine IT skills with managerial skills in, for example, marketing or production - there are needs for production and design managers who

understand new materials. Moreover, there is need for managers and engineers - whether design or production engineers - to consider the whole process of design and manufacture as an integrated system.

3. Biotechnology

Biotechnology involves the application of biological organisms to industrial purposes. Many production processes in the food and drink industries now are based on traditional biotechnology - fermentation, leavening and other natural processes. New biotechnology processes involving genetic manipulation are beginning to revolutionize agriculture, chemicals, pharmaceuticals, food and drink, waste treatment and process plant. It is taking much longer than anticipated ten years ago for biotechnology to have major impacts. So far, biotechnology's biggest successes have been in human healthcare, including therapeutic products and diagnostic kits. Progress in other sectors has been relatively slow so far. During the next ten years, the increase in EC employment resulting from biotechnology will probably be small and concentrated on R&D.

An OECD report suggested, however, that in the early years of the next century, biotechnology would begin to acquire importance of the same order as IT now.[9] Biotechnology has the potential for developing new crop varieties resistant to pests and disease, and for revolutionizing livestock farming by the genetic manipulation of animal embryos.

Residues from agricultural chemicals in crops and water supplies are a growing environmental problem. But biotechnology may help solutions to be found, especially in relation to insecticides. The toxins biodegrade quickly and leave no residues. Bio-insecticides are formulated so that growers can mix them with water in a tank and spray them on crops just like ordinary pesticides. Eventually bio-insecticides may be replaced by techniques of transferring toxin genes directly into plants so that the crops themselves make the poisons which kill the insects.[10]

The areas in which biotechnology skills are needed include fermentation, protein chemistry, plant molecular biology, and microbial physiology. As commercialization gathers pace in the 1990s, there will be increasing demand for graduate scientists and technicians for process supervision and quality control. Skill requirements will shift to those involved in designing and operating commercial processes, such as enzyme technology, protein chemistry and biochemical engineering. As with IT and materials, there will be requirements for hybrid skills - scientists involved in project management need management and business administration skills.

4. Improving Environmental Protection

It has been widely suggested that there is a tendency to move away from 'end-of-pipe' pollution control to more comprehensive approaches of waste minimization and recycling. This has been questioned, however, on the grounds that while this tendency may be desirable, a comprehensive approach is very expensive in terms of the need to replace expensive plant and machinery. Research in progress may lead to developments in the breaking down of industrial waste into much less damaging forms.

Such trends could have pervasive effects on needs for skills and training. The tasks involved in environmental management include maintaining awareness and understanding of environmental legislation, developing production processes for the reduction of environmental damage, and monitoring and analysis of waste, whether solid, liquid or gaseous. While engineers and technicians are heavily involved in plant design to comply with environmental standards, operators need to learn to sample, monitor and regulate waste streams. Graduate engineers and scientists require to undertake multi-disciplinary study of environmental technologies and policies, which can be acquired through postgraduate study and short courses.[11]

III. VOCATIONAL EDUCATION AND TRAINING IN INDIVIDUAL EC COUNTRIES[12]

A. Germany[13]

In most Federal Länder, compulsory education begins at age six and lasts for nine years. After four to six years at Primary School, there are three principal alternative forms of secondary school provision: the five or six year Hauptschule which caters for the lower half of the ability range, the six year Realschule and the nine year Gymnasium. The Hauptschule offers general education plus Arbeitslehre, i.e. basic economics and technology. Realschulen offer a general secondary education beyond that provided by Hauptschulen, and this permits transfer to training courses leading to a professional qualification. The Gymnasium offers courses leading to general university entrance qualifications.

The term 'dual system' was first coined by the German Commission for Education during the period 1953-1965. It involves private firms and publicly run vocational schools cooperating to provide training for apprentices. The part of the training provided by the firms takes place in the workplace itself, and in training workshops. The principal learning venue in vocational schools is the classroom, but workshops, laboratories and offices are also used.

The Vocational Training Act which came into force in 1969 was an important legislative measure, regulating apprenticeship training and further vocational training and retraining in all branches of the economy.[14] The German system emphasizes the provision of a broad basic training on the grounds that individual and national prosperity depends on the ability of workers rapidly to adapt to the constantly changing demands of all areas of the economy. Broad initial training avoids the need for retraining in a related trade or reduces the cost of such training. Of equal importance is the need to promote mobility of labour both for greater industrial efficiency and to provide increasing opportunities for occupational and thus social advancement.

There is comprehensive legislation to regulate training at the place of work including training schedules authorized by central government and examination rules issued by the competent authority under directives promulgated by the Federal Training Committee. Chambers of Trade were authorized to establish vocational training committees to control and administer training at the place of work. Initial apprentice vocational training is tightly regulated by law. The statutory obligations of the employer include the provision of

systematic and specialized trade training, and the provision free of charge of the necessary training facilities, in particular materials and tools. The trainee must also be given the free-time necessary to attend the part-time vocational school, and has a legal right to appropriate remuneration which must be assessed according to his age and year of training. Such remuneration is normally considerably below the wages of an unskilled worker of comparable age.[15]

Training regulations control the competences which workers must achieve to be recognized as qualified. The two sides of industry cooperate with the state in identifying the skills necessary for each occupation. Some 70 per cent of those aged between 16 and 19 undertake apprenticeships in the dual system and a further 20 per cent stay on in education - far higher figures than in other EC states. The number of mechanical engineering apprentices trained is about five times higher in Germany than in Britain and two and a half times higher than in France.

So far as possible, the same standards operate across regions, firms, industries and occupations. However, while both employers and workers attach great importance to the educational aspects of vocational training, employers and their representatives stress the need for firms to be as autonomous as possible in relation to vocational training in firms. In contrast, workers and trade unions demand that in-firm training be more closely integrated into the publicly run education system, with a tight network of legal regulations.[16]

The dual training system provides systematic delivery of carefully considered curricula for occupations in a wide range of industries, with college-based teaching covering theoretical aspects and practical training taking place in firms. The schools teach the basics, including the basics of new technology - from the theory of accounting, to how a computer or a CNC machine-tool works. Larger companies rely less on the schools and more on themselves as the schools are not so advanced in relation to technical developments and are less practical in their approach.

Demographic changes led to an enormous increase in the number of school-leavers at the end of the 1970s, giving rise to fears that the system of voluntary intake of apprentices by companies might break down. In the event, companies did supply the needed increase in training places, but there was a substantial increase in unemployment of 20-25 year old in the first half of the 1980s. The great social esteem associated with being skilled in Germany combined with the large number of school-leavers seeking apprenticeships resulted in many people receiving skill training for occupations in which there was insufficient work available. Many could not find work in the occupations for which they had trained and had to accept semi-skilled work in other occupations.

Nevertheless, the high skills of German operators reduces the number of indirect staff needed at intermediate levels concerned for example with quality control and supervision. Comparing British and German clothing manufacturers, it was found that German plants employed less than a third as many quality controllers and a half as many supervisors. The work of German operatives is more reliable because they can recognize quality problems before they affect output seriously. Similarly in engineering, operatives who have been better trained can produce higher output more quickly because they know the properties of the materials they are working with and are able to deal with problems such as tool wear.

In general the tensions between the dual training system and the needs of new technology are being coped with well by the larger companies and the commercial sector and less adequately in the craft sector. The craft sector consists of very small companies such as car repair firms typically employing five or ten people. These companies need to recruit new employees very infrequently and some do not participate in the dual system: they tend to rely on continuing training which is not regulated by the state. Even those which do participate have difficulty in attracting good apprentices as young people prefer to enter large companies where employment prospects are better. Nevertheless, training in craft enterprises is overseen by Chambers of Crafts and Trades which try to sustain standards. State Regulations for training for new technology in craft industries are under review, but craft sector firms may find it difficult to stay in the dual system. The high cost of introducing new technology deters them from introducing it, and they may not possess the new equipment which apprentices will have to be trained on.

Successful use of new technologies requires self-reliant, more flexible multi-skilled workers able to work in teams and to think in abstract terms. (See part 2 above.) The following quotation from an interview with Siemens in Munich illustrates this:

> **"The theoretical background is now of more importance, given the changing technologies. We need young people now to be able to think at an abstract level, so we have changed or methods of training and teaching to develop these abilities. The ordinary school system was too slow in developing skills in that direction. With the new electronic machinery, for example, you can no longer follow with the eye or with the hand, you must think as well. We have to develop apprentices' capacity for abstract thinking ... we try to develop these abilities in young people through self-learning systems, we train them how to ... do computing and so on. The young people welcome it, they have already been playing with computers since the age of about 13, so they have a 'rough' knowledge but not a rounded general background. However, it is a sufficient base from which we can develop."**

Such qualities have not been taught in the dual training system, which has been accused of being inflexible. Technology is changing rapidly, but it takes a long time to change the training regulations: it can take ten years from starting discussions about changing regulations to producing trained people with the new qualifications. In recent years, however, higher rates of youth unemployment have permitted companies to recruit more highly educated school leavers than in the past. Highly qualified school leavers are more capable of thinking abstractly than their predecessors, and this has compensated to some extent for the inflexibility of the dual system.

In 1979 10 per cent of the German population between 19 and 64 participated in continuing training. This proportion had increased to 18 per cent by 1988.[17] Skilled workers train to receive Meister, technician and advanced clerk certificates. Meister examinations and the conditions for participating in them are determined nationally. The incentive to become a Meister is considerable, as the Meister has high status and authority and receives about 40 per cent more pay than a skilled worker, in comparison with about 10 to 20 per cent more in Britain. As a consequence, skilled workers are prepared to spend substantial amounts of their own time studying for Meister examinations. The high

competence of Meisters allows them to adapt machinery and to attach automatic feeding devices to it without fearing that frequent breakdown within a group of linked machines could lead to serious production stoppages.[18]

For reasons indicated by the following quotation, major companies have increased their expenditure on continuing training sharply:

> **"Apprentices can take advantage of only 50% of knowledge gained at age 27. At that age they must relearn new knowledge. Product life cycles are ... in rapid decline so new learning and product diversification into new areas is necessary for the company".[19]**

The trade unions support continuing training keenly, particularly as an alternative to redundancy for workers whose skills have become obsolete. Rationalization agreements negotiated between employers and trade unions have encouraged employers to retrain older workers. Länder provide subsidies when whole industries are being restructured, but generally firms mainly fund continuing training programmes themselves.

In both France and Germany, there are centrally funded vocational education and training research organizations organically linked with the various concerned interests. National politicians, central government departments, employers' organizations, trade unions and research workers all play important parts in formulation of research proposals. This ensures that research findings are translated into action.[20]

B. Denmark[21]

There are nine years of compulsory education, from the ages of seven to 16. After leaving school, the Gymnasium provides a three year course leading to university entrance. Initial vocational training is provided through apprenticeship, through basic vocational training, higher commercial courses and higher technical courses.

Agriculture was dominant in the Danish economy as recently as the 1950s. Since then, Denmark's education and training system played a major role in reducing dependence on agriculture and transforming Denmark into an industrialized economy supplying advanced manufactured products to niche markets.

Danish industry expanded rapidly in the 1960s, but the number of apprenticeships declined. Starting in 1972, attempts were made to reform apprenticeship but the results were not satisfactory. Accordingly in 1977, the Efg-Education Act established vocational education and training with strong emphasis on the interaction between theory and workshop training. This has been subject to minor reforms since then. More than half of school leavers now enrol in basic vocational education. This involves three to four year courses on average, with two thirds of the time spent on theoretical and practical education and training at technical or commercial colleges and one third of the time spent in company's workshops. Overall responsibility is exercised by the Council for Vocational Education set up by the Ministry of Education which includes representatives of management and labour organizations.

A state programme of continuing vocational training for semi-skilled workers started in 1960 and a similar programme for skilled workers started in 1965. The emphasis on training semi-skilled workers should help Danish industry to cope with the changes in manufacturing organization described in Section 2 of this report which are placing more responsibility on operators for quality and output.

Adult vocational programmes are contained in the 'AMU-system' which is also responsible for work introduction courses for young people and the unemployed. Training programmes are controlled by committees which include employer and trade unions representatives. They are administered by the National Labour Market Authority under the auspices of the Ministry of Labour which pays for the courses. The typical course lasts three weeks: courses range from traditional craftsmanship to computer based production methods. Courses on cooperation and quality-consciousness are becoming increasingly popular.

C. France

Compulsory schooling is from the age of six to 16. It starts with five years of primary education. The system of education, both general and vocational, is highly centralized. It is a competitive system which has focused traditionally on (a) full-time education (general, technical and vocational) and (b) developing the competence of people who will hold the highest posts in industry, commerce and public administration.

Between the ages of 11 and 16, the majority of students in France receive a general education. However, some pupils switch to vocational courses when they are 14 or 15. Students may take one of three educational paths at age 16: general secondary schools (lycées) which leads to the academic school leaving certificate - the baccalauréat - which prepares them for university entrance. Technical secondary schools provide three-year courses in general and vocational subjects leading to a technical version of the baccalauréat. Pupils at vocational secondary schools take two or three year courses in specific vocational subjects.

Most apprenticeships are in craft occupations and in small firms in sectors such as baking and motor vehicle repair. Apprenticeship is governed by legislation and by a contract for between one and three years which is signed by an employer and a young person aged 16 to 25. It is funded by a special tax on employers and by the public authorities which was initiated in 1925.[22] Apprenticeship aims to provide general theoretical and practical training leading to the award of a vocational qualification. Employers must provide apprentices with practical training and register them at an apprentice training centre, and the minimum number of hours they must spent at the centre is prescribed.

In 1983, the French state transferred very wide-ranging powers over vocational training including responsibility for apprenticeship to Regional Councils. These Councils prepare programmes which are financed by the State, as well as firms, Départements, Communes and households.

Continuing education and training grew rapidly in the 1970s and 1980s, following legislation in 1971. The number of training establishments grew fast. New research organizations were created - the most important of which is CEREQ (Centre d'Etudes et de

Récherches sur les Qualifications). CEREQ was charged with the duty of studying and disseminating information on the evolution of occupations and the labour market. As with German research organizations, CEREQ is connected closely with the sources of political power, ensuring that its findings are taken seriously and translated into policy. CEREQ has played a major part in recent reforms in France in many ways through its studies on a wide range of training topics, including the needs of industry and commerce and by developing new forms of qualifications in collaboration with many organizations.[23]

Since 1971, employers of more than 10 workers have been compelled to spend a minimum of 1.2 per cent of their total payroll each year on training, but the actual expenditure rose to 2.54 per cent in 1987 and now averages around 2.8 per cent. There are, however, wide differences between size of firm and sector of industry. In 1987, enterprises employing more than 2,000 exceeded 2.5 per cent, while those under 500 did not reach 2 per cent. Expenditure in public utilities - water, gas, electricity - reached 7.3 per cent, while building, civil engineering and agriculture did not exceed the legal minimum.[24] In that year, nearly a quarter of the working population took part in training schemes.

A disadvantage for some time was that many managing directors came to regard in-house training as a legal obligation rather than an investment in the skills of their employees. However, from the mid-1980s, some large firms in many sectors - including electronics and aerospace, glass making, food processing and chemicals, spent up to 4 or 5 per cent of payroll on training to meet the challenges of the 1990s. Firms were moving away from Taylorist practices which involved the fractionation of tasks, towards the employment of more highly skilled workers using modern production methods (see section 2 above). In the 20 years since the 1971 legislation, organizational changes - in particular a trend towards less 'Taylorist' organization - combined with better basic education of workers, have resulted in important changes in training, including increases in variety of work experience and closer integration of theoretical and practical training. It has been estimated that, on average, French firms spend at least 20 per cent more on training than they declare. A significant proportion of training expenditure has gone towards intensive training to move workers up from semi-skilled to skilled status. Training programmes were carried out as collaborative ventures between firms and state agencies. But, partly because of lack of resources, the response of smaller firms has been less dynamic than that of large firms.[25]

The French vocational education and training system is very large and extremely complex. Accordingly, it is very difficult to assess its overall effectiveness.[26]

D. Britain[27]

There is a comprehensive, undivided system of primary and secondary education between the ages of five and 16. There is very little vocational education prior to the school leaving age of 16. The absence of legislative control of vocational education is a peculiar feature of the British system. One consequence has been the continuing entry into the labour market of a high proportion of young people without vocational qualifications - or with such qualifications at a very low level - and a very diverse pattern of vocational education and training.[28]

By the late 1950s, neglect of training was generally perceived as a significant factor

underlying the decline of Britain's competitiveness relative to other advanced industrial nations. In 1964, a Conservative Government enacted an Industrial Training Act with all-party support. This emp vered the Government to set up Industrial Training Boards (ITBs). The succeeding Labour Government implemented the legislation by setting up several ITBs for various sectors of industry (engineering, construction, distribution etc.) which were governed by Boards on which employers and trade unions were represented. Until 1973, the ITBs were financed by a levy on firms' pay-rolls, but most of the levy receipts were returned to firms in the form of grants for undertaking training approved by the ITBs. As a result, training improved in both quality and quantity during the late 1960s, but the levy/grant system involved firms in considerable amounts of paperwork. Small firms complained most because they paid levies but received relatively little in the way of grants.

In 1970, a Conservative Government returned to power with a Manifesto commitment to examine the work of the Industrial Training Boards and 'root out unnecessary bureaucracy'. After three years of uncertainty, the 1973 Employment and Training Act created the Manpower Services Commission (MSC), another body on which both employers and trade unions were represented. The MSC was given the task of comprehensive national manpower planning, unprecedented in peacetime. The 1973 Act also brought in an unworkable system of levy exemption which had the result of depriving the ITBs of revenue from their industries, forcing them to seek Government money through the MSC.

Prior to 1973, one of the advantages of the provisions of the 1964 Industrial Training Act was that ITBs were not very dependent on Government money, and not therefore, vulnerable to Government spending cuts. As the 1973 Employment and Training Act deprived ITBs of much of their revenue, the MSC put forward schemes for supporting apprentice training, but these were not implemented, mainly because of fierce employer opposition. The MSC believed that there was need for a training revolution in Britain which would involve a permanent national comprehensive programme for young people, and developed long-term plans accordingly. MSC plans, which culminated in 1983 in the Youth Training Scheme (YTS), envisaged training flexible, multi-skilled workers competent to cross obsolete craft-boundaries. The Conservative Government approved of this approach, partly because trainees could be paid less than apprentices, and partly because it appeared to provide a basis for undermining trade union influence.

The proportion of pupils staying on in full-time education after the end of compulsory schooling at 16 is lower than that in other advanced industrial countries. Although the number of places has declined recently, for the last several years many British pupils have left school to take up YTS places, initially for one year and subsequently for two. The evidence indicates that YTS, even when it was extended to two years, was inadequate to provide the skills necessary for craftsmen and technicians in industries such as engineering and construction.

The philosophies behind YTS and apprenticeship are radically different. It is, however, arguable that, backed by sufficient resources, the YTS flexible approach might have yielded better results in terms of competence than apprenticeship. ITBs placed strong emphasis on reforming apprentice training, in particular in the attempt to substitute training to prescribed standards for the traditional 'time serving'. But numbers of apprentices have declined for many years, with particularly sharp falls in the 1980s. In particular, the pay

differential between apprentices and skilled workers is low - far less than in Germany - and deters British employers from recruiting apprentices.

At the end of 1988, the Government published a White Paper, 'Employment for the 1990s', whose principal provisions were the abolition of ITBs and the creation of locally-based Training and Enterprise Councils (TECs). These are led by employers - trade union representation is optional. The Government complained that the ITBs had done too little to support continuing training. This complaint was largely justified. Unfortunately, however, the TECs suffer from a similar problem. Most of the money the Government provides for them has to be devoted to training young people who would otherwise be unemployed. All programmes carried out by TECs supported by Government funds - mainly training for the unemployed - have to be directed at the acquisition of NVQ qualifications. However, while NVQ standards have now been set for most occupations, there are not yet many powerful incentives for people already in employment or their employers to make efforts to ensure that those standards are attained (see below).

The Government hoped that TECs would derive a substantial proportion of their revenues from local employers but so far TECs are relying mainly on Government money for their support. Despite worries about Government training expenditure cuts, however, the TEC movement has gained widespread approval, from trade unions and the Labour Party as well as from employers.[29] Recently, however, the chairman of the National Training Task Force who had been given the responsibility of setting up TECs was reported as calling on the Government to abandon 'voluntarism' and introduce a compulsory levy on company pay-rolls to ensure that money is spent on training.[30]

A Working Group on Vocational Qualifications set up by the MSC reported in April 1986. It recommended that the general objective of an improved system of qualifications 'should be to develop a clear, coherent and comprehensive system of vocational qualifications, based on the assessment of competence directly relevant to the needs of employment and the individual'. It concluded that 'the most effective way of obtaining a structure of qualifications that provides coherence, clearly understood standards and routes of progression' was 'to bring qualifications within a readily understandable orderly national framework'. The Report led to the setting up of the National Council for Vocational Qualifications (NCVQ).

Since then, many organizations - NCVQ, Industry Lead Bodies such as the Engineering Training Authority and the Construction Industry Training Board, and certificating bodies such as the City and Guilds of London Institute - have devoted considerable resources to analyzing work functions as people currently fulfil them. Like the TECs, these organizations are 'employer-led'. This provides the basis for establishing National Vocational Qualifications. Standards for various job functions are set by a Lead Body - whether an Industry Lead Body such as the Engineering Training Authority or a cross-sectoral body such as the Training and Development Lead Body. Standards in the form of units are then combined into qualifications by accrediting and awarding bodies such as City and Guilds of London Institute and then submitted to approval by the NCVQ.

A fundamental idea behind NVQs is that people can attain standards of competent performance by many routes. The NVQ system allows a worker to acquire qualifications by demonstrating competence, and does not prescribe the process through which the competence

is acquired. Government funding is only available to support training schemes which lead to NVQs. But Youth Training and other Government schemes have always been designed mainly to reduce unemployment rather than to train people for skilled employment. They have never been given sufficient resources to produce well trained workers for modern craft and technician occupations. The competence of those responsible for training young people is often inadequate. There is no equivalent to German Meisters in Britain with the competence and responsibility for instructing trainees and guiding them towards securing vocational qualifications, as well as showing experienced workers how to do things better and adapt to new production techniques.[31]

Comparisons between the new British system of qualifications and the Japanese system are illuminating. Like NVQs, Japanese qualifications are 'competence based' - i.e. those who seek qualifications do not have to have taken specific courses: this has been called the 'driving test' approach.[32] But Japanese companies and workers seek to acquire formal qualifications largely because the law or a customer, or a quality association representing customers, dictate that a firm must have so many people with specific qualifications employed. Such motivation for acquiring formal qualifications is not yet pervasive in Britain - although it does apply in some areas such as driving including Heavy Goods Vehicles, and welding. There is no attempt in Japan to force certification into a comprehensive national 'whole role' NCVQ pattern.

It is important to ensure that the emphasis on current job requirements in the National Vocational Qualification system is 'not taken to the point at which learning about the underlying principles and the broader context of the occupation is neglected'.[33] Recent reports suggest that the 'eagerness of those in charge of policy to bring numbers in Youth Training receiving a recognized training qualification up to levels close to those in Europe while seeking to increasingly shift the cost of Youth Training to employers may be the most important reason for the sudden fall in standards expected'. They argue that, by concentrating on occupational skills and failing to build on and extend trainees' capacities in mathematics and English, NVQs represent a retrograde step in education and training provision for young people.[34]

It appears that, while extensive research is undertaken on vocational education issues in Britain, its influence on policy is far less than in France or Germany. Instead there seem to be 'a series of quick fix studies, often well done, but rarely validated thoroughly before another "elixir" is brought out of the political magician's hat to replace what has gone before'.[35]

Continual experimentation and frequent shifts in training policy make Britain a poor general model for other countries to follow. 'Any attempt to describe the delivery of training in Britain as a system is bound to fail, as the semblance of a training system is not yet established.'[36]

However, new ideas sometimes result in useful innovations. For example, several Group Training Associations (GTAs) were set up in the late 1940s and early 1950s, and still survive. In essence, they plan and carry out training for small firms which do not have the resources to do so for themselves. Industrial Training Boards (ITBs) were largely responsible for encouraging and financing their growth in numbers during the late 1960s, but many continued to survive with support from the MSC and from firms even after the

abolition of the ITBs. Initially they concentrated on craft and technician training, but more recently also contributed to supervisor and management training.

In the mid-1980s, there was an interesting example of cooperation between major industrial firms, three educational establishments, Government and the Engineering Industry Training Board (EITB) which helped to solve a shortage of software skills. A local branch of the Philips multinational combined with three other firms to encourage two local colleges to set up two-year training courses to train software technicians capable of doing much of the work previously undertaken by graduates. It was hoped that this scheme would help to alleviate shortages of software graduates. The EITB together with Government helped to finance the research which validated the approach, and also financed the training of some of the students. When research had shown that the scheme was likely to be successful, the EITB used its national network of Training Advisers to disseminate the training scheme to other areas. This mechanism for introducing new training in one area and disseminating it nationally proved to be successful, but it was never used again, partly because the organizations and funding sources used to support the scheme were abolished subsequently.

E. Greece

Vocational Education and Training policies can only be effective in stimulating economic growth if the infrastructure and attitudes conducive to economic growth are also in place. In terms of the factors which are important to the competitive success of a modern industrial economy, Greece is one of several regions of the EC which are rather poorly endowed. Compulsory education covers a period of nine years, six in primary schools and three in secondary schools. But only 3.9 per cent of Greek GNP, far less than in other EC countries, is devoted to education. It has been suggested that as much as 25 per cent of the population may be illiterate. Secondary school teachers receive very little training, and the curriculum is outmoded. There are no loans or grants for undergraduate courses.[37]

The Greek economy is dominated by large numbers of small firms with very limited technological capability. Most larger companies are foreign owned, the principal technologies in use were developed and produced abroad and very little training is carried out to adapt the labour force to its use. Greece has the lowest ratio of R&D to GDP of any EC member state (0.3 per cent). The infrastructure is poor. In particular, the electricity network is subject to frequent breakdowns and the telecommunications system is obsolete. Just as important, industry and commerce is characterized by a merchant culture of securing quick profits and capital is not readily available for long-term investment in industry.[38] There is little Information Technology equipment produced in Greece, and its use is also low.

Data is poor, but there are indications, for example, that Greek organizations suffer from shortages of people with appropriate skills. Shortages are exacerbated by emigration. Attitudes to training appear rather negative in both public and private sector organizations.[39]

IV. EC VOCATIONAL EDUCATION AND TRAINING POLICIES AND INITIATIVES

The European Commission believes that investment in education and training at all levels must be enhanced qualitatively and quantitatively in the 1990s, both to reduce economic disparities between regions and to contribute to economic competitiveness.

CEDEFOP (European Centre for the Development of Training) was established in 1975 with the task of promoting the development of vocational training at Community level. Collating and disseminating information on vocational training in Europe is one of its major tasks.

During the 1980s, community programmes relating to education, training and youth were given new impetus with the establishment of the Task Force: Human Resources, Education, Training and Youth. In the second half of the 1980s, the Council of the European Community made several decisions to put in place several programmes relating to training and the coordination of
qualifications.

A first line of action developed around the concept of mutual recognition of qualifications. A very important step was the adoption of a directive relating to recognition of qualifications acquired after a minimum of three years university education. Extension of this initiative to other levels is under consideration. In 1985, the Council of the EC passed resolution which listed five levels of qualifications, from 1 (very little skill), 2 (approximately craft level), via technician, Meister etc. to University level (level 5). CEDEFOP was given the brief of establishing comparabilities between these levels of qualification in each EC country (basically occupational profiles underlying qualification levels). CEDEFOP started with three sectors: hotels, construction and car repair, and studied between about 8 and 12 occupations in each sector. They then went on to study other sectors such as metalworking, clothing, textiles. These occupational profiles were then discussed with Governments, Trade Unions and employers. This research process has now been completed for about 200 occupational categories at enormous expense.

The idea of standard qualifications throughout Europe was abandoned about 18 months ago. Transparency of qualifications requires that employers in one EC state should have sufficient knowledge to know what attaining qualifications in another EC state involves. It falls a long way short of mutual recognition. However, learning lessons from the failure of plans for mutual recognition of vocational qualifications across-the-board at lower levels, some progress has been made in terms of mutual recognition of about 30 professional qualifications, and of a few "regulated occupations" at lower levels -such as some categories of electricians.acquired after a minimum of three years university education. Extension of this initiative to other levels is under consideration.

One of the principal EC programmes relating directly to vocational education is EUROTECNET which aims to develop vocational training in new technologies. Amongst its aims is to study developments in training in small and medium-sized enterprises and to carry out studies to identify needs for new qualifications resulting from European programmes primarily concerned with developing new technologies such as ESPRIT and

BRITE.

Another significant initiative is PETRA which has set up training partnerships whose role includes development of careers guidance, use of new technologies in training and training for young people without qualifications.

ERASMUS aims to promote the mobility of university students between EC countries. COMETT aims to further cooperation between universities and enterprises, for example in producing courses and developing new training materials in relation to new technology. The EC places emphasis on the role programmes such as COMETT have played in setting up new networks in the form of University Enterprise Training Partnerships (UETP). These have involved groups already interested in cooperation such as universities as well as groups not so far much affected in this way such as small and medium-sized firms.

LINGUA aims to promote improvement in foreign language competence, primarily by means such as promotion of initial training and in-service training courses for teachers of foreign languages. However, LINGUA also promotes exchanges between young people who are undergoing vocational and technical education.

The EURYDICE network (The Educatior Information Network in the EC) is concerned with disseminating information on EC education systems. ARION aims to improve Member States' knowledge of each others' education systems by fostering exchanges between persons designated by education authorities at national, regional or local level.[40]

A series of initiatives has also been adopted concerning human resources, including EUROFORM for new qualifications and new employment opportunities, NOW for training women and HORIZON for handicapped people. Demographic change is reinforcing the attention paid to equal access to training for women. The EC believes that women need to be encouraged and supported to train and be employed in higher level jobs.

While EC initiatives are already making an impact on a wide range of vocational training issues, it is too early to judge their impact as a whole. Moreover, the European Commission regards the diversity of systems of education and training and of the cultures they represent as fundamental and it is Community policy that this diversity should be conserved. The view is strongly held that any attempt to harmonize these systems would be counterproductive and such an objective has been rejected unanimously by Member States.

To date, the EC's general policy of respecting differences between member states' education and training policies remains unchanged. The first necessity of establishing common policies is to collect data on a comparable basis. But each country has different education systems, different labour markets, different training systems, different patterns of work organization. The EC (for example, through the FORCE programme is making strenuous efforts to collect standard data, but facing extremely difficult problems. Several EC officials are keen on the idea of convergence, and reluctant to accept the view of dispassionate observers that the data is meaningless outside its institutional context, and that

the institutional context is very different in each member state *[1] . Most independent experts consider that, even if the ideal of convergence is attainable, it would take several decades to accomplish.

The pattern of funding of vocational education and training in EC countries is extraordinarily complex. At present, the available data is poor. However, a survey of the financing of training in the EC is being completed be CEDEFOP. It is due to be published during the summer or autumn of 1993.

It is probable that the bulk of vocational education and training expenditures is financed by employers providing their own training, or be individuals. This applies generally to initial training, but even more strongly to continuing training which is financed mainly be employers, to a small extent by individuals, and much less by governments. Such data as is available is not believed to be very reliable. The extent to which the forthcoming CEDEFOP publication will improve the situation remains to be seen.

In France, it was estimated that public expenditure accounted for 61 per cent of vocational education and training in 1986, but French researchers believe that this is a substantial exaggeration. Moreover, it s not clear in France what expenditure should be considered as public, and what as private. Some firms spend a minimum of 1.2 per cent of their payroll on training because the law forces to them. Should this be treated as public or private expenditure?

In Germany, firms and trainees accounted for 88 per cent of the costs of the dual system in 1980, the Federal Institute of Labour (jointly financed by employers and employees) 2 per cent and public bodies 10 per cent.

Denmark experienced a serious decline in apprenticeships in the 1970s. The response to this was to increase the number of training places by offering young people basic occupational training. While apprentices received wages paid by employers, students undertaking basic occupational training receive no pay during an initial year of in-school basic training and general education, but the education and training is paid for out of public funds. In the general education, but the education and training is paid for out of public finds. In the general education, but the education and training is paid from out of public funds. In the following two years, these trainees are paid from a statutory fund collected from employers.

Britain, training places for people who would otherwise be unemployed are financed through Government schemes administered by locally based Training and Enterprise council. Otherwise, the vast majority of training expenditure is financed by employers and individuals.

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* This is particularly the case with those working in the Task Force on Human Resources, Education Training and Youth, which is responsible for developing EC policy in relation to theses matters. Such officials may well promote their ideas outside the EC, just as some British Officials promote national Vocational Qualifications and Training and Enterprise councils in other countries. In relation to economic and industrial policy, we are witnessing the dire consequences of adoption of untried and unsuitable Western government policies in Eastern Europe, on a massive scale. It is to be hoped that such experiences, albeit on a much smaller scale, will not be repeated in relation to training policies in MERCOSUR countries.

V. IMPLICATIONS FOR MERCOSUR COUNTRIES

International competition is intensifying. At the same time, rapid technological and organizational change is presenting difficult challenges even for the most advanced vocational education and training systems in Europe, such as those of Germany and Denmark. Even Germany's response to the need to extend and modernize continuing training in small and medium size enterprises has not been fully adequate.

Modernizing vocational and educational training is insufficient by itself to meet these chalienges. Extensive changes are needed in the organization of manufacturing. The application of Information Technology to manufacturing, services and construction is both expanding rapidly and changing fast. These trends make the education and continuing training of managers and professionals vital to the success of modern and modernizing economies. It is widely recognized that the successful use of new technology requires increasing numbers of people with general scientific and technical qualifications, and governments in European countries have ensured that the provision of places has tended to reflect this need to varying extent, but student demand for such places has not always been sufficient to fill them all. In addition to improving vocational education and training, MERCOSUR countries need also to pay attention to these aspects.

This report is concerned with international competition, technological trends and their implications for human resources development policies in Europe. Even in the light of detailed knowledge of the changes in skill needs resulting from new technology use, adapting education and training programmes to meet identified needs is by no means straightforward. Some of the major difficulties are indicated below.

Technological change does not seem likely to result in radical changes to countries' vocational education and training systems. Rather there has been a tendency for new developments to be contained within countries' existing systems. The same skill needs can be met by different combinations of educational provision and training programmes in different countries and different education and training provision may be used to meet the same skill need even within the same country. Indeed, there can be substantial differences between individual firms in a particular area. Extreme examples of this can occur with the introduction into an area of new production methods, forms of work organization and vocational training programmes by inward investors.[41]

Specific skills can be developed by means of alternative patterns of formation. For example, a Japanese small firm is likely to meet the need for someone to operate a CNC machine-tool by recruiting a 19-year-old school leaver with a relatively good education in mathematics and science and train him on the job. A comparable British small firm will be more likely to seek to employ someone in his twenties or thirties who had previously received training at another firm. The British craftsman is likely to have left school at 16 with less academic mathematics and scientific knowledge than his Japanese counterpart. His apprentice training will have involved initial theoretical elements followed by a period of practical training. A German craftsman is likely to have attained a higher standard of education than his British counterpart and will have undergone a combination of practical work and theoretical (school) based training in the Dual System.

Nevertheless, relationships between vocational education and training and economic

performance can be very important. For example, effective vocational education and training played a key role in transforming Denmark from a primarily agricultural nation into a modern industrialized state. But these relationships are not simple and straightforward. Designing and implementing effective national policies is particularly difficult because of the many close links and interactions between education, training and other policy areas. The availability of people with particular skills is affected by general education as well as by training. The supply and demand for trainees is affected by pay which in turn may be affected by collective bargaining, work organization and industrial relations.

The educational system and the work organization, and industrial relations traditions of every country are different. This makes it vital to adapt vocational education and training policies and practices to the particular conditions in each country, and to the specific and changing needs of its industries. A coordinated vocational and educational training research system in each MERCOSUR country could play key roles in studying these factors and helping to develop appropriate policies. But it is important to ensure that research findings are taken seriously and translated into policy and action.

In both France and Germany, there is widespread interest in ensuring that vocational education and training is carried out properly; and there are mechanisms which ensure that research results are used in policy formation and the development of practical education and training programmes. The experience of these countries shows that this requires politicians, central government departments, employers' organizations, trade unions and research workers to be involved in formulation of research proposals.[42] The British experience shows that, in the absence of such conditions, the contribution made by research is likely to be far less.

The Greek experience shows that a sound vocational education and training system can only be effective in stimulating economic growth if other elements of the infrastructure and general attitudes in the society are also appropriate. If industry, commerce and providers of finance adopt short-term perspectives, this can cripple attempts to promote economic growth. Reliable electricity supplies, transport systems and telecommunications infrastructures are essential prerequisites for a modern economy. Moreover, vocational education and training can only be effective if the population has received sound basic education.

Both the Danish and German vocational education and training systems are characterized by strong state regulation and involvement. A major factor sustaining the excellence of these systems is close cooperation at all levels from local to national between employers and trade unions in relation to both initial and continuing training.

The German dual system has developed steadily since 1969. It is also sustained by very good basic education, and by cultural factors, in particular by respect for the concept of 'beruf' -loosely translatable into 'calling' or 'vocation' - in relation to occupations from skilled worker to senior professional: belief in the utmost importance of giving everybody the chance to acquire both the education and the practical training necessary to meet the requirements of their 'calling'. This commitment to 'beruf 'is spread throughout all sections of society, and is entrenched strongly amongst workers and their trade unions. While there has often been conflict between employers and trade unions about the emphasis which should be placed on particular aspects, the strong consensus about basic values has been

encapsulated in highly detailed legislation relating to vocational education and training.

German training is also sustained by the high pay differential between apprentices and skilled workers, helping to reduce the cost of training apprentices incurred by employers (in contrast to Britain, for example where these differentials have been relatively low and where apprenticeship is no longer flourishing). Further, the pay differential between Meisters (very approximately foremen or supervisors) and skilled workers in Germany is relatively high, giving skilled workers strong incentives to study in their own time to meet the stringent qualification requirements which have to be met to be eligible for high status well-paid positions as Meisters. There have been several unsuccessful attempts to introduce the Meister concept into Britain. The low pay and status differentials between supervisors and skilled workers has proved to be an insurmountable obstacle to success in such endeavours.

Training levy and tax systems inevitably lead to a certain amount of waste. Some firms may undertake training with the principal objective of avoiding paying levies rather than of enhancing workers' skills. Sometimes such training may contribute little to enhancing workers' skills. Nevertheless training levies and apprenticeship taxes seem to have made very positive contributions to French training. The British levy/grant system introduced in 1964 (partly in imitation of the French system) was far less successful. Its failure was due to the frequent twists and turns of British Government industrial training policy rather than to problems inherent in levy systems. The Industrial Training Board (ITB) system was established in 1964, damaged by continuing uncertainty in the period 1970 to 1973, crippled in 1973, and mostly destroyed during the 1980s. It is possible that the British levy/grant system could have been developed and improved, and it might have helped to make needed changes in British training culture. But the system was not left intact long enough to assess its potential.[43] It is, therefore, suggested that, based on the French experience, MERCOSUR countries could consider options of introducing training levies very seriously.

The British National Vocational Qualifications System (NVQ) was initiated in 1986, and is not yet fully in operation. It has been argued that the NVQ emphasis on performance in work may lead to the neglect of basic education, in contrast to the German dual system which builds vocational competence on a sound educational basis. The establishment of locally based Training and Enterprise Councils was also initiated recently, in 1988. It is too early to assess the potential of these policies.

There is no single 'best practice' education and training model which provides a universal key to economic growth and international competitiveness. While, for example, the German and Danish systems are very effective, these systems are different from each other and it is impossible to decide which is the more generally effective. Transferring elements of successful policies in EC countries to MERCOSUR countries is desirable. But, before any such transfers are attempted, proposed policies need to be evaluated very carefully in the light of the political, cultural, social and economic conditions which prevail in those countries.

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