ASIAN DEVELOPMENT BANK **IES: REG 99035**

IMPACT EVALUATION STUDY

OF THE

TECHNICAL AND VOCATIONAL EDUCATION PROJECTS

IN

MALAYSIA, PAKISTAN, PAPUA NEW GUINEA, AND SRI LANKA

December 1999

CURRENCY EQUIVALENTS
(as of August 1999)

Malaysia	**Pakistan**	**Papua New Guinea**	**Sri Lanka**
Ringgit (RM)	Rupee (PRe)	Kina (K)	Rupee (SLRe)
RM1.00 = $0.2660	PRe1.00 = $0.0200	K1.00 = $0.4200	SLRe1.00 = $0.0147
$ 1.00 = RM3.76	$1.00 = PRs50.00	$1.00 = K2.42	$1.00 = SLRs68.00

ABBREVIATIONS

CBO	–	community-based organization
CBT	–	competency-based training
DMC	–	developing member country
ERC	–	Equipment Repair Center (Malaysia)
FGD	–	focus group discussion
GDP	–	gross domestic product
HND	–	Higher National Diploma (Sri Lanka)
IES	–	impact evaluation study
IPSET	–	Institute for the Promotion of Science Education and Training (Pakistan)
NATSHOL	–	National Tertiary Scholarship (Papua New Guinea)
ND	–	National Diploma (Sri Lanka)
NGO	–	nongovernment organization
NISTE	–	National Institute for Science and Technical Education (Pakistan)
PETT	–	preemployment technical training (PNG)
PNG	–	Papua New Guinea
SLIATE	**–**	**Sri Lanka Institute of Advanced Technical Education (Sri Lanka)**
STR	–	student-teacher ratio
STS	–	secondary technical school (Malaysia)
SVS	–	secondary vocational school (Malaysia)
TEVT	–	technical education and vocational training
TC	–	technical college (PNG and Sri Lanka)
VTC	–	vocational training center

NOTE

In this report, “$” refers to US dollars.

Operations Evaluation Office, IE-61

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EXECUTIVE SUMMARY

The main objective of the impact evaluation study is to assess the long-term impact of the assistance provided by the Asian Development Bank (ADB) to technical education and vocational training (TEVT) in Malaysia, Pakistan, Papua New Guinea (PNG), and Sri Lanka. It looked into the projects' impact at four levels: the institutions, the graduates, the employers, and the institutional and policy environment. To have sufficient basis for assessing the projects' impacts, the study group surveyed 5,273 respondents, held 25 focus group discussions for qualitative inputs, visited 31 schools and TEVT institutions, and held consultations in each developing member country (DMC) through a national workshop. The results from the research methods used, including secondary research, were cross-checked with each other for consistency and reliability. The study fits well with the country assistance plans of each of the four DMCs, where ADB is a major player in the development of the social sector, and where social and education impacts of projects are a key concern. From the experiences of the DMCs, the study sought to derive lessons, examine issues that need to be resolved, and recommend actions that need to be taken in the design and implementation of ongoing and future projects in the subsector. The study covers seven completed and three ongoing projects.

ADB's assistance generally aimed at improving the quality, increasing the efficiency, expanding the capacity, and ensuring the relevance of the TEVT systems to produce highly trained technicians, operators, skilled workers, and craftsmen to support the DMCs' drive toward industrialization. The 10 projects had a total cost of about $976 million at appraisal, of which $408 million was to be funded by ADB. Malaysia accounted for 79 percent of total project cost and 62 percent of ADB lending. The project components included the establishment of technical teachers training colleges (TTTCs) in Pakistan and Sri Lanka and upgrading of schools in Malaysia and PNG; the establishment of new secondary technical and vocational schools in Malaysia, polytechnics in Pakistan, and the upgrading of technical colleges (TCs) in PNG and Sri Lanka; staff development; and consulting services. More than 1 million students have benefited from these projects during the past 15 years.

In general, the study found that while the projects had significant development impacts up to a few years after completion, these have not been sustained, except in Malaysia. In Pakistan, PNG, and Sri Lanka, most of the buildings of the TCs or polytechnics need repair and refurbishing. Only about half of the equipment is still operational (depending on the technology areas). Of the operational equipment, not all is fully utilized due to lack of consumable materials for practical exercises. Most of the course curricula have not been updated since project completion and are outdated. A majority of the teachers who participated in the projects' staff development programs have not had further training since then. The TTTCs in Pakistan and Sri Lanka are underutilized and operating below capacity due to lack of recurrent expenditure budget. Recently, however, those TTTCs have been reorganized by their governments and the new setup looks more promising under the new policy directions. There have been few or no industry linkages. Long-serving teachers felt that the situation was better in the 1980s than now. Employers generally concurred with this assessment. Many of them felt that public TEVT institutions have deteriorated over the past 10 years. Malaysia, on the other hand, offers a contrasting picture. With a series of five projects during the same period (1980-1998), its technical and vocational schools continue to be well-provided in terms of facilities, equipment, teachers, and consumable and other support materials compared with the country's academic schools. However, as in the other DMCs, the technical and vocational schools also have little linkage with industries.

Two common factors beset the present state of the polytechnics in Pakistan and the TCs in PNG and Sri Lanka. First, the mindset of education authorities and heads of institutions is heavily oriented toward the "safety net" role of TEVT, i.e., providing education and training opportunities to the socially, economically, and/or intellectually disadvantaged. For as long as the target clientele is provided such opportunities, it is deemed good enough regardless of quality or industry demand. Because it does not matter that they are virtually operating in isolation from industry, education and needs are mismatched. Second, the governments were unable to sustain the projects after completion. There were no significant additional capital investments in the projects after completion, and inadequate recurrent expenditure budgets have had adverse consequences for the internal and external efficiencies of the system.

The study reveals mixed operational impacts or outcomes among the DMCs:

(i) over the past 15 years, growth rates in enrollment were modest in Malaysia and Pakistan at about 7 and 5 percent, respectively, per annum, while they were minimal in Sri Lanka and even in slight decline in PNG;

(ii) the student-teacher ratio was low in PNG (6:1) and in Malaysia (9:1), but relatively high in Pakistan (19:1) and Sri Lanka (22:1);

(iii) average daily attendance was quite high at about 90 percent, except in Pakistan, where it was between 30-60 percent in Sindh and Balochistan, and 50-80 percent in Punjab and Northwest Frontier Province (in contrast to 80-90 percent among girls in women's polytechnics);

(iv) dropout rates were minimal except in Sri Lanka, where it was as high as 50 percent, especially in technology courses;

(v) pass rates were high at more than 90 percent in Malaysia and PNG, but lower in Sri Lanka and Pakistan at around 50 and 40 percent, respectively;

(vi) of those who sought employment upon course completion, about 80 percent in Malaysia and PNG got a job within six months, but only about 60 percent in Pakistan, and 50 percent in Sri Lanka;

(vii) about 68 percent of the graduates in PNG worked as technicians for their first job, 50 percent in Malaysia and Pakistan, and only about 15 percent in Sri Lanka (about 43 percent of the graduates in Sri Lanka worked as operators or skilled workers in their first jobs);

(viii) graduates of nonproject schools received higher average initial salaries than those of project schools—with average differentials of 16 percent in Malaysia, 9 percent in Sri Lanka, and 5 percent in Pakistan (no data are available for PNG);

(ix) among final-year students, more than 90 percent of those in technical, vocational, and academic schools in Malaysia intend to pursue further studies, 50 percent in PNG, 35 percent in Pakistan, and 25 percent in Sri Lanka;

(x) those who intend to seek employment upon course completion comprise 60 percent in Sri Lanka, 55 percent in Pakistan, 40 percent in PNG, and less than 1 percent in Malaysia; and

(xi) final-year students in Malaysia display high preparedness for pursuing further studies, but not for employment, self-employment, or day-to-day living; those in the other three DMCs expressed preparedness to seek employment, and to a lesser extent to pursue further studies, and all felt unprepared for self-employment or to start their own business (this reflects the basic thrust of the present curricula).

The projects contribute to the promotion of access and equity in TEVT opportunities. The profile of families of final-year students shows that most of them belong to the poorer segment of society in terms of education, occupations, and family income. In terms of women's participation, the data show an increasing share of women among the students and among teachers except in PNG. There are no significant differences between project and nonproject schools.

The study points out that the years ahead will be difficult given the ever accelerating globalization of trade in goods and services. While globalization will undoubtedly bring about certain benefits, it will also have significant costs. Specifically, it can have adverse effects on local industries if they are not prepared to compete with low-priced, high-quality imported goods and services. The Operations Evaluation Mission noted that while industry people were keenly aware of this, most education authorities and heads of TEVT institutions were not. No sense of urgency was evident. Yet the opportunity has, in fact, arrived for the schools to be truly relevant to industry. They can be a source of competitive advantage for industry.

There is an urgent need to forge a strong partnership between the TEVT institutions and industry. But this calls for consideration of a number of issues:

(i) Education authorities and heads of TEVT institutions need to make a paradigm shift from a predominantly "safety net" orientation to a "source-of-competitive-advantage" orientation, without necessarily discarding the former.

(ii) The governments particularly of Pakistan, PNG, and Sri Lanka, need to raise their level of commitment to TEVT—from policy to action. Official policy statements assuring high priority of TEVT are not enough. These need to be backed up by actual allocation of resources. If Malaysia is to be taken as the benchmark, it would mean increasing the present budgetary allocation to TEVT by about three times.

(iii) The DMCs, with the support of aid agencies, need to commit to support TEVT over the long term, given the long development cycle of the subsector. Past experience suggests that long-lasting impact cannot be attained through a single project, but only through a series of overlapping projects with consistent core objectives, carried out over a long period.

In preparing future projects, the demand for graduates should be carefully ascertained, both from the viewpoints of industry and other users, as well as of potential students. Also, in view of low and inadequate operation and maintenance budgets, the affordability of project facilities that are to be provided needs to be considered. The study recommends that ADB and other funding agencies consider the following specific investment needs of each DMC:

- **Malaysia.** Upgrade the science, mathematics, and English programs of the upper secondary academic schools in support of the country's drive to develop high-technology industries, as well as upgrading the vocational training centers to directly supply skilled workers to industry.

- **Pakistan.** Upgrade the quality of existing polytechnics, and develop short courses for skills upgrading that will strengthen linkages with industry, improve utilization of facilities, provide extra income to instructors, and enhance cost recovery.

- **Papua New Guinea.** Cooperate in the rehabilitation of the TCs and the vocational training centers, support the reforms already initiated, and establish a framework for an adequate approach to bring TEVT institutions and industry together and make TEVT a common concern. As a second major thrust, convert the curriculum into the competency-based training system to bring the TCs into the mainstream of articulation (system of equivalency) among the different delivery systems.

- **Sri Lanka.** Focus on total quality improvement of existing TCs and the conversion of the TC curriculum into competency-based training. This will soon become necessary given the country's relatively fast-growing and modernizing manufacturing sector.

I. BACKGROUND

A. Rationale

1. Since 1980, the Asian Development Bank (ADB) has approved 26 technical and vocational education projects, accounting for about 30 percent of total ADB lending to the education sector during the period. Human resource development, and within this area, technical education and vocational training (TEVT), is expected to occupy an important role in future ADB operations. Although assistance for TEVT has always been undertaken in support of the national development plans of ADB's developing member countries (DMCs), the desired results have not always been achieved. This impact evaluation study investigates the underlying reasons for the differences in project performance. The four DMCs covered in the study—Malaysia, Pakistan, Papua New Guinea (PNG), and Sri Lanka—have either a number of ongoing projects in the subsector (Malaysia and Pakistan) or recently-approved projects in support of skills development (PNG and Sri Lanka). The study fits well with the country assistance plans of each of the four DMCs, where ADB is a major contributor to the development of the social sector, and where social and education impacts of projects are a key concern.

2. The DMCs were selected to represent different geographic locations, population sizes, and stages of development, under which the TEVT projects were implemented. Over the period 1980-1999, 5 projects were implemented in Malaysia,[1] 2 in Pakistan,[2] 1 in PNG,[3] and 2 in Sri Lanka.[4] The total cost of these 10 projects at appraisal was about $976 million, of which $408 million or 42 percent was funded by ADB. The first three projects in Malaysia were rated generally successful, those of PNG and Sri Lanka were rated partly successful, while that of Pakistan (the first project) was rated unsuccessful. From the experiences of the four DMCs, the study sought to derive lessons, examine issues that need to be resolved, and recommend actions that need to be taken in the design and implementation of ongoing and future projects in the subsector. Inputs will also be provided in the formulation of ADB's education strategy.

B. Objectives and Scope of the Study

3. The main objective of the study was to assess the long-term impact of ADB's assistance to TEVT in the DMCs. Specifically, the study looked into the projects' impact on four levels, as follows:

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[1] Loan 476-MAL: *Vocational Education Project*, for $20 million, approved on 30 October 1980; Loan 673-MAL: *Second Vocational Education Project*, for $58 million, approved on 20 December 1983; Loan 840-MAL: *Third Vocational Education Project*, for $68.8 million, approved on 1 September 1987; Loan 1355-MAL: *Technical and Vocational Education Project*, for $72 million, approved on 30 May 1995 (ongoing); and Loan 1596-MAL: *Technical Education Project*, for $40 million, approved on 17 December 1997 (ongoing).

[2] Loan 419-PAK(SF): *Technical Teachers' Training and Polytechnic Institutes Project*, for $21 million, approved on 29 October 1979; and Loan 1373-PAK(SF): *Technical Education Project*, for $60 million, approved on 19 September 1995 (ongoing).

[3] Loans 551/552(SF)-PNG: *Technical Education Project*, for $8 million each, approved on 26 November 1981.

[4] Loan 585-SRI(SF): *Technical Education Project*, for $16.1 million, approved on 30 September 1982; and Loan 887-SRI(SF): *Second Technical Education Project*, for $36 million, approved on 21 April 1988.

(i) the delivery system, i.e., the schools, technical colleges (TCs) or polytechnic institutes—how the projects have enhanced their institutional capacity to produce the desired quantity and quality of graduates;

(ii) the output, i.e., the graduates themselves—how they performed in the world of work, or in the institutions of higher learning for those who opted for further study;

(iii) the "user" of the output, i.e., the employers—how they perceived the contribution of the graduates to their operations; and

(iv) the institutional and policy environment—how the projects have enhanced the management capabilities of the implementing agencies and influenced the DMCs' TEVT policies and programs.

4. For Pakistan, PNG, and Sri Lanka, the assistance provided was at the post-secondary level, i.e., that of polytechnics[5] in Pakistan, and of TCs in PNG and Sri Lanka. In Malaysia, however, the assistance was at the upper secondary level—that of secondary technical schools (STSs) and secondary vocational schools (SVSs). In all cases, the study covered both project schools and nonproject public and private schools.

C. Approach and Methodology

5. The study used two approaches in assessing the projects' impact: longitudinal and cross-sectional. The longitudinal approach traced the changes in the capacity of the delivery system and the graduates' performance over time, using both secondary and primary data. The cross-sectional approach used primary data collected from the survey of project and nonproject schools, a tracer study of graduates from both types of institutions, and a survey of employers of both groups of graduates. The findings and conclusions were cross-checked for reliability and consistency against the results from other research techniques employed such as focus group discussions (FGDs), school visits and interviews, and the national workshops.

6. The survey utilized five questionnaires, one for each of the five types of respondents, i.e.: schools (institutional respondent), teachers, final-year students, graduates, and employers. The samples were first stratified by geographic location and then the institutions (schools and industries) selected purposively. Within each of the institutions, however, the respondents were selected randomly. Individual respondents such as graduates who were unemployed were randomly selected and traced in their residences. The actual sample sizes are shown in Appendix 1. The study survey reached a total of 5,273 respondents broken down as follows: institutions – 128; teachers – 917, final year students – 1,954; graduates working – 1,696; graduates studying (Malaysia only) – 164; and employers – 414. In addition, the study included 25 FGDs attended by 280 participants, visits to 31 schools or TEVT institutions, and consultations in each DMC through a national workshop.

[5] Polytechnic institutes offer three-year postsecondary programs leading to the award of Diploma of Associate Engineer. Colleges of Technology offer Bachelor in Technology (B. Tech) post-diploma degree programs on top of the Diploma of Associate Engineer program. In this study, *polytechnics* include Colleges of Technology.

D. Profile of Project Countries

7. The DMCs represent different environments in which TEVT projects were implemented (Appendix 2 shows selected socioeconomic indicators). In terms of population size, Pakistan and PNG are at the extreme ends of the spectrum with 135.3 million and 4.2 million, respectively, in 1997, while Malaysia and Sri Lanka are about of the same size with 21.7 million and 18.6 million, respectively. Except in Malaysia, a majority of the people still lives in the rural areas, with PNG having the highest proportion at more than 80 percent in 1997. With low productivity of the rural sector and, therefore, low rural incomes, gross national product per capita in these countries consequently remains low. The proportion of the population living below the poverty line in the three countries is still significant (20-35 percent), in contrast with Malaysia's less than 10 percent. Literacy rates are quite high, especially in Sri Lanka, with 90 percent, compared with Malaysia's 84 percent (illustrating that literacy does not seem to automatically translate to higher income). Pakistan still has the lowest literacy rate at about 37 percent followed by PNG at 72 percent. In all the DMCs, the literacy rate of the female population is consistently lower than that of the male population, with the discrepancy more pronounced in Pakistan and PNG.

8. The difference in the degree of industrialization among the DMCs is also evident from the structure of output and employment. Over the 17-year period (1980-1997), the share of manufacturing in the gross domestic product of the DMCs increased in varying degrees. The most significant increase was experienced by Malaysia—from 19.6 percent to 35.7 percent, followed by Sri Lanka, which increased from 13.7 percent to 21.5 percent during the period. In Pakistan and PNG, the share of industry has hardly changed over the same period. In terms of employment generation, the manufacturing sector of Malaysia again posted an impressive record, increasing its share in total employment from 15.5 percent in 1980 to 27.5 percent in 1997, growing at an average rate of 6.8 percent per annum. Sri Lanka's manufacturing sector also performed respectably, increasing its share from 9.9 percent to 16.2 percent during the same period. The manufacturing sectors of Pakistan and PNG appeared to have stagnated.

9. Inasmuch as the demand for technical personnel is largely a "derived" demand[6] arising from the growth of industry (particularly the manufacturing sector), the level and pace of industrialization have, to a certain extent, some bearing on the performance of TEVT projects. In general, the faster the pace of industrialization, the tighter the market for technical personnel becomes and the greater the sense of urgency to develop TEVT. Thus, the growth of the TEVT subsector is very much a function of a country's macroeconomic policies and performance. This consideration must be kept in mind in assessing the impact of ADB-assisted TEVT projects.

E. Overview of the TEVT Subsector

10. There is no precise definition as to what constitutes the TEVT subsector, but it is understood to include all formal and nonformal courses designed to develop associate engineers, technologists or technicians, operators (skilled and semi-skilled), office workers, small entrepreneurs, and the like. These courses are provided by various public and private

[6] TEVT does not lead industrialization. It supports and responds to it. This is because the investment decisions of firms take into consideration many other factors such as size of the market, degree of competition, availability of raw materials, infrastructure, regulatory environment, etc. The availability of highly qualified technical personnel, although an important consideration, is ordinarily not the decisive factor.

educational and training institutions, industry, nongovernment organizations (NGOs), churches, community-based organizations (CBOs), and other such organizations. The TEVT subsector in Malaysia comprises some 78 STS/SVS with a combined enrollment of about 42,000 students; 160 postsecondary public-school providers with a total enrollment of 46,910 students; numerous private training institutes or centers with an estimated enrollment of about 90,000; and those operated by industries.[7] Pakistan has 3,285 formal and nonformal TEVT institutions with total enrollment of about 155,000 students in 1989, excluding the informal sector; more than 90 percent of these are operated by the Government.[8] In PNG, formal training is provided by seven TCs and 117 vocational training centers (VTCs) with a combined enrollment of about 13,600. A significant amount of training is conducted in the informal sector by NGOs, CBOs, and churches.[9] Sri Lanka has 1,182 TEVT institutions with total enrollment of about 70,000 in 1997.[10] In Pakistan, PNG, and Sri Lanka, the Government is the main provider of TEVT. In Malaysia, however, private TEVT providers including industries account for the larger share.

11. In the DMCs, TEVT institutions have proliferated in both the public and private sectors with little or no coordination with one another, offering courses of varying quality and operating in isolation from industry. In recent years, however, the DMCs have taken significant initiatives to reform their TEVT systems, partly in response to the pressure brought about by trade globalization. New training systems are being adopted such as contextual learning in Malaysia and competency-based training (CBT) in PNG and Sri Lanka. The latter two DMCs are also emphasizing the use of CBT to train early school leavers for entrepreneurship and self-employment in the informal sector. One changing area is the role of government in the provision of TEVT: Sri Lanka, for instance, has declared that its policy is for the Government to serve mainly as "facilitator, coordinator, standard-setter, and regulator" of TEVT, and that the private sector should be the main provider of preemployment and job-entry training. Another is the area of articulation between levels of training in TEVT and general education. Systems are now being put in place in Malaysia, PNG, and Sri Lanka to allow for greater flexibility in recognizing learning acquired from different delivery systems and in widening career choices through the examination system and trade skills certification. Forging stronger linkages with industry through the institute management committees is a major thrust, particularly in Pakistan. These developments augur well for the future of TEVT.

[7] Strategic Review of Technical Education and Skills Training in Malaysia, Volume I, December 1998.
[8] Hawthorn Institute of Education, TA Report on *PAK: Technical and Vocational Education Project*, September 1990.
[9] WD Scott, TA Report on *Skills Development Project* in Papua New Guinea, February 1999.
[10] Center for Development Management and Productivity, TA Report on *SRI: Skills Development Project*, April 1999.

II. PROJECT OBJECTIVES, SCOPE, AND IMPLEMENTATION PERFORMANCE

A. Objectives and Scope at Appraisal

12. In general, the primary objectives of ADB's assistance to TEVT have been improving the quality, increasing the efficiency, expanding the capacity, and ensuring the relevance of systems to produce highly trained technicians and skilled craftsmen in sufficient numbers to support development needs. Promoting access and equity in educational opportunities among regions and people in a country has been a secondary objective, particularly in Malaysia. These objectives have been pursued over time, except in Malaysia, where a change in primary objective was noted starting with the fourth project: instead of preparing students for employment, the project objective shifted to "preparing students for further engineering and business education" in response to the changing economic environment. A summary of the objectives and components of the 10 TEVT projects implemented during the period 1980-1999 is shown in Appendix 3. Project components included the establishment of the Technical Teachers Training Colleges (TTTCs), and the upgrading of an existing one; the establishment of new schools or upgrading of existing ones; the creation of fellowships (international and local); and the provision of consulting services in different areas such as curricula, instructional materials, information systems, and management processes. Emphasis, however, varied from project to project and country to country.

13. The allocation pattern of project costs is shown in Appendix 4. On the whole, for all 10 projects, the hardware component, i.e., civil works and equipment and furniture, accounts for about 76 percent of total costs. This pattern is, however, heavily weighted by Malaysia, whose projects, largely construction of new schools, accounted for about 79 percent of the combined cost of the 10 projects. On a per country basis, Pakistan and Sri Lanka followed a similar pattern, although equipment and furniture accounted for almost half of total cost as compared with Malaysia, where civil works took more than half of the total cost. In PNG, only about 50 percent of the total cost went to the hardware component. In all countries, less than 20 percent of the total cost went to the "software" component such as fellowships and consultancies, except PNG, where consultancies accounted for about one third of the total cost.

B. Implementation Performance

14. Some indicators of project implementation performance are shown in Appendix 5. Of the seven projects already completed (2 are still ongoing in Malaysia and 1 in Pakistan), the actual total project cost was about 11.7 percent less than the appraisal estimate. On a per country basis, however, some overruns were experienced in the first and third projects in Malaysia, but these were more than offset by the underrun in the second project. In the other three countries, the estimate and actual costs were closer except for the second project of Sri Lanka, where the actual cost was about 31 percent less than the estimate. Loan utilization rates have been generally high except in Malaysia's second project, which utilized only 37 percent of the loan amount. This was because a general slowdown in the construction industry at the time depressed the cost of materials, making it possible to realize substantial savings. The loan

utilization of Sri Lanka's second project was also low at 68 percent, due to lower-than-anticipated costs of major items at appraisal. Ideally, considering the long processing period required to get another loan, governments should endeavor to fully utilize approved loans.

15. The completion periods estimated at appraisal ranged from 54-72 months. The actual completion periods of the seven projects already completed ranged from 66-146 months. The longest slippage was about 88 months, experienced in Pakistan's first project mainly due to delays brought about by the change in the location of the women's polytechnic. Considerable slippage was also experienced in Sri Lanka's first project, which was delayed by 39 months. The details of implementation performance for each project have been discussed in the various project completion reports and project performance audit reports. What needs to be pointed out, however, when such experiences are taken together, is the general indication that a country's capability to design and implement projects appears to be enhanced as it gets involved in more projects. The benefits of such experience appear to be dissipated, however, when the gap between projects is longer than about two years.

C. Policy Dialogue

16. Of the 10 projects under evaluation, only three have substantive and specific policy dialogue content (Loans 1355-MAL and 1596-MAL, and 1373-PAK). These include decentralization of school administration, incentives for private sector participation, school-industry linkages, cost recovery and financial sustainability, increasing utilization rates and cost-effectiveness, increasing female participation, and developing/strengthening management information and benefit monitoring and evaluation systems. In Malaysia, initiatives such as the Time Sector Privatization allow both the private and public sectors to make use of available training facilities. In Pakistan, tuition fees are being introduced gradually.

III. IMPACT OF ADB OPERATIONS

A. Operational Impact

17. This section examines the outcome of operations of the project schools over the past 15 years. To the extent that long-term time-series data are available, trends over the period are highlighted. Indicators of outcome are also obtained through comparison with nonproject schools. It is not possible to isolate precisely the impact of ADB assistance from that provided by other funding agencies and the DMC governments. Thus, conclusions that may be drawn are indicative rather than definitive.

1. Curricular Offerings and Curriculum Content

18. The project schools offered a wide range of courses at different levels, of different duration and aimed at different target clienteles. Malaysia's STS/SVS cater to upper secondary students (Grades 11 and 12) and also offered short skills courses for out-of-school youth. Pakistan's polytechnics offer 2-3 year technician courses and 4-year B. Tech post-diploma degree programs; recently, they have also started to offer short courses (usually of 6 months' duration) for specific industry needs. PNG's TCs offer one-year preemployment technical training (PETT) courses and 6-10 week block (extension) courses for apprentices, as well as technician courses consisting of three years of part-time study (normally 20 weeks per year) and short courses of 1-20 weeks' duration. PETT courses will soon be replaced by a two-year Technical Training Certificate course. Sri Lanka's TCs have the most varied course offerings, ranging from six-month short courses to the four-year Higher National Diploma (HND). In 1996, however, its HND and National Diploma (ND) courses were transferred to the Sri Lanka Institute of Advanced Technical Education (SLIATE). Over the years, new courses have been added in response to a perceived need, often without benefit of any market study. It is difficult to phase out a course once it has been started, even if social and/or industry demand for its graduates has dwindled. Thus, there is a proliferation of courses in project schools.

19. Review and updating of curriculum is almost always a component of ADB-assisted TEVT projects. In Malaysia, this occurred in 1985 for the vocational subjects, and again in 1992 as part of the integrated upper secondary curriculum that gave students a choice of four groups of electives, including technical and vocational education courses. In Pakistan, the first revision was made in 1980 and the second in 1996. In PNG, the revision was done in the early 1980s and has remained in draft form to date. In Sri Lanka, a major revision was done in 1987. All these, however, happened as a result of required activities of agency-assisted projects and not as an institutionalized and continuing process. During the FGDs, teachers and students consistently mentioned the need to update the curriculum and include the latest developments in the field such as digital technology, computer applications (Appendix 6), entrepreneurship, and industry training.

2. Enrollment: Capacity vs. Social Demand

20. The growth rates in enrollment of project schools over the years have been modest as they are constrained by the physical capacity of the schools as well as of the dormitories/hostels, since most of them, except in Sri Lanka, are residential institutions (Appendix 7). Enrollment at Malaysia's STS/SVS has grown at a faster rate in recent years at 7.2 percent per annum. ADB has been instrumental in the capacity expansion of the STS/SVS in partnership with the Malaysian Government. In spite of this respectable growth, however, its total capacity still accounts for less than 8 percent of total upper secondary enrollment, an even smaller vocational/technology stream than that of the academic schools. Similarly, in Pakistan, ADB has been instrumental in expanding the capacity of the polytechnics but its intake is still less than 5 percent of the matric output, i.e., Class X students who have passed the matriculation examination. In PNG and Sri Lanka, enrollment appeared to have stabilized between 2,000-3,000 students and 18,000-20,000 students, respectively (before Sri Lanka's transfer of HND and ND courses to SLIATE). ADB's role in these countries has been more nearly one of upgrading for quality improvement than of capacity expansion.

21. Social demand has consistently outpaced the capacity of the project schools. Malaysia's STS/SVS accommodate only about 60 percent of total applicants; Pakistan's polytechnics only about 30 percent; PNG's TCs a low of 15 percent; and in Sri Lanka, only about 25 percent. A sampling of the level of social demand by technology/trade areas is shown in Appendix 8. While the pattern of social demand reflects a common trend across the DMCs, there are also certain country-specific peculiarities. The traditional technology areas such as electrical and electronics are in high demand by students; mechanical and automotive follow closely. Information technology and business management and commerce have recently gained popularity. Whether the pattern of social demand matches with that of industry is discussed in para. 40.

3. Instructional Methods and Materials

22. The instructional methods remained largely traditional, consisting of lectures, some practical work, and demonstrations. Many teachers admitted that there was not much difference between how they were taught during their student days and how they themselves are teaching now. Although most of them had learned how to develop learning materials, use audio visual aids, and design workshop projects during the staff development program (para. 51), most of the time materials and equipment are not available in their schools (except in Malaysia, where the STS/SVS are well provided). Often, they used photocopied handouts or have students copy from the board in the absence of textbooks. Practical exercises are often not conducted, either because equipment is not operational or because of lack of consumable materials (in Pakistan, for example, the budget for consumables is only about PRs50 [$1.00] per student per year). In some cases, the students, especially girls in women's polytechnics, bring their own materials.

4. Internal Efficiency

a. Selected Indicators

23. The teaching-learning process in the classrooms or workshops/laboratories is affected by a number of factors. How efficient this process has been in the DMCs can be gleaned from certain selected indicators shown in Table 1.

Table 1: Selected Internal Efficiency Indicators

Indicator	Malaysia	Pakistan	Papua New Guinea	Sri Lanka
Average Class Size	30-34 (STS/SVS) 35-40 (academic)	50-100	15-20 (technology) 30-40 (others)	15-20 (technology) 30-40 (others)
Student-Teacher Ratio	9:1 (STS/SVS) 19:1 (academic)	19:1	6:1	22:1
Attendance Rate (%)	90	30-60 (Sindh, Balochistan) 50-80 (Punjab, NWFP)	95 (theory) 60 (practical)	90
Dropout Rate (%)	5 or less	5-10	5-10	Up to 50
Completion Rate (%)	90 or higher	-	90	70-76
Pass Rate (%)	91.9 (STS/SVS) 76.6 (academic)	40	90	49 (1988-98)

NWFP = North-West Frontier Province, STS = secondary technical school, SVS = secondary vocational school.
Sources: Secondary Data, Focus Group Discussions.

24. **Average Class Size and Student-Teacher Ratio.** The average class size varies widely among the DMCs. Malaysia's STS/SVSs have about 30-34 students per class, lower than the academic schools' 35-40. In Pakistan, the usual class size is 50 students, but some have as many as 100 students. In PNG and Sri Lanka, technology classes have 15-20 students, and about 30-40 students for business and other courses. The student-teacher ratio (STR) in Malaysia's STS/SVS is a low 9:1 compared with the 19:1 in the academic schools. In Pakistan, the STR was 19:1, in Sri Lanka, 22:1, and in PNG a very low 6:1. Except for PNG and Malaysia's STS/SVS, the STRs of the other DMCs have steadily increased over the years due to high social demand. Measured against the accepted international norm for STR for technical courses of 15:1, Malaysia's STS/SVS and PNG have to adjust STRs upward to reduce unit cost, while Pakistan and Sri Lanka have to adjust downwards to enhance quality.

25. **Attendance, Dropout, and Completion Rates.** In Malaysia, PNG, and Sri Lanka, average daily attendance rate is about 90 percent except in practical classes in PNG, which is about 60 percent due to nonavailability of equipment and materials. In Pakistan's Sindh and Balochistan, it is as low as 30-60 percent and in Punjab and North-West Frontier Province, 50-80 percent. This partly ameliorates the overcrowding problem due to large class sizes. Among women's polytechnics, however, attendance is much better at 80-90 percent. A major reason for the attendance problem is the laxity in enforcing the rule requiring 70-80 percent attendance rule before one is allowed to sit in the Board examination. The dropout rate is not a major problem in Malaysia, Pakistan, and PNG, but is a serious one in Sri Lanka—as high as 50 percent, particularly in technology courses. The main reason cited is financial: as soon as they get basic skills the students start looking for jobs in order to help their families. As expected, the completion rate is lower in Sri Lanka than in the other three countries. There are no significant differences between project and nonproject schools in these respects.

26. **Pass Rate and Learning Achievements.** Teachers and students revealed that while continuous assessment of learning achievement is being done internally at least four times a

year, students do not give it as much importance as the external examinations conducted by the Board of Examination or its equivalent. The pass rate of Malaysia's STS/SVS graduates in the external examinations has been generally higher than that of their counterparts in academic schools, about 92 percent vs. 77 percent, in 1998. In Pakistan, the pass rate at the national level is around 40 percent, varying widely among the four provinces, with Punjab registering the lowest and Sindh the highest. Questions about the integrity of the examination results were raised many times during the FGDs, however. In PNG, the pass rate is a high 90 percent, while in Sri Lanka it is quite low, averaging 49 percent during the period 1988-1998. These figures reflect quite closely the teachers' assessment during FGDs as to how much of the intended curriculum their students achieved (or learned) given what the teachers were able to implement (or deliver). (In Pakistan, the indications were opposite to the examination results). Reasons for the wide gap between the intended curriculum and achieved curriculum are discussed in Appendix 6.

b. Preparedness of Final-Year Students and Transition Moves Upon Course Completion

27. Teachers and final-year students were asked how prepared the students were in tackling the various options, i.e., further studies, wage employment, self-employment, and day-to-day living, upon course completion. In Malaysia, final-year students of both project and nonproject schools are perceived to be very well prepared to pursue further studies, but not to pursue wage employment, much less self-employment. In the other DMCs, high preparedness was indicated in seeking wage employment, although they also felt prepared to pursue further studies. All, however, felt much less prepared to pursue self-employment. In Pakistan and PNG, teachers and students of nonproject schools expressed a higher level of preparedness than those of project schools. The reverse was true in Sri Lanka. The results are shown in Appendix 9.

28. Final-year students were also asked about their immediate plans upon course completion, given the same options as above. These plans were then compared with the steps actually taken by the graduates upon course completion. More than 90 percent of the final-year students in Malaysia, both from STS/SVS and academic schools, intend to pursue further studies. The corresponding figure in Pakistan was about 35 percent, in PNG close to 50 percent, and in Sri Lanka about 25 percent. Those who intend to seek wage employment comprise about 40 percent in PNG, 50 percent in Pakistan, and 60 percent in Sri Lanka. Those who intend to start their own business are very few except in Sri Lanka (close to 10 percent). Compared with the actual moves of those who preceded them, the proportion of those who pursued further studies was only about 50 percent in Malaysia, 10 percent in Pakistan, 4 percent in PNG, and about 25 percent in Sri Lanka, similar to the plan of the final-year students. It is more likely, however, that because of the changing environment, the actual moves of the final-year students will follow their plans more closely than the pattern of choices of previous graduates.

c. Overall Assessment of TEVT Programs

29. The final-year students of both STS/SVS and academic schools in Malaysia appeared equally satisfied about their school TEVT programs. However, STS/SVS graduates' ratings on overall quality were significantly higher than those of academic school graduates. Similarly, the STS/SVS teachers' ratings on overall strength of the programs were significantly higher than those of academic school teachers. In Pakistan and PNG, the quality and program strength ratings of the nonproject schools by both their graduates and teachers were significantly higher than those of graduates and teachers from project schools. This is partly influenced by the

relatively lower salaries that project school graduates command in the job market (para. 33). The opposite was true as far as overall satisfaction of students was concerned. In Sri Lanka, there was no significant difference on quality and program strength ratings between project and nonproject schools, although the students of project schools expressed higher levels of satisfaction.

5. External Efficiency

a. Job Search Duration, and Reason for Hiring

30. Among the graduates surveyed who opted to seek wage employment, more than 80 percent of those in Malaysia and PNG get jobs within six months of course completion, 60 percent in Pakistan, and 46 percent in Sri Lanka. Consistent with this finding, the proportion of those who get jobs after a year was about 37 percent in Sri Lanka, 18 percent in Pakistan, and less than 10 percent in Malaysia and PNG. A majority of the graduates get hired either because of good performance in tests and interviews or because of their special training or qualifications. The number who get hired because of the endorsement of relatives or friends is quite significant in Sri Lanka (about 20 percent). Across the four DMCs, graduates of nonproject schools, most of whom come from private TEVT institutions (except in Malaysia) generally appeared to be more employable. Details are shown in Appendix 10.

b. Profile of Entry and Present Jobs

31. At least half of project school graduates worked either as technicians or operators, skilled workers or craftsmen for their first job, with the highest proportion noted in PNG at more than 80 percent. As expected, Malaysia's academic nonproject school graduates have the lowest proportion (about 25 percent). A significant proportion of graduates, presumably from business and commerce courses, works in clerical positions as entry jobs. The matchup between education and training and first job appears to be quite significant, with more than 65 percent saying there was a proper match. PNG has the highest percentage of proper matching at more than 85 percent, most probably because of its long apprenticeship period (three years for PETT graduates) prior to the granting of certificate or diploma. The mix of jobs or positions of graduates changes over the years as they get promoted or pursue other careers. The matchup, however, between education and training versus present job does not continue to reflect the matchup with their first courses at the STS/SVS, polytechnics or TCs, as many have taken other courses since then. A profile of the entry and present jobs of graduates, and the extent to which such jobs match with their education and training, is shown in Appendix 11.

c. Need for Training Prior to Regular Assignment

32. A majority of the graduates who were employed after graduation needed to be trained for about 3 months or more before given regular assignments. A relatively smaller proportion (about 68 percent) of STS/SVS graduates in Malaysia needed training, compared with the 92 percent of the graduates of academic schools. Similarly, about 77 percent of the graduates of project schools in Sri Lanka needed training, compared with 93 percent in nonproject schools. Most of the training needed was on-the-job in combination with formal training (Appendix 12).

d. Average Initial and Present Monthly Salary

33. Some indications as to how the employed graduates fared financially in terms of initial and present salary is shown in Table 2 (details in Appendix 13). Comparison across countries may not be appropriate because of the different stages of development and the differences in cost of living. The low level of the average present salary in Sri Lanka is due to the fact that a good number of the respondents are recent graduates.

Table 2: Average Initial and Present Monthly Salary
(in current US $)

Item	Malaysia		Pakistan		Papua New Guinea		Sri Lanka	
	P	~P	P	~P	P	~P	P	~P
Average Initial Salary	167.2	193.4	45.9	48.1	na	na	53.4	58.7
Average Present Salary	310.1	361.8	130.2	135.7	na	na	64.3	71.4
Salary Differential:								
• Initial	15.7% (~P higher)		4.8% (~P higher)		na	na	8.9% (~P higher)	
• Present	16.7% (~P higher)		4.2% (~P higher)		na	na	11.0% (~P higher)	

P = graduates from project-assisted schools, ~P = nonproject graduates, na = not available.
Source: Impact Evaluation Survey.

34. In the three DMCs where data is available, the graduates from nonproject schools consistently showed higher average salary, both initially and at present. The salary differential in Malaysia is quite significant, with the graduates of academic schools getting nearly 16 percent more than those of STS/SVS. In Sri Lanka, nonproject school graduates also get 10 percent more than those of project schools; in Pakistan, the differential is lower at less than 5 percent. The reason for the difference could be that nonproduction-related jobs (where a larger proportion of nonproject school graduates work) generally pay more than production-related jobs, or that the graduates of nonproject schools, which include private schools (except in Malaysia) command a higher wage.

e. Usefulness of Education and Training to their Jobs

35. The survey findings show that a high 80 percent of graduates in the DMCs who are working found their education and training either "useful" or "very useful," except in Sri Lanka, where the proportion is about 65 percent. Conversely, the proportion of graduates in Sri Lanka who found their education and training "useless" is more than 20 percent, compared with less than 5 percent in the other DMCs. It is possible that this group largely represents the younger batch of graduates who are experiencing a mismatch between their education and training and jobs available.

f. Job Mobility and Prospects for Advancement

36. Graduates of TEVT do not change jobs very often, especially in Sri Lanka, where more than 70 percent have not changed jobs since joining the labor force. In Malaysia and Pakistan, more than 60 percent either have not changed jobs or changed jobs only once, as compared with 30 percent in PNG. There is no significant difference between graduates of project and nonproject schools in this regard; this could be indicative of: limited opportunities in the economy, narrow specialization, young age, or a combination of these factors. More than 70 percent of the graduates in Malaysia think that their future is either "bright" or "very bright," compared with PNG's 60 percent and Pakistan's 50 percent. The least optimistic are graduates in Sri Lanka where only about 20-25 percent think that they have a bright future. Between 35-40 percent think that prospects are dim. This may be due to the general economic and political situation, the relatively younger age of the respondent-graduates, and the fact that more than 70 percent of them are still on their first jobs, which apparently are not very promising.

g. Performance of STS/SVS and Academic School Graduates in Institutions of Higher Learning (Malaysia)

37. In Malaysia, the performance of STS/SVS and academic school graduates at the institutions of higher learning[11] were compared using their mean scores in first-year examinations in engineering and technical courses. On the combined mean scores of STS/SVS versus academic graduates, the difference was statistically significant in favor of the former. However, between graduates of technical courses of STS/SVS versus the graduates of the science stream of academic schools, which properly are the more comparable outputs, there was no significant difference on mean scores. In the perception of lecturers, there were also no significant differences between the two groups of students on theoretical knowledge, analytical skills, and oral presentation.

[11] Includes Polytechnic Shah Alam, Institut Teknologi MARA, University of Technology, Institut Kemahiran MARA.

6. Demand vs. Supply: The Mismatch

38. During the period 1980-1997, there were significant shifts in the structure of demand of industries for technical personnel in the DMCs, as shown in Appendix 14. The demand for professional, technical, and related workers (to which occupational group the technicians and technologists belong) grew much faster than those for production and related workers (operators, skilled workers, and craftsmen) and for other groups of workers, particularly in Malaysia. This trend was validated during the FGDs with industry representatives.

39. Industries require a whole spectrum of technical personnel comprising scientists/ engineers, technologists/technicians, and operators/skilled workers/craftsmen. Depending on the stage of a country's industrial development and the technologies employed by industry, the personnel mix, on the average, would be one engineer for every three technicians and 20 operators (1:3:20). The mix changes over time as the country develops. At present, the knowledge requirement for the new technologies is increasing. The implication is that as the new technologies become more knowledge-intensive, the proportion of engineers/scientists and technologists/technicians will be increasing, while that of operators/skilled workers/craftsmen will be decreasing (e.g., 1:5:12). In Malaysia, for instance, there is an ongoing "transformation" program among industries that trains operators to become technicians, technicians to perform some engineering tasks, and engineers to concentrate on research and development. The shift is best illustrated in Appendix 15, which shows the changing shape of the personnel triangle—a narrowing at the base and "bloating" at the middle and upper level as industries adopt new technologies. It is important to have an idea which shape applies to a country given the technology mix of its industries, as it has major implications for the supply side.

40. How has the supply side, i.e., the project schools, responded to this trend? There is enough evidence to say that they are largely unaware of it. Without close linkage with industries, schools do not get the right signals from their market. This is supported by the survey results comparing perceptions on social demand versus industry demand (Appendix 16). In the DMCs, except PNG, social demand (as perceived by teachers), either by occupational group or by technology area, was significantly higher in most cases than industry demand (as perceived by industry managers/supervisors). In PNG, however, the reverse was true, probably because of the stagnant formal sector that forces the Government to focus on the informal sector instead. In Pakistan, PNG, and Sri Lanka, there is an oversupply at the higher level (degree holders) and at the middle level (technicians) but a shortage of qualified technicians and operators/skilled workers/craftsmen—and an oversupply of semiskilled and unskilled labor.[12] In Malaysia, the shortage was being felt at all levels before the recent economic crisis, but eased up during the crisis; with the recovery of the economy, there has been a tightening of the market for higher- and middle-level personnel. This trend is expected to continue as the Government pursues its vision of a "high-skill, high-wage" economy. At the same time, it has to contend with the challenge of providing training opportunities to the 50 percent of school leavers who do not complete the Malaysian Certificate of Education (SPM) or the Vocational Certificate (SPMV).

[12] In Sri Lanka, 12.2 percent of male and 27.3 percent of female General Certificate of Education (A level) and higher education graduates were unemployed in 1996 (Labor Force Survey, 1996). In Pakistan, the Second Perspective Plan (1998-2003) projected a surplus of engineers and technicians of about 35,000 graduates during the plan period. On the other hand, of the 1.63 million production and related workers required during the plan period, TEVT is expected to supply only 0.16 million graduates, a shortage of about 1.5 million. In PNG, it was gathered from discussions with some industry executives that their problem regarding the middle and higher level personnel is not quantity but quality.

41. The delivery systems assisted by ADB in the DMCs need to be more directly focused on current industry needs. The STS/SVS in Malaysia are only indirectly supporting the demand for middle- and higher-level personnel, since a great majority of their graduates pursue higher studies before joining the labor force. In Pakistan, short-term industry needs are for operators and skilled workers that the polytechnics do not produce. In PNG, the need of the economy as a whole is providing skills for livelihood in the informal sector, inasmuch as the prospects for job creation in the formal sector are limited. In this case, the TCs are not as well-positioned to contribute as the VTCs. Similarly in Sri Lanka, the main thrust of government is self-employment, toward which the TCs have yet to adjust their programs, courses, and staff capabilities. There appears to be a need to review the focus of ADB's assistance on TEVT in the DMCs.

B. Institutional Impact

42. This section deals with the impact of ADB assistance on the capacity or capability of the concerned institutions as service delivery systems. This includes the Executing Agency (EA), and its project implementing units (PIUs), the support institutions such as teacher training centers and (for Malaysia only) equipment repair centers, and the project schools. Institutional capacity is considered in terms of management and staff, physical facilities, and budgets.

1. Executing Agency/Project Implementing Unit

43. As in most TEVT projects, the implementation of projects and overall management was the responsibility of the respective Ministries of Education as EAs of the DMCs through their technical education departments, or their equivalents. The PIUs were usually organized under these departments. Every project included a component to strengthen the EA and PIUs such as fellowships for staff and various consultancies on organization structuring, management systems, and curriculum development. The impact of assistance on the EAs and PIUs was reflected in the improved implementation performance of projects. These performances were already partly assessed in the project completion reports and project performance audit reports. Over the longer period, however, it appears that EAs/PIUs that have had to handle a series of projects such as those in Malaysia have kept their implementing capability intact and even enhanced it over time. The learning curve evidently applies. Based on the implementation performance of past and current projects, this cannot be said of the other countries to the same degree.

2. Technical Teachers Training Centers

44. The establishment of the TTTCs in Pakistan and Sri Lanka were major project components. In Malaysia and PNG, ADB's inputs were relatively limited as these were mainly for upgrading of facilities and staff. In general, the role of the TTTCs in the DMCs is to provide pre-service and in-service education and training to technical teachers. Over the years, this role has evolved together with their respective organizations. In Pakistan, understaffing, lack of recurrent budget, and underutilization of the National Technical Teachers Training College

persisted until recently, when it was merged with the Institute for the Promotion of Science Education and Training;[13] the merged entity was renamed the National Institute for Science and Technology Education (NISTE). The combined facilities are expansive and the task of fully utilizing them appears daunting. The NISTE is headed by a director general and has a much broader scope, covering both science and technical education. NISTE's new plans and programs have been drawn up, but have yet to be fully implemented. Much depends on the support of the federal government, particularly on the recurrent budget. On its own, NISTE's management has initiated programs to generate revenues by offering its services to industries and private schools. This new setup appears promising, but results have yet to be seen.

45. The case of the TTTC in Sri Lanka is similar to that of Pakistan. The same problems of underutilization due to understaffing and lack of recurrent budget have persisted. In November 1998, by an act of Parliament, the TTTC was converted into a corporate body and renamed the National Institute of Technical Education (NITE) under the administration, management, and control of a board of governors. It is mandated to be a center for higher learning, providing graduate and postgraduate technical and vocational education. It is headed by a director general and has a staff of 82 in 1998 with some 60 vacant positions. Efforts are underway to fill the vacancies. Meanwhile, the new management has started offering its services to public and private corporations and NGOs in such areas as teacher training, curriculum development, national skills standards setting, computer training, and computerization of library information systems. NITE has yet to realize its full potential.

46. In Malaysia, ADB extended assistance to the TTTC under the third and fourth projects with new buildings, equipment, furniture, and fellowships. The TTTC provides specialist preservice training for trade courses and commerce for nongraduate teachers. In 1996, however, the preservice function was transferred to the Tun Hussein Onn Institute of Technology. It is headed by a principal and has 141 academic staff, mostly university-trained and with considerable teaching experience. It has 12 departments with a budget of around RM10 million. Recently, it introduced a course known as "Program Khas Pensiswazahan Guru" to enable teachers to acquire degrees. The facilities are in reasonably good condition except those for catering, bakery, and confectionery which are in relatively poor condition, but which are frequently used. Other facilities that have high utilization rates but are insufficient to meet current needs include the science and information technology laboratories and the studies for fashion design and tailoring.

47. In PNG, the TTTC was established and remained as part of the University of Goroka and has been integrated into the university's teaching program. During project implementation, the TTTC played an important role in the localization of the teaching staff. Over the past 10 years, however, there has been a decrease in enrollment. The TTTC has one expatriate staff member with an enrollment of only 11 students in the trade courses. The physical facilities provided by ADB have limited utilization. A majority of the people in the university is not aware that there is in fact a TTTC and that it was assisted by ADB.

3. Equipment Repair Center, Malaysia

[13] Established under Loan 759-PAK(SF): *Science Education for Secondary Schools Sector Project*, for $28.8 million, approved on 28 November 1985.

48. Through ADB assistance, four Equipment Repair Centers (ERCs) were established, one in each of the four regions of Peninsular Malaysia. The main objective of the ERCs is to provide repair and maintenance services for the STS/SVS in their respective regions. In addition, they train teachers and students to carry out minor repairs and their own maintenance work. They are also expected to make two visits a year to service the schools in their respective areas. The ERCs in Kemaman (east coast region), Sungai Buloh (central region), and Batu Pahat (southern region) serve 18 schools each while the ERC in Sungai Petani (northern region) serves 15 schools.

49. As support units, the schools consider the ERCs as of some help in the repair and maintenance of their equipment. Their effectiveness, however, has been constrained, especially during the current economic crisis, by several factors: the shortage of staff (only 2-5 staff per center); lack of expertise in the latest technology due to lack of formal training; old and outdated equipment, especially in Kemaman and Sungai Buloh; and delays in response time. Delays are due to bureaucratic procedures, as all requests require endorsement from the State Technical Education Department before visits can be made. These constraints need to be addressed if the potential of the ERCs is to be realized.

4. Project Schools (STS/SVS, Technical Colleges, Polytechnics)

a. Management

50. In the DMCs, management of the project schools has remained centralized. Although principals exercised some authority to manage day-to-day operations, decisions related to policies, budget, recruitment of staff, transfers, promotions, offering of new courses, and purchase of equipment, among others, are exercised by the technical education departments or their equivalent. While there are governing boards, councils, or management committees with industry representations in every TC or polytechnic (in Pakistan, PNG, and Sri Lanka), these bodies are largely recommendatory and most of them are inactive. In such an environment, it is not surprising to find that most of the school heads were of the bureaucratic mold, with little creativity, initiative, and daring to do what needs to be done. It should be noted, however, that in each of the four DMCs, there are a few who, operating in the same environment, stand out above the rest. Their schools' physical surroundings are clean and students are disciplined; they take the initiative in mobilizing external resources for operating and capital expenditures and in establishing linkages with industries. These are examples of best practices that should be studied and emulated. The personal qualities of these leaders should also guide the authorities in selecting new school heads in the future.

b. Teaching Staff

51. In general, teachers in project schools are older, with longer teaching experience but with lower educational qualifications, than those of the nonproject schools. This is more pronounced in Sri Lanka (project and nonproject schools) and PNG (project schools) where the proportion of nondegree holders (Diploma and Certificate) is more than 75 percent. In Malaysia, the difference between STS/SVS and academic schools in the proportion of nondegree holder teaching staff is quite significant at 30 and 3 percent, respectively. In terms of industry experience, Pakistan (nonproject), PNG (project), and Sri Lanka (project and nonproject) have about 20-25 percent of the teaching staff with 10 years or more of work experience with industry. Malaysia's teaching staff, in both project and nonproject schools, has the highest

proportion of experienced faculty, more than 70 percent, but they have no industry experience. A profile of the teaching staff of project and nonproject schools across the four DMCs is shown in Appendix 17. To upgrade the capabilities of the teaching staff, the projects provided international and local fellowships in Malaysia, Pakistan, and Sri Lanka (PNG's was funded by the Australian Agency for International Development). Those who participated in the program rated it above average in improving their knowledge of the subject matter and teaching skills. A majority found the duration just right and that they were able to apply some of what they have learned. However, the fellowship program was a one-shot affair and the majority of the teachers, except in Malaysia, have had no training since then.

52. In Malaysia, there is no significant difference among final-year students and graduates from both project and nonproject schools in the perception of the number and quality of teachers, and no significant difference as well between the 1980s and the present, according to the long-serving teachers. Among the present teachers, however, the perception is that the STS/SVS have significantly more teachers available than the academic schools. This is confirmed by the lower STR of STS/SVS compared with academic schools (para. 24). In the other countries, the pattern of perceptions is similar; in Pakistan and PNG, the difference is more in the quantity rather than the quality of teachers in nonproject schools; in Sri Lanka, the same is true of teachers in project schools. In Pakistan, however, the graduates' perception of quality of teachers is significantly higher for nonproject schools. Over time, between the 1980s and the present, there has been no significant difference in perceptions of the quantity and quality of teachers across the project countries. In general, the teachers are regarded quite highly by the students and graduates. Many students consider their teachers as one of the major strengths of their schools. The perceptions of the number and quality of teachers over the years from the point of view of the final-year students, graduates, and the teachers are shown in Appendix 18.

c. Physical Facilities

53. Comparing the state of physical facilities of the project schools between the 1980s and at present, the long-serving teachers' assessment is that, in general, the facilities were better then than they are now. This is particularly true of workshops/laboratories, classrooms, and/or library in Pakistan, PNG, and Sri Lanka. In Malaysia, the perception is that there is no significant difference in the condition of classrooms and workshops/laboratories, but that the library facilities are much better now. A summary of assessments on physical facilities from the points of view of teachers, final-year students, and graduates is shown in Appendix 19.

54. Comparing the present facilities of the project schools with those of nonproject schools, significant differences emerged. In Malaysia, ratings on STS/SVS facilities are significantly higher compared with those of academic schools. In Pakistan and PNG, the teachers and final-year students in nonproject schools gave significantly higher ratings on their facilities than those in project schools. However, the graduates' ratings of Pakistan's project schools were significantly higher than those of nonproject schools. The same is true of the graduates' ratings in Sri Lanka. Sri Lankan teachers' and final-year students' perceptions showed no significant differences between the facilities of project and nonproject schools except in the library, where the teachers felt those of project schools were better. These assessments conformed with the Mission's observations during field visits. The buildings looked old and most of the equipment is outdated; only 40-60 percent of it is operational due to lack of repair and maintenance. Good housekeeping was generally not evident either in the physical surroundings or inside the classrooms and workshops/laboratories.

d. Industry Linkage

55. Linkages between schools and industries have not improved significantly since the first projects. Although a number of the employers surveyed indicated some form of cooperation with schools (in-plant training of students being the most common), such cooperation was limited. This is one of the weakest aspects of the TEVT program in all the DMCs. A TEVT system that aims to serve the needs of industry cannot be effective without the active participation of industry. It is not enough that industry accepts student trainees as required in the curriculum or teachers for industry exposure. The management inputs of industry people are often an untapped resource. One only needs to compare the project schools where industry people are involved in their management and those where they are not. The differences in the dynamism of the course offerings, the order and cleanliness of the physical facilities, the morale of teachers and students, among others, are clearly evident. Industry's orientation toward results, insistence on accountability, and, above all, its standard of excellence somehow gets injected into the public TEVT corporate culture. Recently, however, serious efforts to strengthen the linkages with industry have been launched in Pakistan with the formation of the Institute Management Committees (IMCs) in the polytechnics. The move was met with enthusiasm by industry, schools, and government policymakers. The model may be considered in the other countries as well.

e. Employers' Assessment of Public and Private TEVT System

56. In the area of meeting social demand, the perception of employers in Malaysia and Pakistan is that public TEVT institutions are more responsive than their private counterparts, while the reverse is true in PNG. Employers in Sri Lanka think there is no difference in the responsiveness of the two to social demand. As to meeting industry demand, employers in Malaysia think the public TEVT institutions are still the more responsive ones, while it is the other way around in the case of PNG and Sri Lanka. Employers in Pakistan do not think there is much difference between the two in this respect. The employers' perceptions on the public and private TEVT institutions in their respective countries are shown in Appendix 20.

57. On the overall state of TEVT institutions, employers across the DMCs generally think that the private institutions have improved more than the public institutions over the last 10 years. The gap between the two is more pronounced in PNG and Sri Lanka. Conversely, the proportion of employers who think that the public TEVT institutions (to which the project schools belong) has "deteriorated significantly" or "deteriorated" somewhat comprises almost 60 percent in PNG and about 30 percent in Pakistan and Sri Lanka, but only about 6 percent in Malaysia. The corresponding proportion of employers thinking that private TEVT institutions have also deteriorated somewhat or significantly is also quite significant in PNG and Pakistan, comprising 27 and 17 percent, respectively.

5. The TEVT Delivery System: A Synthesis

58. In Pakistan, PNG, and Sri Lanka, the starting point of primary activities—the identification of courses and the design of curricula—has been weak. Many of the courses were chosen not because of industry needs but because of social demand—the need to provide alternative educational opportunities to the disadvantaged. The corresponding curricula were often designed with the assistance of consultants and donor-agency experts, but with little or no local industry participation. The process of continuing review of course offerings and curriculum

has not been institutionalized, so most of them are outdated. It is only recently that new training systems or technologies have been considered, such as the CBT for PNG and Sri Lanka and contextual learning in Malaysia. Recruitment and admission are carried out centrally at the Ministry level; school management has little or no control over such policies except for the few paying students in PNG. The choice of courses by students are sometimes ill-advised, simply because the teachers and/or counselors themselves are not in touch with the labor market. A number of courses do not have good employment prospects and thus aggravate the demand-supply mismatch. The effectiveness and efficiency of the teaching-learning process is greatly diminished (to different degrees depending on the project country) because of a number of factors, including the outdated curriculum, inadequate and obsolete equipment, lack of textbooks and consumables, teachers' lack of practical skills, quality of students (either disinterested or the too heterogeneous a mix), and the absence of continuing staff development.

59. Students are assessed by the school to determine the level of learning acquired. This is not given much importance by either the teachers or the students, however, because the results hardly count. What really matters is the external examination that is the basis for the awarding of the certificate or diploma. In some provinces in Pakistan, the integrity of the examination itself has been questioned. Less than half of the students in Pakistan and Sri Lanka eventually receive the certificate or diploma; more than 90 percent do in Malaysia and PNG. However, paper qualifications of successful graduates hardly impress industries. Unsuccessful graduates either take the examinations again or look for lower-level employment positions. There are no placement services to assist graduates, nor have there been any even for industry training, since industry training is not required by the curriculum. Consequently, only a few get hired. Those hired have to be trained for at least three months before being given a regular assignment. Overall, the social rate of return on investment in the project schools is evidently low, except in Malaysia.

60. It is quite evident that almost all strategic activities of the delivery system, primary or support, are either not carried out at all or experience problems in the way they are carried out. Not much have changed since the implementation of the projects. In fact, a good number of industry people and even of the long-serving teachers in Pakistan, PNG, and Sri Lanka think that the delivery system, i.e., their schools, has deteriorated over the years. The initial inputs and momentum achieved by the projects have not been sustained. The organization infrastructure, which spans all the other activities, is one of the weakest parts of the system, particularly management. Any reform should start from here. The problem, however, has already become systemic. It must be addressed holistically.

C. Socioeconomic Impact

1. Access and Equity

61. Mainly for equity considerations, one of the traditional roles assigned to TEVT is to provide economically disadvantaged and/or intellectually less gifted youths access to high-quality and relevant education and training. A profile of the families of final-year students (Appendix 21) indicates that both project and nonproject schools have been performing this role. About half of the fathers of project school students in Malaysia and Pakistan, and more than 85 percent in PNG, have had basic education (10 years or less of schooling). In Sri Lanka, the

proportion is 30 percent. In terms of occupation, about 20 percent of the fathers had managerial/ professional jobs; the percentage was even lower in PNG, where a large proportion (about 48 percent) of the fathers of project school students were subsistence farmers. About 30 percent of the families in Pakistan, 40 percent in PNG, and 70 percent in Sri Lanka earn less than $1,000 per year (about $83 per month). The average number of children per family is 3-4 in Sri Lanka, 4-5 in Malaysia, and 5-6 in Pakistan and PNG. Access and equity, either geographically or by socioeconomic status, is further facilitated by the provision of dormitories and hostels that enable the families, especially those from remote areas, to save on cost of food and transportation. Thus, ADB's intervention in TEVT has had considerable impact on poverty reduction in addition to meeting the skills requirements of industry.

2. Poverty Reduction

62. The experience in East Asia before the crisis shows that growth can reduce poverty by generating employment and incomes, with labor-intensive growth reducing it even faster. Survey results in impact evaluation studies in other DMCs show significant positive correlation between vocational training and employment/career, vocational training and socioeconomic improvement, and employment/career and socioeconomic improvement of graduates of ADB-assisted schools. Graduates benefited from the projects through greater access to higher quality courses as well as better chances of finding well-paying jobs. The projects were seen to have contributed to poverty reduction by augmenting the income of the families of the graduates.

3. Women in Development

63. Except in PNG, female participation (students and teachers) in TEVT has increased over time as shown in Table 3. With the exception of PNG, the participation of female students in TEVT has grown significantly during the period under study. The highest level of participation is in Sri Lanka; with female students making up about a 40 percent share in total enrollment; the proportion is more than 30 percent in Malaysia, and more than 20 percent in Pakistan and PNG. A closer look at this development, however, reveals that most of the female enrollment is concentrated in the business, commerce, clerical, and secretarial courses. Female participation in technology courses is not substantial, although it may have gradually increased over the years. In the case of teachers, a significant improvement in female participation has taken place in Malaysia. The share of female teachers in PNG has decreased due to the localization of teaching positions (replacement of expatriates by nationals). In Pakistan and Sri Lanka, teaching in TEVT has remained predominantly a male-dominated profession.

Table 3: Women Participation in TEVT
(percent)

Percentage	Malaysia		Pakistan		PNG		Sri Lanka	
Share	1980	1998	1980	1998	1980	1998	1980	1998
Female Students	26.6	32.2	10.1	21.5	21.1	21.6	30.9 (1982)	38.5
Female Teachers	21.8	38.2	na	13.4	28.9	22.0	na	15.3

TEVT = technical education and vocational training, PNG = Papua New Guinea, na = not available.

Sources: Various appraisal reports, project completion reports, project performance audit reports, and country report.

D. Financial Impact

1. Trends in Educational Finance

64. The relative importance that the governments of the DMCs give to education in general and to TEVT in particular may be gleaned from the long-term financial ratios shown in Appendix 22. In all three ratios, Malaysia has provided the best support in terms of budgetary allocations. PNG showed a steady decline in recent years, particularly for the share of technical education in total education expenditures. Pakistan and Sri Lanka have about comparable ratios for the share of education in the gross national product and in total government expenditures. However, for the share of TEVT in total education, Pakistan's ratio has been declining (resulting in reduced funding for operating expenses, particularly consumables and repair and maintenance), while Sri Lanka's has been slowly increasing. The contrast between Malaysia and the other three countries in support to technical education is clearly evident. That such support has in the end been justified may be partly seen in the high positive correlation between the rapid growth of manufacturing value added per worker (a measure of productivity) and the number of TEVT graduates per year (Appendix 23). Investment in technical education appears to have been partly responsible for the productivity gains experienced by Malaysia's manufacturing sector.

2. Recurrent Unit Cost and Cost Recovery

65. The DMCs have a tradition of either free or heavily subsidized education. In Malaysia, education is free through upper secondary, including board and lodging for STS/SVS students. In Sri Lanka, education at all levels is free and a monthly allowance to full-time students is provided in the TCs. In Pakistan, a minimal fee is charged which is less than 10 percent of the unit cost. In PNG, the government pays for 80 percent of the total operating cost of the TCs directly through the budget or indirectly through the National Tertiary Scholarship (NATSHOL).[14] The balance comes from self-funded or company-sponsored individuals and some contracted projects with industries.

66. The average recurrent cost per student varies significantly among the DMCs (Appendix 24). At $2,915 per student, PNG is the highest cost-provider. One of the main reasons for this is its very low STR of 6:1. To bring the ratio to a more cost-effective norm of 15:1, enrollment would have to be increased to about 3,000 students—in which case the cost will go down by 67 percent—or the number of teachers reduced. Localization of staff could also be pursued further, since expatriates still constitute about 22 percent of the teaching staff. The average annual cost for a three-year contract of an expatriate was about $32,000, compared with $5,700 for a national.[15] This presupposes the availability of qualified local staff.

[14] In 1991, NATSHOL accounted for about 81 percent of state-sponsored students. This had dropped to 52.9 percent by 1998.
[15] WD Scott, Preparatory TA on the *Skills Development Project* in Papua New Guinea, February 1998.

67. In Malaysia, the major concern is the significant difference in the average cost per student between the STS/SVS ($1,633) and the academic schools ($763). With the shift in objective of STS/SVS (para. 12), the two delivery systems have become competing alternatives. The average unit cost of STS/SVS is 114 percent higher than that of the academic schools, but its pass rate is only about 20 percent better. While employers perceive STS/SVS graduates to be significantly better qualified than those of academic schools, the average salary of the latter has consistently been about 16 percent higher. In Pakistan and Sri Lanka, the low level of average unit cost hardly indicates efficiency; instead it indicates inadequate provision, particularly for operating and maintenance expenses.

68. Except for PNG, the DMCs do not have any significant cost recovery measures in place. Increasing tuition fees has been found to be a very sensitive measure. At the time of the Mission, however, one cost recovery measure was being seriously considered in Pakistan: the "2+1" model. The model proposes a partnership between the polytechnics and industry for a fee during the final year of the 3-year technician course. The prospect of immediate employment after completion is expected to lessen students' insistence on free or highly subsidized education. This model or its variant could be considered for Sri Lanka and PNG as well. There is an urgent need to explore other cost recovery models in view of the increasing difficulty of governments in providing and sustaining adequate funding for TEVT.

IV. KEY ISSUES

A. Role of TEVT in the Context of Trade Globalization: Need for a Paradigm Shift

69. The conventional role assigned to TEVT has always been to supply industry with highly trained technical personnel—technicians, operators or skilled workers, and craftsmen. The extent to which the TEVT succeeded in fulfilling this role varied among the DMCs. However, the immediate customer—industry—has been generally unhappy with the results. On the other hand, the corollary role of providing access to educational opportunities for the economically and intellectually disadvantaged appears to have been given more emphasis. Thus, it was common to see, not only in the DMCs but in many other countries as well, the TEVT systems turning out a multitude of graduates from a menu of training programs regardless of quality and the demands of industry. Industry does hire some of them, but has first to provide long periods of on-the-job and/or formal training prior to their regular assignment. The TEVT systems (except those that are industry-sponsored) and industry have largely been operating in isolation from each other.

70. Such arrangements cannot continue in the face of the accelerating globalization of trade. The increasingly intense competitive environment in both the domestic and the export markets will require industries to exploit every possible source of competitive advantage. A major one undoubtedly is the quality of technical personnel. TEVT can be a source of competitive advantage for industry. This is not a new role; in fact, it is simply making good the role traditionally assigned to it. But it entails some major adjustments. To be truly a source of competitive advantage for industry, it may be necessary to overhaul the entire delivery system to achieve a minimum level of quality, and then invest in a number of key institutions to produce a cadre of highly specialized personnel. A paradigm shift is thus needed: from a predominantly "safety-net" orientation to a "source-of-competitive-advantage" orientation, but without necessarily discarding the former. The demands are different, but not necessarily incompatible. There is, therefore, a need to change the emphasis in all of the DMCs.

B. Commitment to TEVT: Key to Sustainability

71. Ownership at the ministry/department level, as well as the institute level, and the development of good governance practices are key ingredients to sustainability. If official policy statements are to be the basis, all the DMCs are equally committed to TEVT. However, the extent to which such statements were backed up by resources has been far from equal. As earlier indicated, Malaysia's ratio of TEVT to total education expenditures has been about three times that of Pakistan, PNG, and Sri Lanka over the years. This is, of course, a question of priorities: how much should TEVT get relative to the other education subsectors, i.e., basic education, general postsecondary education, and higher education? Malaysia decided to consistently give a relatively high share to its TEVT and such decisions appeared to be paying off (para. 65). The other three countries might take a cue from this experience. At the past and present level of funding, their TEVT systems as a whole have been far from a source of competitive advantage that they could be. Specifically, for the project schools—the TCs and the

polytechnics—the desired level of internal and external efficiencies could not be sustained after project completion. A critical mass of investment and operating resources is needed in order for the TEVT system to deliver desired results. This calls for a higher level of commitment: from policy to action.

C. Development Thrusts Within the TEVT

72. Although ideally the whole subsector would be strengthened, there is a need to prioritize development among TEVT delivery systems according to their three-tiered level of output: lower-level personnel (VTCs), middle-level personnel (TCs or polytechnics), higher-level personnel (universities or advanced TCs and colleges of technology). There are, of course, certain overlaps in terms of course offerings, but the classification generally holds true among the DMCs. In fact, the different delivery systems fall under different ministries or departments. The need to prioritize is dictated not only by the magnitude of the costs involved, but also by the changing personnel structure of industry as it develops and employs increasingly more sophisticated technology and requires better-educated and trained workers (Appendix 15).

73. At the level of the project schools, there are a number of issues that each DMC has to address. They are as follows:

- **Malaysia.** With a shift in its objective from "preparing students for work" to "preparing for further studies," there is little now that distinguishes the STS/SVS in terms of objective, curriculum, and output from the technology/vocational and science streams of academic schools. Can its significantly higher unit cost continue to be justified by other considerations, such as access and equity and better quality perception by industry? A set of clear differentiating features needs to be articulated for the STS/SVS or they will soon face an identity crisis.

- **Pakistan.** While its industries do need "real" technicians, most of the needs based on discussions with industry leaders are for lower-level personnel—operators and skilled workers. This has not been the major area of expertise of the polytechnics. Should it now develop as a major thrust, short courses that are industry-specific in partnership with industries (also as part of cost recovery measures) or should this task be left to the VTCs? Over the longer term, the thrust articulated in Pakistan's Perspective Plan is on quantitative expansion of the polytechnics, despite the projected surplus of its graduates over industry needs. Given the substantial quality gap, shouldn't the focus be on quality improvement of existing polytechnics rather than on quantitative expansion?

- **Papua New Guinea.** TCs have been found to be high-cost, low-quality providers (compared with private providers), catering mainly to the needs of the formal sector. ADB's Employment-Oriented Skills Development Project[16] will address both higher- and lower-level TEVT and specifically includes the design of linkages between these levels. The need for lower level skills development is also met by other organizations such as NGOs, CBOs, and churches, ensuring a welcome diversity in TEVT activities, rather than a monopoly by the government.

[16] Loan 1706–PNG(SF): *Employment-Oriented Skills Development Project*, for $20 million, approved on 28 October 1999.

- **Sri Lanka.** The ADB-assisted Skills Development Project[17] will focus on lower-level skills for industries and for self-employment, particularly for rural youth including women. This is a shift in focus from the TCs to the VTCs. Should the TCs reposition for this task or should it be left to the VTCs, NGOs, and CBOs? Should the TCs be left to deteriorate further or should further assistance be provided to rehabilitate them in support of the country's small but strategic manufacturing sector?

D. Size and Quality of the Delivery System

74. Social demand exceeds the capacity of the project schools several times over in the DMCs. The issue then is whether capacity should be expanded to meet social demand. Given that the project schools are primarily designed to produce middle-level personnel for industry, the issues of quantity and quality should come into consideration: is there enough demand for the graduates and are they of the right quality? If the answer is negative (and at present, there is much to be desired), then quality improvement of existing capacity would be the logical focus. On the other hand, if capacity is not expanded, how else will the excess applicants obtain the education and training they see available from the project schools? Would it not be better just to have them trained regardless of quality and prospects for employment, because then the economy will then have a pool of trained personnel? This is one balancing act that each DMC, considering its particular circumstances, will have to resolve.

E. Public-Private Sector Mix in the Provision of TEVT

75. The issue of capacity can be partly addressed by sharing the task with the private sector. In all the DMCs, the Government is the main provider of TEVT. From the results of the study, however, the private TEVT institutions appear to be the more efficient providers. Would it not be cheaper for the Government to meet most of the excess social demand by simply encouraging private sector institutions to increase their share in the provision of TEVT? Future aid donor operations could then focus more on the incentive structure, and quality and efficiency aspects, rather than on quantity in publicly funded TEVT institutions. Various incentives might be considered, such as access to loans or to grants, tax relaxation, teacher training, sharing of facilities, learning materials, and the like. This becomes even more urgent given perennial budgetary constraints of DMC governments.

[17] Loan 1707–SRI(SF): *Skills Development Project*, for $18.8 million, approved on 28 October 1999.

V. CONCLUSIONS

A. Overall Assessment

76. ADB's assistance to TEVT in the DMCs had a significant impact for a few years after project completion, but the impact has not been sustained through the years except in Malaysia. Enrollment capacity increased with the establishment of new schools, especially in Malaysia and Pakistan, thus providing access to and promoting equity among the poorer segments of the population. But with no major reinvestment after project completion, the capacity of the project inputs in Pakistan, PNG, and Sri Lanka has gradually dissipated over the years. The course offerings proliferated, but the curricula have not been regularly updated. A majority of the teachers has received no further training since the projects' staff development program. Many of the buildings need repair and only about half of the equipment is operational (depending on the technology area). Even items still operational are not fully utilized because of the lack of consumable materials. The extensive facilities of the TTTCs in Pakistan and Sri Lanka continue to be underutilized, although prospects look more promising under the new policy directions. Industry linkage has remained nonexistent or minimal until recently. Consequently, the internal and external efficiencies of the project institutions have been low.

77. Based on the survey results, long-serving teachers felt that the situation was better in the 1980s than it is at present. Industry people confirm this assessment, indicating that the public TEVT institutions have deteriorated over the years particularly in Pakistan and PNG. Malaysia provided a more optimistic picture, but Malaysia's TEVT institutions, notably the STS/SVS, have fundamental questions as to their *raison d'etre* as a delivery system. New policy directions and programs for TEVT have already been drawn up and reforms initiated in all the DMCs, including forging stronger linkages with industry. This augurs well for both the TEVT institutions and industry as they face an accelerating globalization of trade in the new millenium. The study confirms the conclusions of the PPARs that the projects in Malaysia were generally successful, while those in the other three DMCs were partly successful.

B. Lessons Learned

1. "One-Shot" Projects Do Not Work: A Long-Term Focus is a Must

78. The one lesson that stands out from the study is that "one-shot" projects do not work. The development cycle of the TEVT subsector and the baseline status from which the projects started were known; it should have been obvious from the beginning that a single project or even two projects spaced several years apart, no matter how well-designed and implemented, could not establish a sustainable system. The requirements of a long-lasting impact simply cannot be achieved by one project. Given the long program cycle needed for sustained development of the subsector, a series of overlapping projects with consistent core objectives, aiming over a longer period (a decade or more), is needed to make an impact on key subsector

indicators while strengthening Government capacity to manage the subsector. This has been the contrasting experience between Malaysia and the other DMCs. With a series of projects, the perennial problem of inadequate funding after project completion could then be partly eased through the projects' provision of incremental recurrent cost allocations. Based on experience, loan covenants requiring the DMC to provide adequate funding after project completion were not enough to ensure sustainability. What this implies is that once an aid donor decides to assist the TEVT subsector, it must be prepared to provide that assistance on a long-term basis.

79. ADB could engage in more substantive policy dialogue with governments and develop a framework for sector development to be implemented over a decade or more supported by continuing financial inputs. However, the length of the long-term horizon period and the proper sequence of successive project interventions may differ according to country-specific context. Taking a holistic approach at the beginning of the first intervention and making a long-term commitment to support a complete program cycle would be in keeping with ADB's character as a development institution.

2. A TEVT System Without Industry Linkage is Untenable

80. The experiences of the DMCs in this study highlight the importance of strong linkages with industry. Operating virtually in isolation from industry, the polytechnics of Pakistan and the TCs of PNG and Sri Lanka have deprived themselves of valuable inputs. (The need for such linkage may not be so urgent in the case of STS/SVS of Malaysia, since the majority of their graduates go for further studies rather than for work). These include not only opportunities for industry exposure of students and teachers alike, but also the built-in feedback mechanism on the type, level, and quality of personnel needed. These are critical inputs in deciding the menu of course offerings and corresponding curriculum content which could minimize the mismatch between supply and demand. Even more important, the project schools lack the inputs of industry executives/managers which could have a significant influence on their corporate culture and the way things are done, as clearly demonstrated in the case of the few project schools with active industry participation. Project concepts should incorporate mechanisms to obtain commitment from industries and to engage them as major stakeholders in the development of TEVT.

3. Leadership Can Spell the Difference in Performance

81. In spite of the numerous constraints faced by the project institutions, there are always one or two in each country that stand out above the rest. It is invariably the leadership that makes them different. In a highly centralized and bureaucratic environment vulnerable to political pressures, the school's leader must possess certain characteristics if the institution is to prosper. Interviews with some of these exemplary leaders reveal that the following characteristics, among others, are critically important: a vision of what the leader wants the institution to be; the willingness to take risks to do what ought to be done even if it does not strictly follow the bureaucratic process; an attitude of not depending only on the government budget; personal courage to stand up to extreme political pressure; ability to mobilize the support of the community (especially the parents and community leaders) to rally behind a cause; ease in dealing with industry people and firm belief in industry participation; creativity and initiative; and, above all, personal integrity. If the heads of project institutions had

possessed most of these characteristics, perhaps the project performance, especially in Pakistan, PNG, and Sri Lanka, could have been significantly better, even in the same operating environment. This is a lesson that future projects cannot afford to overlook.

C. Follow-Up Actions

1. For the DMCs

a. Packaging a Series of Projects Over the Long-Term

82. Given the present state of their TEVT systems and the need to improve the competitiveness of industry in the face of the prospective zero tariff by year 2020 for developing countries, the DMCs may consider it important to upgrade the TEVT subsectors. A package of perhaps 4-5 projects would be needed, prioritized according to the timing of the development of the various delivery systems (para. 79).

b. Assessment of Managerial Corps

83. There is a need to design and implement an assessment program for the TEVT managerial corps, particularly the principals and their understudies, if any, to evaluate their leadership capabilities and potential. Those who do not measure up should be retrained, redeployed, or retired. Indonesia's recent policy of "talent scouting"—the upgrading of school management personnel in terms of selecting those with the best management skills—would be a good model to adopt. Equally important would be the preparation of a succession plan, identifying those next in line, or sourcing from outside with particular bias in favor of those from industry. Certainly, this is easier said than done and would require a strong political will. It is a necessary condition, however, if the project institutions are to have the dynamism required of a successful and responsive delivery system.

c. Opening Windows for Industry Participation

84. There are certain areas where industry can participate in the management of public TEVT institutions—at the level of the school Board, if any, or on an Advisory Council or Committee, either at the level of the school or of a department. One must, however, take into consideration the observed reluctance of school management to involve industry in running schools. In most cases, the reason is that the school management, particularly the head, feels "uncomfortable" dealing with industry. Other school officials are simply overzealous in protecting their turf. In both cases, there may be a need to institutionalize industry participation through legislation, by incorporating the proposed body in the school's charter or by some other means. By itself, though, this would not be enough. A major implementation push from the central level must be exerted down to the level of the schools. Another major consideration to make the plan work is in the choice of industry representatives: they must have both the interest and the time.

d. Physical "Facelift" of Campuses

85. The appearance of physical facilities—the grounds and buildings (inside and outside), often reflect the quality of the institution's management. In most of the project institutions, with

few exceptions, one cannot fail to notice the litter on the grounds, the untrimmed grass, the graffiti on the walls, the smell of the toilets, the dust on the floor and furniture, the long-idle equipment, the broken windows. If these are the visible signs outside, what would one assume about the systems and procedures, the records, the decision-making processes, inside the organization? What message does it convey to the students, teachers, and the community? These are things that are often overlooked in both project design and implementation. Setting aside some funds to ensure basic housekeeping and cleanliness on each campus would go a long way toward creating an atmosphere conducive to learning. This would also be a good impetus toward cleaning up the internal systems and processes within the institutions.

e. Developing a Database and an Information System

86. The need for a comprehensive database and information system comes up in almost all ADB-assisted projects and cannot be overemphasized. In the course of this study, the Mission found the availability of secondary data very much wanting, particularly in Pakistan and PNG. It is time that serious efforts were exerted to develop a database, and to design and install an information system not only for the project schools but for the TEVT subsector as a whole.

f. Depoliticization of Project Institutions

87. Politics is accepted as part of all public institutions, but the extent of involvement appears to be particularly intense in the project schools in Pakistan. Because students and teachers are supported by political parties, it has been very difficult for management to enforce rules and regulations, take disciplinary action, enforce academic standards, practice performance appraisal, or initiate innovative programs to benefit the schools. In short, the managers cannot manage. Unless the political element is eliminated, or at least substantially reduced, no amount of reform in the project schools can go far. This would require nothing less than a sincere effort on the part of the national leadership backed up by a vigilant media and the citizenry.

g. Identifying Immediately Actionable Matters

88. A number of other suggestions gathered through the survey, FGDs, and interviews can immediately be implemented by the DMCs without waiting for another foreign-assisted project. These include, among others, the following:

(i) Integration of entrepreneurship and industry training modules and industrial ecology in the curriculum;
(ii) Industry attachment of teachers;
(iii) Strict enforcement of attendance policies (Pakistan);
(iv) Equitable allocation of student places in TCs (PNG) and polytechnics (Pakistan);
(v) Filling of vacant posts (Sri Lanka and Pakistan);
(vi) Increases in the budget for consumables (Pakistan);
(vii) Establishment of repair and maintenance units in the four regions or at least in each college (Sri Lanka);
(viii) Establishment of a Directorate and Board of Technical Education in Balochistan (Pakistan); and
(ix) Use of information technology to improve the efficiency of delivery systems and external efficiency.

2. For External Aid Agencies

89. In line with ADB's new focus to address poverty reduction in the region, undertake poverty analyses during project preparation in order to ascertain the most effective policies and institutions to fight poverty through assistance to TEVT. The challenge is to identify the investment niche in the TEVT subsector under the proposed development thrust focusing the role of TEVT from more of "safety net" to a more balanced "source-of-competitive-advantage" orientation.

90. Make a commitment to support TEVT over the long term through a series of overlapping projects with the same core objectives.

91. In preparing future projects, carefully ascertain the demand for graduates, both from the viewpoints of industry and other users as well as of potential students.

92. In view of low and inadequate operation and maintenance budgets, consider the affordability of project facilities to be provided.

93. Review the thrust of assistance in each of the DMCs. Among the series of projects that the DMCs may package for the long-term, aid agencies should consider assisting the following:

- **Malaysia.** Upgrade the science, mathematics, and english programs of the upper secondary academic schools in support of the country's drive to develop high-technology industries, as well as upgrading the VTCs to directly supply skilled workers to industry.

- **Pakistan.** Upgrade the quality of existing polytechnics, and develop short courses for skills upgrading that will strengthen linkages with industry, improve utilization of facilities, provide extra income to instructors, and enhance cost recovery.

- **Papua New Guinea.** Cooperate in the rehabilitation of the TCs and VTCs, support the reforms already initiated, and establish a framework for an adequate approach to bring TEVT institutions and industry together and make TEVT a common concern. As a second major thrust, convert the curriculum into the CBT system to bring the TCs into the mainstream of articulation (system of equivalency) among the different delivery systems.

- **Sri Lanka.** Focus on total quality improvement of existing TCs and the conversion of the TC curriculum into CBT. This will soon become necessary given the country's relatively fast-growing and modernizing manufacturing sector.

APPENDIXES

Number	Title	Page	Cited on (page, para.)
1	Survey Sample Sizes, Focus Group Discussions Conducted and Number of Participants, Schools/TEVT Institutions Visited, and Number of National Workshop Participants	30	2,6
2	Selected Socioeconomic Indicators of Project DMCs	31	2,7
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