



**Lessons and Implications drawn from “Appraisal Study: Technological Diffusion,
Human Capital and the Market for Skilled workers and High Level Education in
Ethiopia**

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**Lessons and Implications drawn from “Appraisal Study: Technological Diffusion,
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Abstract

This paper presents the research methodology employed in an Appraisal Study on TVET, carried out by two Italian experts in the framework of the support of the Italian Development Cooperation to the Education Sector Development Program (ESDP). The study explored the needs for the appropriate balance of skills and qualifications required at the time. Focus was made at the created imbalance in skill hierarchy and the skills demanded in the market and tuning it to educational developments at Junior Technical Colleges (JTCs) levels. They designed and applied various instruments, as skilled manpower demand survey, complementing available data in the country. They also carried out economic analysis, examining the trends and the structural change in the labor market. The empirical result obtained by the survey is strongly supportive of the JTCs Project, initiated by MOE at the time. The study identified human and physical resources required for setting up the JTC programs.

Introduction

The Appraisal Study was carried out in 2001 by Ernesto Felli and Giovanni Tria¹, both Italian Experts that worked on the subject in the framework of the Ethio-Italian Country Program in support of the Education Sector Development Program (ESDP). The Italian Development Cooperation allocated 28.5 Million Euros for the development and improvement of educational programs in primary schools, higher education and TVET programs at Central level and regional levels (Afar, Tigray, Somalia and Oromiya). As TVET component is part of the education domain whereby cooperation is envisaged, the Appraisal Study was initiated by MoE which requested the Italian Development Cooperation to appraise a proposed strategy of upgrading a number of technical and vocational schools to a diploma level of 10+3. The study was hence to assess the degree to which a proposed strategy of upgrading a few technical school establishments to a level of JTCs could be viable.

¹ E. Felli & T. Giovanni (July 2001). Appraisal Study: Technological Diffusion, Human Capital and the Market for Skilled Workers and High Level Education in Ethiopia, Ethio-Italian Development Cooperation Program in support of Education Sector Development Program (ESDP); Addis Ababa.

The Appraisal Study was initiated while the Junior Technical Colleges in the country were being promoted to B.Sc. program. The reform added to the imbalance of required mix of technicians. In 1997, the Bahir Dar Polytechnic Institute was promoted to Bahir Dar Engineering College. New engineering colleges were established in Mekele (1997), Jimma (1998), and Arbaminch (1998), Debub and Alemaya Universities, reducing, by default, the number of expected technical education diploma graduates. The design and development of technical education program, however, demand working forces of various proportions and levels. To fill the gap, one strategy was to upgrade a few technical schools to a level of JTCs. The Appraisal Study, as mentioned above, was carried out to explore the viability of that strategy.

This paper presents the methodological approach employed in the study focusing on its findings having immediate implications in the design and developments of JTCs. It also presents the relevance and implication of the study in the education system of the country.

Methodology

The study is based on two methodological approaches: (A) The macroeconomic analysis and (B) the skilled manpower demand survey.

(A) The Macroeconomic analysis

The experts explored trends and long-term structural changes in the Ethiopian economic policy and guidelines. Reviews of documents of Central Statistics Authority (CSA) on employment by sector and sub-sectors were made. Other reviews made included the economic reform policy papers for various periods and the Interim Poverty Reduction Strategy Paper agreed with the IMF and the World Bank. Their exploration in macroeconomic analysis included progress made in promoting market economy and the government development strategy and intended direction at the time the study was carried out. Interviews were also carried out with concerned persons from various sectors of Addis Ababa regarding demanded skills to be upgraded. The findings from the analysis

were observed in conjunction with the survey of labor demand to have further insight into vocational training demands.

(B) Skilled Manpower Demand Survey

Sample Design:

The other method employed in the study was a manpower demand survey. The survey was based on a representative, stratified sample of the Ethiopian private and state-owned enterprises. Main criteria set in sampling the Ethiopian firms included:

- (a) the selected sample included only the non-agricultural sectors, but considered two categories of firms linked to the agriculture production as agriculture support and commercial agriculture
- (b) a weighting scheme that considered employment share, productivity performance, expected growth, absorption of skilled workers and
- (c) stratifying the sample in order to account for both regional and ownership dimensions.

The survey sample consists of public and private manufacturing establishments, public and private marketing services establishment and the civil service. Manufacturing establishments with 10 employees and over were considered for the sample. The survey sample considered included categories of firms including:

- Agriculture and allied
- Mining and quarrying
- Manufacturing (ex. Manufacturing of tobacco and beverage products, textile, dressing of leather, wood and wood products, paper and paper products, fabricated metal products, machinery and equipments, electrical machinery and apparatus, medical instruments, ...)
- Utilities (Electricity, gas and water, construction)

- Services (ex. Wholesale/retail trade and catering + hotel and restaurant, transport, banking, insurance, real estate activities ,...)
- Other services (ex. renting of machinery and equipment , computer and related activities , research and development , ...)
- Other (Public administration and other social services as education , health , social work) .

The sample size was determined at 300 establishments of which 95% was from Addis Ababa. . This was stated to be due to the fact that about 95% of the major manufacturing and marketing services establishments were located in Addis Ababa compared to those at national level at the time. About 5 % of the samples were taken from the Regions to ensure geographical representation.

Questionnaire design

A questionnaire was designed and administered to the selected enterprises to assess the potential demand for skilled workers in Ethiopia. The questionnaire was organized around two main sections:

- A. the then situation of business and
- B. expected evolution of business at the time of the survey.

Items were set to assist the collection and organization of information and including:

- (i) Number of employees by skill and qualification (level of education), number of vacancies (manpower demand) modeled around three main areas: technology, business administration and agriculture. The specific fields of specialization are identified into these broad areas.
- (ii) Judgment of performances of skilled and semi-skilled workers
- (iii) Staff turnover and training opportunities in a period of two years prior to the commencement of the study.

Items were also set to assist the collection of data reflecting the anticipated business evolution at the time of the survey. The same model as that described in (i) above was set to assess areas of skill and level of qualification required at the time of the survey. The second part of the questionnaire design included monthly salaries an enterprise was willing to pay for skilled personnel at certificate, diploma and degree levels and skills deficit observed in new recruits.

2. Findings & discussions presented that have implications on program development

2.1 The study discussed a number of relevant issues including (i) reviews of literature reflecting why the economic performance of Sub-Saharan countries was poor and (ii) macroeconomic analysis having implications on development issues and sectoral analysis on agriculture, industry (manufacturing and construction), and services (trade and business). All the analysis considered the sources of demand for skilled labor of various categories in Ethiopia. *It provided a basis for projecting demand for mid-level skilled labour in medium term following the time the study was carried out.*

Despite the fact that the 2001 study needs to be updated to the present situation of the education sector, major findings *at the time of the study* having immediate influence on education program design are sighted below:

- The Ethiopian Development Strategy focuses on elimination of poverty. The emphasis is on the short term in on agricultural development based on increasing smallholder productivity. This, however, is combined with promotion of private sector and parallel development in the manufacturing and service sectors. Projections under the government's medium strategy show accelerated growth in manufacturing.
- Government interventions in key markets were noted, at the time of the study, to have implications for competition as well as increased costs of

doing business and might have resulted in distortionary pricing, and hence eroding the confidence of the private sector.

- Employment growth in large and medium scale manufacturing, construction, trade and commercial services as well as the financial sector (all of which demand a relatively high proportion of skilled labor) showed expansion. The absolute number of jobs created at the time, however, was noted to be small.
- There was no conspicuous employment growth observed in agriculture. The sectoral analysis on agriculture showed significant increase in government budget allocations, both recurrent and capital. The rise in capital expenditures included expansion of facilities for extension services, small-scale irrigation and rural roads. A significant increase in employment of agriculturalists in the civil services and subsequently an increase in such employment was observed.
- One of the key issues mentioned is the slow rate of technological progress in the manufacturing sector. The output of industries in the sector is constrained by several factors, of which one has to do with the shortage of skilled workers and specialized technicians. An increased supply of better-trained technicians, i.e. in the form of JTCs issuing a diploma was also recommended to be nested in the digital (information) revolution.
- Distributive trade (including wholesale and retail), the hotel industry and the financial sectors showed significant growth in output. Accordingly, employment opportunities increased in these trades.

Such analysis and findings were used as a basis for projecting demand for mid-level skilled labor in the medium term. On the whole, the Experts recommended *a phased approach* in the supply of skilled manpower that would depend on the extent and type of investments being undertaken. They also emphasized that with increased globalization exposure to competition will increase pressure for improved quality and automation, which will in turn exert an upward pressure on demand for skilled workers and technicians.

2.2 The study presented various results using survey data. The various tables presented in the study included:

- Expected manpower requirements by sector, program and qualification
- Expansion of establishments and factors
[The establishments were asked if they planned to expand their business then and in what expansion factors (capital, manpower, or both). Categories of establishments considered included agriculture, manufacturing, utilities, construction, services, and public administration.]
- Distribution of establishments by ownership
- Anticipations of surveyed establishments on future trained manpower requirements.
- The supply of graduates in technical fields
[Tables included graduates in technology, agriculture and management / commerce, 1992 EFY, Regular programs; Subject Field (then) Graduates, New JTC graduates (at the time), undergraduate/diploma ratio]

2.3 Program Design Characterized by Study Outcomes

It is mentioned above that this study was initiated as a result of a situation whereby there were few diploma level vocational education programs which do not cope with expected proportion of mix of qualifications. At the time the study, there were five degree granting engineering institutes in different regions of Ethiopia and only two colleges producing technicians. There was a clear imbalance between the number of graduating technicians and that of engineers, following expected proportion of skill hierarchy. The country needed to increase the total amount of skilled workforce with a right mix of skills and qualifications. The study suggested that seven Technical and Vocational schools be upgraded to JTCs with defined interventions described below:

(i) Field of specialization and curricula

The field of specialization that ought to be offered in each envisaged JTC establishments had been articulated looking at the market demand for skilled labor. Courses in information and communication technologies have been considered as crucial in most envisaged JTCs.

(ii) Human and physical resources required for setting up JTCs programs.

Studies on human and physical resources of the seven selected TVET schools had been conducted to explore the extent to which the envisaged JTCs could make use of. The broad indicators, such as, capacity of building and number of facilities, the number of classrooms, lecture halls, libraries, the number of qualification of both academic and supporting staff and the number of enrolled students had been identified. Higher education standards were used to estimate the budget required in terms of physical and human resources to upgrade TVET schools to JTCs. The costing and budgeting exercises considered also included the following components:

(a) Academic Staff

The success of any training program depends on the availability of all required training inputs. Teaching materials and equipment can be utilized optimally if handled by qualified staff of the recommended level. Thus the appropriate mix of staff qualification needs were defined for the JTCs.

The estimate of academic staff requirement was based on teacher's estimated weekly workload.

(b) Physical Resources

The availability of physical facilities in sufficient quantity, quality and size is one of the essential inputs for starting the JTC programs. The cost for additional physical resources required were estimated using the survey on available TVET physical facilities and comparing their compatibility against higher education standards of physical facilities. A standard cost per square meters was applied in estimating costs for classrooms, seminar rooms, lecture halls, conference rooms, drawing rooms, workshops and laboratories. Cost estimates were also made for purchase of reference materials, textbooks, professional journals, and computers.

Other cost estimates were also made for components including dormitories and dining hall, offices for academic and administrative staff, furniture, equipment and vehicles.

3. Relevance & Implications of the Study

The methodology employed in the study is presented as much as is thought to be gained from such a practice. The design and development of higher education establishment practices in the country, at least in most cases, seem to be based on anticipated demands rather than defined methodological approach as that employed in this study. Duplications of similar educational establishments are said to be observed as a result of assumptions of profitability and relevance rather than based on concrete evidence.

The objective of this paper, as stated above, is hence to share such an experience of a methodological approach specifying (a) the needs of the economy for qualifications and (b) the volume of training that creates conditions for coherence between the employment structure and the technical and vocational education system.

The results of the study point out that relevance of education could be ensured, among other things, by exploring the macroeconomic level, manpower requirements, labor market and use of indicators and hence tuning the design and development of education programs to that of the market potential. The macroeconomic level approach provides information of medium-term occupational trends and the examination of alternative employment scenarios that would be useful for educational developments. In the macroeconomic analysis, the experts considered the source of demand for vocational and technical training and seek to evaluate the rate of growth in such demand. The labor market analysis provides information for skilled labor forecasts. The study used such methods and came out with remedial suggestions of upgrading a number of TVETs to JTCs.

The Appraisal study carried out by the two Italian Experts has been instrumental to decisions reached in the framework of the Ethio-Italian Development Cooperation for upgrading four technical schools (Addis Ababa Technical School, Winget Construction

School, Sihin Vocational Technical School and Dire-Dawa Technical School) to JTCs (Addis Ababa Tegbared College, Winget TVET College, Sihin TVET College, and Dire-Dawa TVET College). Type of support defined under the Cooperation includes construction of buildings, provision of furniture and equipments and staff development packages. Upgrading the four selected Technical and Vocational schools to TVET programs at Junior Technical Colleges (JTCs) level need to be perceived as aimed to correct the assessed imbalance of skill and qualifications mixture existing at the time. And this support goes in line with the general commitment of the Government to expand and improve the 10+ 3 level education program of the country