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Japan International Cooperation Agency (JICA)
Ministry of Education, the Republic of Ghana

The Study for Development of a Master Plan to Strengthen Technical Education in the Republic of Ghana

Final Report
Executive Summary

November 2001

Pacific Consultants International

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The exchange rate applied in the Study is;

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(September, 2001)

Preface

In response to a request from the Government of the Republic of Ghana, the Government of Japan decided to conduct a "Study for Development of a Master Plan to Strengthen Technical Education in the Republic of Ghana" and entrusted the study to the Japan International Cooperation Agency.

JICA selected and dispatched a study team headed by Dr. Yoshihiro Asano of Pacific Consultants International to Ghana between March 2000 to December 2001. In addition, JICA set up an advisory committee headed by Mr. Nobuhide Sawamura, Associate Professor of Hiroshima University, between March 2000 and December 2001, which examined the study from technical points of view.

The Team held discussions with the officials concerned of the Government of Ghana and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Ghana for their close cooperation extended to the study.

December, 2001

川上隆朗

Takao Kawakami
President
Japan International Cooperation Agency

Mr. Takao Kawakami
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

Dear Sir,

We are pleased to formally submit herewith the Final Report of "the Study for Development of a Master Plan to Strengthen Technical Education in the Republic of Ghana".

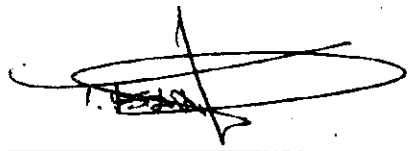
This report compiles the results of the Study, which was undertaken in the Republic of Ghana from March 2000 through December 2001 by the Study Team, represented by Pacific Consultants International.

We had been assisted by many people for the accomplishment of the Study, and we would like to express our sincere gratitude and appreciation to all those who extended their kind assistance and cooperation to the Study Team, in particular, Ministry of Education who act as the counterpart agency.

Also, we acknowledge the effective assistance by all the officials of your Agency and the Embassy of Japan in the Republic of Ghana.

We hope that the report will be able to contribute to the development of technical education for Ghana.

Very truly yours,



Yoshihiro Asano

Team Leader,
The Study for Development of
a Master Plan to Strengthen
Technical Education in the
Republic of Ghana

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

OVERVIEW

Development Context in Ghana

The most important feature of the Government's policy to address Ghana's economic problems is to develop an export-oriented industrial sector, with particular emphasis on private sector involvement. In this context, not only is the Government attempting to create conditions to assist existing industries and enterprises to be more competitive internationally, but it is also encouraging new investment to the development of human resources.

Importantly, a substantial number of enterprises in Ghana exist within the "informal" sector of the economy. Most of these enterprises are characterized as a small labor force, and they generally do not conform to relevant Government regulations. A substantial number of the workforce operates within the informal sector in Ghana. The sector is integral to the current economic reform agenda, and there is significant focus on enabling small enterprises within the informal sector to develop, and become progressively absorbed within the formal sector in a near future.

One of the major means of contributing to growth in both sectors is to provide relevant human resources. Education and training courses need to provide relevant knowledge and skills for people to enter the workforce. There should also be courses to enable people already in the workforce to upgrade existing skills and acquire new ones under globalization of economy. Technical and vocational education and training (TVET), more than any other educational sector, is of particular importance to meet the changes of human resource needs.

TVET in Ghana

The current formal TVET system in Ghana has considerable difficulty in responding to emerging human resource demands. In general, the current system is *supply-driven*, rather than *demand-driven*, and it has the following issues to provide effective human resource development:

- Courses have little significant input from industries and enterprises in terms of outcomes and standards;
- There is little equivalence between courses run by institutions managed under different ministries;
- Because of the expectation that most course work must be mainly undertaken within each respective institution, there is far too much pressure on the already meager facilities and equipment, especially for the conduct of practical work; and
- There is limited opportunity for people working in the informal economy to access courses in the formal TVET sector.

There is increasing pressure on post-secondary education institutions in Ghana to respond to emerging TVET needs, and to address issues of access and opportunity for all. As a result, the traditional roles of the TVET institutions are urgently needed structural changes. Polytechnics, in particular, are being challenged to demonstrate relevance of their course offerings and student outcomes.

TVET Reform Strategies (Master Plan)

The Master Plan incorporates a process of TVET reform to enable Ghana to meet emerging needs. It proposes a broad set of activities that aim to create strong linkages between industry and the TVET system so that it can provide access to lifelong learning for all Ghanaians. This is to be achieved through cooperation and partnership between ministries, industry and enterprises both in the formal and informal sectors, local government, labor, teachers, parents, students and community- based organizations.

A National Qualifications Framework (NQF) is one of the key elements to provide a mechanism for the restructuring of the sector to encourage new and flexible curricula, the upgrading of learning standards and monitoring and regulation of qualifications. There is to be an emphasis on quality assurance of courses (utilizing industry-based competencies), mobility of learning, transferability of module credits and easier articulation between courses.

It is intended that a Competency-Based Training (CBT) approach be used as the primary methodology for achieving effective links between TVET institutions and all industry and business and community enterprises. In the CBT approach, the industries identify and develop competency standards, assessment guidelines and qualifications in close collaboration with training organizations. Based on these requirements, TVET institutions will develop new curricula called "Training Packages."

Training Packages are modules, which can be provided not only by education institutions, but also by industries, as long as they are accredited. Since Training Packages reflect industrial needs, quite a few modules, especially practical training by using specific equipment, can be conducted by industries in the formal and informal sectors. In other words, the CBT approach is an open system to encourage participation of all parties concerned, by sharing scarce assets needed to provide TVET.

Key priority issues for the reform of the TVET system include:

- Improving capabilities for the delivery of TVET through teacher education, industry skills development, industry-driven curricula and course development, and the development of community and further education;

- Developing and improving systems for articulation from one course to another, and from post-secondary education institutions into higher education institutions;

- Upgrading teacher skills especially for practical training; and

- Developing and improving systems to increase educational access for those living in rural areas, women and disadvantaged people.

For the TVET reform, it is proposed to establish new organizations, such as Ghana National Training Authority (GHANTA) and Industry Training Advisory Boards (ITABs), to oversee the national training agenda. GHANTA will supervise TVET reform across all industrial sectors, and ITABs will be responsible for identifying competencies that industry and business need. The ITABs will work in close collaboration with TVET institutions to develop Training Packages.

Implementation Measures

In line with current and emerging needs within the Ghanaian economy and global market demand, six strategic fields were selected as pilot programs to introduce the CBT approach in Polytechnics. They are: Hospitality and Tourism, Information Technology and Communications, Business Information Technology, Post Harvest and Food Processing, Wood Processing Technology and Manufacturing Technology.

Proposed measures to achieve successful implementation of pilot programs in Polytechnics are: overall organizational development, training package development, staff upgrading and teaching materials development. It is intended that once the recommended TVET reform strategies are implemented with the Polytechnics, they can be applied throughout all levels of the TVET system in Ghana.

Urgent Action Programs

Urgent action programs are proposed in order to facilitate change from the conventional TVET system to the CBT system, particularly in the Polytechnics. The urgent action programs are classified into two types of initiatives: Ghanaian initiative, and technical and financial assistance by the support from donor agencies.

Urgent action programs by Ghanaian initiatives are particularly important to sustain the implementation of TVET reform in Ghana. The Government agencies need to make the following efforts:

- Cooperation between the TVET Sector and Industry
- Establishment of CBT Development Committee
- Development of GHANTA
- Introduction of Cost Recovery Policy

Polytechnics need to make the following efforts:

- Establishment of Preliminary ITABs
- Development of Short Courses
- Strengthening Industrial Liaison Officer, Alumni Association and Industrial Attachment

The CBT system is new for Ghana and, therefore, technical and financial assistance by donor agencies will be necessary in the initial stage of the TVET reform processes. These programs are:

- It is proposed to recruit international experts for adoption of the CBT approach. These experts have knowledge and experience in implementing a CBT approach, and they will work with Ghanaian counterparts to introduce a CBT system during the period of Phase I (2002-2004). These experts are: 1) institutional development expert, 2) financial development expert, 3) CBT resource development expert, and 4) textbook/workbook production expert.

- It is proposed to establish a special unit to be responsible for the production of teaching materials including textbooks/workbooks that will support the adoption of a CBT approach in the TVET. The unit will operate on a small scale in the initial stages, focusing on commonly used subjects, such as communication skills, quality control, productivity improvement, occupational health and safety.

- It is proposed to establish a CBT Development Center to support TVET reform in Ghana. The overall goal of the CBT Development Center is effective implementation of the CBT approach in the TVET sector, including training of teachers and administrative staff in Polytechnics and dissemination of the CBT approach in all levels of TVET institutions under various ministries. The CBT Development Center has four major functions: 1) human resource development, 2) institutional development, 3) teaching materials development, and 4) administration and management.

CHAPTER 1 INTRODUCTION

1.1 Background of the Study

In response to a request from the Government of the Republic of Ghana, the Government of Japan decided to conduct a technical cooperation project called the Study for Development of a Master Plan to Strengthen Technical Education in the Republic of Ghana (hereinafter referred to as the Study).

The Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of technical cooperation programs, conducted the Study in accordance with relevant laws and regulations in force in Japan. The Ministry of Education (MOE) of Ghana acted as the Counterpart Agency and coordinated the implementation of the Study with other relevant government agencies. The Scope of Work for the Study was agreed between MOE and JICA on December 1999, and the Study started from March 2000.

1.2 Goal and Objectives

The goal of the Study was to develop a Master Plan to improve the technical education system in Ghana in terms of human resource development, institutional strengthening and facilities improvement towards the year 2020, with particular emphasis on Polytechnics. The Study was to investigate measures in which the technical education sector could be restructured so that 1) it may develop the mechanisms required for sustainable economic growth, 2) the sector may become less dependent on the government budget, and 3) the sector may achieve the flexible human resource development system in response to changes in the demand of the labor market.

1.3 Implementation Framework

The Study was divided into three phases: Phase 1 - Review of technical education systems in Ghana, Phase 2 - Development of a Master Plan to strengthen technical education, and Phase 3 - Development of institutional strengthening measures for selected Polytechnics. The Phase 1 study was conducted from May to July 2000, the Phase 2 study was conducted from August 2000 to March 2001, and the Phase 3 study was conducted from April to October 2001.

1.4 Structure of the Report

The report is divided largely into two parts: Part I The Current Situation, and Part II Planning to Strengthen Technical Education. Following the introduction of Chapter 1, Part I consists of four chapters. Chapter 2 gives an overview of current socio-economic conditions in Ghana. Chapter 3 analyses the labor market by using existing data and documents. Chapter 4 discusses Ghana's technical education systems as a whole. Chapter 5 identifies specific areas of curriculum development of technical education, with emphasis on Polytechnics.

Part II consists of four chapters. Chapter 6 presents major considerations for the preparation of a Master Plan to strengthen technical education. Chapter 7 formulates a Master Plan to strengthen technical education towards the year 2020. Chapter 8 examines implementation measures for selected pilot Polytechnics and pilot programs proposed in the Master Plan. Chapter 9 presents urgent action programs.

CHAPTER 2 OVERVIEW OF SOCIO-ECONOMIC CONDITIONS

2.1 Population

The total population of Ghana increased from 8.6 million in 1970 to 18.4 million in 2000. The average annual growth rate was 2.62 percent between 1970 and 1984, decreasing slightly to 2.56 percent between 1984 and 2000. The most significant characteristic related to population growth is the extent of rapid urbanization. Approximately one-third of the population resided in urban areas in 1984. Although current figures are not yet available, it is predicted that the population in urban areas will establish a higher growth rate than that recorded in the 1984 figure.

2.2 Recent Economic Trends

Economic Recovery Programs

In the early 1960s, Ghana had the highest per capita income among African countries. In the 1970s and 1980s there was a sharp decline due to a number of factors including the steep increase in the price of oil, severe droughts and economic mismanagement. The sharp decline in Ghana's economy resulted in a deterioration of living conditions. An important consequence of this was the large-sale migration of skilled Ghanaians to other countries. It is believed that approximately two million Ghanaians are currently living outside the country, many of them with higher education.

In 1983 Ghana launched an Economic Recovery Program (ERP), with support from the World Bank and the International Monetary Fund. The program was aimed at directing economic and financial policies, away from predominantly centralized control and strict regulations, to a more liberal and market-oriented economy. The initial phase of the program (1983-1986) focused mainly on economic stabilization, through the removal of exchange restrictions and price controls. From 1987 the program emphasized liberalization policies, combined with structural and institutional reforms. The exchange system was further liberalized; flexible pricing policies for cocoa were introduced; privatization of state-owned enterprises (SOE) was promoted; and a major restructuring of the financial sector was initiated. As a result of the ERP, the macro-economic conditions improved: the average growth rate of real GDP went from negative growth between 1980 and 1983 to 4.3 percent per annum between 1983 and 1991.[1]

Since 1991, Ghana has implemented economic recovery programs on its own initiative. During the first half of the 1990s, Ghana faced a major trade imbalance, the result of lack of foreign earnings from exports. This was mainly caused by the decline of agricultural output and power generation, due to adverse climatic conditions. The overall economic condition has improved since the mid 1990s. The growth of real GDP has improved from 3.3 percent

[1] African Development Bank and African Development Fund, *Ghana: Country Strategy Paper*, Paper prepared for the Annual Meetings of the Boards of Governors, 1996, pp.8-9.

in 1994 to 4.0 percent in 1995, 4.6 percent in 1996, 4.2 percent in 1997, and 4.6 percent in 1998. It reached 5.5 percent in 1999. The average annual growth rate of real GDP between 1993 and 1999 was 4.4 percent.

Economic Activity by Sector

The following is a brief summary of the recent economic activity by sector in the period from 1993 to 1999:

(1) Agricultural Sector

Agriculture is the dominant sector of the Ghanaian economy. In 1999 it accounted for 36.9 percent of GDP (based on 1993 constant prices). In the agriculture sector, food and livestock production has the largest share with 24.4 percent of GDP in 1999, followed by fishing (4.9 percent); forestry and logging (3.9 percent); and cocoa (3.6 percent). Agricultural output has grown at 4.3 percent per annum between 1993 and 1999. Forestry and logging production increased significantly, with an average growth rate of 10.5 percent during the same period, which is the highest growth rate of production among the sub-sectors.

(2) Industrial Sector

Industrial production increased at an average annual growth rate of 4.6 percent between 1993 and 1999. The share of industrial production of GDP in 1999 was 25.1 percent (based on 1993 constant prices), which has increased slightly (by 0.3 percent) from its share in 1993. The industrial sector comprises the mining and quarrying, manufacturing, electricity and water, and construction sub-sectors. The manufacturing sub-sector had the largest contribution (9.1 percent) to the GDP in 1999, followed by construction (7.9 percent), mining and quarrying (5.6 percent), and electricity and water (2.5 percent).

(3) Service Sector

The Service Sector has grown at an average annual rate of 5.3 percent between 1993 and 1999, which is the highest growth rate, compared with the agriculture sector (4.3 percent) and the industrial sector (4.6 percent), during the same period. The share of service production in GDP has increased by 1.5 points from 27.5 percent in 1993 to 29.0 percent in 1999. In the service sector, government services produced about 10.8 percent of GDP in 1999, which was the largest share in the production of services. Next were the wholesale and retail trade and the restaurant and hotel sub-sector accounting for 6.7 percent of the GDP, followed by the transport, storage and communications sub-sector (4.6 percent), and the finance, insurance and business services sub-sector (4.3 percent).

2.3 National Development Policies

Long-Term Vision

Ghana's long-term planning and socio-economic development policies are discussed in a plan called "*Ghana -Vision 2020*" (hereafter referred to as *Vision 2020*), which was formulated by

the National Development Planning Commission (NDPC) in 1995. According to *Vision 2020*, the long-term plan for Ghana is to achieve "the status and standard of living of a middle-income country"[2] by the year 2020. The basic development objectives are "to reduce poverty, increase employment opportunities and average incomes and reduce inequalities, in order to improve the general welfare and material well-being of all Ghanaians."[3]

Vision 2020 emphasizes the importance of Science and Technology as the key media for development, and focuses on five basic themes with the following major goals:

- Human Development - reduce poverty, increase average incomes and reduce disparities in incomes and opportunities

- Economic Growth - Establish an open and liberal market economy that optimizes economic development and ensures maximum welfare and material well being of all Ghanaians

- Rural Development - Reduce the disparities in incomes and standards of living between the rural and urban populations

- Urban Development - Ensure that small and medium-sized towns and cities adequately fulfill their roles as service centers for their rural hinterlands

- Enabling Environment - Create an environment in which all sections of society can contribute to a sustained and accelerated rate of social and economic development

Economic Development Policies

In order to achieve the long-term goals of *Vision 2020*, it is intended to create a shift in economic structure to increase productivity at internationally competitive prices. The following is a brief summary of the major intended sector development strategies and policies:

- Agricultural Sector - Achieve production at an average growth rate of 4 percent per annum, increase crop production through application of new technology and expand and diversify export crops by making the sector more price-competitive and export-oriented

- Industrial Sector - Increase the sector's share of GDP to 37 percent by 2020 by diversifying local products and making them more internationally competitive, expanding the range of manufactured goods to meet domestic demand and maximizing the use of local raw materials in the construction industry

- Service Sector - Establish Ghana as a major venue for international tourism, create an efficient system for storage, transportation and distribution of goods and services and establish an efficient financial system in the private sector

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[2] *Ghana – Vision 2020 (The First Step: 1996-2000)*, Presidential Report on Coordinated Program of Economic and Social Development Policies, p.31.

[3] Ibid.

2.4 International Trade

Balance of Payments

Ghana's overall balance of payments went into deficit in 1999 with the amount of US$93 million[4], after it experienced surpluses of US$249 million in 1995, US$25 million in 1997, and US$99 million in 1998. This was caused mainly by a large trade deficit, which increased from US$257 million in 1995 to US$1,112 million in 1999.

Two major items have contributed to reduce the deficit of the trade balance. The private transfers amounted to US$472 million and net receipts from travel for US$279 million in 1999. Together they amounted to US$751 million, which corresponded to 68 percent of the total trade deficit in 1999. It is the view that the key factors to improve the balance of payments in Ghana are to strengthen the structure of economy to promote exports, and increase private transfers and receipts from travel.

Trade Characteristics

Ghana's major export commodities are "gold" (US$608 million), followed by "cocoa products" (US465 million), "wood products" (US$205 million), "fruit" (US$91 million), and "aluminum products" (US$84 million). These 5 items together accounted for 81 percent of the Ghana's total exports in 1999.

Ghana's major import commodities are "petroleum, and electrical energy" (US$532 million), followed by "vehicles and their parts" (US$500 million), "machinery parts not containing electrical components" (US$391 million), "machinery parts containing electrical components" (US$235 million), and "printed materials" (US$207 million). These 5 items together accounted for 57 percent of the total of Ghana's imports in 1999.

[4] *Annual Report 1999*, Bank of Ghana

CHAPTER 3 THE LABOR MARKET

3.1 National Employment Policy

The following are policy measures incorporated in *Vision 2020* intended to create employment in the formal sector for all Ghanaians by the year 2020:

- Promotion of greater participation of women in productive employment;
- Priority given to infrastructure development in the most deprived areas;
- Promotion of employment in rural areas;
- Liberalization of trade practices;
- Increased access to education and vocational training;
- Investment incentives to labor-intensive forms of production; and
- Strengthening of links between human resource development and industry, agriculture and other productive sectors.

3.2 Labor Market Analysis

Labor Force and Population

There is little reliable data available for discussion and analysis of the labor market in Ghana. The most recent information on the labor market is from household surveys, such as the Core Welfare Indicators Questionnaire (CWIQ) Survey, in which 14,514 households were interviewed nationwide. Based on this survey, carried out in 1997 by the Ghana Statistical Service (GSS), in collaboration with the World Bank,[5] the Ministry of Employment and Social Welfare (MESW) estimated the size of the working population.

Education of the Labor Force

According to the information mentioned above, almost half (45 percent) of the labor force had never attended school (39 percent) or had not completed primary education (6 percent), while half of the labor force had completed primary school (13 percent), junior secondary school (31 percent) or senior secondary school (5 percent). A very small portion (1 percent) of the labor force had post-secondary education.

[5] This survey on the labor force was undertaken by MESW, with the support of the World Bank. The results of the survey, however, were not available at the time of writing this report.

Employment by Sector

Employment by the industrial sector (1997) is summarized as follows. The sector consisting of agriculture, forestry and fishing had the largest share of employment (56 percent), followed by the retail trade (21 percent), service industries (10 percent) and manufacturing industries (5 percent).

Employment in the Informal and Formal Sectors

The informal sector consists of mostly self-employed persons, who operate small enterprises, with easy entry and easy exit. The informal sector, which is chiefly found in agriculture and in the retail trade, is the most dynamic sector, absorbs a lot of labor and is believed to be growing at a rate of 5 percent per year.[6] The informal sector is often characterized as having low productivity, poor skills, low wages and few inputs. Comprehensive and reliable data are, however, largely unavailable, making it difficult to analyze employment in the informal sector in Ghana.

The statistical data prepared by the Ghana Statistic service shows only the employment structure of the formal sector.[7] Total formal employment amounted to 464,000 persons in 1985, which was only 8 percent of the total employment of 5,422,000 persons, as found in the 1984 population census. Formal employment in Ghana was, for many years, dominated by the public sector. Public sector employment expanded from 184,000 persons in 1960, to 288,000 in 1970, and 397,000 in 1985. However, it dropped sharply, by more than 200,000 persons, to 189,000 in 1990. One of the causes of the significant decrease during the second half of the 1980s has been the privatization of many public and state-owned enterprises under the Economic Recovery Program (ERP).

3.3 Estimation of the Labor Market

The supply of and demand for labor in 2000 has been estimated in Table 1. The labor market in Ghana can be summarized as follows:

- The estimated gap (4.9 million persons) between the supply of labor (8.8 million persons) and the demand for labor (3.9 million persons) is largely filled by underemployment (4.6 million persons) including part-time workers, unpaid workers and self-employed persons. There is a relatively small number of persons with no employment (0.3 million persons).

- The informal private sector (3.4 million persons) is by far the most significant employer in the labor market in Ghana. The public and semi-public sectors (0.3 million persons) have decreased their employment as a result of the Economic Recovery Program. The demand for labor in the formal private sector (0.2 million persons) is extremely low.

[6] Ministry of Employment and Social Welfare (Interview with staff)

[7] Quarterly Digest of Statistics, 1998, MESW, January 1999.

- By sector groupings, by far the most important are the agriculture, forestry and fishing sector (2.2 million persons), followed by the service sector including wholesale trade, retail trade, finance and social services (1.2 million persons). The demand for labor in mining, construction and manufacturing (0.3 million persons) is relatively much less than in the agriculture and service sectors.

Table 1 Summary of labor market, 2000

	Total (%)	Persons (thousands)
Supply:		
Labor force in 2000	100.0	8,800
Literate	47.9	4,215
Post-secondary education	1.3	114
Demand:		
Full employment	43.9	3,863
Underemployment	52.2	4,594
Unemployment	3.9	343
Total	100.0	8,800
Full employment by public and private sector		
Public and semi-public sector	6.9	267
Private sector:	93.1	3,596
Formal private sector	(4.1)	(158)
Informal private sector	(89.0)	(3,438)
Total	100.0	3,863
Full employment by sector		
Agriculture, forestry, fishing sector	55.9	2,159
Industrial sector (manufacturing, mining, construction, utilities)	8.9	344
Service sector (wholesale, retail, finance, service)	31.8	1,228
Others	3.4	132
Total	100.0	3,863

Source: Prepared by the JICA Study team, based on the figures from *Labor Market Skills Newsletter,*

CHAPTER 4 OVERVIEW OF THE TECHNICAL EDUCATION SECTOR IN GHANA

4.1 Definitions

Definition of Technical Education

The term "technical education" is interpreted in many ways. On the one hand, the term technical education is used to describe narrow academic programs related to technological and scientific fields. The term is also used to describe much wider contexts including various skills and knowledge needed for employment in industry and business. In Ghana, technical education generally refers to school-based formal technical education and training programs operated under the Ministry of Education (MOE).

There is also debate about the distinction between "education" and "training". The term "education" is often used to describe programs that deliver "high level" knowledge and skills, which are predominantly "theory-oriented." "Training", on the other hand, is used to describe formal and non-formal programs that deliver "lower level" skills which are predominantly "practically-oriented".

With the recent rapid changes of technology and the global labor market, these narrow definitions of technical and vocational education and separation of education and training are neither appropriate nor useful. In other words, there is no clear boundary between "technical and vocational" and "education and training." We need a more comprehensive perspective. In this Study, therefore, we use the term "technical and vocational education and training (TVET)" as a more comprehensive term which covers school-based education and training programs, both formal or non-formal, designed to prepare individuals with skills and knowledge necessary for specific occupations or productive activities in the various sectors of economy.

Definition of Formal and Non-Formal Education and Training

Pedagogical literature describes formal education as a structured educational system provided by the state or by private institutions receiving some certification from the state. Non-formal education is, on the other hand, seen as education that takes place outside of the formally-organized school. It is called non-formal education because it is noncompulsory; it does not lead to formal certification and may or may not be supported by the state.

4.2 Overview of the Formal TVET Sector in Ghana

There are many institutions operating in the formal and non-formal TVET system in Ghana. The following is a brief description of the roles of the various institutions:

Ministry of Education (MOE)

The MOE is responsible for the management and administration of the following institutions that offer TVET courses at varying levels:

1) Junior Secondary Schools (JSS) offer what are referred to as pre-vocational and pre-technical subjects such as catering, woodcraft, paper craft, metal craft, graphic design and sewing. The aim of these courses is to "prepare students for real life." Only 35 percent of JSS graduates progress to other levels of formal education and training.

2) Senior Secondary Technical Schools (SSTS) provide "pre-vocational" courses for future apprentices and workers, foremen and base level technicians in catering, woodworks, metal works, building, electric works, etc. with some hands-on experience higher than JSSs. Their primary objective is to not only provide students with a good general education but also practical skills in preparation for technical and vocational courses offered in tertiary institutions.

3) Technical Institutes (TI) take in students from different educational and training levels and backgrounds. They mainly provide TVET courses for junior secondary schools (JSS) and some senior secondary schools (SSS) dropouts with the aim of producing skilled apprentices, workers, foremen and technicians in various fields, including electrical/electronics, building, automotive, furniture manufacturing, fitting & machining and metal fabrication.

4) Polytechnics were established in 1993 due to the mounting pressure of demand for tertiary education and the need for highly skilled human resources. Eight Technical Institutes were upgraded to tertiary level education institutions and called Polytechnics. The Polytechnic provides tertiary level technical and business education with a Higher National Diploma (HND) in the fields of engineering, applied science, and business & management studies. The objective of the Polytechnics is to produce highly skilled workers, technicians, managers and engineers to support modern industries in a competitive global market.

5) There are five Universities in Ghana: Kwami Nkrumah University of Science and Technology (KNUST), University of Ghana, University of Cape Coast, University of Development Studies, and University College of Education at Winneba (UCEW). KNUST, University of Ghana, University of Cape Coast are providing tertiary education in a number of technical fields of agriculture, engineering, science and mining. The stated objective of the universities is to produce engineers, technical supervisors and future managers to be able to develop and manage industries and organizations.

6) There are three teacher education streams that prepare people for either professional or non-professional status. The status level will determine the educational areas in which a person may teach. The teacher education streams are: 1) Teacher Training Colleges (38 in number) offering 3 year courses for SSS graduates to become general elementary school teachers and JSS; 2) University College of Education of Winneba (UCEW) offering either a one to three-year course enabling students to become professional teachers in institutes including TIs; and 3) several of the major Universities offer a four-year course which enable some graduates to become teachers at Polytechnics, SSS, Teacher Training Colleges, and TIs.

Ministry of Employment and Social Welfare (MESW)

The MESW administer two kinds of TVET institutions: National Vocational Training Institutes (NVTI) and Integrated Community Centers for Employable Skills (ICCES). There are twenty-seven NVTIs, which provide vocational training courses with the objective of producing apprentices, workers, foremen, and base level of technicians in the fields of automotive, carpentry, catering and hairdressing. An NVTI Board administers the courses and supervises formal certification of the courses in collaboration with the National Trade Training and Testing Committee. A smaller number of ICCES provide non-formal skill-oriented courses to train young people particularly in rural areas. ICCES do not currently offer formal certification for courses.

Ministry of Environment, Science and Technology (MEST)

The MEST has operated 10 Ghana Regional Appropriate Technology Industrial Service/Intermediate Technology Transfer Units (GRATIS/ITTU) to provide TI graduates with more practical and updated techniques. They usually offer two and three-year courses in areas such as metal work, wood processing, civil engineering and computer graphics. They also provide short-term (3-6 months) courses in fields such as material dyeing, home economics and computers. GRATIS/ITTU have a small incubation scheme, by which their graduates are supported for the start-up of small-scale enterprises.

Administrative and Advisory Processes & Procedures

There are three supervisory bodies in the TVET sector. The National Council for Tertiary Education (NCTE) is an advisory body to the Minister of Education (MOE) in the development of institutions providing tertiary education. The National Accreditation Board (NAB) is the primary agency for accreditation of tertiary institutions and curriculum. The National Board for Professional and Technical Examinations (NABPTEX) is responsible for curriculum and examination administration and certification of the Higher National Diploma (HND).

Analysis of Budget, Student Enrolment and Unit Cost in the Education Sector

The following table provides information relating to Government expenditure on the various levels of education in Ghana.

Table 2 Budget, enrolment, and unit education cost by levels of education

	1991/92		1993/94		1995/96		1997/98		1999/00		Growth rate
Budget (US$)	(Mil. US$)		(Mil. US$)		(Mil. US$)		(Mil. US$)		(Mil. US$)		
Primary education	70	36%	65	34%	67	36%	82	35%	75	28%	0.76%
JSS	43	22%	47	25%	39	21%	49	20%	49	18%	1.69%
SSS	19	10%	19	10%	20	11%	31	13%	30	11%	5.53%
Technical & vocational training	2	1%	2	1%	2	1%	2	1%	2	1%	-0.54%
Tertiary education	19	10%	19	10%	18	9%	28	12%	31	12%	6.65%
Other administrative services	43	22%	37	19%	41	22%	46	19%	80	30%	7.89%
Total of MOE budget	196	100%	189	100%	188	100%	237	100%	266	100%	3.87%
Total Government budget	872		925		1,175		1,293		n.a.		5.78%
	22.5%		20.5%		16.0%		18.4%				(upto 98/99)
Enrolment (Public only)											
Primary education	1,807,223		1,910,408		1,955,713		1,959,651		2,106,200		1.93%
JSS			655,642		677,660		678,159		697,392		1.03%
SSS	144,700		176,654		185,479		190,003		208,739		4.69%
Technical & vocational training			14,472		16,078		14,547		13,824		-0.76%
Tertiary education	11,857		16,923		26,481		36,626		51,872		20.26%
Unit education cost (US$/student/year)											
Primary education	39		34		35		42		35		-1.15%
JSS			72		58		72		70		-0.42%
SSS	133		108		110		162		141		0.81%
Technical & vocational training			149		129		142		141		-0.92%
Tertiary education	1,587		1,151		672		770		607		-11.32%

Source: Statistic Department, MOE

4.3 Overview of Non-formal TVET Provision

It has been expressed by the MOE that tertiary institutions should not be seen only as "elite islands" for formal education and training.[8] This is very much in line with many countries of the world sharing the philosophy that publicly-supported colleges and universities have a responsibility first and foremost to educate but, also, to be a resource for the community as a whole.

Community-Based Programs

The Private Enterprise Foundation (PEF) is one of the larger organizations offering entrepreneurial training both in regional capitals and in rural districts. The programs are predominantly two to three day workshops mainly for women involved in small business and micro-enterprise type activity. The PEF often works in cooperation with the National Board for Small Scale Industries (NBSSI), which runs regional advisory and business centers, and also with some Intermediate Technology Transfer Units (ITTU).

Church-Run Programs

Church-run institutes have been an important feature of TVET provision in Ghana for a considerable time. Some, such as St Paul's TI in Koforidua, have been incorporated into the formal TVET system. The major churches, however, continue to conduct technical and vocational training particularly for young women.

[8] Comment by Mr. Budu-Smith, Deputy Director General, GES of the MOE and former Director of Vocational Education, GES, at Steering Committee Meeting on 5 July 2000.

Industry and Private Institute Programs

Non-formal training programs are provided by many of the larger companies. VALCO, for example, have a core of four full-time trainers who supervise and conduct courses for all employees on an annual basis. The curricula for the courses are designed in-house, and certification is also internally provided. Other companies such as Unilever and GAFCO also offer various types of training programs for their employees who receive internal certification for courses completed.

Polytechnics and Non-Formal TVET

The people involved in TVET programs at non-tertiary levels commonly mentioned that students in these programs could use more and better in-depth training in business management and entrepreneurial skills. The overwhelming majority of graduates of TVET programs, such as those from local apprenticeships, NVTI-qualifying programs, ITTU, ICCES, or the like, tend to go into their own businesses, where there is a huge need for upgrading their skills. ITTU, for instance, expressed a concern for enhanced business-related skills for the students, and they could greatly benefit from the expertise of Polytechnics, including short-term courses or seminars in relation to computer and information technology, especially for smaller businesses.

There is a strong desire for some linkage between the Polytechnics and other formal and non-formal TVET programs. The MOE emphasizes the importance of Vocational Technical Resource Centers (VOTEC) to improve technical and vocational skills of the community.[9] It is possible for Polytechnics to also assume the role of regional resource centers by strengthening linkages between formal and non-formal TVET sectors.[10]

[9] See the Republic of Ghana, *Comprehensive Development Framework: EDUCATION*, Ministry of Education, November, 1999, p.17.

[10] Interview with Dr. Baah-Boakye, Principal, Accra Polytechnic, 4 July, 2000.

CHAPTER 5 TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) CURRICULUM

5.1 Overview of the TVET Curriculum Development Process

The traditional view of curriculum is that it should be designed by the educational authorities. The programs undertaken then lead to the conferring of qualifications that are determined by the relevant educational authorities or institutions. In Ghana, the notion of curriculum in all TVET institutions is mostly traditional. The curriculum in most institutions is generally the responsibility of education and training authorities, with limited input from industry.

The Curriculum Development Process in MOE

The following is a brief description of the curriculum development process related to TVET under MOE:

- Junior Secondary Schools (JSS) - The Curriculum Research & Development Division (CRDD) of the Ghana Education Service (GES) has the responsibility for the development and review;

- Senior Secondary Technical Schools (SSTS) - The CRDD is responsible for the curriculum development and review. However, the West Africa Examination Council (WAEC) administers examinations and issues certificates;

- Technical Institutes (TIs) - The Technical Examinations Unit (TEU), under the Technical and Vocational Education Division of GES, is responsible for curriculum development. In some cases industry makes direct contact with TIs in order to seek customized specific training for their workers;

- Polytechnics offer two types of courses: 1) Tertiary Higher National Diploma (HND) and 2) Non-tertiary Intermediate and Advanced Craft and Technician Certificates. For HND tertiary courses, NABPTEX is responsible for curriculum development, examination administration and certification of the HND.

5.2 Certification in Technical and Vocational Education & Training

Related to curriculum development functions, certification for the TVET courses offered under MOE, MESW and MEST varies considerably. The certifications awarded by these ministries are not only different, but it is very difficult to articulate from one qualification to other.

A student, for example, who has undertaken a course offered by an institution under MESW cannot use credit points to gain exemptions from units within a course run by an MOE institution even when the knowledge and skill levels in two courses are similar. Even between the courses such as Technician III and HND within the same MOE, students cannot

transfer any of the credits to one another. This situation makes it difficult to make efficient human resources development pathways in the total TVET framework in Ghana.

5.3 Analysis of Selected Polytechnic Curricula

The HND curricula, which were essentially revised versions of the two-year diploma programs previously offered at universities, were accredited by the NAB in 1995, and approved for delivery by the NCTE – the chief policy-making body for tertiary education in MOE. Courses offered in Polytechnics include engineering, applied science and technology, business and management studies and art and design.

Critical Review of Selected HND Curricula

The selected HND curricula were reviewed and rated in terms of how they complied with the following criteria:

- Stated intended learning outcomes
- Provided details of assessment guidelines (e.g. Assessment methods and appeal processes)
- Specified pre-requisites and co-requisites
- Listed relevant reference texts, reading lists and resource/support material
- Noted recent changes to reflect latest industry practices
- Specified employment opportunities
- Listed forthcoming review dates
- Gave the ratio of theory to practice in the conduct of each course

It was apparent that the documentation had been heavily based on overseas models. There was no indication of any adaptation for the Ghanaian context, and the lack of suitable teaching resources particularly in practical classes compromised the integrity of the learning. Although most documents included a list of equipment required for teaching, little or no mention was given to reference materials (reading lists). Without the appropriate teaching resources the teaching style could only be predominately didactic (teacher-centered) in nature, that is, mostly theory-based. All courses contain an 'Attachment' in which students spend time in an industry placement. Although students spend approximately three months (outside of the academic year), the documents provide minimum detail regarding this important aspect of the course.

5.4 Recent Curriculum Reforms within the TVET Sector

Tertiary Education

Since the HND curricula had not been reviewed since their inception, the Conference of Polytechnic Principals (COPP) initiated a plan to revise the current curricula to reflect emerging industry and business needs in 1999.

The process of revising the HND curriculum is as follows: COPP convenes a Curriculum Review Committee within the Polytechnic community to review the current curriculum of each course, with advice from subject experts from the industries and professionals from universities. Polytechnic teachers are also consulted. After reviewing each current curriculum, COPP sends the draft of the revised curricula to NABPTEX. NABPTEX then sets up Committees, with industry and professional experts in each field, to further check contents of the draft curricula. After being reviewed by NABPTEX, the revised curricula are sent to NAB for accreditation. The revised curricula then get instituted as the standard.

Non-Tertiary Education

There have been two major recent initiatives in curriculum development in technical education. One is the strengthening of the function of the National Coordinating Committee for Technical and Vocational Education and Training (NACVET), and the other one is the Resource Center Project for Technical Education.

- NACVET - Under the co-chairmanship of the Minister of Education and the Minister of Employment and Social Welfare, NACVET was established under the Provisional National Defense Council (PNDC), and given the role of coordinating all vocational and technical education institutions at non-tertiary levels.

- Vocational Technical Resource Centers (VOTEC) - The project, conducted under MOE with loan assistance from the Dutch Government, seeks to strengthen twenty existing technical/vocational institutes (not including any Polytechnics), including some senior secondary technical schools, to operate as resource centers, two in each region. It appears that the curricula being used are translated versions of Dutch curricula.

CHAPTER 6 MAJOR CONSIDERATIONS FOR THE PREPARATION OF A MASTER PLAN TO STRENGTHEN TECHNICAL EDUCATION

6.1 National Policies for Human Resource Development in Ghana

According to *Ghana-Vision 2020*, "human development" is one of the five major development themes to achieve the nation's long-term vision, which is to achieve "the status and standard of living of a middle-income country" by the year 2020. The basic goals of human development are "to reduce poverty, increase average income and reduce disparities between incomes and opportunities."[11]

6.2 Emerging Issues in Relation to the TVET Sector

Economic Factors

The financial instability brought about by the shortage of foreign and domestic investment has caused a weak demand in the labor market. This dysfunction has caused a shortage of tax revenues for the Government, so that the Government has had difficulty in delivering and maintaining effective education and training. All these factors are related to each other. It is important that TVET reform is seen as a part of the process of social and economic development in Ghana.

Lack of Linkages between the TVET Sector and Productive and Service Sectors

There is little linkage between TVET sector and productive and service sector in Ghana. The lack of linkage has meant missed opportunities for TVET sector to provide workers with effective training courses. The TVET sector should play a leading role in providing effective training courses for workers, in cooperation with the production and service sectors.

Lack of Effective Industry-Related Courses

The main problems encountered in the current TVET system in Ghana include lack of adequate equipment and facilities for practical training, extreme shortage of industrial placements for practical attachments, inadequate means of assessing attachments even when they are possible and weak partnerships between TVET institutions and industry. The TVET institutions are not providing effective programs relevant to the needs of industry in both the formal and informal sectors. This is due in part to the lack of industrial experience of the responsible administrators and teaching staff that undertake the design and development of courses.

[11] *Ghana Vision 2020*, p. vii.

Weak Demand of the Labor Market

Although there are no reliable statistics[12], our interview survey with the stakeholders suggested that nearly 30 percent of recent Polytechnics graduates could not find appropriate jobs in the domestic labor market. This problem is largely caused by the mismatch between human resources trained in Polytechnics and industrial demands, and it is accelerated by the recent economic depression in Ghana. The TVET sector needs to provide effective training courses for workers to achieve the relevant skills and know-how needed in the specific industrial areas.

Structural Complexity

Many aspects of the TVET system have essentially been developed from traditional academic schooling in Ghana. Various TVET institutions are operating under different Ministries with different standards, which make it difficult to find equivalences between courses run by institutions managed by different ministries. TVET reform will enable an integrated response to emerging industry and enterprise needs.

Lack of Quality Assurance

The current TVET system lacks a systematic, progressive approach to assessment with an emphasis on practical demonstration of skills. The major constraint factors may be a reluctance to change the traditional system of written examinations. Agencies traditionally responsible for these functions, such as NABPTEX, the TEU, and NTTC (National Trades Training Council), will be primarily affected. A flexible reform will necessitate re-training staff in order to prepare these agencies to change their orientation to accommodate new roles.

Inadequate Practical Capabilities of TVET Teachers

Technical skills and practical knowledge are important for teachers at TVET institutions, but currently there is no specific requirement for industry experience. As industry needs to adapt new approaches to working practices to become part of the global market, so must new approaches to teaching and learning be integrated in TVET sector. The current approaches to teaching and learning, such as the predominantly didactic (teacher centered) teaching style and the academic rationalist orientation to curriculum design and assessment, are completely unsuitable, and will significantly inhibit any attempt to meet current needs of industry. A new breed of teachers with new teaching and learning skills will be required to meet the challenges confronting the TVET sector.

Limited Learning Opportunities

The TVET sector does not have flexible schemes with easy accessibility for participation, such as acceptable tuition levels, flexible learning schedules, self-paced learning, home learning, self-learning at nearby local learning centers, and short courses. In order to provide

[12] Polytechnics do not have a reliable monitoring of alumni relations system to track the employment status of their graduates

equal opportunities, particularly for those people such as workers in the informal sector and people living in remote areas, different types of technical education delivery systems will need to be developed and become widely used.

6.3 Specific Issues in Polytechnics

Lack of Funding

Recently there has been a rapid growth in enrolment in higher education. The government budget for higher education, however, has not so much increased for the last decade. This has caused various problems in Polytechnics, such as insufficient equipment, inadequate classrooms, and insufficient funding to provide appropriate maintenance. A sharp increase in student enrolment, without sufficient support and funding, together with appropriate teachers and facilities, causes deterioration of quality in technical education in Polytechnics. Some cost sharing schemes should be introduced into higher education institutions, including Polytechnics.

Management

There are many managerial difficulties in the Polytechnics. For instance, 1) there is no obligatory system by which technical institutions can monitor and document the activities of graduates, 2) there is no self-evaluation system of Polytechnic performance, 3) there is very limited recruitment of top managerial staff from the non-academic industrial sector (this has been partly implemented), 4) there are little incentive schemes for teachers, such as teaching in industry, participation in distance-learning, industrial attachment and textbook development and 5) the roles and functions of industrial liaison officers are inadequately supported.

Curriculum Delivery

Delivery of education and training in Polytechnics is mainly traditional and teacher-centered. There is currently little scope for alternative teaching methods, such as self-paced, student-centered and distance-learning. An introduction of an effective teaching method will require major changes. There may be substantial difficulties in getting teachers, particularly those who have been in the traditional system for a long time, to change their teaching methodologies. To develop and practice effective TVET at Polytechnics to meet the needs of industry, there are substantial requirements for re-training and re-orientation of all teachers, together with a provision of incentive schemes for them.

Teaching/Learning Resources

Most of the teaching staff in the Polytechnics do not have the requisite skills to prepare good quality teaching materials on their own, because currently general texts are not well supplemented by such resources as "student workbooks" and "workshop log books". It will be necessary for the staff to develop resource materials specific to the competencies needed to teach the students.

Industrial Attachments

Students in Polytechnics are required to enroll in industrial attachment programs during their summer vacation for three months at the end of the first and second years of schooling, respectively, but there are insufficient places available. However, the industrial attachments themselves are generally not productive, because they are unstructured and inadequately supervised. Importantly, there is no adoption of "Trainer" and "Assessor" roles in the current industrial attachment arrangements, because industrial attachment is not an assessable part of the accredited courses.

Access and Equity Issues

There are increasing pressures on higher education institutions to address issues of access and opportunity for all. As a result, the traditional roles of Polytechnics are being challenged to demonstrate relevance of course offerings and student outcomes as well as improved access for people who are outside the academic system and wish to re-enter it. Furthermore, increased participation of women in scientific, technical, math-related fields is a national policy directive. There are many factors inhibiting higher enrolments of women in Polytechnics. These factors, such as limited dormitory facilities for women, the lack of flexibility in course scheduling, and the limited opportunity to undertake part-time diploma and certificate courses, should be improved.

6.4 Lessons Learned from Other Countries

In developing a Master Plan for technical education in Ghana, the Study Team visited eight countries to investigate their respective TVET reform agendas. They are:

- United Kingdom: UK Polytechnics have been recently transformed into what are referred to as "Post 1992 Universities," which display different features from traditional universities.

- Australia: An industry-led Competency-Based Training (CBT) approach has been adopted in post-secondary technical and vocational education and training (TVET) sector.

- South Africa: South Africa has moved towards greater industry participation in determining the training outcomes of the vocational education and training (VET) system. The industrial sector established National Standards Bodies (NSBs) to set industry competency standards and provide course accreditation.

- The Republic of Ireland: Creation of a Higher Education Authority and Establishment of the National Training and Employment Authority (NTEA)

- Japan: University of the Air (UOA) is the largest public university offering distance-learning through TV and radio broadcasting

- Thailand: Sukothai-Thammathirat Open University (STOU), established in 1980 through JICA assistance, offers a variety of distance education courses.

- Singapore: Skills Development Fund (SDF) was adopted by the government in 1979 in building its human resources, especially to provide effective training programs for workers.

- Malaysia: Skills Development Program and Penang Skill Development Center (PSDC)

CHAPTER 7 A MASTER PLAN TO STRENGTHEN TECHNICAL EDUCATION

7.1 Major Goals for a Master Plan

The primary goal of the Study is to formulate a Master Plan to enhance the delivery of technical education in Ghana. The concept of "technical" used in the study incorporates a broad range of technical and vocational programs delivered in a wide variety of institutions not only under MOE but also other ministries in Ghana. The Master Plan, therefore, covers a wide variety of institutions in the formal and non-formal Technical and Vocational Education and Training (TVET).

The Master Plan, targeted for the year 2020, will present a comprehensive framework showing what the TVET system should be in the future, and how it can be achieved. An appropriate TVET system should be an efficient human resource development system, which can respond quickly to the changes in the labor market as well as industry needs. Furthermore, the system should be less dependent on government subsidy in order to become financially sustainable.

7.2 Development Scenarios

Development Scenarios Based on Economic Growth

In estimating infrastructure and human resource development of TVET in Ghana up to the year 2020, the Study formulated three development scenarios. As *Vision 2020* intends to achieve "the status and standard of living of a middle-income country" by the year 2020, we referred the data of per capita GDP in middle-income countries as a target in developing the scenarios.

The three development scenarios were considered in terms of high, medium and low economic growth rates. The estimate of high growth is that Ghana could achieve a per capita GDP of US$1,500 in 2020, with an annual growth rate of 8.6 percent between 2001 and 2020. The estimate of medium growth is that Ghana will achieve a per capita GDP of US$1000 in 2020, with an annual growth rate of 6.7 percent. Low growth is estimated at GDP per capita of US$665 with an annual growth rate of 4.7 percent for the same period (This scenario was a projection based on the growth rate of per capita GDP experienced between 1993 and 1999).

Future Demand Forecast of the Labor Market

On consideration of the three scenarios, it was decided that the high growth estimate is unrealistic in the context of recent economic history and the current situation in Ghana. The low growth scenario is perhaps pessimistic, especially in the context of the reforms being implemented as part of *Vision 2020*. The Study Team, therefore, selected the medium growth scenario as the framework for a Master Plan. Estimated future enrolments by types of institutions, in line with a medium growth scenario, are provided in Table 3.

Table 3 Enrolment growth by institution for 2000, 2010 and 2020 for Medium Growth Scenario.

	Scenario 2 (Mid growth)	Year 2000 (1,000)	Year 2010 (1,000)	Year 2020 (1,000)	Annual growth rate (%) 2000-2020
1	University	43	61	86	3.6%
2	Polytechnic	22	47	97	7.6%
3	TI	14	25	46	6.0%
	Total tertiary (Univ + PI)	**65**	**107**	**184**	**5.3%**

7.3 Strategies for Systemic Reform of the TVET System in Ghana

Ghana's TVET system is very fragmented and lacks linkages with industries. In order to achieve the target of the medium growth scenario, the TVET sector needs to undergo comprehensive structural reform. In general terms, Ghana's TVET system needs to change from the current *supply-driven* model to a *demand-driven* model, in order to support industrial needs and respond to the changes in technology and global market demands.

The following is a brief summary of key strategies that need to facilitate appropriate systemic change:

1) Establish a long-term national TVET policy that identifies and deals with issues in the TVET sector.

2) Move towards greater delivery of continuing education in the TVET sector.

3) Adopt a Competency-Based Training (CBT) approach in the TVET sector. A CBT approach is a systematic learning process, in which the primary focus is on the students' ability to demonstrate industry-developed competencies.

4) Develop an industry-led TVET sector. Rather than adhere to the traditional concept of "curriculum", the Master Plan recommends the development of a system of "Training Packages." Training Packages are developed mainly by industry, in close collaboration with TVET organizations.

5) Provide customized TVET programs with flexible delivery so that more people can access training, especially from the informal sector

6) Establish competition amongst TVET providers. With clearly defined national curriculum standards, public and private TVET providers will be encouraged to become "centers of excellence" and compete for training delivery.

7) Create a National Qualifications Framework (NQF). An NQF will replace many different TVET qualifications currently offered by MOE and other Ministries. In the NQF, TVET certification will be developed from the competencies identified by each industry sector.

8) Move the focus from quantity to quality in the TVET sector. A rationalized TVET system should provide better quality of human resources, and should more directly assist the current emerging industrial needs.

9) Create new funding schemes, including a Skills Development Fund (SDF), Ghanaian Emigrants Fund (GEF) and a new Student Loan, to implement the TVET reform with financially sustainable.

7.4 Organizational Development

One of the key recommendations in the Master Plan is to introduce a CBT approach as the central methodology of the reformed TVET system in Ghana. A CBT approach is *demand-driven*, and for it to be effectively implemented, a new organization should be established, and the industries must play a significant role in the TVET reform.

It is recommended that a joint Ministerial Council be formed in the beginning. The Ministerial Council will represent all ministries with major TVET responsibility, and it forms a central body called the Ghana National Training Authority (GHANTA). GHANTA have the responsibility for coordinating the whole reform process. It will have a Board and Executive Council, and will comprise appropriate personnel from industry and the TVET sector.

GHANTA will establish Industry Training Advisory Boards (ITABs) for each major industry sector. ITABs, comprising representatives from relevant industries and enterprises, and community groups, work together with TVET representatives to develop competencies and standards (Training Packages) for each industry sector and sub-sector. The National Qualification Authority (NQA) will be established to be responsible for the development of national qualifications, in line with competencies identified by the ITABs.

Figure 1 illustrates the relationships of prospective organizations to achieve TVET reform.

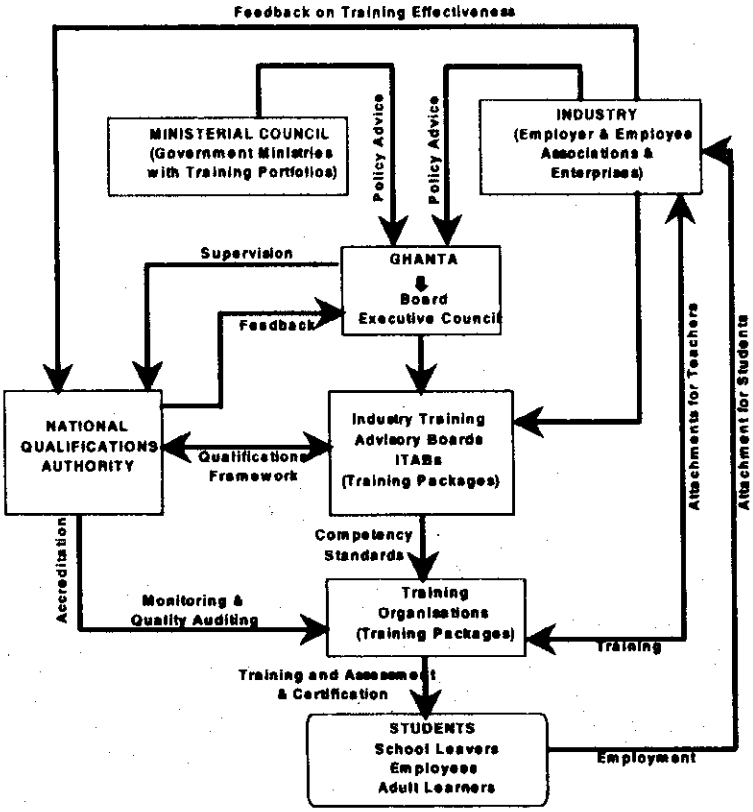


Figure 1 Institution relation model of national framework of TVET for Ghana

CHAPTER 8 IMPLEMENTATION MEASURES FOR PILOT POLYTECHNICS AND PILOT PROGRAMS

The Study Team recommends a phased approach to TVET reform in Ghana. Systemic reform must begin immediately, but at the same time, a number of the important reform measures, such as the introduction of CBT, need to be introduced gradually. In order to implement the reform measures, the Team selected pilot Polytechnics as case studies to examine institutional strengthening measures and also pilot programs to introduce the CBT approach within the Ghanaian context.

Figure 2 is a conceptual diagram of implementation measures for pilot Polytechnics and pilot programs.

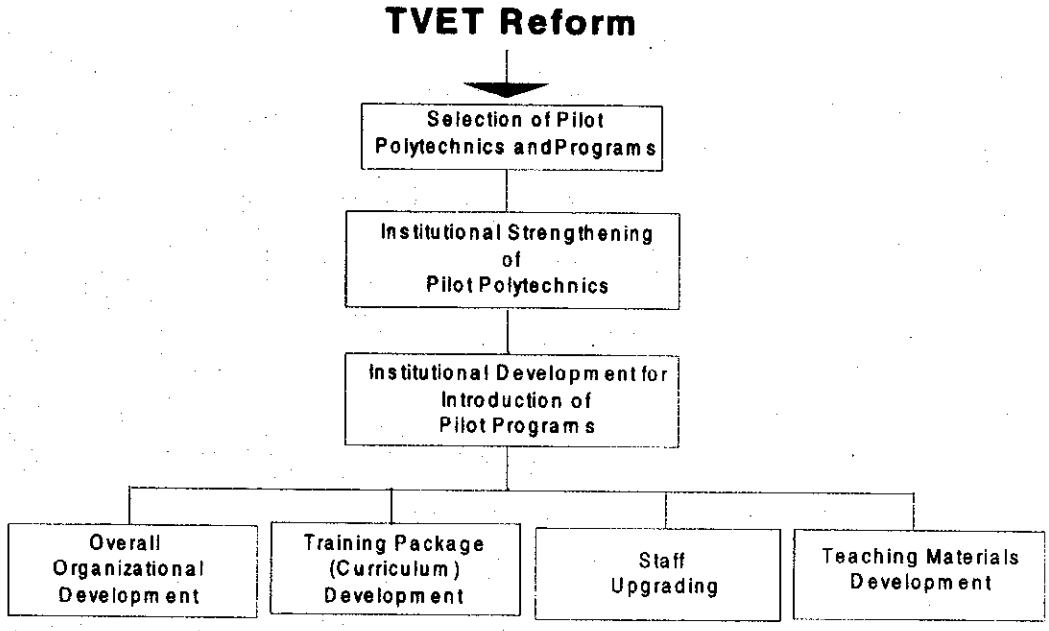


Figure 2 Conceptual diagram of institutional strengthening measures for Pilot Polytechnics and Pilot Programs

8.1 Selection of Pilot Polytechnics and Pilot Programs

Selection of Pilot Polytechnics

The pilot Polytechnics are case studies to examine institutional strengthening measures. On the basis of characteristics of Polytechnics, the Study Team selected three pilot Polytechnics: Accra, Ho and Tamale Polytechnics.

1) Accra Polytechnic represents a large and integrated Polytechnic located in the urban area. It focuses on education and training programs for advanced technologies in terms of the global market demand.

2) Ho Polytechnic represents a medium-size Polytechnic focusing on education and training programs of technologies related to the local resources.

3) Tamale Polytechnic is a relatively small Polytechnic located in rural regions. It functions as a regional human resource center to offer general information on technologies and advanced skills needed for the local industries in the region.

Selection of Pilot Programs

Major considerations in selecting pilot programs were:

- Direct relation with the labor market demand in the country
- Potential to contribute to the development of Ghana's export industry
- Capacity to produce human resources that will enable Ghana to compete internationally by meeting global standards
- Compatibility with existing courses and capacity to improve these courses and pilot programs

Based on the above criteria, the following six new pilot programs were selected to examine CBT methodology at each Polytechnic:

1) Hospitality and Tourism – The Services sector, and in particular Hospitality and Tourism, together with all relevant industries, have great potential to lead the nation's economic development. The new program at Polytechnics will offer resource management, marketing, communication technology, and so on.

2) Information Technology and Communications - All the business and industries urgently need skilled human resources in Information Technology and Communications. The new program at Polytechnics will offer advanced courses, such as networking, data communications, operating systems, web page development, computer graphics and software development.

3) Business/Information Technology (Business/IT) - It is relatively a new field in which it is intended to combine the fields of Business Administration with Information Technology. The primary objective of the pilot program is to provide effective training courses focusing on applications of IT hardware and software in areas such as accounting, banking, marketing, logistics and office administration.

4) Post Harvest and Food Processing - In order to promote export of agriculture commodities, advanced technology in post harvest and food processing is significantly important in Ghana. Food processing technology is linked to a wide range of supporting industries such as agricultural machinery, fertilizer, animal feed, logistics, distribution and packaging of products. The pilot program will offer these courses.

5) Wood Processing Technology - Wood products were the fourth largest export commodities (US$205 million in 1999) in Ghana, following gold, cocoa and tourism. The trend of the export in wood products implies clearly that the demand of skilled labor in the wood processing industry has increased significantly and, at the same time, the demand has shifted from low skilled labor workers to advanced skills and knowledge of wood processing technology.

6) Manufacturing Technology - Through the analysis of existing industry, the Study Team identified that the following technical areas are particularly important in Ghana: agricultural engineering, metal processing, well drilling, design and drawing skills, industrial engineering and engineering management. The pilot program will offer the above courses to develop skilled human resources with a fundamental knowledge of manufacturing technology.

Table 4 illustrates prioritization of programs in each Polytechnic.

Table 4 Development plan of pilot programs

		Pilot programs					
		(1)	(2)	(3)	(4)	(5)	(6)
	Polytechnic	Hospitality and tourism	Information technology and communications	Business information technology	Post harvest and food processing	Wood processing technology	Manufacturing technology
1	Accra	xx	xxx	xx		x	xx
2	Kumasi		x	xx	xx	xx	xxx
3	Takoradi	x	xx	xx		xxx	xx
4	Ho	xx	xx	x	xxx		x
5	Cape Coast	xxx	xx	xx			x
6	Tamale	xx		x	xxx		xx
7	Sunyani	xxx	x	x	xx		
8	Koforidua	x	xx	xxx	x		
9	Wa	x		x	xx		xx
10	Bolgatanga	x		x	xx		xx

xxx: Major center with a function to develop teaching materials in form of textbook and workbook, which is developed in a short term
xx: Center, developed in a mid term
x: Center, developed in a long term

8.2 Institutional Strengthening Measures for Pilot Polytechnics

Linkages with the Industrial Sectors

One of the most critical issues in the management of Polytechnics is the need to create linkages between Polytechnics and industries. Some of the measures to establish the linkages are:

- Seeking opportunities for industrial attachments for both students and teachers to learn practical knowledge and skills.

- Monitoring activities for graduates through alumni associations so that the Polytechnics can get more opportunities for industrial attachments and funding sources to improve their education and training.

- Establishing Industry Training Advisory Boards (ITAB) to define competencies needed in the industrial sector.

- Conducting analysis of resources at national and regional levels.

- Assisting emerging industries by customizing training courses needed for workers.

Income Generation Schemes

Some Polytechnics have made efforts to generate income by using their resources. The income generation schemes in Polytechnics are now, however, very limited to the areas of wood processing, catering services, and Internet cafés. The revenue from these activities has been small. Polytechnics can develop innovative schemes, such as "campus companies" through which they operate businesses through their own initiative. The scheme should be supported by the private sector. Because of concentration of a variety of business activities, Accra Polytechnic in particular has great potential to introduce an income generation plan.

Role of Industrial Liaison Officer

Industrial Liaison Officers at each Polytechnic should function as leading agents to strengthen the linkage between Polytechnics and industry. To this end, they should play an important role to develop industrial attachments for both teachers and students. In addition, Industrial Liaison Officers should be responsible for monitoring, collecting and compiling data of the graduates in cooperation with alumni association.

8.3 Institutional Development Measures for Pilot Programs

Overall Organizational Development

The introduction of the CBT system will require the modification of many traditional systems and administrative procedures. These procedures will be required to be performed at the national and local levels. The extent of the modification will depend on how Ghana approaches the CBT system. For these purposes, the following organizations will be required to administer the TVET reform process at the national level and support the introduction of a CBT approach in the pilot programs at Polytechnics. They are the Ministerial Council, Ghana National Training Authority (GHANTA), Industry Training Advisory Boards (ITABs) and the National Qualification Authority (NQA).

In the initial stage of the TVET reform, it will be necessary that existing supervisory bodies, such as NCTE, NABPTEX and NAB, play a key role in developing ITABs, together with industry. Figure 3 illustrates administrative relationships between NCTE, NABPTEX, NAB, industry, ITABs and Polytechnics.

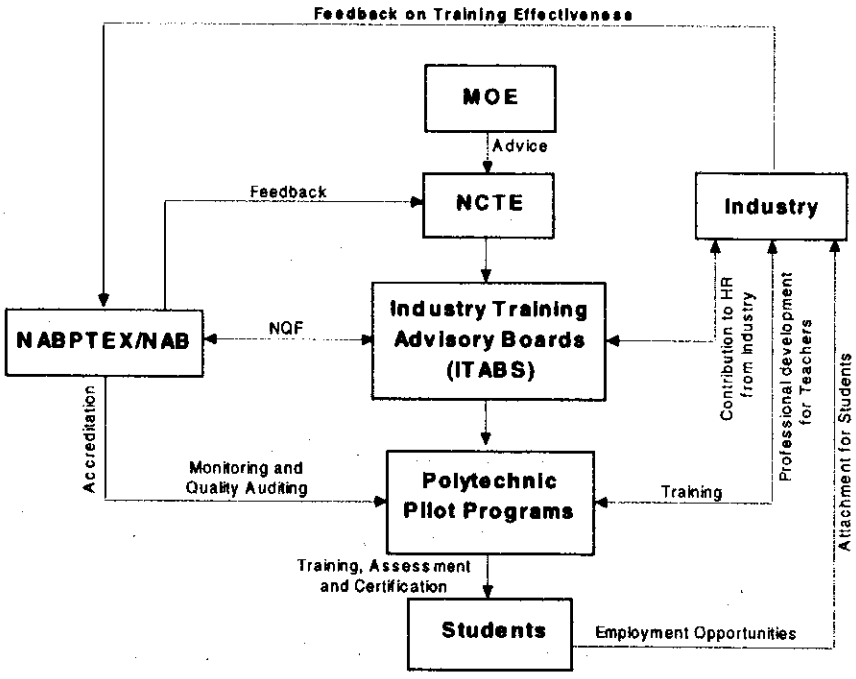


Figure 3 Overall Administrative Structure for Implementation of Pilot Programs

Training Packages

Training packages will form the basis of all nationally recognized TVET institutions throughout Ghana. The process for development of training packages will involve a group of representatives from a specific industrial sector, which will then develop a list of competencies that must be demonstrated by workers in their industry. The Study Team, in collaboration with some Ghanaian industries, produced six indicative training packages as a demonstration of the scope of the exercise.

Staff Upgrading

For the introduction of CBT programs, it is important to have teachers who have relevant technological knowledge and skills. If teachers have an appropriate level of practical skills and knowledge to use and maintain machines, educational equipment could be well maintained and repaired at minimum cost. Since only teachers with appropriate industrial experience can satisfy these requirements, it is recommended that industrial people be hired as part-time teachers in TVET institutions. This scheme should be expanded much more, especially so that classes can learn application technologies and practical training.

Teaching Materials Development

One of the critical issues in current TVET in Ghana is a lack of teaching materials, including textbooks, workbooks and audiovisual tapes. There are very limited capabilities to develop appropriate teaching materials due to lack of human resources and facilities. Many imported

textbooks are quite expensive in Ghana. The Study Team proposed developing teaching materials as a priority measure to improve the TVET sector, including Polytechnics.

8.4 Implementation Schedule

The key recommendation in this Study is to introduce a demand-driven CBT approach into the TVET sector. The CBT approach would be introduced to Polytechnics first, and then it would be extended to other TVET institutions in the future. It is recommended that the CBT system should be carefully introduced by means of a step-by-step approach. The following is a brief summary of each phase:

(1) Phase I (2002 to 2004): Initial Stage to introduce the CBT Approach

In the initial stage, it is important for both the TVET sector and industry to learn the concept and implementation process of the CBT approach. For this purpose, several foreign experts who have knowledge and experience of the CBT approach need to work with their Ghanaian counterparts to prepare basic conditions and the institutional framework needed to start the CBT approach in Ghana.

(2) Phase II (2004 to 2007): Preparation Stage to start the Pilot Programs

Phase II is a trial stage to implement the CBT approach in selected courses in Polytechnics. The following items would be developed in this period:

- Use of textbooks and other teaching materials for common modules, such as communication in workplace, performing computations, application of quality procedures, planning to undertake a routine task and so on,
- Establishment of a CBT Resource Development Center, which functions as a core facility to develop, demonstrate and disseminate the CBT approach, including training of managerial and teaching staff, and developments of printed and audiovisual teaching materials for distance-learning programs,
- Establishment of a Council of Ministries, a provisional organization of GHANTA, to introduce a national qualification framework, and
- Overseas and domestic training for the managerial and teaching staff for pilot programs.

(3) Phase III (2007 to 2010): Operation of the Pilot Programs

In this Phase, the CBT approach will be operated at the pilot programs in Polytechnics. The following activities are needed in this phase:

- Delivery of the CBT approach at the pilot programs in Polytechnics,
- Development of teaching materials on a full scale,
- Establishment of GHANTA and ITABs of all industrial sectors, and
- Overseas and domestic training for managerial and teaching staff for pilot programs.

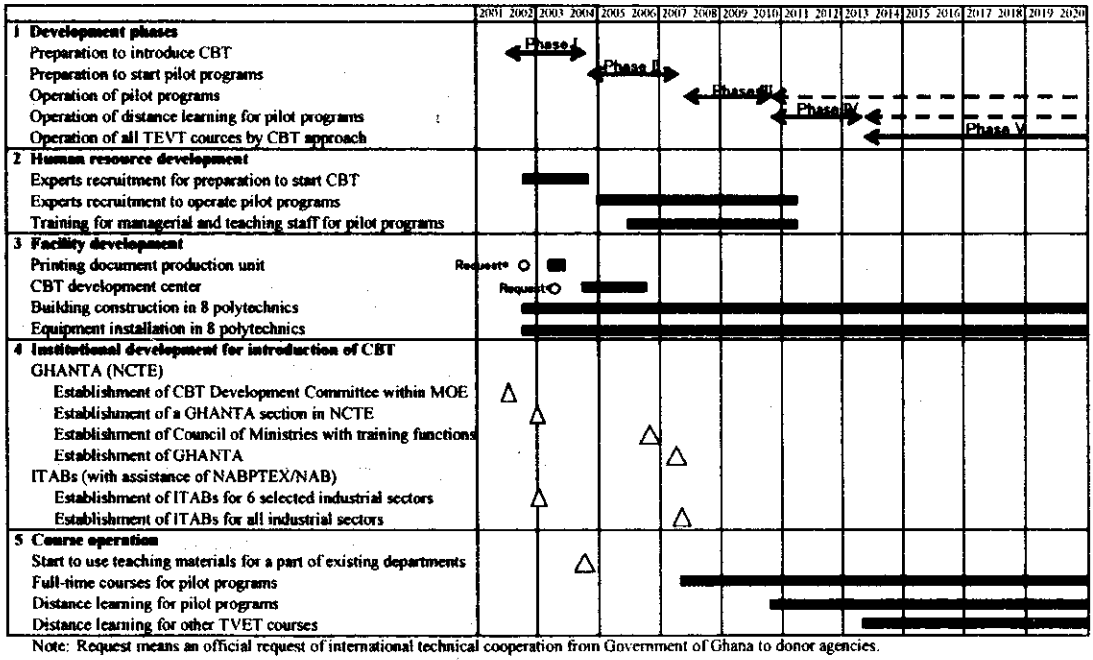
(4) Phase IV (2010 to 2013): Operation of Distance-Learning in the Pilot Programs

The distance-learning program will be introduced in this Phase based on previous experience with implementation of a CBT approach in pilot programs.

(5) Phase V (2013 to 2020): Implementation of the CBT Approach in All TVET Sectors

A full range of distance-learning programs will start based on the experience with distance-learning programs in selected areas implemented in the Phase IV. All TVET providers, including public and private education and training institutions under all Ministries, will participate in the CBT system, with the establishment of a National Qualifications Framework (NQF).

An overall implementation schedule is shown in Figure 4



Note: Request means an official request of international technical cooperation from Government of Ghana to donor agencies.

Figure 4 Overall implementation schedule

8.5 Budgetary Simulation

Budgetary Simulation for Three Polytechnics

The Study Team compared budgetary simulation among three pilot Polytechnics. The major finding are summarized as follows:

- The accumulated enrolment from 2002 to 2020 would be 171,000 students- year at Accra Polytechnic, 117,000 students-year at Ho Polytechnic, and 62,000 students-year at Tamale Polytechnic.

- Tamale Polytechnic shows the highest unit education cost per student. This is because Tamale Polytechnic has a relatively smaller enrolment number, which causes higher education costs, compared to Accra and Ho Polytechnics.

- Furthermore, Tamale Polytechnics needs to recruit more part-time teachers, which would mean an increase in the unit education cost.

- The ratio of the government support in the entire operation cost in Tamale Polytechnic is the highest among the three pilot Polytechnics.

Budgetary Simulation for 8 Pilot Programs at Polytechnics

Table 5 shows the results of budgetary simulation of the pilot programs. The major findings are summarized as follows:

- The accumulated enrolment in the pilot programs amounts to 285,000 students-year from 2007 to 2020. The enrolment number in packaged courses and short courses are 203,000 students-year (71 percent) and the enrolment in distance- learning courses is 82,000 students-year (29 percent).

- The accumulated cash outflow throughout the period is estimated at US$541 million, in which equipment cost occupies the highest share of US$153 million (28 percent), followed by building cost of US$135 million (25 percent), personnel cost of US$126 million (23 percent), and staff training cost of US$25 million (5 percent).

- In the accumulated cash inflow of US$541 million, the student fee has the highest share of US$229 million (42 percent), followed by government support of US$199 million (37 percent).

- The unit education costs in the pilot program are US$2,500 per student in packaged and short courses and US$413 per student in distance-learning courses, in which government subsidy are US$929 per student in packaged and short courses and US$135 per student in distance-learning courses.

- The average government support in the pilot programs is estimated at US$699 per student, which is more than 50% higher than the support in 1998 (US$421 per student).

Table 5 Summary of accumulated financial simulation for pilot programs by Phases

	Phase I-III (Upto 2010)			Phase IV (2010 to 2013)			Phase V (2013 to 2020)			Total		
	Pilot (Pkg+Sht)	DL (Pilot)	Pilot Total	Pilot (Pkg+Sht)	DL (Pilot)	Pilot Total	Pilot (Pkg+Sht)	DL (Pilot)	Pilot Total	Pilot (Pkg+Sht)	DL (Pilot)	Pilot Total
Students (1,000)	4	0	4	21	4	26	177	78	255	203	82	285
Finance (Mil. US$)												
Cash outflow	32	8	40	85	1	86	389	25	414	507	34	541
Building	8	1	8	26	0	26	100	0	101	134	1	135
Equipment	11	5	16	35	1	35	89	13	101	134	18	153
Staff training	9	1	11	4	0	4	10	0	10	24	1	25
Personnel Cost	2	0	3	11	1	12	105	6	111	119	7	126
Others (*)	2	0	2	9	0	10	85	6	91	96	6	102
Cash inflow	32	8	40	85	1	86	389	25	414	507	34	541
Revenue	4	0	4	21	1	22	293	22	315	319	23	341
Student fee	4	0	4	21	1	22	181	21	203	207	22	229
Others (**)	0	0	0	0	0	0	112	1	113	112	1	113
Government support	28	8	36	64	1	65	96	3	99	188	11	199
Unit education cost (US$/student/year)	7,821		9,644	4,019	308	3,372	2,195	322	1,623	2,500	413	1,897
Government support (US$/student/year)	6,794		8,617	3,023	125	2,518	542	39	388	929	135	699

(Share Percentage)

	Phase I-III (Upto 2010)			Phase IV (2010 to 2013)			Phase V (2013 to 2020)			Total		
	Pilot (Pkg+Sht)	DL (Pilot)	Pilot Total	Pilot (Pkg+Sht)	DL (Pilot)	Pilot Total	Pilot (Pkg+Sht)	DL (Pilot)	Pilot Total	Pilot (Pkg+Sht)	DL (Pilot)	Pilot Total
Students (1,000)	100%	0%	100%	83%	17%	100%	69%	31%	100%	71%	29%	100%
Finance (Mil. US$)												
Cash outflow	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Building	23%	8%	20%	30%	4%	30%	26%	2%	24%	26%	3%	25%
Equipment	35%	68%	41%	41%	42%	41%	23%	50%	24%	27%	54%	28%
Staff training	29%	20%	27%	5%	0%	5%	3%	0%	3%	5%	4%	5%
Personnel Cost	7%	4%	7%	13%	39%	14%	27%	25%	27%	23%	21%	23%
Others (*)	6%	0%	5%	11%	14%	11%	22%	23%	22%	19%	18%	19%
Cash inflow	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Revenue	13%	0%	11%	25%	60%	25%	75%	88%	76%	63%	67%	63%
Student fee	13%	0%	11%	25%	60%	25%	47%	85%	49%	41%	65%	42%
Others (**)	0%	0%	0%	0%	0%	0%	29%	3%	27%	22%	2%	21%
Government support	87%	100%	89%	75%	40%	75%	25%	12%	24%	37%	33%	37%

Note: (*) Others in cash outflow include transportation, utilitiesor and so on. For DL only, learning mateirals and schooling are included.
(**) Others in cash inflow is residual value of building.

8.6 Economic Analysis

The main purpose of the economic analysis is to examine effects of the projects in terms of the national economy. In order to estimate an economic return on investment and to assess the economic viability of the projects, the Economic Internal Rate of Return (EIRR) was calculated.

Cost Benefit Analysis

The scope of economic analysis for three pilot Polytechnics, namely Accra, Ho and Tamale Polytechnics, includes existing courses, CBT courses, and distance-learning courses. The scope of economic analysis for pilot programs includes only CBT courses provided by pilot programs in each Polytechnic (eight courses total).

The EIRRs of each model are summarized in Table 6, which can be interpreted in the following way:

- Economic analysis in all cases result in high EIRRs, ranging from 22.2 percent to 26.0 percent, which indicate that this project is feasible from an economic viewpoint. This is mainly because graduates from Polytechnics earn higher income than graduates from second cycle institutions.

- The EIRR of pilot programs in Polytechnics is the lowest among others due to the highest initial investment cost in building, equipment and human resource development, as well as their operation and maintenance cost.

- The EIRR of Tamale Polytechnic is the lowest among three pilot Polytechnics. This is caused by higher personnel cost of teachers because of an assumption that Tamale Polytechnic has to recruit more part-time teachers from outside the region.

Table 6 Summary of the estimated EIRRs

(%)

	Pilot Polytechnic: Accra	Pilot Polytechnic: Ho	Pilot Polytechnic: Tamale	Pilot programs in eight Polytechnics
EIRR	26.0%	25.3%	23.5%	22.2%

Source: Estimated by JICA Study Team

CHAPTER 9 URGENT ACTION PROGRAMS

Urgent action programs in the TVET reform are discussed in this chapter, with particular emphasis on Polytechnics. The urgent action programs are divided into two types of initiatives: one is Ghanaian initiative and the other is technical and financial assistance by donor agencies. It is recommended that these action programs be implemented during the initial stage of the TVET reform.

9.1 Urgent Action Programs by Ghanaian Initiatives

Government Efforts

- In the initial stage of the reform process, Ministry of Education (MOE), in cooperation with Association of Ghana Industries (AGI) and Ghana's Employers Association (GEA), should play a leading role in the development of new organizations, such as Ghana National Training Authority (GHANTA) and Industrial Training Advisory Boards (ITABs).

- A CBT Development Committee should be established within the MOE. The Committee would play a significant role in the introduction of the CBT approach.

- GHANTA should be established in NCTE, and then, it will become an independent organization by 2007. The Government will appoint members of GHANTA, including representatives from various Ministries and industry.

- The Government should make a strong effort to establish a national consensus in the introduction of a cost recovery policy to achieve financial sustainability in the TVET sector.

Polytechnic Initiatives

- In the initial stage of the development of pilot programs, preliminary ITABs in the relevant industrial areas should be established through the Polytechnics' initiative.

- Polytechnics should provide efficient delivery of TVET courses not only for full-time students but also workers in the formal and informal sectors. The provision of short courses is particularly important in terms of flexible delivery of TVET courses and income generation.

- Polytechnics should make a strong effort developing computer databases with information on students, alumni, enterprises, teachers, as well as financial management, equipment and inventory. The database would support efficient management and operation of TVET programs.

- Industrial liaison officers should play an important role in the development of meetings held regularly between the Polytechnics and the industrial sector as well as establishment of preliminary ITABs. The function and role of industrial liaison officers should be discussed in the Polytechnic Council.

- Alumni associations should be encouraged in order to promote a strong linkage between the Polytechnics and industries. Regular meetings and seminars organized by Alumni associations would support the Polytechnics to identify industrial needs.

- A special task force should be established in Polytechnics to strengthen industrial attachment. The major objectives of the task force are to develop industrial attachment opportunities for students and teachers, to develop training objectives, to monitor individual achievement, and to develop the roles of trainers and assessors in industrial attachments.

9.2 Urgent Action Programs by the Support from Donor Agencies

Recruitment of International Experts

A CBT approach is new for Ghana and, therefore, international experts who have the knowledge and experience needed to promote the implementation of the CBT approach in Ghana. It is recommended that donor agencies provide financial and technical support in the initial stage of the reform process. The international experts would be: 1) an institutional development expert, 2) a financial development expert, 3) a CBT resource development expert, and 4) a textbook/workbook production expert. The objectives of each expert are described as follows.

- The institutional development expert will assist the National Council for Tertiary Education (NCTE) in developing new organizations to introduce the Competency Based Training (CBT) in the Technical and Vocational Education and Training (TVET) sector. These organizations include the preliminary version of the Ghana National Training Authority (GHANTA), Industry Training Advisory Boards (ITABs) and the National Qualification Authority (NQA)

- The financial development expert will assist the NCTE in developing financial schemes to support the implementation of the CBT approach. Initiatives should include financial schemes such as a skill development fund and a student loan fund.

- The CBT resource development expert would assist NCTE in developing competency standards, assessment guidelines, qualifications, textbooks and workbooks

- The Textbooks/workbooks development expert would assist NCTE in developing the capabilities needed to produce textbooks and workbooks, such as editing, printing and binding

Special Unit to Develop Teaching Materials

The development of textbooks and other teaching/learning materials is essential to the implementation of the CBT courses in the TVET sector in Ghana. In order to start the CBT courses at the selected pilot programs in the Polytechnics, it is recommended that donor agencies support the development of a special Unit responsible for the creation of print-based resources and other teaching/learning materials. The Unit will operate on a small scale in NCTE during the initial stage (limited to a few technical fields).

The Unit has the following functions and activities: 1) human resource development by providing on-the-job training for planning, manuscript development, editing, printing, distribution, inventory control and financial management; and 2) production and sales of textbooks and workbooks for some selected modules.

A preliminary financial estimation was conducted to examine the financial viability of the Unit. The total investment cost of the Unit would be US$93,000 and the preliminary financial analysis indicates that the development of the Unit is feasible with the financial internal rate of return (FIRR) of 49 percent.[13]

CBT Development Center

The CBT Development Center (the Center) is extremely important in its support of the TVET reform in Ghana. The overall goal of the Center is to develop the CBT approach in the TVET sector, including all training organizations under various ministries, and to provide equal learning opportunities to the entire nation with reasonable training cost.

There are four major functions in the Center: 1) human resource development, 2) institutional development, 3) teaching materials development, and 4) administration and management. Each function is explained as follows:

- Human resource development will involve training for managerial staff and teaching staff in TVET institutions. The training for managerial staff includes provision of knowledge of the CBT approach, financial management of training organizations, personnel management, operational skills and knowledge of training organization and training course management. The training of the teaching staff includes understanding of the CBT approach, development skills of teaching materials, teaching skills needed for CBT courses, course operation, and management of CBT courses.

- Institutional development will involve the activities to support the development and operation of new organizations related to the CBT approach, including GHANTA, ITABs and the NQA. These organizations should be developed in close collaboration with the industrial sector.

- Teaching material development includes the productions of audio-visual video and textbooks/workbooks related to CBT. These teaching materials can be developed by the Center to reflect local needs, conditions and circumstances.

[13] The initial investment is excluded in this calculation, assuming it is covered by some donor agencies

- Administration and management includes two major activities: sales and promotion of textbooks/workbooks and operation of distance-learning courses. This function also includes strengthening cooperative relations with the industrial sector.

Figure 5 illustrates conceptual scheme of the Center.

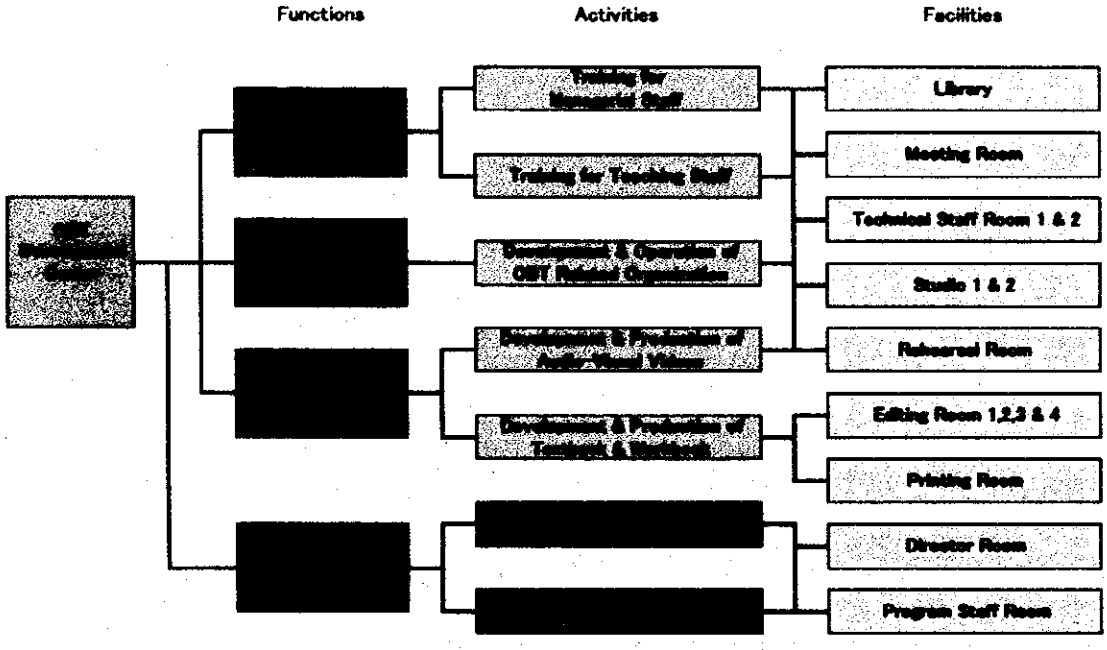


Figure 5 Conceptual diagram for the CBT resource development center

A preliminary financial estimation of the Center was conducted to examine financial viability of the Center. The total investment cost of the Center amounts to US$6.3 million and the preliminary financial analysis indicates that the development of the Center is feasible with the Financial Internal Rate of Return (FIRR) of 68 percent[14]. However, some financial support from the MOE and/or the private sector would be necessary to operate the Center properly during the early stages (up to 2010).

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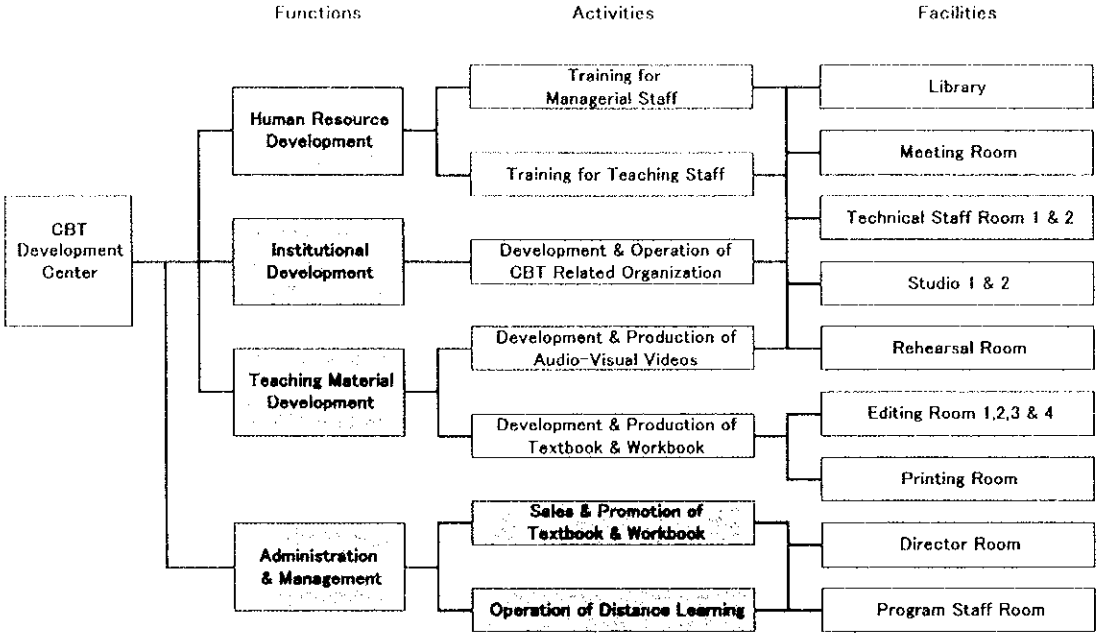

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