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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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University of Amsterdam Consortium

Strengthening Private Sector Participation in Philipppine Technical and Vocational Education and Training

Opportunity Study:

The feasibility of sector-specific and advanced training centres in the Philippines

University of Amsterdam Consortium Research Team

June 1996

CONTENTS

EXECUTIVE SUMMARY

This report reviews the opportunities available to government and industry in the Philippines for establishing and maintaining training centres which serve the specific needs of one industry sector or sub-sector. It examines ways of estimating the demand for such provision, and provides a framework whereby the costs, location, investment requirements, resources and benefits of such provision might be calculated.

The report is structured along lines recommended by UNIDO for its industrial feasibility studies, modified to meet the particular needs of the training industry. The framework outlined in this **opportunity study** can thus be used by TESDA and others as a basis for full feasibility studies when considering proposals for specific industry-oriented provision.

Existing specialist public sector training provision in the Philippines is examined, and the evidence on which the report is based is outlined. It includes surveys of firms, training institutions and trainees undertaken in 1995-6 as well as case studies in the Philippines and Singapore.

The market for sector-specific training comprises employers, employees and potential employees. The evidence points to substantial demand from employers for sector-specific training which complements their already considerable investment in on-the-job training (OJT) and in-plant training centres. Demand varies by industry sector, influenced by differential pressures to upgrade skills in response to new technologies. The report focuses particularly on the substantial level of demand expressed within the engineering industry, using this industry in order to demonstrate a framework for examining the specialist provision which might be provided for one industry sector.

Within the engineering sector, demand is likely to be greatest for upgrading engineer, technician and skilled production worker skills, on the basis of current industry investment in training. The level of demand for 40-hour upgrading programmes for these groups should be sufficient to ensure a throughput of over 1500 trainees per year, paying fees of P1000-P2000 per trainee.

This training provision should be integrated with in-plant training, which should minimise both the need to invest in expensive training equipment and the disruption to firms releasing key workers for training. The location of a training centre should also minimise disruption and cost, by its proximity to the main concentration of manufacturing sector served. For engineering, as for other manufacturing sub-sectors, this is likely to be in the NCR/CALARBAZON area. The existing proliferation of public sector training provision in this area makes some rationalisation possible, so that existing premises and facilities could be converted to a more specialist function, thereby avoiding the cost of a new 'greenfield' centre.

The resources required to operate a centre on the scale projected would cost about P5 million per year. About half of this would cover the personnel costs of 10-12 staff, including two trainer/managers and the equivalent of another four full-time trainers, but making use of part-time and temporary specialist staff, seconded from industry. Other recurrent costs include course supplies, premises and administrative expenses, and an estimated P2 million per year

for capital investment. On top of this, an initial capital investment of up to P30 million is envisaged, mainly for specialist training equipment and software which augments equipment available within firms.

A specialist training provision should operate as a joint public-private sector partnership, on a non-profit basis. Its governance should be under the control of an independent governing board, with majority representation by the industry sector, through its industry association, but with representatives also from TESDA and the relevant labour associations. The board should set the centre's service and financial targets and seek ways in which the centre can progress towards self-sufficiency. However, too much emphasis on financial self-sufficiency in the centre's early years may well divert it from its prime purpose of providing specialist services unavailable from other sources for that specific industry sector.

It seems unlikely that trainees and their employers will pay fees at full cost levels in the first instance. Support for the centres should be sought from some combination of a levy on firms in the sector, a TESDA grant and/or vouchers or loans for trainees. Sensitivity analysis points to the financial risks resulting from high fixed costs. These risks can be alleviated by long-term agreements with major employers for a guaranteed level of trainee throughput over several years, and by investment in a recruitment-focused marketing strategy. Close involvement of the industry's employers at every stage is the best guarantee of financial success.

Alternative development models are considered. They include major centres which provide certificated and pre-employment training but at a far higher level of investment than is envisaged here. Alternatively, the identification and further development of 'centres of excellence' from amongst existing training providers is less likely to offer the sharp service focus of the preferred model.

A full cost-benefit analysis is beyond the scope of this report, but the main economic benefits of the proposed investment relate to the achievement of current national targets for industrial development, trade liberalisation and technological upgrading. These benefits may be difficult to quantify, but they represent efficient use of investment capital by building upon recent legislative reforms of TVET in the Philippines, while avoiding duplication of training provision.

The report recommends that TESDA undertakes a full-scale feasibility study for one specific manufacturing sub-sector, examining the possibility of developing one or more of its existing specialist centres in the ways suggested in this report. The report's annexes provide a framework whereby this can be achieved.

SECTION 1. PROJECT BACKGROUND

1. This report considers the demand for and feasibility of selected industry sector-specific and advanced training centres. The report examines ways in which such centres might be funded, and provides a framework whereby the financial viability of individual centres might be assessed. It uses the data collected in three national surveys (of training institutions, enterprises and trainees) and their associated case studies[1] in order to review the prospects for specialist training provision in four industrial sectors:

- garments
- electronics
- non-electric machinery
- automotive engineering

Much of the following analysis combines the two latter sectors under the heading 'engineering'. It includes a more detailed study of this industry as an example of the ways in which a specific manufacturing sector might benefit from specialist training provision.

1.1 Structure and contents

2. The report is structured along the lines recommended by UNIDO for its industrial feasibility studies, modified to meet the specific characteristics of this service industry analysis. It comprises, therefore, eight sections based broadly on the UNIDO Summary Guidelines. They are:

i. **Executive summary.**

ii. **Project background**, including the project history and parameters, the pre-feasibility studies undertaken by the research team, and justification of the data collection and evaluation approaches.

iii. **Market analysis and marketing strategy**, including:
- analysis of the demand for these centres in the specified industrial sectors based on surveys and case studies undertaken as part of the research project;
- analysis of the labour market to be served by the centres;
- estimate of volume and location of demand and output capacity of proposed centres;
- new technologies to be installed at the centres, training programs, accreditation and consultancy services to be offered, and technology resources and industry standards to be disseminated by centre(s); and
- analysis of potential for income generation and likely revenue sources.

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[1] University of Amsterdam Consortium/UNIDO, *Strengthening Private Sector Participation in Philippine Technical and Vocational Education and Training*: Strategic Report, 5 Specialist Reports and 4 Background Papers, May 1996

iv. **Location and investment requirements**, including premises, land and equipment, taking account of relationships with firms in that industrial sector and impact on existing training providers.

v. **Organisation and human resources**, including:
- costs, qualifications and sources of trainers, management and other professional staff
- overhead costs
- administrative costs
- likely organisational structures
- governance/management arrangements.

vi. **Implementation planning and financial appraisal,** specifying financial implications of alternative development models for centres; and including a provisional break-even analysis and sensitivity analysis, plus a review of likely sources of funding.

vii. **Economic cost-benefit analysis,** with an initial analysis of the costs and benefits of using existing providers or establishing new specialist centres and the impact provisionally in terms of employment generation, technology transfer and achievement of national socio-economic objectives.

viii. **Recommendations**.

3. The report also includes annexes which:

* outline the stages to be undertaken and the evidence to be acquired and analysed when investigating further the feasibility of a specific proposal for an industry-led sector-specific training centre, with particular reference to the metals industry (Annex 1);

* summarise the key factors likely to point to a feasible proposal for a sector-specific or advanced training centre (Annex 2);

* indicate the questions used in the case studies and national establishment surveys undertaken in this project (Annexes 3 and 5); and

* summarise the background information drawn from case studies undertaken in Singapore on behalf of this project (Annex 4).

1.2 Type of study - an 'opportunity study'

4. The UvA team has examined the UNIDO *Manual for the Preparation of Industrial Feasibility Studies* and UNIDO's Summary Guidelines *Preparation of Industrial Investment Studies* (July 1992). This documentation was prepared according to the needs of production industries rather than a service industry such as training. However, it is possible to utilise the framework used in these guidelines with some adaptation to meet the distinctive characteristics of training provision, in order to

examine the need for and feasibility of providing branch-specific training centres and advanced training centres.

5. The UNIDO Manual draws a useful distinction between a project *opportunity study;* a *pre-feasibility study*; and a full *feasibility study*. They represent a hierarchy of pre-investment studies, beginning with the opportunity study. This is characterised as requiring not more than 2 to 3 man-months (as opposed to the 6 to 12 man-months for a feasibility study). This study has been undertaken by the UvA team's financial and new technology specialists, with the help of other team members and UNIDO officers. It has the characteristics, in terms of cost, function and resourcing, of a UNIDO opportunity study. The findings of this report need to be appraised from a technical, industry-specific perspective, as well as from financial, training and socio-economic perspectives, if they are to be used to shape the next stages in the development of sector-specific training provision.

6. As an ***opportunity study,*** it reviews the opportunities available to TESDA, the Philippine industrial associations and the Philippine government. It also provides:

- a model whereby more detailed investigations within specified industrial sectors might be undertaken by TESDA, in association with industry (see Annexes 1 & 2); and

- a focus for greater involvement of the private sector in training provision in the Philippines, and a vehicle for encouraging specific manufacturing sectors to work with the public sector in meeting their specialist training needs.

7. A further terminological issue needs to be resolved. The terms "sector-specific", "branch-specific", "specialized" and "advanced" are applied fairly indiscriminately to training centres, without any agreed definition of their precise meaning. For the purposes of this report, two terms only are employed. They are:

* **sector-specific training centres (STCs)**, defined as centres which serve one industrial sector and are wholly or predominantly training-focused; and

* **advanced training centres (ATCs)**, defined as centres which serve one industrial sector but which focus on research and development in new technologies and manufacturing processes, along with a wide range of associated services for that sector, including training, consultancy, and product-testing and -development.

8. However, advanced training centres as defined above do not focus primarily on meeting the needs of middle level manpower - the focus of VTP II. Their focus is at a higher level, with their strong research emphasis. Furthermore, sector-specific training centres which serve middle level manpower needs are likely to provide some "advanced", highly specialized training in line with the changing needs of their industrial sectors. This study, therefore, will concentrate on the feasibility of sector specific training centres (STCs) and will consider ways in which the needs of specified industrial sectors might be appraised and met.

1.3 Sector-specific training centres in the Philippines

9. The Vocational Training Project II (VTP II) proposal recognised that NMYC (as it was then, before the establishment of TESDA) was not equipped to support industries needing advanced, specialist and industry-specific skills. For this reason the Project included a component which would examine the feasibility of establishing sector-specific and advanced training centres. The proposal made specific reference to the requirements of the garments, wood-processing and printing trades.

10. That proposal envisaged the preparation of detailed TORs by July 1992, for report completion by June 1994. Delays in the initiation of this component enabled account to be taken of the impact of the establishment of TESDA and the implementation of the TESDA Act and related legislative and regulatory changes.

11. Within TESDA, the Office of Manpower Skills Development (OMSD), established in 1969, provided forms of specialised and advanced training from 1969 until it was subsumed within the recently established National Institute for Technical and Vocational Education & Training (NITVET). OMSD established nine centres, five designated 'advanced' in that they serve several industrial sectors and four 'specialised', each serving a single sector. The advanced training centres (ATCs) serve land transport, electro-mechanics, computers, electronics/telecommunications and construction. They provide technical assistance to industry and have benefitted from substantial investment in facilities and staff training.

12. The specialised training centres (STCs) are for footwear & leather trades, metal trades, garments and hotel and restaurant trades. Their programs provide basic to intermediate level skills training, with some industry support. They generate income from trainees fees, set at levels which cover approximately 50% of direct course costs, which they can retain through a "revolving fund", authorised for NMYC by Executive Order. The revolving fund amounts to some P7 million per year, and generates a working surplus of about P1 million, reinvested in tools and equipment. In consequence, the calls on TESDA's budget for materials and other operating expenses (MOOE) are modest - in 1995 only P975,900. However, the centres have been managed along with central OMSD services as a single cost centre, so that it is difficult to identify the expenditure patterns, unit costs and relative efficiency of the individual centres.

13. TESDA is currently examining ways of involving the private sector in running ATCs and STCs through co-management agreements, through which TESDA and Industry Associations share control and responsibilities for the centres. The absence of cost information may present some problems in arriving at satisfactory agreements which can enable these centres to build upon their distinctive achievements to date. During the period of this survey, uncertainties about the future of the centres were causing understandable concern and inhibiting the medium-term planning which centres of this type must undertake.

14. Other sector-specific training centres in the Philippines include the recently established Marine Technology Training Centre, supported by the Norwegian government

(NORAD) and operated by TESDA. Other Philippine government departments which support sector-specific centres and programs include:

DOST (Department of Science & Technology)
- Metal Industry Research & Development Centre (MIRDC) in MetroManila
- Philippine Textile Research Institute (PTRI)
- Industrial Technology Development Institute

DTI (Department of Trade & Industry)
- Construction Manpower Development Foundation at Cavite & Makati
- electronics
- furniture
- printing & packaging
- Garment Industry Training Program.
- First Cavite Industrial Centre Program

15. These are all public sector institutions. The private sector comprises a very large number of training institutions, generally smaller and less comprehensive in their range of provision than public sector institutions. A significant proportion of these focus on the needs of single industrial sectors or occupational groups - notably, as in most countries, computing and business studies. The available data do not permit an accurate catalogue of private sector training provision by industrial sector, although the research team has been made aware of private sector-specific provision under the aegis of some industry associations and chambers of commerce.

16. The initial focus of this project, in its preparatory stages, was in the context of the transfer of responsibility from the public sector to the private sector, including the private training sector. As the research programme has developed, the emphasis has shifted to seek ways of involving the private sector more fully in TVET planning, funding and delivery. Notions of public-private collaboration and shared participation have emerged as more useful concepts than notions of privatisation, by transferring public sector assets to the private sector. The possibility of such transfers is not excluded in this opportunity study, but it is but one of a range of options whereby the greater participation of the private sector might be achieved.

1.4 Evidence

17. This report draws upon the data collected by the sector surveys undertaken by the UvA and associated national team . The surveys of establishments within four selected industrial sectors and training institutions have provided valuable data. These have enabled the research team to review the demand for sector-specific training from firms and their industry associations for the four industry sectors covered by the surveys.

18. The evidence has been augmented by data from the series of related case studies, undertaken in the Philippines and in Singapore by members of the UvA team, TESDA and the national research team, along with interviews with representatives of the relevant Philippine industrial associations. These provide a snapshot of current

provision levels as well as the views, opinions and proposals of key members of the relevant sectors. They offer a perspective from which the team has been able to evaluate the extent to which existing centres meet expected demand and might potentially meet that demand with appropriate marketing and organisational strategies. The team has not, however, examined the financial feasibility of individual centres, as the relevant data is currently unavailable.

19. Annex 1 provides an overview of the financial appraisal elements needed in a more specific feasibility study, including analyses of payback, rates of return and cash flow, and the indices and ratios which test for liquidity, stability, profitability and credit-worthiness, together with some indications of their applications with reference to the metals industry and in particular the existing specialist training facilities for that sector. Key elements of a thorough market and financial appraisal, including estimates of market size, market financial capacity and competitor analysis in the market appraisal, are demonstrated in later sections of this report.

20. Three of the industrial sectors investigated by this project are currently served by specialist training facilities. These are not all solely training centres, but all undertake some training activities. Case studies have been undertaken at each of the centres, which have provided perspectives on both the range of services sought and used by industries within the sector, including training but also research, consultancy, testing and product development. The establishment survey has provided insights into the current level of training activities being undertaken by firms within these specific sectors. This has been augmented by interviews with representatives of the major Philippine industry associations, including the Semiconductor Electronics Industry Foundation Inc. (SEIFI), which does not have its own training centre, but which promotes training for its sector including dual training with the Dualtech Training Centre. The survey of training institutions has provided detailed evidence of the nature of training provision currently available for industries within these sectors.

21. Case studies of the industry associations have provided data on their current provision of and aspirations for specialist services. The spectacular industrial development of Singapore has been ascribed to, amongst other factors, the establishment of advanced training centres. A specific survey has, therefore, been undertaken in Singapore of a sample of these centres (Annex 4). While lessons from Singapore cannot, of course, be translated to the very different industrial context of the Philippines, the survey has provided a valuable perspective from which to view the prospect of establishing Philippine industrial sector-specific centres.

22. This report makes particular reference to the evidence concerning the engineering and metals industry. Throughout the report, examples from that manufacturing sub-sector are used in order to illustrate a specific type of specialist provision. It must be emphasised that this focus is purely illustrative, and is not based on an in-depth study of that sub-sector. As indicated earlier, pre-feasibility and feasibility studies are required before investment decisions can be made.

SECTION 2. MARKET ANALYSIS AND MARKET STRATEGY

23. This section of the report seeks to:

- analyse the demand for sector-specific training in the four specified industrial sectors, using evidence from the surveys and case studies;
- estimate the scale of potential demand for the services of STCs and ATCs in the selected industrial sectors and relate that to centre output capacity;
- review the main characteristics of the labour market which would be served by the centres;
- examine new technologies which would be required in specified centres, and relate these to training programmes and their accreditation; and
- analyse the centres' potential for income generation and likely revenue sources.

The nature of the 'product' to be marketed - the training services and ancillary services such as consultancy - is considered in the next section.

24. The evidence from the survey of establishments in the garments, engineering and electronics sectors has provided insights into the current and potential demand for training in each sector. The market for sector-specific training comprises three major segments:
- employers within the industry
- employees in that industry
- potential and aspirant employees including school-leavers and the unemployed.

25. Each segment has rather different requirements. For example, while employers are likely to prefer training provision which is sharply focused, closely related to current industrial processes and undertaken with as little disruption to production processes as possible, employees are likely to prefer broader training, which is certified and provides transferable skills. Potential employees are also likely to seek certified and transferable training, and are more likely to look for full-time training provision than the other two market segments.

2.1 The demand for sector-specific training

26. The research undertaken by the project team points firmly to the need for new forms of training provision. One message coming through strongly from all quarters - employers, government, employees and even from the training providers - is that the existing training institutions do not focus on the requirements of industry for ongoing training for its employees. The prime concerns of most training institutions are with pre-employment training. The research points to mixed views about the efficacy of that provision, but is unambiguous about the demand for sector-specific training for

those already in employment.

27. The limitations of existing training provision have been well documented[2]. Key criticisms are of the limited relevance of the curricula, the capabilities of the teaching staff and the resources provided for TVET in both public and private sectors. With a few notable exceptions, training institutions provide a basic diet of pre-employment training, with only limited attempts - usually as income generation measures - to upgrade the skills of their former trainees and meet the specific and changing needs for ongoing training of employers.

28. This project's research findings have provided some confirmation for these criticisms. Examination of the sources of training of a representative sample of employers found that very limited use is being made of either public or private sector training providers. Only 4% of electronics firms use either private or public sector training centres. 6% of engineering firms and 17% of clothing firms use government training centres; for private sector centres the figures are 3% and 5% respectively[3]. Case studies in those sectors confirmed the low opinions held by employers of existing provision (with a few notable exceptions), even where those employers where fully aware of the range of provision available. In consequence, Philippine industry has invested heavily in developing its own training facilities, as well as (in the electronics industry) making heavy use of foreign training centres.

29. The case studies provide some evidence of employer demand for sector-specific training, as do the final questions of the establishment survey (see Annex 5). When asked to identify the three areas where "government intervention would be most useful to you", enterprises identified the "establishment of a training centre specifically for your industry sector" as their second highest priority; while general taxation-funded support for training rated third out of a possible 11 initiatives (Table 1). In contrast, levy grants and tax rebates for training were rated as the two lowest categories by enterprises.

30. Even more encouraging is the high priority given to sector-specific training when firms were asked which initiatives they and their industrial associations would be most likely to contribute towards. Training centres are in practice the highest priority in each category (top ranking was awarded to an initiative - identifying critical skills - with few cost implications for either firms or industry associations). In contrast, firms indicated decisively that neither they nor their associations would want to contribute towards the costs implied by levy-grants or systems of tax incentives and tax rebates (Table 1).

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2 See the chapters by R.M. Doctor in *TVET Sector Study Series*, TESDA, 1995 and the earlier series of publications *(Making Education Work)* by EDCOM, 1992/3

3 Sonali Deraniyagala & I.S.A. Baud *Firms, Technological Development and HRD in the Philippines*, Specialist Report no.5, May 1996

Table 1: Firms' views on initiatives to promote training (rank out of 11)

	a.	b.	c.	d.
Establishment of training centre for your industry sector	7	2	2	2
Financial support to training through taxation	10	3	8	11
Levy-grant system	8	10	11	10
Tax incentives and rebates to firms	6	8	9	9
Tax rebates to employers	7	11	10	7

a = government most likely to intervene
b = government intervention most useful
c = firm most likely to contribute towards costs
d = industry association most likely to contribute towards costs

31. When this data is analysed by industrial sector, the priorities indicated in Tables 2 and 3 emerge. In all but the automotive sector, firms give highest priority to contributing towards the costs of a sector-specific training centre. When asked which sector their industry association would be most anxious to contribute to the firms surveyed only the non-electric machinery sector did not give high priority to a sector-specific centre (Table 3). When asked what would be the most useful form of government intervention, the engineering sectors gave top priority to a sector-specific training centre. The garments sector rated this initiative only 5th (and was particularly pessimistic about the likelihood that the government would actually intervene in this way - 9th out of 12 possible government interventions).

32. Conversely, all sectors gave very low priority to levy grants and tax rebates as useful government interventions, although only the garments sector considers such government intervention quite likely to occur. The overall picture is that each sector demonstrates high levels of readiness, either individually or through their industry association, in setting up sector-specific provision, but each is strongly resistant to investing in forms of support for training through the taxation system.

33. Some evidence, from the project's case studies of industry associations, supports the view that there is a demand for sector-specific training. Most associations interviewed pressed strongly for sector-specific provision with government help. The only association sceptical of the value of such a development was one of the two associations serving the garments industry (the other was very strongly in favour of a "mini-factory" for the sector).

Table 2: Priorities for individual firms by industrial sector (ranking out of 11 initiatives that "the firm would be most likely to contribute towards the costs")

	Garments	Non-elec. machinery	Automo-tive	Electr-onics
Establishment of training centre for your industry sector	1st	1st	7th	2nd
Financial support to training through taxation	8th	5th	5th	7th
Levy-grant system	10th	9th	11th	11th
Tax incentives and rebates to firms	5th	10th	9th	10th
Tax rebates to employers	7th	11th	10th	10th

Table 3: Priorities for industry associations by industrial sector (ranking out of 11 initiatives that "the industry association would be most likely to contribute towards the costs")

	Garments	Non-elec. machinery	Automo-tive	Electr-onics
Establishment of training centre for your industry sector	1st	7th	3rd	1st
Financial support to training through taxation	9th	11th	8th	9th
Levy-grant system	8th	10th	10th	10th
Tax incentives and rebates to firms	10th	9th	11th	6th
Tax rebates to employers	6th	6th	7th	8th

34. These opinions are borne out by current practice. At present, several associations organise sector-specific training for their members. In the electronics sector SEIFI coordinates an annual course for about 20 technicians, based at the Dualtech Institute. In the automotive industry, both the Association of Consolidated Automotive Parts Producers Inc. (ACAPP) and the Philippine Automotive Federation Inc. (PAFI)

organise and co-sponsor training, with the help of TESDA. The associations were critical of existing training institutions, citing their lack of skills as the main reason why more use was not made of their services. Their criticisms extended to existing government-run sector-specific centres, where they exist. The associations indicated that the fact that such centres **are** government-run inhibits their effectiveness and relevance.

35. The overall view from the associations is that sector-specific training is needed and that they would support a joint venture with government, if each party contributed to the costs. However, government help would be needed in providing the major part of the initial funding, while association members might be willing to contribute land or equipment for such a venture.

2.2 New technologies and training in the industry sectors

36. There are significant differences between the sectors in terms of their perceived training needs as demonstrated through the survey of establishments (Annex 5). Whereas in the garments and non-electric machinery industries less than 20% of firms have had to provide new training or hired new employees to cope with new production technology or new products, the figure rises to 29% in the automotive industry and 47% in the electronics industry. Looking ahead, a rather different picture emerges. When asked whether they plan to introduce specified new technologies in the next two years, 47% of the garments firms and 41% of the automotive firms responded positively, in contrast to the 35% and 21% positive responses of the non-electrical machinery and electronics firms respectively.

37. The different approaches by each industrial sector to new training needs is also significant. Firms which have introduced new technologies indicated the ways in which they acquired the necessary skills. In the garments sector, training by equipment suppliers and buyers is insignificant, and the most common response is to hire new employees, followed by in-house training for employees. Little use was made of government or private training centres. In the non-electrical machinery sector, in-house training is more important except for unskilled workers, who are hired as required. As with garments, little use is made of government and private training centres or of training by equipment suppliers or buyers.

38. The electronics industry similarly concentrates on in-house training, at every grade level including unskilled workers. Second in importance is training by equipment suppliers, especially for engineers and technicians; and rather more use is made of private training centres than in the other industrial sectors. However, little use is made of government training centres or buyers. The automotive industry depends heavily on in-house training, with little use of any of the other routes for skills enhancement other than some limited use of private training centres.

39. The implications of this evidence point to rather different types of training provision for the various sectors, with garments and engineering looking in particular to training in new technologies - an important role for a specialist centre - while improvements within existing in-plant and generic training provision might well be more appropriate for the electronics industry.

40. Furthermore, a strong preference for sector-specific training has been identified in each sector. The low take-up of external training provision, especially in the garments and engineering industries, along with the expressed desire for an industry-specific training facility, points to substantial unfulfilled demand which might be met through sector-specific training provision.

41. Extrapolation of that demand for training across each of the sectors suggests that, for many firms in each sector, sector-specific training which augments their existing in-plant provision is a top requirement, particularly for upgrading their skilled workers. For other firms, such sector-specific training provision would enable them to avoid the heavy investment needed where their further expansion depended on establishing or enhancing in-plant training facilities. For smaller firms in each sector, such provision is likely to prove particularly valuable where it enables the skills of current workers to be upgraded, rather than incurring the cost of buying in additional expertise.

2.3 Demand by occupational groups

42. The scale of likely demand from the industrial sectors for such specialist centres can be assessed from the evidence in the establishments' survey of numbers of workers currently receiving training. This is summarised in Table 4, as a proportion of the total workforce by category of employee. It suggests that the heaviest demand for training engineers and skilled production workers is likely to be from the electronics and engineering industries, while the heaviest demand in the garments industry is likely to be for technician training.

43. The evidence of employee and potential employee demand is more difficult to ascertain. However, the surveys provide a broad perspective on the labour market in the four industrial sectors, on the current skill levels, the current distribution of skilled workers in each sector and the relative investment levels by sector establishments in training.

44. The data indicate that, extrapolating the present levels of employee training by grades across each manufacturing sector, the greatest demand is likely to be for the training of skilled production workers in the garments and engineering sectors. If only 5% of this demand is met by a specialist centre for each industry, it points to an annual throughput of between 500 and 1000 skilled production workers per year. Present levels of demand for engineer training is likely to be very small in the garments industry (<200 per year in total across the whole country), but substantial in the engineering industry (about 2500 per year: or a throughput of 250 per year if 10% of these were

trained each year in a specialist centre). For technicians, current levels of training provision in garments and engineering are similar, and point in the engineering industry (if 5% of this demand is met through a specialist centre) to a training throughput of about 400 employees per year[4].

Table 4: Percentages of employees receiving training in the past year, by manufacturing sector

	Engineering	Electronics	Garments
Engineers	41	41	32
Technicians	46	45	59
Skilled production workers	29	29	9
Skilled non-production workers	12	12	6
Unskilled workers	42	42	59

2.4 Income generation and fee levels

45. The final element within this market analysis examines the potential for income generation, and the extent to which specialist centres might be expected to progress towards self-sufficiency, at least in their training provision. Evidence from existing specialist centres indicates that fee levels vary widely both between and within institutions. They range from as little as one peso per training hour to over P200, around an estimated average training fee for skilled employees of about P30 per training hour. Evidence from the commercial short course market points to fee levels for skilled manpower as ranging up to P1000 per day. This project's survey of establishments suggests that firms are able to buy training services from external providers at rates up to P200 per hour (for a three or four day programme).

46. The evidence suggests, therefore, that the market can bear hourly fees in the range of P50-150, for classroom-based courses aimed at middle level manpower. This points to a course fee for a 40 hour programme of up to P4000. It can be assumed that firms contributing (whether individually or through their industry association) to the revenue or capital costs of a training institution will not be prepared to pay a fully commercial rate, but a discounted rate of about 50% of the full market price should be acceptable. These assumptions would need, of course, to be tested in the field as part of a pre-feasibility study (see Annex 1).

47. Using the demand levels suggested earlier, and the fee levels indicated above, revenue generated from training activities can be estimated. A specialist engineering training centre, with a throughput of approximately 200 engineers, 400 technicians and 1000 skilled production workers attending 30-40 hour training events could generate annual fees of over P2 million (Table 5). Demand at this level would require a centre with at

[4] Calculated from a total working population in the engineering industry of about 250,000, of whom 8.3% are technicians (20,600), and 46% of these receive annual training (9500).

least four full-time equivalent trainers, although additional involvement in industry-based consultancy work and related income generating activities would increase the staffing requirements. However, the projected fee income, at 50% of the full market rate, would be insufficient in itself to cover all the costs required to provide this level of provision, as detailed in Section 5.

Table 5: Potential annual fee income for an specialist engineering centre

	estimated annual throughput	fee per trainee (pesos)	total income (pesos)
engineers	200	2000	400,000
technicians	400	1500	600,000
skilled production workers	1000	1000	1,000,000
skilled non-production workers	60	1000	60,000
TOTAL	1660		2,060,000

48. Options for pricing policies include supply-driven, cost-plus policies whereby courses are priced at a fixed percentage above delivery costs, or demand-driven policies whereby prices are set at levels calculated from the existing training market. Both approaches argue for considerable flexibility by training providers, whether for adjusting course prices in line within real cost variations, or (the recommended approach) by monitoring the training market carefully and locating specific courses within that market which take account of demand, competition and the intended location of the course provision along a high quality/high take-up spectrum.

49. Other forms of income generation are also feasible. Although the short and intense nature of the training provision makes production activities an unlikely source of income, consultancy services to the industry sector are a possible source of additional funds, with the further benefit that such services help trainers to keep in touch with the latest organisational and technological developments in their industry.

50. However, consultancy and other services such as trade testing are unlikely to bridge the gap between income and expenditure. A specialist training centre of the type envisaged would need additional support, at least in its early years and both public and private sources of such support can be identified. The market analysis points to both TESDA and the industry associations as obvious sources, and Section 5 considers these in some detail.

SECTION 3. LOCATION AND INVESTMENT

51. In this section of the report, issues shaping location and investment decisions are considered. The location of a specialist training centre is examined first. The 'product' or output of the training sector is then considered, with particular reference to two decisions with important financial and locational implications:

- should the hands-on training element using state-of-the art industry tools and equipment be located in a specialist centre which replicates industrial equipment and practices in its workshops through 'simulated work experience' and 'model factories' as central features of the training provision? Or should this experience be obtained by structured in-work experiences involving forms of mentored on-the-job training?

- should training concentrate on the specific short term and immediate demands of newly introduced equipment and production systems, or should it provide those more generic skills which enable trainees to take on flexible assignments across the industrial sector?

3.1 Location decisions

52. Locational and investment needs are shaped by the national distribution of the industrial sector being served, the differential regional growth rates by sector and the evidence of current availability of training provision targeted at each sector. This information is not easily available in the Philippines, however, with regional distribution of firms at the sub-sectoral level being about five years out of date when published by the National Statistics Office (NSO). The regional distribution of training provision (both public and private) is not available generally.

53. The principles governing locational decisions can be illustrated with reference to Table 6, which indicates the location of manufacturing enterprises with more than 50 employees. It demonstrates the concentration of manufacturing in the NCR and Region 4,which between them contain 82% of the firms with between 50 and 500 employees and 68% of those with over 500 employees - the likeliest users of specialist training provision and the necessary suppliers of OJT and dual training facilities. The dominance of these adjacent regions makes the location of any specialist training provision outside these regions very problematic. Closer analysis, by industrial sector and sub-sector and by province can be undertaken using NSO data. This data, which also provides a dynamic picture of locational change over time, points clearly to the concentration of most manufacturing sub-sectors in NCR and the CALARBAZON provinces of Region 4 (with, for example, virtually all the nation's electrical appliances, radio and television and metal-working machinery manufacturers with more than 10 employees).

54. The location of a sector-specific training centre which takes its trainees from existing employees for short periods of time needs to minimise the disruption and expense, by locating the centre near the major concentration(s) of firms in that sub-sector. This reduces travelling time and the consequent loss of working time while travelling, and also reduces the need for dormitory provision and/or the payment of overnight subsistence costs. The establishment of specialist training facilities outside NCR/CALARBAZON would be very difficult to justify for most industries, particularly where industry was required to provide not only a regular throughput of trainees, but also dual training and OJT facilities.

Table 6: Percentage of medium and large sized manufacturing firms by region[5]

Region	% of firms with 50-500 employees	% of firms with >500 employees
NCR	67	53
3	6	8
4	15	15
7	7	7
10	2	1
11	3	4
other regions	2	12

3.2 Types of training

55. Decisions about the types of training to be offered depend upon information about current demand and supply, as considered in the previous section, as well as the locational issues examined above. However, these do not specify the types and range of services which comprise a training institution's portfolio. Further analysis is required in order to determine the particular types of training and non-training 'products' which the training centre provides to its customers.

56. Philippine experience of on-the-job-training (OJT) and dual training, stimulated by the 1994 Dual Training Act, points to a training model which makes as much use as possible of existing firm-based facilities. The possible location of specialist training centres and the scale of financial investment is shaped by the market analysis outlined in the previous section and by some fundamental principles about the nature of effective TVET learning. One financial implication of a work-related training model such as the dual training system is that the enterprise sector will bear a substantial proportion of the training costs, through the supervised access of trainees to workplace facilities and equipment. Conversely, individual firms are less likely to contribute willingly to the

5 Source: 1994 Manpower Planning Factbook, TESDA, 1995

costs of training in purpose-built, specialist centres which simulate work-based learning provision in expensively equipped training workshops.

57. The type of training to be provided through specialist provision is shaped by the preferences of the main providers - the employers within the sub-sector. As indicated earlier, their preferences are for training provision which is sharply focused, closely related to current industrial processes and undertaken with as little disruption to production processes as possible. The heavy use currently made of internal training (OJT and in firms' own training centres) and the limited take-up of external training provision revealed by the firms' survey points strongly to forms of training provision which augment and make use of existing in-plant provision. This argues for forms of dual training - short, intensive periods of off-job training, which are then reinforced through practice back at work. Short periods of off-job training - 40 hours (one week) or less - are likely to create less disruption than longer periods away from work.

58. The concentration of manufacturing facilities within a relatively confined area of the country makes the adoption of these efficient training methods feasible. Dual training and OJT present opportunities for trainees to obtain practical experience of state-of-the-art manufacturing processes, equipment and facilities within existing manufacturing plants, rather than through simulated work experience in purpose-built training workshops. Investment in training facilities can concentrate on the lower cost equipment (which may be donated by industry) on which basic skills can be acquired and practised, and on those specialist computerised training facilities on which processes can be practised which are too delicate, dangerous or costly to be practised by trainees using production equipment, and which provide feedback as part of the learning process.

59. The use of dual training and OJT as an integral part of specialist training provision also suggests that experience of current industrial practices and organisational systems can be acquired through OJT. The role of a specialist training centre can then focus on new approaches to work design and delivery, preparing trainees for innovations which are likely to transform manufacturing processes before they are widely adopted by Philippine firms. Such a focus is likely to prove attractive to employers, in that their employees will be prepared for innovation as it is introduced, thereby reducing those barriers to change which commonly impede industrial progress.

60. In turn, this points to a dual function for a specialist training centre which justifies investment by the industrial sector in facilities for off-the-job training. While one key purpose of such a centre would be to enhance and upgrade employees' skills, an equally important function is to shape employees' attitudes through intensive short periods of off-job training to accept, welcome and support innovation, and to carry those attitudes back to the workplace, influencing colleagues and shaping organisational practices and culture. These dual benefits need to be clearly demonstrated by the centre, if it is to ensure continuing support from the sector's employers in the form both of financial contributions and a regular supply of customers.

61. In more detail, the types of sharply focused training courses envisaged require careful preparation by professional staff experienced in both industrial processes and instructional design. The proposed focus on trainees already in employment points to intensive training courses based on training packages tailored to the industry sector's needs and building upon the capabilities already acquired by trainees at work and through pre-employment training. These packages would specify the practical workshop experiences to be acquired at the centre, using basic tools and equipment and more sophisticated specialist training facilities, providing assessment and diagnosis, which complement the on-job experiences of the trainees. Training packages of this type can point to the specific post-training activities to be undertaken through the OJT elements of this dual training which provide reinforcement for and practical experience of the learning acquired at the training centre, Manuals of guidance and support for both trainees and for those with responsibility for mentoring and supervising OJT are essential elements of the overall training package.

SECTION 4. ORGANISATION AND HUMAN RESOURCES,

62. A brief and necessarily provisional assessment is made in this section of the human and other resources required by a typical specialist training centre. It draws on the scale assessments of the previous two sections, and takes as an example the engineering industry. However, this is very much a first overview of these issues. As with the other elements of this opportunity study, it needs to be followed up - if and when any decision is made to examine in more detail the feasibility of centre(s) for any specific industrial sector - by a feasibility study focused on that industrial sector, using the resources not only of a financial and training specialist but also a technical specialist familiar with that industrial sector and its TVET requirements in the Philippines.

63. The issues reviewed in this section include:

- the costs, qualifications and sources of trainers, management and other professional staff;
- capital investment requirements;
- an assessment of likely recurrent administrative and other overhead costs;
- likely organisational structures; and
- governance/management arrangements which involve the industry sector and TESDA.

4.1 HRD

64. Human resources are normally by far the largest recurrent costs of a training institution. Evidence from a variety of sources in this project provides insights into the likely costs of trainers, managers and other staff required by a sector-specific centre of the type and of the scale indicated above. Using the calculations of demand made in the previous section, a likely staffing structure, with an annual cost of just under P2.5 million, might comprise the numbers of managers, trainers and support staff indicated in Table 7.

65. These calculations are based on:
- the estimates of throughput in Section 2 (Table 5);
- assumptions that class sizes will range between 12 and 25; and
- expectations that trainers will undertake on average 28 hours' training per week over a 48 week year.

Other assumptions are that firms will bear the internal costs of OJT and other firm-based training/work experience.

Table 7: Estimated salary structure and staffing levels for a hypothetical specialist training centre

staff grade	monthly salary range (P'000s)	annual cost (P'000s)[6]
2 managers/senior instructors	20 - 40	780
4 f.t.e. trainers[7]	15 - 30	1170
2 technicians	8 - 12	200
2 administrative/clerical	6 - 10	208
1 security etc.	4 - 8	78
TOTAL		2428

66. The human resources required in any specialist training facility will depend on the nature of training provision and the answers to the questions raised in the previous section concerning the balance of work-based and 'work-like' training. Training which makes extensive use of OJT demands different staff profiles from classroom-based training. Training which focuses upon hands-on mastery of work-based competences has different staffing requirements from more traditional, didactic training with substantial knowledge and attitude-formation elements. The training approaches posited earlier require that trainers have an intimate knowledge of manufacturing processes, in order that off-job training can be integrated with trainees' on-job experiences. This points to substantial industrial experience as a necessary criterion for selecting both trainers and managers, along with sound appreciation of learning processes as well as training skills.

67. These qualities might more readily be obtained through the secondment of appropriate staff from within the industry to the specialist centre rather than by recruitment on the open market. There are also industry-specific skills required in such a centre which are likely to be obtained through the occasional deployment of specialist staff, brought in from industry as guest instructors and on secondment for longer periods of time, working alongside a small full-time group of managers/instructors, recruited as indicated above. Staff might also be drawn from existing training centres, including those displaced by current rationalisation processes - but only where they have or can be trained to acquire the relevant capabilities. Crucial to the centre's success is the culture engendered by a community of instructors and managers who are fully conversant with the industry, its working practices and the latest technological and organisational innovations.

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6 Mid-point of range. Assumes 13 months' pay per year

7 A combination of full-time and part-time instructors, brought in from industry

4.2 Organisational structure

68. The organisational structure of any proposed centre will depend upon the industrial sector and the range of programmes and other services offered by the centre. The scale of provision indicated above suggests that a course team structure of two or three teams, each comprising a small group of full- and part-time trainers, managed by a senior instructor, is a feasible working arrangement. Overall centre management would be undertaken by two managers, with one (the business manager) focusing on administrative and financial matters and the other (the instructional manager) on industrial liaison, recruitment, industrial innovation and curriculum development.

69. The managers would be expected to undertake some training activities (or other productive work such as consultancy), equivalent to up to 50% of their available time. Trainers would be expected to include the supervision of OJT as part of their workload, as well as some curriculum design and course management responsibilities.

4.3 Other costs

70. Other course-related costs would include course supplies and materials, staff development and trainee subsistence expenses. An estimate of these annual costs for the size of centre envisaged here is attempted in Table 8. The major expenditure envisaged is on course supplies, estimated at P200 per participant. Trainee stipends are included, to cover the travel and subsistence costs of a minority of trainees who have to travel unusually long distances or reside away from home during the period of training.

Table 8: Estimated non-staffing annual recurrent costs for a specialist training centre

	annual expenditure (P'000s)
course-related:	
course supplies	332
staff development	16
trainee stipends	16
non-course related:	
premises costs	160
administrative costs	200
Total non-staffing costs	724

71. Non-course-related costs, other than management costs, comprise two main categories:
- premises-related costs (including rents, water, light and power and maintenance/repairs); and
- administrative costs (travel, telephone, postage, publicity, etc).

The annual non-course related cost estimates are also indicated in Table 8. Total recurrent non-staffing costs amount to P724,000 or about 23% of the total recurrent costs of just over P3 million.

72. Capital expenditure requires a different set of assumptions and calculations. An initial assumption is that it is neither affordable or desirable that the specialist centres undertake forms of hands-on training which can more efficiently be undertaken within firms as part of dual training or OJT. This defines the role of the centre (as indicated in the previous section) as providing:

* relatively low-cost hands-on training which needs to be integrated with classroom-based learning;

* experience of some production equipment, such as some computer-assisted machinery, where experimentation on working production machines is dangerous or expensive, so that state-of-the-art training equipment is needed; and

* access to specialist training equipment, where feedback is a key element of the training process.

73. In the metals industry, examples of such capital investment might include an initial investment in CAD/CAM and CNC equipment which could amount to P30 million, as individual machines cost from P1 million to P8 million. Thereafter, capital expenditure is needed for upgrading and replacement and a minimal investment of P2 million per year is assumed in the estimates below.

74. A further assumption is that the specialist centre is not a 'greenfield' project requiring new buildings, but that an existing training centre is converted to this specialist function. The rationalisation of training facilities by TESDA should enable an appropriately located centre to be identified and converted at relatively low cost, so that the major initial expenditure focuses on the specialist equipment and facilities available neither in the existing centre or within firms[8].

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8 Cost and related issues arising from the redeployment or redundancy of staff displaced by such a transfer are not considered here. The rationalisation processes are already in hand, as part of the reforms arising from the 1994 TESDA Act, and their consequences lie outside this opportunity study.

4.4 Governance and management

75. The necessarily close relationship between a specialist training centre serving one industrial sub-sector and that industry needs to be reflected in the centre's governance and management. The industry, through its industry association, should be centrally involved in the centre's governance. Even if the centre receives significant government funding (see Section 5) it should be quite independent of the government's legal and regulatory framework.

76. Although a detailed proposal for the board's structure and operation lies outside the remit of this report, a governing board should contain representatives of each of the parties concerned in its provision, including:

- the industry, through its industry association;
- the government, through TESDA; and
- employees through their labour association(s).

77. The tasks of the centre's governing board should include the approval and monitoring of institutional performance, including approval of business plans and monitoring of HRD policies and income generating strategies. More specifically, the governing boards should:

* review the annual income and expenditure proposals of the centre's managers, in the form of a business plan, and approve them, when satisfied as to their feasibility;
* receive regular reports from the centre's managers on the extent to which the organisational and financial objectives of their business plans are being achieved;
* review the extent to which the centre collects and uses information about the most recent organizational and technological developments in the industry in order to update and modify the range of services it offers to the sector;
* take responsibility for the recruitment of the centre's senior staff, and monitor the centre's personnel and HRD policies to ensure that they are in keeping with best private sector practice; and
* monitor and review the centre's overall provision and set targets for the centre's progress towards financial self-sufficiency.

SECTION 5. IMPLEMENTATION PLANNING AND FINANCIAL APPRAISAL

78. The above sections are based on a series of assumptions about the establishment and operation of a sector-specific training centre. This section draws together those financial, technological and organisational assumptions, before reviewing possible alternative development models for centres. The section goes on to attempt a provisional break-even analysis, using the example of a specialist centre for the engineering industry, and based on an estimate of likely sources of capital and revenue funding. It concludes with a sensitivity analysis, reviewing the implications of various funding scenarios.

79. The key assumptions made in the previous sections are that a specialist training provision for a manufacturing sector would:

* train mainly or entirely current employees of the sector's firms, leaving pre-employment training to existing generic training centres;

* be based on dual training principles, in which trainees alternate blocks of time at the centre and in work;

* provide intensive short periods of off-job training (typically through 40 hour programmes), after which skills learned can be reinforced through supervised on-job training;

* be jointly planned and supervised by enterprise and training centre staff, so that the in-work elements of the training would be closely integrated with the off-job training at the centre;

* be located in an area with a major concentration of firms within the industrial sub-sector served by the centre.

80. A further and central financial assumption can be added to these. It is that a specialist centre would operate as a partnership between public and private sectors on a non-profit basis. The private training market in the Philippines is already so well established that specialist provision is likely to be already available where it is profitable. The type of specialist provision posited in this report serves a niche market which is, at least in its initial years, likely to depend to some extent on public and/or private sector support. This section of the report examines the sources and scale of such support. It does not rule out the possibility of a centre covering its costs, but its economic benefits (examined in Section 6) are more readily measured in terms of the economic success of the industry sub-sector and the consequent national benefits, rather than in terms of short term financial profits in return for entrepreneurial investment in the training centre.

5.1 Alternative development models

81. There are, of course, other ways in which the services of a specialist centre might be deployed. The model outlined above is not, we understand, one that is commonly found in the Philippines. It does not provide pre-employment training, and does not offer long, certificated programmes of study. It assumes that the training will be provided in a dedicated but not purpose-built centre. All of these assumptions can be challenged.

82. One alternative development model is for the establishment of a more comprehensive centre, which provides both specialist pre-employment and post-employment training. Such training is likely, at least in part, to be certificated, and would comprise substantially longer periods of training than are assumed above. Such a centre would be larger, with more staff and a wider portfolio of services than assumed above. Examples include the French-, German- and Japanese-Singapore Training Institutes in Singapore (Annex 4). It would, however, be considerably more expensive to establish and to maintain (the Singapore Institutes provide one-year full-time certificated programmes similar to those provided by the polytechnics[9], whose graduates are bonded for three years after graduation. For those reasons alone similar initiatives in the Philippines may have considerable difficulty in winning support from manufacturing firms across the sector and the regions.

83. At the other extreme, it is possible to envisage a type of provision which would not be based in one physical 'centre', but would be distributed across a number of existing training providers in several regions. This would involve the coordination and extension of existing specialist provision within training centres where the industry (through its association) felt that standards were sufficiently high for these to be deemed 'centres of excellence'. Special programmes, designed for and by industry, would be provided alongside the centres' more generic provision. There are merits in this approach, especially for industrial sectors which are well-distributed across the Philippine regions, and where the physical location of a single centre would disadvantage employees and employers in other regions. Indeed, some of the current training provision by, for example, Meralco, Don Bosco and Dualtech training centres approaches this model. Disadvantages, however, include the absence of full industry control over the provision and likely tensions between the demands of generic training and those of the customised training required by a specific sector.

84. Between these two extremes, there is a spectrum of potential provision along which the specialist short-course, dual training centre indicated earlier is broadly central. The analysis in the rest of this section is based on that model, but it is important to stress that other models should be developed, costed and considered with industry representatives before any specific developmental mode is adopted.

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9 Joao Oliviera & Gerald Pillay, *Training for new technologies in Singapore*, International Labour Office, Geneva, 1992

85. As indicated earlier, it also is possible to envisage a model of provision on a for-profits basis, with a private entrepreneur developing services and facilities in the expectation of financial returns. The existing in-plant training facilities developed by some of the major Philippines manufacturing firms could provide the basis for such provision. However, evidence from existing private training centres suggests that the form of industry-specific provision examined here is less attractive than generic training in terms of profitability, while the unavailability of sufficiently detailed financial data on the operation of in-plant centres makes further analysis of this option beyond the scope of this report.

5.2 Cost estimates and cost recovery for an industry-specific training centre

86. The cost information drawn from the estimates in the previous two sections is drawn together in Table 9. To these should be added initial establishment costs, estimated in the example used throughout this report at P30 millions, on the assumption that premises, furniture, fittings, etc. are provided without cost.

Table 9: Annual cost estimates for a specialist engineering training centre

	P'000s
Staffing costs	2,428
Non-staffing recurrent costs	724
Capital costs	2,000
Total	5,152

87. These figures are based on the modest throughput figures summarised in Table 4 (1660 per year or about 35 trainees per week), with a similar number of trainees being supervised on work-based training each week. The forecast fee income of just over P2 million per year covers about two-thirds of the recurrent costs and 40% of the total annual costs. The remaining income of about P3 million per year needs to be obtained from sources other than fees, of which the government (through TESDA) and industry (via the industry sub-sector's association) are the most obvious.

88. There are at least four different ways in which these sums might be generated. They are:

- a levy on all firms in the industry sub-sector over a specified size (e.g. 10 employees) on the basis of their payroll, with remissions for fees currently being paid by firms and for firms opening their internal training facilities to trainees other than their own employees. A levy of only P40 per employee on the estimated 100,000 metals industries employees in firms of over 10 employees would raise the P3 million required after remissions to firms providing trainees and OJT facilities;

- an annual grant from TESDA on the basis that, if this training facility did not exist it would be TESDA's responsibility to provide it. Under the 1994 TESDA Act it is committed to "ensure that appropriate skills and knowledge are provided to industry by (training) centres" through the TESDA Development Fund which "shall be utilized exclusively in awarding of grants and providing assistance to ...industries (etc.) ... for upgrading their capabilities"[10];

- some combination of the two (although the administrative costs of a levy on employers mean that below a certain level those administrative costs absorb most of its revenue); and/or

- payment directly by trainees, assisted by vouchers or loans from TESDA (also possible under the TESDA Act). Loans could be repaid out of earnings or reimbursed in kind, in the form of work as instructor/mentor for OJT once training had been completed. The level of support required would be (in the worked example) P3000 for technicians and P4000 for engineers.

89. A fifth method of covering costs - by increasing fees so that they cover the full recurrent costs - is thought to be impracticable. Firms would be unlikely to contribute on the scale required (up to P5000 for a one week course) sufficiently to maintain year-round throughput, as well as contributing to the hidden costs of OJT/dual training supervision. Trainees are very unlikely to invest on this scale themselves, particularly as this type of training is most unlikely to pay substantial dividends directly in the form of higher wages. However, this assumption has not been tested and some further analysis of price sensitivity is needed in a full feasibility study. This should determine:

- the range of fees currently paid by trainees for private TVET;
- the benefits sought by those trainees at different fee investment levels in the form, for example of greater employability, higher potential salaries and greater job satisfaction, and;
- the key price barriers.

In these ways a more comprehensive estimate can be made of the range of feasible contributions from trainees, their employers and government.

10 *Technical Education and Skills Development Act of 1994* (R.A. No. 7796)

5.3 Break-even and sensitivity analysis

90. As fees are unlikely to be the main source of income for a specialist centre of the type envisaged, a straightforward break-even analysis relating volume of training to income is not possible. However, the training throughput of 1660 trainees per year in the worked example is a modest and minimal estimate. It requires only two programmes per week with 18 participants or three per week with 12 participants to cover the estimated costs (assuming 48 working weeks per year). Any reduction in this throughput level has the double disadvantage of increasing the unit costs of training and reducing the benefits to the industry sub-sector. These figures should, therefore, be regarded as a base provision level.

91. Increasing throughput by 20%, to 2075 trainees per year, increases the fee income by P400,000 a year with very little increase in costs, if this is achieved by larger groups (three groups of 15 per week or two groups of 23 trainees). Further increases, however, do not necessarily lead to further unit cost reductions. Increases in trainee numbers to the point where they have to be divided into two teaching groups has a step effect on costs, by requiring additional trainer time as well as extra premises. The market analysis (Section 2) indicates the scope for a larger throughput, but also the limits imposed both by the overall size of the occupational groups (engineers, technicians, etc.) within an industry sub-sector, and by the readiness of employers to release and pay for the further training of their skilled employees.

92. Sensitivity analysis involves estimating the risks involved should assumptions used as a basis for the financial forecasts prove inaccurate. The key assumptions, whose bases need to be calculated for each centre planned are:

- the level of demand for specialist provision within the industry sub-sector;
- the readiness of industry to release trainees and pay fees at level proposed;
- the availability of low cost or 'no cost' facilities rather than investment in 'greenfield' provision;
- the availability of funds, through grants, levy, loans or vouchers, to augment fees;
- the likelihood of initial large-scale capital investment in some limited specialist equipment;
- the willingness of industry to provide facilities for dual training/OJT and to cover part of supervision costs; and
- the capability of the industrial sector, through its industry association, to provide governance and strategic planning for the centre.

93. Each of these assumptions needs to be tested through a full feasibility study. A framework for such a study is outlined in Annex 2 and 3.

94. The main risks are financial. Investment, even on the modest scale envisaged, needs to be sustained over a number of years - the level of training provision assumed for technicians in the engineering industry would reach to only about 10% of its target population in ten years. Financial security in terms of medium or long term commitment by industry and government is necessary for a centre to survive. Financial insecurity and short-termism is likely to lead to the diversion of centre activities away from its core purpose - intensive upgrading training - and into activities such as production, consultancy and possibly pre-employment training, which might help the centre to survive but are unlikely to provide the benefits to the industry sub-sector that can be derived from sharply focused, sector-specific training.

95. An analysis of the fixed costs required to operate the centre whether or not there are trainees identifies the main financial risks. These risks relate mainly to a shortfall of trainees. In the example used earlier, fixed costs comprise the initial capital outlay, staffing costs other than part-time trainers, and other non-course-related premises and administrative costs. These amount to over 80% of the annual costs indicated in Table 8. The marketing analysis in Section 2 suggests that higher fee levels are unlikely to generate compensatory income to cover rising unit costs should course numbers fall, so that recruitment failures are unlikely to be compensated by increasing fee levels. This in turn argues for those responsible for the governance and management of the centre ensuring the minimum projected throughput levels by means of:

- long-term agreements with major employers for an agreed number of trainees per year; and/or

- investment in a marketing strategy focusing on trainee recruitment.

96. Failure to achieve sufficient trainees can be compensated by diversification, by using professional staff as consultants to industry and by developing different programmes, such as pre-employment and longer-term training courses. These, however, have the disadvantages indicated above, with the specialist provision becoming diluted so that the centre might eventually become indistinguishable from other more generic training providers.

97. In practice, an initial substantial involvement by the industry sub-sector in setting up the centre, through contributions to the initial capital investment, the secondment of staff as trainers and managers, and involvement in centre governance, seems the likeliest strategy to build long-term private sector commitment and hence to guarantee the minimum throughput levels needed for survival as a specialist centre.

SECTION 6. ECONOMIC COST-BENEFIT ANALYSIS

98. A full cost-benefit analysis lies beyond the scope of this report. It should, however, be undertaken as the central part of a full feasibility study, before any substantial investment is made by either public or private sector. This final section attempts to draw together the evidence and assumptions about the costs and benefits of involving the private sector in the provision of sector-specific training. Options for developing new forms of provision are reviewed within the broader context of employment generation, technology transfer and achievement of national socio-economic objectives in order to assess the benefits which might derive from public and private sector investment in such provision. The impact of possible public-private sector partnerships as well as forms of privatisation are considered, as are the costs and benefits of using existing providers and establishing new specialist centres.

99. The analysis in the previous sections argues for a distinctive approach to the establishment and operation of sector-specific training facilities. The core of the analysis is for a public/private sector partnership whereby the public sector contributes premises, some initial capital investment and a proportion of the operating costs over a period of at least five years. The private sector - the main beneficiary of the facilities - contributes a major part of the operating costs and some part of the initial capital investment, provides facilities and support for on-job training, and guarantees a regular throughput of trainees drawn from the sector's employees.

100. The costs of such a venture, if shared between public and private sector, involve relative modest investment by each. Assuming, as in the example earlier, capital set-up costs of P30 million and annual operating costs of P5 million, the total ten year cost of such a facility amounts to P8 millions per year. If shared equally between TESDA and the industry this would take up less than 1% of TESDA's current annual budget and cost employers just P16 per employee across the industry sector.

101. The benefits of specialist training provision are demonstrated in the evidence from Singapore (Annex 4). There, specialist provision in, for example, the component divisions of the Institute of Technical Education such as the Precision Engineering Institute, includes certificated programmes, 40-hour upgrading courses and customised courses for individual firms. The centres are publicly funded as part of a government strategy to invest in the enhancement of the nation's higher level technical skills. Private sector collaboration involves the provision of new equipment, machinery and software without cost to the training centres and majority membership of the centres' Boards of Governors.

102. The proposals in this report are for a more modest and more sharply focused form of provision than the Singapore centres. The existing infrastructure of public and private sector training institutions has the potential to deliver pre-employment training and generic skills development. The TESDA Act and related legislation such as the Dual Training Act of 1994 have already, following the recommendations of EDCOM in the early 1990s, put in place many of the elements needed for rationalising and enhancing

the provision and capabilities of the existing institutions.

103. The development of separate sector-specific provision which impeded these TESDA-led reforms would benefit neither the industry sector or the Philippine economy. The innovations should complement this rationalisation and contribute to the reformation and rationalisation of the Philippine training system. The major benefits and most obvious returns on public/private sector investment are those which complement and build upon existing facilities rather than duplicating them. For these reasons, the main needs would seem to be for specialist, sharply focused training provision which meets the needs of Philippine industry to upgrade large numbers of its technical workers, at engineer, technician and skilled production worker levels.

104. The significance of such development can be seen from a broader economic perspective, relating the needs of the manufacturing sector to the Philippine economy overall. Manufacturing is the most dynamic part of the Philippine economy, and is central to the national objective of achieving newly industrialised country status by the end of the century. In a global economic climate of trade liberalisation and global competition, this demands investment in the development and enhancement of technical and vocational skills - the purpose behind the TESDA and Dual Training legislation.

105. Any appraisal of the benefits of investment in sector-specific training provision needs to take this context into account. The modest investment costs indicated above can then be related to the industry sector's internal and international markets, the prospects for increased competition in both, and the need for skills upgrading in order to ensure the sector's international competitiveness. The higher Philippine wage levels in comparison with East Asian competitors makes the need for investment in HRD all the more crucial.

106. Recent analyses of Philippine industrial development have focused on the need for technological upgrading in response to the recent GATT-UR agreement[11]. The success of East Asian economies such as South Korea and Malaysia have been attributed at least in part to government investment in mechanisms whereby new technologies have been attracted into the country and employees trained in their applications. The type of specialist training provision indicated in this report is one vehicle for introducing and disseminating the technology transfer skills associated with industrial growth.

107. From this perspective, the issue of whether investment is primarily a public or private sector responsibility is secondary. However, in the context of current privatisation policies there are strong expectations that industry should shoulder a larger proportion of its HRD costs than some sectors have yet been used to, coupled with substantial (and well-founded) criticisms of the government's track record as a training provider. The approaches indicated in this report place the initiative in developing appropriate sector-specific provision firmly with the private sector, while the evidence from this study

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11 Aniceto C. Orbeta Jnr. & T.C. Sanchez *The Philippines in the regional division of labor*, PIDS Paper, January 1995; ILO, *The impact of the GATT/Uruguay Round on employment prospects for the Philippines*, Technical Report, 1995

suggests that manufacturing industry would be prepared to take on those responsibilities.

108. However, there remains a legitimate role for the government, in shaping the environment for industrial development. The creation of TESDA specifies more precisely than has previously been the case in the Philippines the government's role. This quite clearly is not in the direct provision of training, but in providing coordination, long-term planning and in the creation of an infrastructure in which privately managed training provision can flourish. The private/public sector collaboration envisaged in this report is a tangible demonstration of how such joint action can be organised.

109. A particular task for TESDA in approaching this goal is to evaluate and provide evidence for the ways in which government support might most effectively be applied. This requires an economic cost/benefit analysis of the Philippine training system in its broader social, economic and political contexts. Issues to be addressed by such an analysis include not only the scale and direction of possible government support (grants vs. loans, vouchers for trainees vs. tax benefits for employers, etc.) but also the benefits that might be anticipated in terms of employment creation, new business generation, technological innovation and technology transfer. The recommendations of the final section point to ways in which TESDA might approach that task.

SECTION 7. RECOMMENDATIONS

110. The study concludes with recommendations on ways in which the findings of this report might be taken forward. In particular, it proposes ways in which a sector-specific feasibility study, focusing on one particular industrial sector or sub-sector, should be undertaken, the resources required and the format in which the study should be presented.

111. The recommendations are supported by a model (Annex 1) whereby more detailed investigations within specified industrial sectors might be undertaken by TESDA, in association with industry. The recommendations include ways of applying the model in the form of more detailed feasibility studies for specific industrial sectors. Taken together, these recommendations amount to a strategy for the greater involvement of the private sector in training provision in the Philippines, and for promoting public-private sector collaboration in meeting the new training needs which Philippines manufacturing sector will require over the next decade.

112. **We recommend that TESDA tests the model, initially with respect to existing TESDA provision through its specialist centres.** The purpose of these tests would be to establish the validity of the model and to provide practice for TESDA staff in the techniques of data collection, analysis and interpretation. Staff on the programmes and in the institutions under review should be reassured that the purpose of the exercise is **not** to privatise their activities.

113. Annex 2 outlines the procedures whereby a feasibility study might be undertaken which focuses on the specialist training needs of a particular industry sub-sector. The central elements are the financial appraisal, the market assessment and the economic cost/benefit analysis. **We recommend that relevant TESDA officers familiarise themselves with these procedures, collect the requisite evidence and prepare feasibility models for further analysis.**

114. The evidence generated by a sector-specific feasibility study will point to alternative models of possible public-sector partnerships. These need to be reviewed by all the relevant parties likely to involved - including industry representatives and the relevant industry associations, labour associations and government departments. **We recommend that a task group is established with membership as indicated above.** Its task should be to review the available evidence of demand for sector-specific training and sources of funding, and to make recommendations on ways in which resources for meeting that demand might be generated. A key condition framing those recommendations is that they should involve appropriate contributions from both public and private sectors.

115. Our final recommendation is that **a flexible strategy for determining the long-term funding of any agreed provision should be determined at the outset**, so that progress towards financial self-sufficiency (if thought desirable) should be part of a medium or long term strategic plan for the provision of sector-specific training. Such a strategy is necessary to enable those responsible for the direction and management of training services and centres to plan for training provision which responds to the changing needs of their customers - trainees, employers and the government. The existing legislative and regulatory framework needs to be reviewed to ensure that it is sufficiently flexible to promote and support such a strategy.

Annex 1: MODEL AND CHECKLIST FOR ASSESSING THE FEASIBILITY OF SECTOR-SPECIFIC TRAINING CENTRES

This Annex provides a checklist of the main issues to be examined in a feasibility study focused more specifically on one industry's needs than is possible in this report. It comprises four sections. The first is the market analysis, including estimates of market size, market financial capacity, training services and competitor analysis. The second is the financial appraisal, including analyses of payback, rates of return and cash flow, and the indices and ratios which test for liquidity, stability, profitability and credit-worthiness. The economic analysis examines the costs and benefits of different models of public and private sector investment in and support for training. The final section indicates issues which need to be considered when considering the relative risks involved in projected investments - the sensitivity analysis.

The evidence:

Central to any effective analysis is good quality data. The questions indicated below require that evidence concerning the training market and finances is obtained, from two main sources:

* desk research - analysis of existing data, including that collected by the National Statistics Office, the National Economic Development Authority, TESDA, the Bureau of Internal Revenue and the Securities and Administration Commission, as well as available industry sources;

* field survey - data collected specifically for the feasibility study, taken from the industry's firms, its employees, existing training providers and government sources. This latter needs to be acquired efficiently, using reliable and valid sampling procedures, by questionnaires and interviews.

1. Market appraisal:

1.1 Training services

* Types of training 'products' which might be supplied (short/long courses; certificated/non-certificated; on-job/off-job; individualised packages, etc.)

* Lead-in (course preparation) and throughput estimates

* Staffing requirements of alternative approaches

* Analysis of relative costs, merits and acceptability of different 'products'

* Training portfolio ('Boston matrix') - market share vs. market growth.

* Costs and benefits of developing ancillary services - consultancy, production. trade testing, etc.

1.2 Demand-side

* Size of the market for training, measured in terms of throughput and projected fee income

* Market segmentation ... by type of firm and size of firm, by occupation (technicians, engineers, etc.), by gender, by qualifications/previous training experience

* Incentives for employers to release staff for training - e.g. technological upgrading, work organisation changes, inadequate pre-entry training, financial incentives such as tax rebates

* Incentives for employees and potential employees to seek training - e.g. salary differentials between trained/untrained staff, available loans/vouchers, etc.

* Capacity of market to buy different types of training provision - current levels of investment in training; pace of technological change in industry; current and potential competition and sector profitability

* Capacity of industry sector to express needs and act collectively; and mechanisms for collective action e.g. industry association, chamber of commerce

* Demand for non-training services such as trade-testing, consultancy, production, etc. including location of likely demand.

1.3 Supply-side:

* Existing training provision, by type and length of training, accreditation and location

* Types of training provision, related to market segments -
  short, medium and long programmes;
  classroom/theory and workshop/practical mixes;
  on-job, off-job/in-plant, and off-job/in training centre mixes;
  certificated/uncertificated;
  block-release, day release or evening only;
  in-plant or training centre, etc.

* Take-up of existing provision by employers, current and potential employees, and industry association(s)

* Reputation of existing training providers and perceived capability to meet industry sector needs

* Capacity of existing training provision, either for expansion or conversion to sector-specific training

* Fee levels and evidence of relationship between fees and take-up

* Promotional strategies and their relative impact on the market

* Balance of public/private sector provision, and likely shifts in that balance

* Current provision of ancillary services - consultancy, trade-testing, research, etc.

2. Financial appraisal:

* Initial capital investment
  - premises
  - land
  - equipment
  - furniture & fittings

* Expected economic life of the investment - anticipated period of continuing demand for training and depreciation of capital assets

* Cost analysis, distinguishing between fixed and variable costs, direct and indirect costs, capital and recurrent costs, and specifying unit costs of training

* Taxation assumptions - potential tax benefits and outlays

* Cash flow estimates, based on:
  - assets: fees (throughput volume and unit fee levels) + non-fee income from consultancy, trade-testing, etc. + grants, etc. in relation to ...
  - liabilities: all expenditure phased against anticipated income flows to provide ...
  - liquidity ratios

* Rates of return and payback estimates, based on estimates of surpluses of income over recurrent expenditure + depreciation

* Indices of stability, profitability and credit-worthiness calculated to estimate progress towards self-sufficiency and profitability

* Analysis of sources of finance with models of alternative funding scenarios.

3. Economic analysis

* National socio-economic objectives

* Extent to which current training provision contributes to achievement of those objectives

* Alternative investment models (by public and private sectors) whereby training system might contribute more substantially to socio-economic targets

* Analysis of costs and benefits of investment models, including review of measurable and intangible costs/benefits

* Selection of preferred investment profile

4. Sensitivity analysis:

Estimated risk to preferred and other investment models of:

* under-recruitment - unsold training places, so insufficient income generated from trainee fees

* income generated from non-training activities

* sufficient capital provision

* sufficient government support (capital & recurrent)

* sufficient industry support (" " ")

* industry capacity to support training (general or industry-specific economic recession), including provision of OJT/dual training places

* recruitment and retention of competent staff (wage levels)

* exchange rate movements (if anticipated income from overseas sources or in non-Philippine currency)

* technological change, requiring investment in new equipment and staff upgrading

* inappropriate location

* competition, from existing or new training providers.

Annex 2: KEY INDICATORS OF A FEASIBLE PROPOSAL FOR A SECTOR-SPECIFIC TRAINING CENTRE

This Annex provides a list of indicators which should be sought when reviewing the feasibility of one or more proposals for sector-specific training provision. Conversely, those preparing such proposals might use the list of indicators in drawing together the evidence required in order to construct a convincing project proposal. It is organised in two sections. The first reviews the environment in which new training provision is proposed. The second is a litmus test for preparing and reviewing the proposal itself.

A. The environment

1. Industry sector with no or very limited current external specialist training provision but with record of significant investment in training

2. Industry sector facing or about to face costs of technological upgrading and/or changes in work organisation

3. Industry sector able to express its needs coherently through a central body such as its industry association(s)

4. Industry sector expanding and/or sufficiently profitable to meet costs of specialist provision, with forecasts of continuing expansion and/or profitability

5. Current training provision rated as inadequate in terms of volume and/or quality by users

6. Framework of financial incentives (loans, tax rebates, levy-grant, vouchers, etc.) to encourage employers and trainees to invest in training, including identifiable incentives for trained employees.

B. The proposal

7. Proposed training provision targeted at specified market segment(s) based on market analysis which demonstrates high levels of demand

8. Income generation from sources other than training realistically projected, in ways which complement and reinforce training and at levels which are unlikely to conflict with needs of training provision

9. Income and cash-flow projections pointing towards self-sufficiency and profitability over medium term (unless projected at the outset)

10. Cost-effective strategies such as forecasts of donation of land and equipment, secondment of instructors and managers, etc.

11. Proposed location(s) adjacent to main concentration(s) of sector firms

12. Sustainable demand forecast for at least five years

13. No or little significant competition in the selected market niche(s)

14. Sector support in form of guarantees by employers of either release of agreed numbers of trainees per year or employment of (pre-employment) trainees on successful course completion

15. Staff recruitment and HRD policies to ensure the recruitment of instructors familiar and credible with industry

16. Structured links between training provider(s) and industry sector, through OJT, advisory committees, industry liaison/marketing strategies, etc.

17. Public/private sector partnership demonstrated by close and continuing industry and government links, through joint financial commitments, industry boards, governing board, etc.

18. Realistic assumptions of government support including likelihood of policy/legislative changes and regulatory adjustments where necessary

19. Financial and market forecasts brought together in an integrated strategic plan as central element of project proposal.

Annex 3: ASSESSING THE FEASIBILITY OF SECTOR-SPECIFIC AND ADVANCED TRAINING CENTRES: FRAMEWORK FOR CASE STUDIES

1. This framework for the comparative analysis of existing branch-specific and advanced training centres is intended to be applied to case studies undertaken by the research team within the Philippines and in Singapore. Its purpose of these case studies is:

   a) to identify existing specialist centres serving specific industrial sectors;

   b) to examine the key features of these centres in terms of their objectives, governance, management, clientele, activities, costs, income (actual and potential), outcomes and financial viability;

   c) to prepare a model which identifies the key features characterising such centres, which can be applied when reviewing proposals for further such centres.

2. The model will used by the research team at the data analysis phase in order to examine the costs and outcomes of such centres, existing and as yet not established, serving the manufacturing sectors scrutinised within this research program. It is important, therefore, that the framework used for data collection is broadly the same in each of the case studies, whether in Singapore and in the Philippines (or elsewhere), so that the model can identify the key common features across the case studies and the characteristics which distinguish particular case study organisations from the rest.

Interviewees:

3. The case studies should involve interviews with:

   - senior managers at each centres, including wherever possible the chief executive/director;
   - the financial director
   - the HRD director
   - the senior person(s) responsible for marketing centre services
   - senior persons responsible for the design, management and delivery of centre training programs
   - representatives of centre customers, and in particular a couple of senior managers from key firms served by the centre
   - the chief executive of the industry association responsible for or served by the centre.

4. Specific questions for each interviewee are not identified here: the questions appended below will need to be directed as appropriate at available staff, but wherever possible

responses to each question should be drawn from at least three different categories of interviewee.

Data:

5. As well as the interviews, the case studies should undertake the collection of the following data:

   - the current operational budget, detailing expenditure by budget head and all sources of income;
   - the financial accounts for the two preceding financial years
   - an organisational chart
   - a list of training activities (short and long programs)
   - numbers of course members on each program during the current year and the two previous years
   - details of capital expenditure and its sources:
     a) when the centre was first established
     b) over the past five years
   - any outstanding proposals for capital expenditure
   - the current corporate plan and (if available) proposals for the next corporate plan
   - all available statistical data concerning the current and projected demand for labour and skill upgrading in the industrial sector(s) served by the centre.

Questions:

1. When and why was the centre first established?
2. What were the initial intentions of those setting up the centre?
3. How have the centre's objectives changed since it was first established?
4. Who determines the centre's policies and outcomes?
5. How is the centre managed?
6. Who is the chief executive answerable to?
7. What are the main sources of centre funds, and how have they changed in recent years?
8. In what ways have the centre's patterns of expenditure changed in recent years - and why?
9. In what ways have the centre's customers (trainees and firms) changed in recent years and why?
10. How are new activities (training programs, etc) identified and planned?

11. Who is most influential in determining the activities of the centre - the government, the industry association, individual firms or centre staff?
12. What are the most cost effective and least cost effective activities currently undertaken by the centre?
13. Is the centre under pressure to improve its cost effectiveness? (IF SO) From whom?
14. What are the main ways in which industry association(s) and individual firms affect the work of the centre?
15. What actions are currently being taken or are planned to improve the centre's cost effectiveness?
16. What have been the centre's major contributions to the industrial sector it serves over the past five years?
17. What are likely to be the major contributions to that industrial sector over the next three or four years?
18. In what ways are the funding, the customers and the activities of the centre likely to change over the next three or four years?
19. What are the main trends within the industrial sector served by the centre? How is the centre likely to respond to those trends?
20. What are the main advantages of a branch/sector specific training centre over a general purpose training institution?
21. If this centre did not exist:
    - who (if anyone) would undertake the activities carried on here?
    - what would the effects be on the industrial sector it serves?
    - would there be a strong demand to establish such a centre now in 1996? (AND IF SO) From whom?

ANNEX 4: SINGAPORE CASE STUDIES

1. FINDINGS

Singapore has practically nothing in common with the Philippines except for its general location on the planet and perhaps for a strong component of Chinese origin in its society and economy. (In Singapore over 75% of the population is of Chinese origin; in the Philippines the proportion is very much less but the total number may of course be greater.)

Singapore is a small island state, as much a psychological island as a physical one (being connected to Malaysia by a causeway), and perhaps derives the cohesiveness of its society not only from its relatively small size and predominantly Chinese culture but also from the sense of external menace which islanders tend to feel. For whatever reason, cohesive the society certainly is, reflected in fairly willing acquiescence to authority, willingness to accept and work within decisions once made, and strong social pressure to conform and achieve. This predisposition greatly assists effective collaboration between institutions and individuals and there is no dogmatic divide between the public sector and the private sector.

Not everything is perfect. There is for instance a certain amount of juvenile delinquency allied with a trend to join secret societies, and a surprising number (not necessarily delinquent) leave school before the recommended, but not compulsory, age of 16. There is evidence of stress: Asiaweek (15 March 1996) reports that "Domestic violence is on the rise ... In 1994, police dealt with 135 cases of family violence, and gave protection to 284 victims - an 89% increase over four years. In just the first half of last year, 287 people sought police protection." In the organisation of government there is apparent overlap in spheres of responsibility and function between the Economic Development Board, the National Productivity Board and the Ministry of Education, and the whole system appears to be a comparatively large bureaucracy. But this last observation must take account of the equally apparent effectiveness of the system.

Singapore has no natural resources and its economy depends to great extent on the operation of some 3,000 foreign companies. Investment is attracted by stability, consistency of public policy, public order, a clear legal and procedural framework, absence of "improper practices", certainty of ownership, no requirement for local partners, good infrastructure, communications and public utilities, low rates of tax, freedom to import labour and repatriate profits - and not least by the availability of a certain number of highly educated and trained professional and technical employees, even if these must be supplemented by non-Singaporeans in large numbers. Some 10% of the population is foreign with permanent residence rights.

There is also a shortage of lower-skilled workers and new investment requiring much unskilled or semi-skilled labour is discouraged. Lower- skilled workers are admitted with one-year permits. According to the Manila Bulletin (9 March 1996) there are some 65,000 Filipino workers in Singapore "dominated" by domestic helpers, but with some professional

managers including construction managers in their number. This figure represents over 2% of the resident population.

The state budget is in surplus, allowing generous government funding of education and training, presumed to be for the wider benefit without formal cost-benefit analysis. This is not sloppy: there is a very strong and coherent intellectual input to the formation of policy, or a hierarchy of agreed policies, within an agreed long-term framework, succeeded by disciplined and consistent implementation. Funding of education has been going on for thirty years and appears to be the key, or one of the keys, to evident success.

Singapore is encouraging Singapore-based firms to invest in other regional countries, especially "resource-rich" countries, i.e. those with plenty of labour, and thus to expand the country's "economic area" (the Regionalisation 2000 programme, referred to in section 3 below.) Singapore will concentrate on its core competences in high-value, high-technology manufacturing and in provision of high-class financial and other services (the International Business Hub 2000 programme). Such policies seem to lead to the emergence of the 'virtual state', on the lines of the 'virtual organisation', which contracts out all its activities including production expect the core functions which give it some minimal identity. What happens to the identity of a 'virtual state'? Whatever happens to national identity, it has the potential to become very rich.

Meanwhile the real GDP of Singapore increased by about 10% in 1994, a similar rate to 1993. The balance of payments is in surplus year after year. Population (1994): 2.8 million, growth rate 2%. Population literacy 92%. Inflation 3.6% (surprisingly high, perhaps pushed by wages, but in any case affordable, and Asiaweek for 15 March 1996 gives an inflation rate of 0.9%); unemployment 2.6% (again surprisingly high given the acute labour shortage but depending on its nature it might be the minimum which allows some flexibility in the labour market).

Manufacturing establishments 4,130; output S$99,980 million; workers employed 422,500; value added S$31,911 million. Investment commitments in manufacturing S$5,764.7 million, of which S$1,437.2 million local. (1994 figures, source EDB). GDP per head in purchasing-power-parity dollars: $21,493. (Cf. Germany $20,165, Hong Kong $23,080, United Kingdom $18,138, Philippines $2,800, China $2,660, India $1,280).

(Source Asiaweek, 15 March 1996 "compiled from latest available data").

2. EDUCATION AND TRAINING

The Singapore education and training system is shown in the chart (Figure 1), produced by the Institute of Technical Education. Further details of the technical education system are in the following section of this report on the ITE. Additional points to note concerning the general system :

* Education is not compulsory by law in Singapore, but is virtually compulsory through social pressure. Secondary education is available for all primary leavers and the government encourages a minimum leaving age of 16. Those who leave earlier are designated "Early School Leavers".

* Streaming begins in primary school: the type of secondary school attended depends on performance in primary schools. At the end of secondary school pupils take O-level or N-level exams. (N = normal.)

* Education is in English. All school pupils must study another language, Mandarin (in the case of the majority of Chinese origin, even if they speak a dialect at home), Malay or Tamil. At "Secondary Special" schools two languages are studied to mother-tongue standard.

* Boys must and girls may have some technical training in secondary school.

* Some 1994 figures:

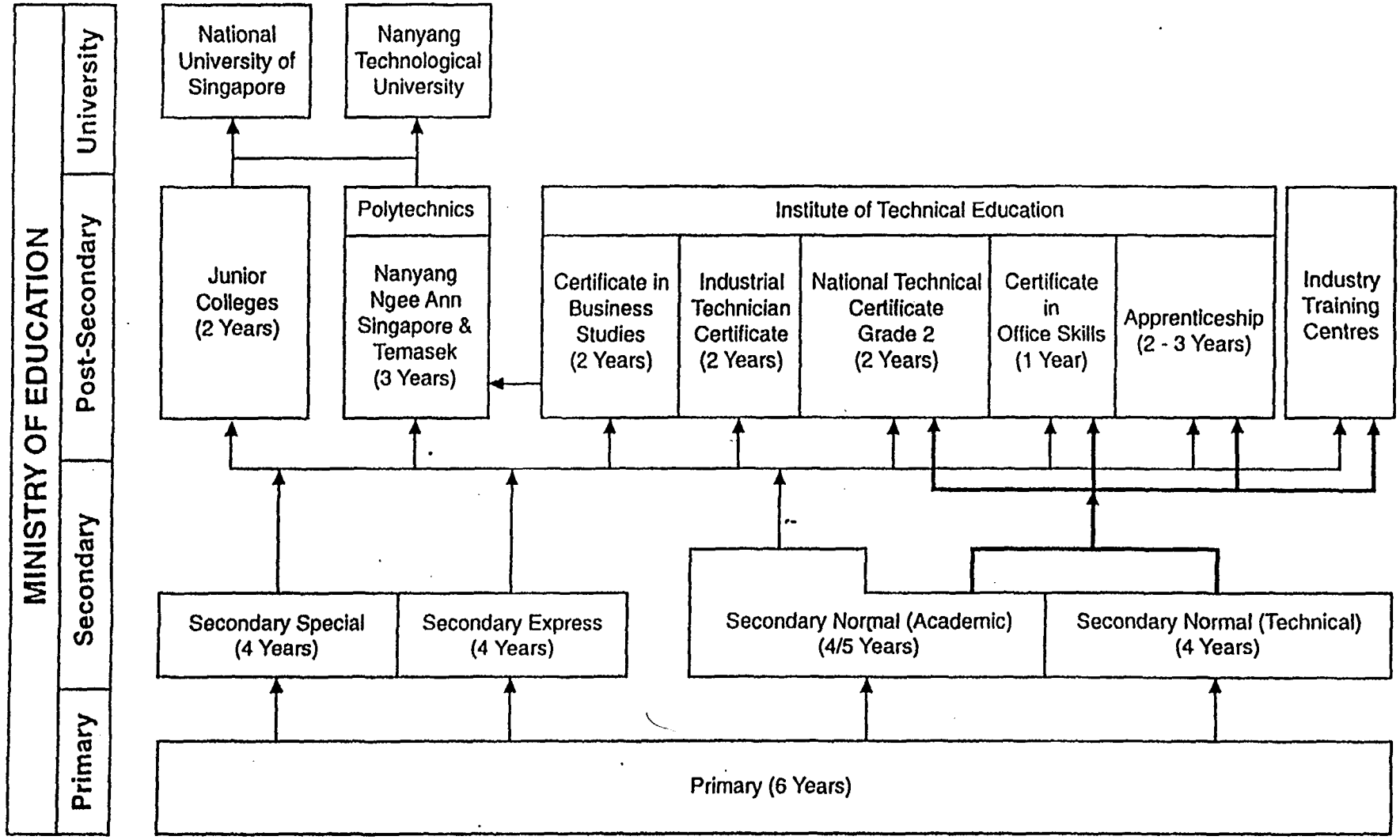
Population	2.8 million
Total student enrolment	541,000
Enrolment in technical & vocational institutes	24,954
Enrolment in tertiary institutions	73,506

(Source: Economic Survey of Singapore 1994, quoted by EDB in "Singapore Update 1995")

* Education is not completely free of charge to users. Parents, or students themselves in higher courses, have to make small contributions to fees. There are various support funds to help needy families or students so that in effect nobody need forego education or training for direct financial reasons.

* The small size of Singapore makes residential facilities unnecessary, except of course for orphans and otherwise deprived children.

Education and Training in Singapore



3. ECONOMIC DEVELOPMENT BOARD

The EDB is an organ of the Ministry of Trade and Industry. (Other organs of the MTI include the Trade Development Board, the National Productivity Board, the Science and Technology Board and the Tourism Board.) The EDB was founded in 1961 after a Dutch consultant had recommended an industrial future for the island, and is responsible for attracting foreign investment in manufacturing and related services. One of the factors which attract investment is a supply of well educated and trained manpower and it is one of EDB's functions to assure such a supply.

In the early years Singapore was a cheap production base for electronics, mostly American. Public investment was concentrated on housing and education. Full employment was achieved in the 1970s and there was a shift to attracting capital intensive industry. This shift brought with it a need for more highly qualified workers and, as a contribution to provision of such workers, the EDB set up three training centres in 1982, namely the French-Singapore Institute, the German-Singapore Institute and the Japan-Singapore Institute with the assistance of the respective governments. The three institutes offered technician-level training with a high practical content and an industrial environment, e.g. with a 44-hour week and with real-life production, contracted by local industries in the later stages of courses. At least in the case of the German institute practically all technical assistance was discontinued in 1987.

The education and training at these Institutes tended to converge with those at the newly developing Polytechnics (under the Ministry of Education) and they were accordingly transferred to Nanyang Polytechnic in February 1993. They still survive under their own names and have residual connections with their sponsoring countries, but effectively they operate as normal teaching departments.

The EDB is now operating five programmes:

Manufacturing 2000
International Business Hub 2000
Regionalisation 2000
Promising Local Enterprises 2000
Co-investment

and an internal development initiative called "Organisation Development-Learning Organisation".

The M2000 programme "will seek to upgrade capabilities across the entire value chain of each cluster, including product and process development, production, manufacturing engineering and strategic marketing." Amongst other activities "an innovation development programme was formulated" ... "a S$1 billion Cluster Development Fund [was set up] for risk sharing projects" ... "tax incentives, financial assistance schemes, industrial land

planning and foreign worker policies were fine tuned" ... "national research institutes and centres ... will train R&D manpower for industry, develop pre-competitive technologies, provide R&D infrastructural support and transfer technology to industry" (Source: EDB Yearbook 1995).

The EDB promotes and finances advanced training, often in partnership with firms, although it no longer delivers any training itself. Training grants are available for training foreign employees, even for training outside Singapore. Formal CBA is not undertaken. "Singapore is aggressively building up its capabilities to meet the anticipated need for specialised manpower in the electronics sector. To achieve this end, manpower development initiatives such as the Radio Frequency Development Engineers' programme and specialised courses on process technologies for semiconductor wafer fabrication and disk media are currently being implemented. The electronics industry has also been sending its engineers and technicians for overseas training in research and development and new manufacturing process technologies. EDB's INTECH (Initiatives in New Technology) scheme supported the training of more than 750 engineers and technicians from the electronics industry [in 1995], and increase of more than 70% from 1994." (Straits Times, 4 March 1996).

On 6 March 1996 the Straits Times published the second of two supplements entitled "Scholars' Choice", giving prominence to EDB programmes. "Investment commitments of S$1.1 billion in the services sector in 1995 will create some 6,000 jobs. In addition about 4000 professionals and technical staff will be needed in the manufacturing sector over the next three years. These job opportunities are the result of targeted growth of the manufacturing sector of 7% per annum between now and 2000, as well as the expansion of the services sector and the telecommunications, broadcasting and logistics industries. Hence the importance of manpower planning... Said Mr Goh Eng Ghee, deputy director of the EDB's Manpower and Capability Development Division, 'We are trying to create more awareness of the growth in the manufacturing and services sectors, what good paying jobs there are ...'. To spread this message, the Manpower Division organises factory visits for career guidance counsellors of schools and higher institutions and holds seminars for junior college students.

"There are notable manpower shortfalls in the strategic sectors ... The EDB's Manpower Division is employing two strategies, namely capability development and manpower augmentation ... The Board will work closely with industry and institutions to identify and enhance the core skills ... 'We don't just look at total manpower needs but the mix of demand and the mix of supply to see how the two match,' said Mr Goh. In the second strategy the EDB leads companies on overseas missions to recruit professionals and skilled manpower...

"Other EDB-implemented schemes include the specialist manpower development programmes to meet the short- to medium-term manpower needs ... The programme for wafer fabrication, disk media and integrated circuit packaging will train - with the cooperation of participating companies - 330 graduates each year at the degree level and 4520 graduates per year at the diploma level over the next three years."

"The EDB has various scholarship programmes ... The newest is the S$15 million EDB-PLE (Promising Local Enterprise) programme, under which 100 scholarships will be jointly awarded by EDB and participating enterprises over five years." 60% of the funds will be provided by the EDB and the balance by the PLEs themselves. "Another S$50 million Glaxo Wellcome-EDB HRD Scholarship programme trains scholars in engineering, economics and science disciplines." This is entirely financed by Glaxo Wellcome."

The "Promising Local Enterprises" programme, PLE2000, has a target to nurture 100 local enterprises each to have sales of S$100 million within ten years. At present they are mostly sub-contractors. There are altogether some 50 schemes of assistance to local companies, including grants or loans for various purposes. However small companies, as in many other countries, have to be encouraged to adopt training and learning policies; this is more the function of the National Productivity Board.

It should be noted that the EDB does not concern itself with "lower-level" industrial skill training such as is still needed in the construction industry and the shipyards. Nor does it concern itself with management training. This is held to be the responsibility of firms, in accordance with their own corporate culture and practice. Most industrial employment in Singapore is in fact in foreign companies: there are very few big local companies.

It does not worry Singapore if companies move operations offshore in search of lower labour costs, at least to the extent that it is lower-level skills which are moved. Investment in labour-intensive industries is not encouraged. In fact the EDB's Regionalisation 2000 programme aims to encourage Singapore-based companies to establish operations in "resource-rich" countries, sometimes within industrial parks which offer familiar conditions established by intergovernmental agreement. Singapore sees itself as a "business architect", ... "will capitalise on its core competencies and act as a global business and knowledge arbitrageur." Singapore investments in the Philippines are listed as US$52 million in five projects in 1994, up from US$39 million in 10 projects in 1993; but these are by far exceeded by investments in other countries:

(1994)	China	US$1,974	712	projects (to June 1994)
	Indonesia	1,470	81	(Sept 94, cumulative)
	Thailand	368	41	
	Malaysia	275	119	
	Vietnam	597	29	(Nov 94)
	Myanmar	272	20	

The EDB's staff numbers just over 300. They aim to attract and retain professional staff of the highest calibre. The Industry Development Division[12] has nine groups each of which maintains the closest contact with firms, Chambers of Commerce and training institutions

[12] There is also an Economic Resource Development Division, a recently adopted name for the former Manpower and Capability Division. However the organisation is set out in a circular form and it is stated that "the EDB adopts a borderless mindset and recognises that the success of all our programmes depend on the people in the whole organisation - members who work as a cohesive, totally aligned team without divisional borders and practising systems thinking." (EDB Yearbook 1995, page 13)

in Singapore. Networking is given high importance and is facilitated. (Chemicals, Electronics Systems, Electronic Components, Light Industries, Aerospace/Defence, Manufacturing Systems, Engineering Systems, Biotechnology, Lands and Infrastructure.)

The EDB keeps informed on technological developments and investment plans elsewhere through 16 offices in other countries and country desk officers in Singapore.

The cumulative picture is of significant, high-quality state involvement in manpower development and of close cooperation with a willing private industrial sector. This cooperation is undoubtedly assisted by the fact that EDB's budget is S$4.3 billion for 1996/97.

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4. INSTITUTE OF TECHNICAL EDUCATION

The ITE was established on 1st April 1992 by the Institute of Technical Education Act (C.141A). The ITE replaced the Vocational and Industrial Training Board in the context of wider educational reform. In particular the ITE no longer offers post-primary vocational training. Although there is no compulsory school-leaving age in Singapore it is now normal practice to stay at school at least until the age of 16, and the ITE only offers post-16 TVET.

The ITE's mission statement is:

> *To maximise the human potential of Singaporeans through excellence in technical education and training so as to develop the quality of our workforce and enhance Singapore's global competitiveness.*

The ITE Act provides for quite detailed control by the Minister of Education. Section 14 (1): "The Minister may, after consultation with the Board, give such general directions not inconsistent with the provisions of this Act as to the policy to be followed by the Institute in the performance of its functions under this Act as appear to the Minister to be necessary and the Institute shall, as soon as practicable, give effect to any such direction."

The Minister holds the main purse-strings: Section 27: "For the purpose of enabling the Institute to carry out its functions under this Act, the Minister may, from time to time, make grants-in-aid to the Institute out of moneys to be provided by Parliament." Section 28: "The Institute may, from time to time, for the purposes of this Act, raise loans from the Government or, with the consent of the Minister, from any source."

The ITE does on the other hand have some fund-raising powers under Section 6 (Powers). "The Institute may ... (e) carry on any trade or business... for the purpose of providing training ... (i) levy and collect such fees, rates or charges for training and other services ... (j) solicit and receive donations from any source or raise funds by any lawful means."

Moreover there is only one Ministry of Education representative on the Board of Governors. This board comprises a chairman and deputy chairman both from private-sector firms and 15 members of whom seven are from private-sector industrial and commercial firms. Six of the others are from the public sector (one each from the Ministry of Education, the Ministry of Defence, the Economic Development Board, the Housing and Development Board, the National Productivity Board, together with the Director of the ITE itself); and two from trade unions (the National Trades Union Congress and the United Workers of Electronics and Electrical Industries).

Total expenditure incurred by the ITE in the year to the end of March 1995 was S$116.5 million, up 6.5% from the previous year. Manpower costs accounted for S$100.3 million. At the end of March 1995 the ITE had 1,270 training staff and 631 non-training staff, a total of 1,901 against an establishment of 2,044. Under the Director there are three Deputy Directors and ten Divisional Directors. The Institute operates eleven training institutions headed by Training Managers all of whom report to the Divisional Director of Institutional Training. Full-time enrolment (new) in the year to end of March 1995 was 6,266, a 7% decline from the previous year. The peak full-time total enrolment in the year was 12,231, down 17% from the previous year, and 9% below the target of 13,400. Output was 6,752, down 1%. (According to the Annual Report 94/95 the ITE's mandate is to enrol 10,000 students a year. Where this "mandate" come from is not stated.)

The ITE also runs Continuing Education and Training (under another Divisional Director) and controls the New Apprenticeship Scheme described below. It should be recalled that the total population of Singapore is just under three million and in such a context the size and organisation of the ITE might be thought heavy and bureaucratic. On the other hand it might reflect the very high importance attached to HRD in Singapore and a structure preferred within the basically Chinese cultural context.

The ITE offer 25 mostly two-year courses in eight "trade clusters" leading to the Industrial Technician Certificate, the National Technical Certificate Grade 2 (NTC-2), the Certificate in Business Studies and the Certificate in Office Skills. NTC-2 courses have common first-year syllabuses within clusters, and all courses reinforce "key competences". (Not identified in detail.) As part of the transition from the former VITB programme the number of courses has been reduced from 40 and full-time courses leading to the lower level Certificate of Vocational Training and NTC-3 have been discontinued (although NTC-3 is still available through apprenticeships or continuing education and training schemes).

Courses are almost entirely funded by the Ministry of Education through the ITE. The average cost was S$7,530 in the year to March 1995. Students pay fees of S$512 a year for the ITC courses and S$260 a year for NTC-2 courses. The ITE professes a concept of "total training". This is not only a question of balancing theoretical and practical elements but incorporates "physical fitness, positive work values and social responsibility in an integrated approach to developing the future Singapore worker". (Annual Report 94/95, p. 36)

Progression to polytechnics or universities is formally controlled by the Ministry and partly depends on whether a Certificate of Merit is obtained. It is advertised in promotional

literature, evidently as an enticement to potential students, but of course if students do proceed from ITE courses to the tertiary system they are lost to employers as (much needed) technicians. This mirrors the trend in Germany which (amongst other factors) is playing havoc with the dual system.

Apprenticeship. The New Apprenticeship System was launched in 1990 and is well controlled by the ITE. Apprenticeships are on offer in 60 programmes in 18 trade areas (including services and commerce) and lead to NTC-2, NTC-3, various specialised certificates (e.g. in health care or travel services) and in one case to a Certificate of Competence (a one-year course in motorcycle mechanics which only requires three years' primary education for entry, very much the exception. See next paragraph). Durations vary from one to three years. Apprentices sign contracts with training employers, who in addition to the usual obligation to train the apprentices and to release them for off-the-job training, pay them a relatively small salary and training costs. Some 600 companies take on apprentices. 1,335 apprentices were taken on in the year to March 1995, 14% down from the previous year and 21% below target. Total enrolment was 2,172, down 14% from the previous year and 13% below target. Output was 1,350, down 3% from the previous year and 10% below target.

Reasons given for the decline in numbers of pre-employment training for school leavers are: reduction in the pool of GCE O-level leavers, increased opportunities at the polytechnics and private schools, and a tight labour market attracting school leavers into direct employment.

Early School Leavers (ESLs). Even under the "Improved Education System" some young people leave school before completing ten years. Vocational training centres are being set up to cater for these both through full-time courses and apprenticeships. The first intake of about 860 ESLs started in January 1995 in an NGO centre and 2 temporary VTCs on ITE campuses. These two have now been replaced by permanent centres with 1,350 full-time training places and 500 apprenticeship placements annually. These appear to be quite high figures given the social and governmental pressure for high educational attainment and the stated shortage of labour. VTCs are after all something of a refuge for the otherwise unemployable in labour-surplus countries. On the other hand it may be that even those who cannot cope with school realise the need for some kind of training.

Continuing Education and Training (CET). This covers academic education and skills training and is beset by acronyms. BEST and WISE provide the academic reinforcement, while MOST, TIME and ACTS are for skill upgrading. There is also a Continuing Education programme for working adults. (Participant numbers for the year to March 1995.)

BEST: Basic Education for Skill Training

Intake of 16,832, bringing total in 12 years to 192,000 or 85% of the target. Demand expect to decline.

WISE: Worker Improvement through Secondary Education
Intake 16,316, bringing total to 63,000 or 52% of the target pool

Continuing Education: Intake 11,822, 17% down from the previous year and 21% below target. Progressive decline resulting from improving school performance

MOST: Modular Skill Training

TIME: Training Initiative for Mature Employees

ACTS: Adult Cooperative Training Scheme: 15,370 training places taken up in these three schemes, 20% down from the previous year and 21% below target.

Industry-based Training (IBT). "Under the IBT system, companies, or in some cases industry associations, which have the resources and expertise to mount specially-tailored skills training programmes for their workers, are actively encouraged to do so. Employers gain from such arrangements because it gives them control and flexibility over the design and schedule of training programmes for their staff. Workers, on the other hand, benefit from receiving skills training that are [sic] directly applicable to their job functions and future development and progression in their respective companies. The training centres that companies set up for IBT can, if they meet ITE's requirements for Approved Training Centres, serve the additional function of providing the OJT component of apprenticeship training for their potential workers." (Annual Report 94/95 p.44). The nature of the "active encouragement" is not explained, nor are the criteria for Approved Training Centres. In the year to March 1995 899 training places were provided, 45% lower than in the previous year and 25% below target. Primary cause for decline: discontinuation of NTC programmes by the Singapore Hotel Association Training and Educational Centre.

Certified On-the-Job Training. This scheme was started in 1994 with 14 participating companies. By March 1995 the number was up to 126 companies, who offered 15,700 training places for some 8,000 workers. The ITE encourages companies to upgrade their on-the-job training and will give them advice on how to do so. The training is structured within a training plan, and once the plan and the trainer(s), together with the training infrastructure, are approved the company can be certified. There was said to be no tangible advantage for employers except that workers can be better trained on their own premises. The National Productivity Board collaborates with this scheme and employers may recoup costs from the Skill Development Fund operated by the NPB. An Industry Trainer Certificate course is jointly run by ITE and NPB. In the year to March 1995 593 trainers completed at least one module and 32 completed all three modules, bringing the total number of certified industry trainers to 117.

Trade Tests. The ITE conducts trade testing. It can include validation of prior learning, i.e. it is not obligatory to attend an ITE course before taking the test. In the year to March 1995 49,516 candidates sat for ITE tests and examinations, 12% fewer than in the previous year. Overall pass rate 81%, unchanged from the previous year.

ITE 2000 Plan. This starts with a "Vision", namely "To Build ITE Into An Established

Post-Secondary Technical Institution By The Year 2000". Below this there are five goals, eight strategies and 21 programmes. The five goals are:

1. An effective training system, responsive and relevant to the needs of the economy
2. An upgraded physical environment compatible with a post-secondary technical institution
3. A campus environment which promotes and support the total development of students
4. Professionally qualified training staff committed to the needs of post-secondary students
5. An improved public image and recognition of technical training

As of June 1995 11 of the component programmes had been developed, six were under development and four were new programmes. (These categories not further elucidated.)

In pursuit of Goal 2 the Physical Development Plan will cost some S$300 million to implement. Four entirely new institutes are being built and three redeveloped on existing sites. The other three are relatively new, having been developed in the 1980s, and will be upgraded to bring them into line with the new institutes. (There is no mention in this plan of the existing Precision Engineering Institute.) In addition the ITE has built itself a new and pharaonic headquarters building at a cost of S$35 million.

"What ITE will look like in the year 2000"

* An upgraded post-secondary technical training system (with 90% secondary school leavers)

* Intakes of 40% of GCE 'O' pool and 70% of GCE 'N' pool of school leavers

* A stronger industry-based training infrastructure with 500 companies certified for on-the-job training

* A system of 10 modern institutes of technical education and a new ITE headquarters

* An improved campus environment for the total development of ITE students

* Better-trained and qualified staff to meet the needs of a post-secondary institution

* An improved image and status of ITE as a post-secondary technical institution - well-accepted by industry, parents, school leavers and community"

4: PRECISION ENGINEERING INSTITUTE, SINGAPORE

(Information from the Deputy Training Manager, supplemented by PEI brochures and some information from the Institute of Technical Education.)

PEI is under the direction of the ITE, which itself has a Board of Governors with strong industry representation, and a number of technical committees. PEI itself has an (advisory only) management committee on which employers are represented (for the most part smaller employers who know what they want). The PEI also maintains continuous contact with industrial firms.

The PEI is managed by its Training Manager under direction from ITE in accordance with Singaporean practice which does not allow much room for autonomy.

Current operational budget entails expenditure for the year of approx S$4 million, of which S$2½ million goes on staff costs. Income earned from sale of products and training services amounts to about $1 million. The balance of about S$3 million is met by the Institute of Technical Education (Ministry of Education).

Financial accounts not published and not available

Organisational chart not drawn up. The Institute is headed by the Training Manager (a professional trainer) who reports to a Divisional Director in the Institute of Technical Education. There is a Deputy Training Manager, and Administration Unit and three training departments.

Training activities:

Industrial Technician Certificate in Manufacturing Engineering
2 years
Entry - 3 O-levels, English, Maths and a relevant science subject

"At the end of the course the student should be able to:

-produce precision components using CNC machines
-use precision tools and equipment for measuring components
-prepare planning and production schedules
-design and manufacture and industrial product using a CAD/CAM system

"Some job titles held by ... graduates include:

-Engineering assistant

-Manufacturing engineering technician
-Quality control technician
-Production supervisor
-Production technician
-Tool designer"

National Technical Certificate Grade 2 (NTC-2) in

Precision Machining
Precision Tooling (Injection Mould)
Precision Tooling (Press Tool)
Tool and Die Making (General)

All 2 years
Entry "Completed" O-level or N-level (not further specified). (N-level is "Normal level", a new more technical O-level)

NTC-2 Precision machining

"At the end of the course the student should be able to:

-interpret blueprints and mark out work pieces prior to machining
-set up and operate precision machine tools to produce a variety of precision metal components which require advanced machining skills
-program, set up and operate CNC machines to produce a variety of precision metal components
-use precision measuring instruments to check measurements
-use CAD software

"Some of the job titles held by graduates include: CNC Machining (Production) Technician; CNC Machine Programmer; Precision Machining Technician"

NTC-2 Precision Tooling (Injection Mould)

"At the end of the course the student should be able to:

-interpret blueprints and mark out .. (as above)
-set up and operate precision machine tools to produce a variety of precision metal components
-set up and operate precision toolroom machines to repair or produce a variety of precision metal tools and injection moulds

-set up injection moulding machines to test moulds
-use precision measuring instruments to check instruments
-use CAD software

"Some of the job titles held by graduates include: Injection Mould Technician; Jigs and Fixtures Technician; Precision Machining Technician"

NTC-2 Precision Tooling (Press Tool)

"At the end of the course the student should be able to:

-interpret blueprints and mark out ... (as above)
-set up and operate ... (as above)
-set up and operate precision toolroom machines to repair or produce a variety of precision metalpress tools, jigs and fixtures
-set up power press to try out press tools
-use precision measuring instruments to check measurements

"Some of the job titles held by graduates include: Jigs and Fixtures Technician; Precision Machining Technician; Press Tool Technician"

-**National Technical Certificate Grade 1 (NTC-1)** in

Precision Machining Technology
Precision Tooling Technology
Precision Tooling Design

All 1 year
Entry NTC-2 in Precision Engineering + 3 yrs relevant experience
(NB: NTC-3 semi-skilled courses not offered at PEI, nor at the other ten ITE Technical Institutes. NTC-2 said to be equivalent to German Facharbeiter, and NTC-1 to German Meister in terms of skill and knowledge, but without the training skills which a Meister must have.)

For the above courses the PEI adopts the "teaching factory" concept, with a 44-hour week. No training machinery. Formal training takes up 18 months and for the last six months students work in real-life workshops making products ordered by customers (not for stock).

For graduates of ITC and NTC-2 courses various "progression paths" are set out which depend partly on whether or not a Certificate of Merit has been achieved. (This is all very well but if the graduates do progress to Polytechnics etc they are lost to industry as technicians.)

Upgrading courses of about 40 hours each:

Customisation and Programming in Autocad Module II
Programming and Operating the CNC EDM Wire-Cut
Programming and Operating the CNC EDM Die-Sinking
Programming and Operating the CNC Mill
Programming and Operating the CNC Lathe
Microcam
Measuring and Gauging
Statistical Process and Quality Control
3D Coordinate Measuring Machine

Customised courses

The PEI also has a number of "transnational partnerships" with firms which provide their own equipment and some training is carried out using this equipment. For example the last three upgrading courses listed above are run in the Mitutoyo-ITE Metrology Laboratory. According to the prospectus "the major cooperation projects within PEI include:

Siemens-Nixdorf Computer-ITE Centre for Advanced Tool and Die Making
Mitutoyo-ITE Metrology Laboratory
Bridgeport (UK)-ITE CNC Laboratory
Sodick-ITE CNC Laboratory
AutoDESK-ITE CAD/CAM Laboratory
Nissei Plastics (S) Cooperation Project
Charmilles Technologies Cooperation Project"

Number of participants not divulged in detail. Total enrolment in full-time courses is about 350, out of a capacity of 800. Mostly 16-yr-old school-leavers, less than 5% girls. A few company-sponsored trainees up to 30 yrs old. (NB Boys of 18 have to do two years' military service.) Annual NTC-1 enrolment is 20-25. About 300-400 participants a year in 40-hr upgrading and in customised courses.

Industry associations not relevant. Firms actively maintain contact and indicate technology intentions. They also readily employ PIE graduates, and use PIE courses for upgrading.

Financial data:

Capital expenditure amounts not available. Source (a) Singapore government (with technical assistance from German camera manufacturer Rollei), and (b) Singapore government. Specialised equipment provided by transnational partners as described above, but this does not form mainstream capability.

The PEI is pressed by ITE to reduce costs especially in the light of falling enrolment but is reluctant to save on staff costs, which account for the major part of expenditure. Staff are well paid, up to industry level, and high priority is given to staff upgrading. The impression is that this pressure from the ITE is something of a formality, and it contrasts with repeated assertions that government is not cost conscious regarding education and training. ITE's training philosophy, moreover, is on "total" training, i.e. with an educational element which does not directly enhance employability, and in the current labour market situation this attitude can well be afforded.

Cost effectiveness not measured. Cost per student is high (highest of all the ITE institutes) but training is reputedly of high quality. Attrition is less than 5%: at the start some students are on a kind of informal probation for three months and may be recommended to quit - but with the current shortage of applicants every effort is made to avoid this. Later on some of the brightest students are lost to Polytechnics.

As indicated above the ITE presses for cost reduction but this seems to be in absolute terms as much as in unit costs.

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5: GERMAN-SINGAPORE INSTITUTE, NANYANG POLYTECHNIC

(Information from the Joint Director and from Nanyang Polytechnic brochures, with some background from Economic Development Board. The Joint Director was not prepared to go through the "data" and "questions" methodically although they had been submitted in advance. It should be understood that the German-Singapore Institute (GSI) is now virtually integrated into the Polytechnic as the manufacturing engineering department.)

In 1982 by the Economic Development Board in collaboration with the Federal German government (together with France-Singapore Institute and Japan-Singapore Institute. The Institutes were transferred to Nanyang Polytechnic in April 1993.) In order to increase supply of manufacturing technologists towards meeting demand. Ready supply of high quality workforce (still) seen by EDB as investment incentive.

The GSI has a Management Council, of which the Principal of the Polytechnic is Chairman. Six of the 11 members appear to be German.

The School of Engineering has an Advisory Committee, the Chairman of which is Senior Vice President of Transpac Capital Pte Ltd and also a member of the Polytechnic Board of Governors. (This person, Mr Wong Lin Hong, is also a member of the Board of Governors of the Institute of Technical Education.) Of the 10 members one might be Dutch, one German and one Japanese.

The Chairman of the Board of Governors is Chairman of Schroder International Merchant Bankers Ltd. One of the 14 members is a Deputy Secretary at the Ministry of Education and she might well be very influential given that most funds come from her Ministry, but we have no information to support this inference.

The Board of Governors has a Development Committee and the Polytechnic also has a Senate chaired by the Principal and comprising senior staff members.

Current operational budget not available. The only public information (still quite useful) is that training cost per Polytechnic student is S$10,200 a year, of which the government pays a Tuition Grant of S$8,600 in respect of Singapore citizens and permanent residents and S$7,800 for others. Students pay the balance, as well as minor fees amounting to S$95.63, although various sources of support are available to them.

Financial accounts not published and not available.

Organisation not set out in chart form. GSI staff listed as follows:

Director (German)
Joint Director
General Administration Officer
Technical Adviser (German)
Manager/CIM Centre
Manager/Precision Engineering Centre
Manager/Robotics and Automation Centre and Industrial Project Group
Manager/Plastics Technology Group
Section Heads/Special Projects

CIM Centre:	3 lecturers
Precision Engineering:	4 Section Heads
	1 Development Engineer
	13 Lecturers
	14 Teaching Associates
Plastics Technology:	2 Section Heads
	4 Lecturers
Automation Technology:	3 Section Heads
	14 Lecturers
	2 Teaching Associates
Industrial Project Group:	1 Section Head
	4 Development Engineers/Lecturers

Training Support and

Related Studies:	4 Lecturers
	1 Teaching Associate
Communication Skills:	2 Lecturers

Training Activities

Diploma in Manufacturing Engineering

The main areas of focus are:

Factory Automation
Advanced Manufacturing Technology
Manufacturing Software
Plastics Manufacturing Technology

3 years for O-level holders. Must include English, Maths and relevant science subject.

2 years for A-level holders, ITC with Certificate of Merit or NTC-2 Craftsman Certificate. (For more about ITC and NTC-2 see PEI case study.)

"Opportunities for graduates: ... may work as supervisors and technical specialists in manufacturing system design and development, precision engineering, product/process design and development, manufacturing software and plastics manufacturing ... graduates with excellent academic results may be accepted into local and foreign institutions of higher learning at advanced entry levels."

The frontier between graduates of this course and university degree holders is indistinct and the Joint Director could only refer vaguely to "depth". There does seem to be more practical work in this diploma course - students actually building machines which they design. But from bought-in parts, not made by students.

The GSI "is known for its "Teaching Factory" concept which entails providing an industrial-like environment, practice-oriented training and industrial project for students to learn in a realistic setting."

Continuing Education Courses

"Topics covered include:
Laser Cutting Technology
Robotics and Factory Automation
CAD/CAM/CAE

CNC Technology
Fibre Reinforced Plastics
Computer Aided Process Planning with Computer Vision
Control Engineering"

The above comes from the GSI prospectus. The separate prospectus for the Professional Development Centre lists 37 courses under the heading "Engineering (Manufacturing)" with durations between 18 and 45 hours.

The GSI has over 20 "technology partners" who provide machinery for use by students. Cooperating firms with facilities in Singapore also provide OJT places and experts. Not all of these are German. Six are identifiably Japanese.

Total enrolment in School of Engineering 3,652 in November 1995. Number of participants in Dip. Mfg. Eng. courses 1068 in July 1994, of whom 428 in first year. (No information on 2-yr and 3-yr enrolment.) 310 students graduated from the 3-yr diploma programme in 1994. In 1995 227 graduated (not stated whether from 2-yr or 3-yr course). (Decline not explained.) It was stated that the GSI has no difficulty in recruiting for all available places. Girls account for about 24% of the engineering students in Polytechnics, compared with 17% five years ago; not known whether GSI ratio is in line.

Amounts of capital expenditure not available. Sources (a) government and (b) government. (German technical assistance up to 1987.)

No outstanding proposals for capital expenditure. When it is required an ad hoc request is submitted to the Ministry of Education.

No corporate plan.

No statistical data available. It is stated that the output of the GSI is more than readily absorbed by industry and that this situation is not expected to change unless there are major changes in the external political or economic environment.

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ANNEX 5: NATIONAL ESTABLISHMENTS SURVEY (SELECTED QUESTIONS)

page 2

ITEM 1. OWNERSHIP - Q1A

A. Indicate ownership *(Please check only one box)*

☐ individual or family ☐ limited company

☐ subsidiary of conglomerate ☐ subsidiary of integrated group

B. PERCENTAGE OF FOREIGN EQUITY - Q1B

C. YEAR STARTED OPERATION - Q1C

ITEM 2. PRODUCTS AND TOTAL SALES

A. Indicate four (4) main product group and total sales. (Proportional value is accepted).

PRODUCTS	TOTAL SALES
Q2PA	Q2PASALE in thousand pesos
Q2PB	Q2PBSALE in thousand pesos
Q2BC	Q2PCSALE in thousand pesos
Q2PD	Q2PBSALE in thousand pesos

B. Indicate approximate total value of sales of the firm for the following years:
(all values in thousand pesos)

1994 _Q1994_____ 1993 _Q1993_____

1992 _Q1992_____ 1991 _Q1991_____

1990 _Q1990_____

C. Indicate proportion of sales being exported. (Percentage value is acceptable).
_Q2C_____

ITEM 3. MAIN CUSTOMERS

Please check at least two boxes:

☐ individuals - Q3A ☐ wholesalers - Q3B ☐ export buyers - Q3C

☐ companies or parent companies wholesalers - Q3D ☐ retailers - Q3E ☐ other manufacturers - Q3F

ITEM 4. EMPLOYMENT

A. Fill-up the following tables:

TYPE OF WORKER	TOTAL HIRED AT PRESENT	TOTAL HIRED IN 1994	EMPLOYMENT IN RECENT YEARS (UP, DOWN OR STATIC)	POSITIONS DIFFICULT TO FILL
PRACTICING ENGINEERS	Q4APRSN	Q4AH94	Q4ATRND	Q4ADIFF
TECHNICIANS	Q4BPRSN	Q4BH94	Q4BTRND	Q4BDIFF
SKILLED PRODUCTION WORKERS	Q4CPRSN	Q4CH94	Q4CTRND	Q4CDIFF
SKILLED NON-PRODUCTION WORKERS	Q4DPRSN	Q4DH94	Q4DTRND	Q4DDIFF
UNSKILLED WORKERS	Q4EPRSN	Q4EH94	Q4ETRND	Q4EDIFF
TOTAL	Q4FPRSN	Q4FH94	Q4FTRND	Q4FDIFF

B. Where do you mainly hire your workers? - Q4B

Please check one box:

1☐ within the municipality 3 ☐outside the province

2☐ outside the municipality, within the province

Continuation

ITEM 5. TRAINING POLICIES AND PRACTICES

A. From which training institutions would you prefer to recruit your workforce:

Q5A1 ☐ TESDA training centres Q5A4 ☐ Don Bosco

Q5A2 ☐ Meralco Q5A5 ☐ SATs (School of Arts and Trades

Q5A3 ☐ TEIs (Technical Education Institutes) Q5A6 ☐ SUCs (State Univ Colleges)

B. Does your firm provide systematic training (other than routine on-the-job training) to your employees ☐ yes ☐ no

(Q5B)

C. TECHNICAL TRAINING PROFILE

TYPE OF WORKER	NUMBER TRAINED LAST YEAR	% TRAINED IN-HOUSE	% TRAINED AT GOV'T VOC INSTI-TUTES	% TRAINED AT PRIV VOC INSTI-TUTES	% TRAINED AT FOREIGN TRAINING CENTRES	% TRAINED BY BUYERS
PRACTICING ENGINEERS	Q5C11	Q5C12	Q5C13	Q5C14	Q5C15	Q5C16
TECHNICIANS AND SUPERVISORS	Q5C21	Q5C22	Q5C23	Q5C24	Q5C25	Q5C26
SKILLED PRODUCTION WORKERS	Q5C31	Q5C32	Q5C33	Q5C34	Q5C35	Q5C36
SKILLED NON-PRODUCTION WORKERS	Q5C41	Q5C42	Q5C43	Q5C44	Q5C45	Q5C46
UN-SKILLED WORKERS	Q5C51	Q5C52	Q5C53	Q5C54	Q5C55	Q5C56
TOTAL	Q5C61	Q5C62	Q5C63	Q5C64	Q5C65	Q5C66

D. Indicate average number of hours of training per year per staff grade - Q5D

_____

E. Do you have an in-house HRD unit - Q5E ☐ **yes** ☐ **no** *(go to G)*

F. Does this unit have an HRD plan - Q5F ☐ **yes** ☐ **no**

G. Does this firm have a formal HRD or training budget - Q5G ☐ **yes** ☐ **no**

If yes, what proportion is it of your total payroll Q5GVAL (in thousand pesos)

H. Indicate the position of the person responsible for training from day to day - Q5H

_____

Is this a full-time responsibility - Q5HFULL ☐ **yes** ☐ **no**

I. Do you employ (other) full-time trainers - Q5I ☐ **yes** ☐ **no**

If yes, how many Q5IYES

average monthly salary Q5ISAL (in thousand pesos)

J. Does your firm run its own training centre - Q5J

☐ **yes** ☐ **no** (skip to O)

K. Indicate the number of working staff (full-time and part-time) in the centre - Q5K

Continuation

L. Give an estimate of the approximate annual costs of providing the training centre
Q5L (in thousand pesos)

Does that include personnel costs - Q5LPER ☐ **yes** ☐ **no**

If not, how many employees are involved for most of their work in organizing and delivering employee training - Q5LNUM

M. What are the main areas of expenditure in the centre - Q5M

1 ☐ Equipment 3 ☐ Materials

2 ☐ Staff 4 ☐ Others

N. Do they vary very much from year to year - Q5N ☐ **yes** ☐ **no**

O. Do you have the facilities and equipment for off-the-job training - Q5O

☐ **yes** ☐ **no**

In what fields Q5OFLDS

P. About how many staff are involved full-time and part-time in supporting on-the-job training?
(give estimated number of full-time equivalent staff) Q5P

Q. What grades are they in the firm
(give estimate monthly salary of that grade) *Q5Q (in thousand pesos)*

ITEM 6. GENERAL QUESTIONS FOR ALL FIRMS

A. Do you commission outside institutions to train your employees either singly or in groups? Q6A

☐ **yes** ☐ **no**

.....if yes, in what fields, and what type of institution ? Q6AYES

B. How much do you spend on external training courses for your employees
(give average annual expenditure) **Q6B** (in thousand pesos)

C. Do you provide any of the following to private training institutions?

Q6C1☐ financial assistance (*give amount if possible)* Q6C1VAL

Q6C2☐ equipment (*give estimated value if possible*) Q6C2VAL

Q6C3☐ assistance with teaching (by providing trainers, etc.).

ITEM 7. TECHNOLOGICAL CHANGE

A. FOR THE ENGINEERING (AGRICULTURAL MACHINERY, TOOL AND DIES, AUTOMOTIVES)

1. Does your firm use any of the following types of technology *(Please check)*

Q7A11 ① General purpose machine tools Q7A15 ⑤ Copy lathes

Q7A12 ② Copy milling machines Q7A16 ⑥ EDMs

Q7A13 ③ NC/CNC machine tools Q7A17 ⑦ Wire cut EDMs

Q7A14 ④ CAD / CAM systems Q7A18 8 Robotics

2. Does your firm plan to introduce any of the above technologies in the next two years? Q7A2

☐ **yes** ☐ **no**

3. If yes, which of the number/s from the above lists? Q7A3YES

Continuation

B. FOR THE ELECTRONICS INDUSTRY

For the Semiconductor Firms:

1. Does your firm undertake any of the following activities? *(Please check)*

☐ 1	Testing Q7B11	☐ 3	Back-end wafer probe Q7B13
☐ 2	Mask or circuit design Q7B12	☐ 4	Wafer fabrication Q7B14

2. Does your firm plan to undertake any of the above activities in the next two years ? Q7B2

☐ **yes** ☐ **no**

3. If yes, which of the number/s from the above lists? Q7B2YES

For the Electronics Firms

1. Does your firm use any of the following types of machinery? *(Please check)*

① NC/CNC machines Q7BX11 ② CAD/CAM systems Q7BX12

2. Does your firm plan to introduce any of the above technologies in the next two years Q7BX2

☐ **yes** ☐ **no**

3. If yes, which of the number/s from the above lists? Q7BX3

C. FOR THE GARMENTS INDUSTRY

1. Does your firm use any of the following types of technology? *(Please check)*

Q7C11 ① Computer-aided grading and marker making
Q7C12 ② Computerized cutting
Q7C13 ③ Operator programmable sewing machines
Q7C14 ④ Computerized embroidery

2. Does your firm plan to introduce any of the above technologies in the next two years? Q7C2

☐ **yes** ☐ **no**

3. If yes,which of the number/s from the above lists? Q7C3

4. For what type of market do you mainly produce Q7C4

☐ quota ☐ non-quota

D. FOR FIRMS IN ALL INDUSTRIES

1. Have you increased the degree of automation in your plan/s in the past 5 years? Q7D1

☐ **yes** ☐ **no**

2. Does your firm use flexible manufacturing systems (FMS) Q7D2

☐ **yes** ☐ **no**

3. Have you introduced new products in past 5 years Q7D3

☐ **yes** ☐ **no**

4. If yes, please specify 2 main products introduced.

_____Q7D41_____ _____Q7D42_____

5. Have you made any changes to existing products in the past 5 years Q7D5

☐ **yes** ☐ **no**

6. If yes, please specify 2 main changes

_____Q7D61_____ _____Q7D62_____

Continuation

7. If you have introduced new production technology or new products in recent years, have you had to provide any new training to your employees or to hire any new employees for this purpose? Q7D7

☐ **yes** ☐ **no** *(skip to 9)*

8. If yes, please indicate type of employee and method of training given in the table below

TYPE OF EMPLOYEE *(Please check)*	**METHOD** 1. Hiring new employees 2. In-house training for existing employees 3. Training at government training centers 4. Training at private training centers 5. Training at equipment suppliers 6. Training by buyers
	1 2 3 4 5 6
Practicing Engineers	Q7D811 Q7D812 Q7D813 Q7D814 Q7D815 Q7D16
Technicians and Supervisors	Q7D821 Q7D822 Q7D823 Q7D824 Q7D825 Q7D826
Skilled Production and Maintenance Workers	Q7D831 Q7D832 Q7D833 Q7D834 Q7D835 Q7D836
Skilled Non-Production Workers	Q7D841 Q7D842 Q7D843 Q7D844 Q7D845 Q7D846
Unskilled Workers	Q7D851 Q7D852 Q7D853 Q7D844 Q7D855 Q7D856

9. Does your firm train apprentices under formal apprentice scheme? Q7D9

☐ **yes** ☐ **no**

10. If yes, how many have you taken on in the last 12 months? Q7D10

11. In what fields ? Q7D11

12. Do you take on informal apprentices or learners ? Q7D12

☐ **yes** ☐ **no**

13. If yes, how many have you taken on in the last 12 months? Q7D13

14. In what fields? Q7D14

15. Do you send them off-the-job education or training at a local institution Q7D15

☐ **yes** ☐ **no**

16. How much is the firm estimated cost of formal and/or informal apprenticeships each year? Q7D16 (in thousand pesos)

17. What are the main costs? Q7D17

18. How many staff are involved in supporting and supervising apprentices? Q7D18

19. How much time is allocated for employees to support and supervise apprentices? Q7D19

20. Does your firm accept students for work experience or on-the-job practical training? Q7D20

☐ **yes** ☐ **no**

21. If so, in what fields? Q7D21

22. Does your firm participate in management or curriculum design at local technical colleges or training institutions in any of the following ways? Q7D22

☐ Directly ☐ Indirectly (Through membership of college boards, etc.

23. Do you participate in the TESDA (NMYC) Training Contract Scheme? Q7D23

☐ **yes** ☐ **no**

24. Do you know of the following tax incentive schemes available from the government for training?

Q7D241 ☐ Productivity Incentive Scheme Q7D243 ☐ Apprenticeship Scheme

Q7D242 ☐ Dual Training Scheme

Continuation

25. Do you claim rebates under any of these incentive schemes? Q7D25

☐ **yes** ☐ **no**

26. Which aspects of your training activities are you most satisfied and least satisfied with ?

Most : (*give two aspects*) _____Q7D26M1_____ _____Q7D26M2_____

Least: (*give two aspects*) _____Q7D26L1_____ _____Q7D26L2_____

27. This project is examining ways in which the government and the private sector might work together to improve the supply of skilled labor? Look at the listed activities (CHECKLIST) and check the 3 areas where:

a) you think the government is most likely to intervene
b) government intervention would be most useful to you
c) your firm would be most likely to contribute towards the costs
d) your industry association would be most anxious to contribute.

	a	b	c	d
1. Reinforcement of labour market information system.	Q7D 271A	Q7D 271B	Q7D 271C	Q7D 271D
2. Provision of information to young people.	Q7D 272A	Q7D 272B	Q7D 272C	Q7D 272D
3. Guidance to education and training institutions.	Q7D 273A	Q7D 273B	Q7D 273C	Q7D 273D
4. Priority to improvement of general education.	Q7D 274A	Q7D 274B	Q7D 274C	Q7D 274D
5. Delivery of skill training at government training institutions in response to skill shortages	Q7D 275A	Q7D 275B	Q7D 275C	Q7D 275D
6. Establishment of training center specifically for your industry sector	Q7D 276A	Q7D 276B	Q7D 276C	Q7D 276D
7. Identification of "critical skills" likely to be in demand and provision of training accordingly	Q7D 277A	Q7D 277B	Q7D 277C	Q7D 277D
8. General financial support to training financed through taxation.	Q7D 278A	Q7D 278B	Q7D 278C	Q7D 278D
9. Levy-grant system to encourage training and to spread the costs fairly.	Q7D 279A	Q7D 279B	Q7D 279C	Q7D 279D
10. Tax incentives and rebates to firms to encourage investment in training	Q7D2 710A	Q7D27 10B	Q7D27 10C	Q7D27 10D
11. Tax rebates to employees to encourage them to train.	Q7D2 711A	Q7D27 11B	Q7D27 11C	Q7D27 11D
12. Others (*please specify*)	Q7D2 712A	Q7D27 12B	Q7D27 12C	Q7D27 12D

Continuation

28. Looking at the following list of activities by technical education and training (CHECKLIST)... indicate the 3 priority areas, (ranked according to importance) for action by:

a) private institutions
b) government technical education institutions
c) government trade schools and training centres
d) universities and state colleges.

	a	b	c	d
1. Upgrade curriculum to meet industry needs.	Q7D 281A	Q7D 281B	Q7D 281C	Q7D 281D
2. Give more emphasis to positive trainees attitudes and work discipline.	Q7D 282A	Q7D 282B	Q7D 282C	Q7D 282D
3. Involve industry more in planning courses.	Q7D 283A	Q7D 283B	Q7D 283C	Q7D 283D
4. Involve industry more in delivering courses.	Q7D 284A	Q7D 284B	Q7D 284C	Q7D 284D
5. Prepare more short courses for specific industries	Q7D 285A	Q7D 285B	Q7D 285C	Q7D 285D
6. Supervise on-the-job training more effectively.	Q7D 286A	Q7D 286B	Q7D 286C	Q7D 286D
7. Deliver consultancy services to industry.	Q7D 287A	Q7D 287B	Q7D 287C	Q7D 287D
8. Undertake trade testing for industry.	Q7D 288A	Q7D 288B	Q7D 288C	Q7D 288D
9. Make better use of industry boards and advisory committees.	Q7D 289A	Q7D 289B	Q7D 289C	Q7D 289D
10. Give more emphasis to general education, literacy and numeracy.	Q7D 2810 A	Q7D 2810 B	Q7D 2810 C	Q7D 2810 D