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Knowledge Sharing Program

2019/20 KSP Policy Consultation Report

PASET National HRD Strategy to Support the Economic and Social Transformation of PASET Member Countries with Focus on Ethiopia and Rwanda

Ministry of Economy and Finance

KDI Korea Development Institute

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National HRD Strategy to Support the Economic and Social Transformation of PASET Member Countries with Focus on Ethiopia and Rwanda

Preface

Knowledge is an essential ingredient in a country's economic growth and social development. Of particular importance is government capacity to formulate and implement policies. The global society is making various efforts to promote knowledge sharing between countries and improve their policy capacity to tackle development issues and enhance global prosperity.

Indeed, knowledge has taken on an ever greater importance as the world confronts this new global pandemic. In the crisis which physical interactions are highly limited, the value of knowledge-sharing is becoming evident since it is the most flexible and prompt instrument to develop and share timely solutions.

When it comes to Korea's economic development, knowledge laid the foundation for Korea's unprecedented transformation from a poor agro-based economy into a modern industrialized nation with an open and democratic society. Technology transfer from abroad and educational investment helped expand the domestic knowledge stock and made this transformation possible. The Korean government could also accumulate invaluable practical lessons not found in a conventional textbook through the course of development.

The Ministry of Economy and Finance (MOEF) of Korea introduced the Knowledge Sharing Program (KSP) in 2004 to share Korea's development experience with the international community through joint research, policy consultations, and capacity-building activities. Since its inception, the program has played a vital role in supporting socio-economic development of partner countries around the world.

Korea Development Institute (KDI) has participated in the KSP since the program's launch and has been working with more than eighty countries. KDI, Korea's leading think-tank with an extensive experience in policy research, has provided solutions to the challenges that partner countries face in a variety of fields, ranging from industrial development to public-sector reform. In the 2019/20 KSP, KDI carried out twenty policy consultation projects including the one with Georgia, a new participant in KSP.

Among these meaningful projects for mutual learning, this one was initiated by Partnership for Skills in Applied Sciences, Engineering and Technology (PASET) of World Bank Group with the aim of "National HRD Strategy to Support the Economic and Social Transformation of PASET Member Countries with Focus on Ethiopia and Rwanda." Upon the request of the PASET, the MOEF and KDI organized a research team consisting of Vietnamese and Korean experts. The team conducted in-depth analysis of internal and external policy environments, identified PASET countries' key development challenges, and offered policy recommendations and action plans.

The COVID-19 pandemic has affected the project this year, as it has done every aspect of our lives. Despite the unprecedented challenge, the project was successfully completed thanks to devotion from the teams from both countries. Throughout the process, I witnessed how collaborative efforts can lead to overcoming hardship, and learned the importance of knowledge-sharing as more and more countries seek to learn how others have dealt with challenges.

On behalf of KDI, I would like to express my deepest appreciation to the Ministry of Science and Higher Education (MOSHE) of Ethiopia Ministry of Education (MINEDUC) of Rwanda for their collaboration in the project. In particular, I would like to extend my profound gratitude to His Excellency Dr. Mulu Nega Kahsay, State Minister for MOSHE, Eng. Mike Hughes, Advisor in Science and Technology at MINEDUC, Bizuneh Debebe, TVET Specialist of EASTRIP Team, Kalkidan Tadesse Deribe, program coordinator of EASTRIP team at MOSHE, Biruk Tekle Gebreyohaness, Education Specialist, at World Bank Ethiopia, Girma Woldetsadik, and Dr. Xiaoyan Liang, Task Team Leaders of EASTRIP at the World Bank for their unwavering support. The completion of this project would not have been possible without their devotion. I also wish to thank the KSP consultation team—Senior Advisor Yang-ho Ahn, Principal Investigator Professor Sung Joon Paik, researchers Professor Su Jung Choi, Professor Hyun-Soo Kim and Professor Hwanbo Park and local consultants Mr. Getachew Ahmed, Mr. Ibrahim Worku Mohammed, Ms. Mahlet Getachew Gezahegn and Dr. Ntahomvukiye Claudien—for producing this report.

I would like to extend my sincere thanks to all who have made valuable contributions to a successful completion of the project. I am also grateful to the Center for International Development of KDI, in particular Executive Director Dr. Sanghoon Ahn, former Executive Director Dr. Youngsun Koh, Project Manager Dr. Song Chang Hong, and Project Officer Ms. Bora Nam, for their hard work and dedication to the project.

I firmly believe that the KSP will serve as a stepping stone to further elevate mutual learning and economic cooperation between Vietnam and Korea, and hope it will contribute to their sustainable development.

Jeong Pyo Choi
President
Korea Development Institute (KDI)

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2019/20 KSP with PASET

Bora Nam (Project Officer, Korea Development Institute)

2019/20 KSP with PASET

Bora Nam (Project Officer, Korea Development Institute)

The Partnership for Skills in Applied Sciences, Engineering and Technology (PASET) was launched in 2013 with the membership of the African governments and the World Bank. PASET aims to accelerate the creation of a critical mass of highly skilled scientists, researchers, technicians, and innovators for the socio-economic development of sub-Saharan Africa (SSA) through several initiatives.[1] Not only led by African governments, partner countries from outside the continent such as China, India, Brazil, and Korea have participated in PASET initiatives to share their development experiences. In particular, the Republic of Korea is the first and main partner country of PASET. The partnership was initiated at the government level and gradually expanded to the institutional and university level since there were continuous demands from partner countries to share Korea's economic development experience through various development cooperation programs.

In this context, the Ministry of Economy and Finance of Korea, Korea Development Institute (KDI), and PASET have launched KSP for PASET partner countries (Senegal, Rwanda, and Ethiopia) in 2016 with the support of the Ministry of Economy and Finance of Korea. With the successful completion of the KSP in 2016/17 and 2017/18, cooperation continued between Rwanda and Korea with the second consecutive year of KSP, while the Ministry of Science and Higher Education(MoSHE) of Ethiopia newly joined the program. The 2019/20 KSP with PASET was launched with the theme "National HRD Strategy to Support the Economic and Social Transformation of PASET Member Countries with Focus on Ethiopia and Rwanda" in cooperation with the PASET secretariat of the World Bank. Especially, project stakeholders of Ethiopia agreed to choose consultation research topics focused on Technical and Vocational Education and Training (TVET) align with East Africa Skills for Transformation and Regional Integration Project (EASTRIP) of the World Bank. The specific consultation topics selected under the theme and corresponding experts for each topic were organized as shown in the following table.

1 World Bank Group website (http://www.worldbank.org/en/programs/paset).

<Knowledge Sharing Program with PASET 2019/20>

Sub-topics	Researchers	Local Consultants
Redesigning Ethiopia's TVET Strategies and Policies	Prof. Sung Joon Paik (KDI School of Public Policy and Management)	Mr. Getachew Ahmed
Organizational Capacity Diagnosis and Strategy Development of Holeta Polytechnic College in Ethiopia	Prof. Su Jung Choi (Seoul National University)	Mr. Ibrahim Worku Mohammed
Strategic Plan for Establishing of Ethiopian National TVET Research Institute	Prof. Hyun-Soo Kim (Soonchunhyang University)	Ms. Mahlet Getachew Gezahegn
Policy Recommendations for Enhancing the Human Capital Index (HCI) in Rwanda	Prof. Hwanbo Park (Chungnam National University)	Dr. Ntahomvukiye Claudien (University of Rwanda)

- Senior Advisor: Mr. Yang-ho Ahn, Former Vice Minister for Ministry of Public Administration and Security
- Project Manager: Dr. Song Chang Hong, Director, Division of Development Research, CID, KDI
- Principal Investigator: Prof. Sung Joon Paik, KDI School of Public Policy and Management

Mr. Yang-ho Ahn, Former Vice Minister for the Ministry of Public Administration and Security of the Republic of Korea and Project Manager Dr. Song Chang Hong, Director of Development Research, CID, KDI also joined the team as a senior advisor and a project manager, respectively.

As the first step of the 2019/20 PASET KSP, a delegation of Korean experts visited Addis Ababa, Ethiopia from August 13 to 18 for the "KSP Launch Seminar and High-Level Meeting" in order to identify project stakeholders' policy priorities and to finalize the research scope. During the mission, a KSP Launch Seminar was held to mark the official launch of the 2019/20 KSP with PASET and inform partner institutions of the KSP implementation cycle and its activities. Besides, the team visited relevant institutions, such as the World Bank Ethiopia office, Federal TVET Agency(FTA), Holeta Polytechnic College(HPC), LG-KOICA HOPE TVET College to identify the most pressing challenges in their respective sectors and build a network.

For the second stage, the KSP team visited Ethiopia and Rwanda, respectively, for the "KSP Policy Seminar and In-Depth Study" from 3 to 8 of December 2019 in Kigali and from 15 to 20 of December in Addis Ababa to share the progress of the research and discuss future plans. During the visit, Korean experts conducted policy seminars for government officials to share the overall Korean development experiences of the HRD sector and in-depth study of research topics through discussions with relevant government officials by visiting Rwanda

Education Board(REB), Rwanda Development Board (RDB), University of Rwanda(UR)-College of Education, Ministry of Education(MINEDUC), World Bank Rwanda Office, National Institute of Statistics of Rwanda (NISR) in Rwanda, Federal TVET Agency(FTA), Federal TVET Institute(FTI), Higher Education Strategy Center(HESC), Addis Ababa Regional TVET Authority, GIZ Ethiopia office, Ministry of Science and Higher Education(MoSHE) in Ethiopia.

For the next step, PASET delegation headed by the State Minister for TVET of the Ministry of Science and Higher Education(MoSHE) of Ethiopia, planned to visit Korea in February 2020 to participate in the "Interim Reporting and Policy Practitioners Workshop." However, the spread of the COVID-19 has placed restrictions on movement between countries as well as greatly affected lest project activities. Despite difficult situation, expert groups in Korea, Ethiopia, and Rwanda continued their collaboration with indirect methods such as video conferences and e-mail.

Korean researchers shared their interim research findings by e-mail and virtual meeting in May 2020 to provide an update on the progress being made in the participating countries. All participants provided their feedback on the given research topic and reached concurred opinions. As the final stage of the project, the "Final Reporting Workshop and Senior Policy Dialogue" was held on 20 of July 2020 and 22 of September 2020 via video conference. During the presentation session, the final research findings of the policy study by Korean experts and partner consultants were shared with approximately 40 participants from the government and related sectors. Following the presentation, the participants made some critical comments and asked a diverse range of questions about the research outcomes and their application to the situation in Ethiopia and Rwanda. Alongside a series of discussions on the KSP research topics, the Policy Practitioners' Workshop was held on 28 September 2020 in order to introduce policies and strategies for distance teaching and learning platform for TVET and Higher Education in Korea in light of COVID-19. At the end of the workshop, PASET and EASTRIP delegations also shared their ideas on establishing strategic implementation of future plans.

Based upon the trust and commitment throughout the last few years, there have been fruitful achievements made by PASET KSP, including the adoption and implementation of policy recommendations, subsequent cooperation projects, and linking with ongoing development projects. The 2019/20 KSP between PASET and Korea contributed to the transformation of member countries by inspiring the government officials and policy practitioners to learn about planning, managing, and monitoring the policies related to human capital development. The partnership will become deepen and positively affect future collaboration between PASET and Korea.

Executive Summary

Sung Joon Paik (KDI School of Public Policy and Management)

Executive Summary

Sung Joon Paik (KDI School of Public Policy and Management)

To solve the problem of poverty and become a middle income country, Ethiopia and Rwanda have implemented a series of national economic development plans like the Growth and Transformation Plan I and II of Ethiopia and the Economic Development and Poverty Reduction Strategy I and II of Rwanda. The main focus of these economic development plans is on the structural transformation of the national economy from the subsistence agriculture-based economy with low productivity to the manufacturing-oriented industry and service focused on with high productivity. A key condition for the structural transformation is the supply of quality labor. For this, Ethiopia has tried to enhance the capacity of education and TVET through the implementation of the Education Sector Development Programmes and the National TVET Strategy. Rwanda also has implemented the Education Sector Strategic Plans and the Rwanda TVET Qualification Framework. However, both countries still have relatively limited human capital base and weak TVET capacity in terms of quantity and quality.

Against this background, the 2019/20 PASET KSP for Ethiopia selected three topics: (1) 'Redesigning Ethiopia's TVET Strategies and Policies'. (2) 'Organization Capacity Diagnosis and Strategy Development of Holeta Polytechnic College in Ethiopia'. and (3) 'Strategic Plan for Establishing the Ethiopian National TVET Research Institute'. As a topic of the second year PASET KSP for Rwanda, the government of Rwanda selected 'Enhancing the Human Capital Index'. Key contents and policy suggestions of these four studies are summarized as follows:

1. Redesigning Ethiopia's TVET Strategies and Policies

Since the inception of its Growth and Transformation Plan I (2009/10-2014/15), the Ethiopian government has tried to restructure the national economy by expanding

the industrial sector with a focus on manufacturing. The rationale of this structural transformation strategy is to increase people's labor earnings by transferring an abundant labor force from the subsistence agricultural sector with low productivity to the industrial sector with high productivity and achieve the national goal of becoming a low middle-income country by 2025.

To realize this, two conditions should be met. The first is that industrial sectors should create a substantial number of wage jobs that can absorb young people from agriculture through the private sector's active investment. The other condition is the supply of quality labor, without which the private sector would not invest. If the Ethiopian government wants to continuously proceed with its structural transformation, it should ensure that the education and TVET system in Ethiopia can train and supply a large number of workers with basic and job-specific competencies as demanded from jobs created in industrial sectors, especially the manufacturing sector.

Has the TVET system in Ethiopia been working well enough to supply quality labor to the national economy? In 2008, the government of Ethiopia introduced the National TVET Strategy, with the key idea of implementing outcome-based and demand-driven TVET. However, the number of TVET graduates has been smaller than demanded and the problems of low quality have been pointed out. In 2019, the Jobs Creation Commission Ethiopia announced the five-year plan of "Action for Job Creation", the target of which is to create 14 million jobs by 2025 and 20 million jobs by 2030 to absorb the young people entering the labor market (about 2 million every year) and the unemployed. This projection indicates that it is urgent to expand and improve the TVET system at a much faster rate.

This study attempts to make recommendations on the new directions of the Ethiopian TVET strategies and policies for the successful implementation of the structural transformation of the Ethiopian economy from a long-term perspective. To achieve this objective, this study analyzed the results of GTP I and II in terms of labor transfer, identified key problems of the current Ethiopian TVET system in terms of meeting future labor demands, and reviewed the Korean cases corresponding to the problems to get meaningful ideas to set new strategic directions.

By reviewing the current education and TVET system, this study found that Ethiopia needs to design a comprehensive, systematic, and integrated education and TVET system, produce and utilize labor demand and supply information, and expand its education base with quality improvements. With these three underlying premises, this study recommends the following strategies:

(1) Adopt and strengthen TVET institution-based TVET: The Cooperative Training Program did not work as intended due to the inability of most firms to provide TVET programs at their worksites and the disproportionate distribution of the state-owned-enterprises mainly in Addis Ababa. To meet the urgent need of supplying as many skilled workers, technicians, and engineers as demanded during new 10-year national economic development plan period, it is urgent to increase the number of seats in TVET institutions and establish workshops for practical training, which can be shared by several TVET institutions.

(2) Expand and strengthen the vocational education track for grades 11 and 12 in a new education system: Considering the current small capacity of TVET institutions and the rapidly increasing demand for quality labor during the 10-year national economic development plan period, the government needs to expand and strengthen vocational education in junior colleges to guarantee the supply of skilled workers to strategic industry sectors.

(3) Revise occupational skills standards and improve the national TVET curricula and learning materials through central government leadership: Given that there is a huge disparity in teacher quality across regions and TVET institutions and consequent problems of skill mismatches and low quality TVET, it is integral for the Federal TVET Agency to revise existing occupational skills standards and develop new ones if necessary in collaboration with industry and experts by type and level of skill, and design TVET curricula and materials for key skills common to strategic industries. Based on the new curricula and materials, the local governments can make informed decisions on what facilities and equipment to install and how many, and what level of trainers qualified for new curricula to recruit.

(4) Guarantee horizontal and vertical pathways: To attract many competent young students into the TVET track, it is integral to make the TVET system open to the general education system including higher education and the labor market. Thus, individuals can easily move to a different track (e.g. from an academic track to the TVET track or vice versa) and between the general education and TVET tracks and the labor market according to their needs.

(5) Institutionalize the national non-formal vocational training system for youths and adults not employed as well as incumbent workers: Formal TVET institutions alone cannot supply enough quality labor as demanded for the 10-year national economic development plan period. To train and supply quality labor promptly to meet rapidly changing labor demand, the government needs to design and institutionalize a non-

formal training system to fully utilize the available manpower (e.g. unemployed youths and adults) and to upgrade the job competencies of incumbent workers in collaboration with enterprises.

(6) Enhance policy coordination among the federal government ministries, between federal and regional governments, and among governments, TVET providers, and industry: It is necessary to strengthen the function of TVET policy coordination of the Council of Ministers and activate the Federal TVET Council as well as regional TVET councils. For more active and effective coordination and collaboration among stakeholders, it is integral to enhance the government officials' TVET capacity.

(7) Diversify TVET funding sources: In addition to the increase in the government budget for TVET, it is necessary to utilize other funding sources like employers, trainees, and international donor agencies. The government of Ethiopia may try a pilot program of collecting levies from employers, or forming the national skill development fund, which consists of the government budget, levies, and/or international organizations' grants.

2. Organizational Capacity Diagnosis and Strategy Development of Holeta Polytechnic College in Ethiopia

The target of this study, Holeta Polytechnic College, is an institution in charge of teacher education in the agricultural vocational education sector of Ethiopia. The College is facing a new challenge as it has recently started a teacher qualification program in the field of agro- processing. The agro-processing sector requires high-level skills compared to the skills required for traditional agriculture, and for this, it is essential for Holeta Polytechnic College to add adequate training facilities and equipment, curriculum, and teachers with industry-relevant skills. In this regard, Holeta Polytechnic College has an opportunity to improve its hardware and quality of training through EASTRIP projects. The EASTRIP project is a great opportunity for Holeta Polytechnic College, but it also demands accountability to maximize performance given such a large budget. In this context, the main objective of this study is to provide useful recommendations to improve quality of training offered at Holeta Polytechnic College based on the diagnosis of the current TVET delivery system.

Background analysis of the current status of Ethiopia's agro-processing industry shows that agro-processing has a large share in Ethiopia's manufacturing industry. Also, even in the

group of SSSI, value-addition of the agro-processing sector for the GDP is higher than that of other sectors. However, despite the high emphasis on the agro-processing sector, there are several challenges including unskilled labor forces with limited experiences.

With regard to gap analysis on the Holeta Polytechnic College, five actions including "A4.1. Ensure stable funding from federal and state government"; "A6.1. Ensure adequate building, classroom, workshop room"; "A6.2. Ensure adequate and appropriate modern equipment"; "A5.2. Ensure availability of teachers with related industry experience"; "A6.3. Provide quality learning materials for both trainers and trainees" were selected as the top five priorities in terms of importance for future and the discrepancy between "as-is" and "to-be." Generally, members of Holeta Polytechnic College consider "lack of budgets and appropriate facilities and equipment" as the core problem of quality training. It is expected that this issue can be solved through EASTRIP, but this study found that supervision by industry experts in the agro-processing filed is essential to optimize utilization of EASTRIP budget. Also, lack of qualified teachers with industry-relevant skills was identified. Especially, the teachers' lack of work experience has affected overall teaching quality. The third problem was related to providing sufficient learning materials for both trainers and trainees. Especially, given that C-level trainers have limited experience with developing learning materials based on occupational standards, it is hard to guarantee the quality of TTLM. Additionally, weak partnership between college and industry and lack of efficiency in governance of satellite programs were highlighted in the gap analysis.

Korea has experiences that are relevant to the problems of Holeta Polytechnic College, and these experiences can be utilized to provide meaningful policy: (i) it is a prerequisite to build a central body at the regional level to establish a link between schools and industry to extend the network; (ii) the government needs to provide sufficient short-term training for teachers to equip them with industry-relevant skills; (iii) it is crucial to develop standardized learning modules based on occupational standards; (iv) school based enterprises could be effective measures to generate income for financial sustainability.

The policy recommendations drawn from the gap analysis of Holeta Polytechnic College and Korea's experiences are as follows:

(1) Strengthening the TVET teacher training system: (i) improving practical skills of teachers through short-term training with industry; (ii) improving teachers' skills in development of curriculum and learning material through the initial and continuous training system.

(2) Strengthening mutual relationship between industry and college: (i) institutionalize industry-college cooperation to establish formal relationship; (ii) provide enough opportunities to convince industry of the capacities of colleges.

(3) Ensuring quality of learning material: (i) develop teaching-learning material at government level; (ii) provide sufficient learning material to trainees.

(4) Planning an exit program for the EASTRIP project including financial sustainability in terms of costs of equipment maintenance.

3. Strategic Plan for Establishing the Ethiopian National TVET Research Institute

The main purpose of this study was to provide the Ethiopian government with policy recommendations to establish the National TVET Research Institute. TVET plays a crucial role in each nation's economic development through providing competent human resources. The national think tank's involvement in TVET policy making is also essential to planning and implementing effective TVET measures. Lessons learned related to the establishment of a national TVET research institute could be found from many international organizations and developed countries including Korea.

This report presents the results of analyzing the Ethiopian context for establishing a national TVET research institute. It covers aspects such as: the Ethiopian research landscape and national TVET research system, Ethiopian national plan for strengthening the research system on TVET, needs analysis on newly introducing a TVET research institute, Korean and global experience on TVET research, and policy recommendations.

Ethiopia offers various forms of research facilities and there are about 20 research institutions in the country funded by the government, and a few R&D centers run by industrial corporations. Currently, TVET research function in Ethiopia is fragmented in various institutions. The Higher Education Strategy Center (HESC), Federal TVET Agency (FTVETA), and Federal TVET Institute (FTVETI) take care of some research functions; however, some TVET organizations are not focused on R&D (FTVETA, FTVETI), or conversely some R&D institutions are not focused exclusively on TVET (HESC). As a result, the R&D outcomes in the TVET field are insufficient and there is no think tank at the national level to plan and implement TVET policy systemically.

The Ministry of Science and Higher Education (MoSHE) of Ethiopia has prepared a strategic plan that will strengthen the current TVET system over the period of 2019-2025. The plan includes restructuring the current TVET system and curriculum, and developing a framework that differentiates TVET and higher education institutions in identifying their own niche areas and competencies. Executing this plan will need detailed investigation and analysis of the sector, which will further strengthen the research system.

Agriculture accounts for about 46% of the total GDP and 85% of the labor force, but presently, the Ethiopian government is actively promoting industrialization by fostering the manufacturing industry. It is time to prepare a plan for establishing and operating a realistic TVET policy research institute that can be linked with future economic development strategies based on Ethiopia's industry and employment situation.

Opinions from the government ministries (MoSHE), agencies (FTVETA, FTVETI, and HESC), TVET institutes (TVET polytechnics and colleges), industries, Chamber of Commerce and also from those who have experience on TVET (including teachers, students, and consultants) are presented in this study report.

In order to achieve the research objectives, the background and necessity of establishing an Ethiopian TVET policy research institute are presented through analysis of similar processes followed by international organizations and TVET research institutes in major countries.

TVET is a key area specified in the SDGs of the United Nations with regard to the provision of quality educational opportunities. National Institutional Arrangements (NIA) proposed by UNDP can be used as a basis for preparing the logic for institutional maintenance to establish an Ethiopian TVET policy research institute. UNDP's NIA checklists define clear roles and responsibilities, and provide directions for streamlining business processes, performance-based evaluation system, coordination system, etc.

UNESCO-UNEVOC network, UNESCO Strategy for TVET (2016-2021), World Bank's PASET, and ESTRIP project were reviewed for TVET policy and to form an understanding of the transition towards sustainable societies and economies.

The Korean case of KRIVET was reviewed focusing on establishment, roles and functions, major projects and achievements, and future tasks. KRIVET has been successful in linking vocational education with vocational training, research and policy development for school-level vocational education and adult vocational skills, establishing a human resource

development system, reflecting industry demands, systemizing qualifications systems, and advancing career education. Currently, KRIVET operates research centers that carry out not only policy research but also many related projects.

The policy recommendations drawn from the analyses of Ethiopia's TVET context and Korea's experiences are as follows:

(i) Legal background is needed so TVET research institute has the rights to operate proactively and express views independently.

(ii) It is recommended that the responsible government official be the Prime Minister. However, as in the opinion survey, it may start at the department level in the short term.

(iii) The TVET research institute could be newly established or alternatively it is possible to consider ways to strengthen research functions in existing organizations.

(iv) In the case of the establishment of a new institution, as in the case of KRIVET, it is necessary to initiate measures related to the formation of relevant foundational laws, differentiation from existing organizations, securing of budget, design of organization and functions, selection of responsible ministries, etc.

(v) In the case of strengthening the research function of an existing organization, it is necessary to decide which organization to be selected.

(vi) The institute needs to perform policy research functions at the level of the federal and local governments.

(vii) The national TVET research institute should establish a master plan for lifelong vocational education and training and encourage the government to promote the development of TVET consistently in response to environmental changes in the medium and long term.

Detailed policy recommendations in areas such as mission, governance, status, organization, research areas, human resources, financing, rule and regulation, and quality assurance are included in this study.

4. Policy Recommendations for Enhancing the Human Capital Index (HCI) in Rwanda

This is one project within the 2019/20 KSP with PASET (the Partnership for skills in Applied Sciences, Engineering and Technology). The purpose of this research is to provide the government of Rwanda with policy recommendations that can contribute to enhancing the Human Capital Index (HCI) with a focus on school indicators. For this purpose, this research reviewed the current state of Rwanda's education system focusing on educational opportunities and academic achievements, and share Korea's experiences that are relevant to these issues.

The government of Rwanda has designated human resource development as a top priority in their national development plan, Vision 2020, and is spending more on education than other African countries (Republic of Rwanda, 2012). However, the World Bank's HCI value for Rwanda was 0.37 and it ranked 142nd among 152 countries in 2018. Among the three components, school indicators such as expected years of school and harmonized test score were lower than the Sub-Saharan African average.

Despite the enrolment rate of primary education being almost 100%, the enrolment rate in lower secondary schools dropped sharply. There is need to improve the participation rate before and after the primary schooling age. The government emphasizes strengthening human capital formation, particularly through the education service delivery of two key components, access and quality. In terms of access, Rwanda has achieved universal access to primary education; however, it is still a challenge to ensure the right to access to 12YBE. While progress in terms of providing access to basic education is an achievement, more effort is needed to reduce dropouts. As much as the access to education has tremendously improved at both the primary and lower secondary levels, it is important to focus on quality so as to identify gaps and suggest strategies to improve student learning achievement. In Rwanda, national examinations have been used for transitioning students to higher levels of education. There is interest to ascertain whether or not test scores represent intended learning outcomes that meet curriculum objectives.

Successful primary school cases illustrate that the school climate managed by the principal's leadership, teacher's efforts and incentives, and maximizing student learning time could make the school more effective, even if it is located in a rural area.

Korea's policy experiences can be a one exemplar regarding these issues. Korea has experienced a rapid and sequential expansion of its education system from primary to higher education in a short period of time. The government responded to graduates' demands for the next level of education by abolishing the entrance examination for lower and upper secondary schools without additional financial support. The reason that the low-cost approach succeeded was that qualified teachers with relatively high educational backgrounds were secured and thoroughly utilized. In the process of expanding educational opportunities, teachers were required to struggle to teach in overcrowded classrooms and they utilized strong discipline to control the students. It is clear that this low-cost approach contributed to the expansion and equity of educational opportunities and provided a foundation for the nine years of compulsory education. However, it caused a decline in the quality of secondary education and led to arguments about equality.

Although Korea has made great accomplishments in terms of the quantity and quality of education, challenges remain about the human capital accumulation of the next generations and educational inequalities. Especially, ensuring educational opportunities for students with disadvantaged backgrounds and the improvement of the below basic level students are still critical issues. Against this background, the Korean government established a support system and implemented educational policies to improve the achievement of the below basic level students.

Based on these results, this research suggested four policy recommendations as follows:

First, Rwanda should focus on lower secondary education and consider how to increase the number of students, even if the quality of education is reduced temporarily like a primary education. In order to do this, we suggest improving the transition system that ensures all primary school graduates who want to advance to a lower secondary school be admitted regardless of their test score. In addition to this system improvement, intensive support for secondary school teachers is needed to achieve real results.

Second, the abolishment of the P6 national examination should be considered in order to ensure the opportunities of basic education for all and expand the years of schooling. Abolishing the P6 national examination means that Rwanda would consolidate primary and lower secondary schools into a single basic education cycle of nine years of schooling. This change could contribute to improving the transition rates from primary and lower secondary school in the short term, however, the establishment of new schools and hiring of qualified teachers should accompany this to ensure the success of this change.

Third, Rwanda should try to increase the average academic achievement level through intensive support for the below basic level students for improving learning outcomes in primary and secondary education. For this, above all, it is necessary to establish a system to diagnose and support below basic level students. ICT technology could be used in the establishment of this system.

Fourth, Rwanda should consider establishing an educational policy research institute to collect and analyze data to develop educational policies. In order for the Rwandan government to continuously enhance its human capital competitiveness, it is essential to develop and implement evidence-based education policies that are suitable for the Rwandan context. This research institute would provide necessary advice from policymakers as a think tank and could also serve as a platform for linking education policy and practice.

01

CHAPTER

Redesigning Ethiopia's TVET Strategies and Policies

Sung Joon Paik (KDI School of Public Policy and Management)

Keywords
TVET (Technical and Vocational Education and Training) Strategy, TVET System, TVET Quality, Structural Transformation, Policy Coordination

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Summary

Since the inception of its Growth and Transformation Plan I (2009/10-2014/15), the Ethiopian government has tried to restructure the national economy by expanding the industrial sector with a focus on manufacturing. The rationale of this structural transformation strategy is to increase people's labor earnings by transferring an abundant labor force from the subsistence agricultural sector with low productivity to the industrial sector with high productivity and achieve the national goal of becoming a low middle-income country by 2025.

To realize this, two conditions should be met. The first is that industrial sectors should create a substantial number of wage jobs that can absorb young people from agriculture through the private sector's active investment. The other condition is the supply of quality labor, without which the private sector would not invest. If the Ethiopian government wants to continuously proceed with its structural transformation, it should ensure that the education and TVET system in Ethiopia can train and supply a large number of workers with basic and job-specific competencies as demanded from jobs created in industrial sectors, especially the manufacturing sector.

Has the TVET system in Ethiopia been working well enough to supply quality labor to the national economy? In 2008, the government of Ethiopia introduced the National TVET Strategy, with the key idea of implementing outcome-based and demand-driven TVET. However, the number of TVET graduates has been smaller than demanded and the problems of low quality have been pointed out. In 2019, the Jobs Creation Commission Ethiopia announced the five-year plan of "Action for Job Creation," the target of which is to create 14 million jobs by 2025 and 20 million jobs by 2030 to absorb the young people entering the labor market (about 2 million every year) and the unemployed. This projection indicates

that it is urgent to expand and improve the TVET system at a much faster rate.

This study attempts to make recommendations on the new directions of the Ethiopian TVET strategies and policies for the successful implementation of the structural transformation of the Ethiopian economy from a long-term perspective. To achieve this objective, this study analyzed the results of GTP I and II in terms of labor transfer, identified key problems of the current Ethiopian TVET system in terms of meeting future labor demands, and reviewed the Korean cases corresponding to the problems to get meaningful ideas to set new strategic directions.

By reviewing the current education and TVET system, this study found that Ethiopia needs to design a comprehensive, systematic, and integrated education and TVET system, produce and utilize labor demand and supply information, and expand its education base with quality improvements. With these three underlying premises, this study recommends the following strategies:

(1) Adopt and strengthen TVET institution-based TVET: The Cooperative Training Program did not work as intended due to the inability of most firms to provide TVET programs at their worksites and the disproportionate distribution of the state-owned-enterprises mainly in Addis Ababa. To meet the urgent need of supplying as many skilled workers, technicians, and engineers as demanded during new 10-year national economic development plan period, it is urgent to increase the number of seats in TVET institutions and establish workshops for practical training, which can be shared by several TVET institutions.

(2) Expand and strengthen the vocational education track for grades 11 and 12 in a new education system: Considering the current small capacity of TVET institutions and the rapidly increasing demand for quality labor during the 10-year national economic development plan period, the government needs to expand and strengthen vocational education in junior colleges to guarantee the supply of skilled workers to strategic industry sectors.

(3) Revise occupational skills standards and improve the national TVET curricula and learning materials through central government leadership: Given that there is a huge disparity in teacher quality across regions and TVET institutions and consequent problems of skill mismatches and low quality TVET, it is integral for the Federal TVET Agency to revise existing occupational skills standards and develop new ones if necessary in collaboration with industry and experts by type and level of skill, and design TVET curricula and materials for key skills common to strategic industries.

Based on the new curricula and materials, the local governments can make informed decisions on what facilities and equipment to install and how many, and what level of trainers qualified for new curricula to recruit.

(4) Guarantee horizontal and vertical pathways: To attract many competent young students into the TVET track, it is integral to make the TVET system open to the general education system including higher education and the labor market. Thus, individuals can easily move to a different track (e.g. from an academic track to the TVET track or vice versa) and between the general education and TVET tracks and the labor market according to their needs.

(5) Institutionalize the national non-formal vocational training system for youths and adults not employed as well as incumbent workers: Formal TVET institutions alone cannot supply enough quality labor as demanded for the 10-year national economic development plan period. To train and supply quality labor promptly to meet rapidly changing labor demand, the government needs to design and institutionalize a non-formal training system to fully utilize the available manpower (e.g. unemployed youths and adults) and to upgrade the job competencies of incumbent workers in collaboration with enterprises.

(6) Enhance policy coordination among the federal government ministries, between federal and regional governments, and among governments, TVET providers, and industry: It is necessary to strengthen the function of TVET policy coordination of the Council of Ministers and activate the Federal TVET Council as well as regional TVET councils. For more active and effective coordination and collaboration among stakeholders, it is integral to enhance the government officials' TVET capacity.

(7) Diversify TVET funding sources: In addition to the increase in the government budget for TVET, it is necessary to utilize other funding sources like employers, trainees, and international donor agencies. The government of Ethiopia may try a pilot program of collecting levies from employers, or forming the national skill development fund, which consists of the government budget, levies, and/or international organizations' grants.

1. Introduction

1.1. Policy Issues

During the period of Growth and Transformation Plan (hereafter the GTP) I (2009/10-2014/15) and II (2015/16-2019/20), the Ethiopian government tried to restructure the national economy by expanding the industrial sector with a focus on manufacturing. The structural transformation of the national economy from a subsistence agriculture-based economy with low productivity to an industry-based economy with high productivity has been the key idea for national economic development. The rationales of this strategy are as follows: (i) a substantially high proportion of people have been working in the less productive agriculture, forestry, and fishing sectors (80.2% in 2005[1]). Thus, many of these workers need to be transferred to more productive industrial sectors including manufacturing to increase their earnings and consequently national wealth; (ii) to absorb the influx of labor from the agricultural sector and rapidly growing youth population, it is integral to expand the industrial sectors with a focus on manufacturing through inducing private sector investment because the growth of the industrial sectors, especially the manufacturing sector,[2] can create abundant wage employment opportunities; and (iii) as more labor works in the industrial and manufacturing sectors, individual worker's earnings in these sectors will rise, and Ethiopia will achieve its national goal of becoming a low middle-income country by 2025.[3]

In order for the strategic rationale of the structural transformation to be successfully realized, two conditions should be met. The first is that industrial sectors should create a substantial number of wage jobs that can absorb people from agriculture and growing young people, and for this the private sector should actively invest in these sectors. The other condition is the supply of quality labor. If private investors, both domestic and foreign, cannot find a sufficient number of workers with the high levels of competencies required, they will not invest.[4] If the Ethiopian government wants to continuously proceed with this structural transformation, it should ensure that the education and TVET system in Ethiopia can train and supply as many workers with basic and job-specific competencies as

1 Central Statistics Agency (2014). Analytical Report on the 2013 National Labor Survey.

2 Modern service sectors with high productivity like banking, insurance, and law require high levels of skills and knowledge. It will be difficult for people from the agricultural sector to get employed in these service sectors. The majority of them will be absorbed into service sectors with low productivity like food, hotel, and delivery. Labor demand in the low productivity service sectors is limited within a country. However, the manufacturing sector can export products. Thus, the manufacturing sector has larger potential for job creation and promoting national economic growth (National Planning Commission (2016.5). Federal Democratic Republic of Ethiopia Growth and Transformation Plan II (GTP II) (2015/16-2019/20) Vol. I: Main Text).

3 Ministry of Education (2015). Education Sector Development Programme V (ESDP V) 2008-2012 E.C. 2015/16-2019/20 – Program Action Plan.

4 Sung Joon Paik (2018). Make Rwanda's HRD system perform better. 2017/18 Knowledge Sharing Program with PASET: National HRD Strategy to Support the Economic and Social Transformation of PASET member countries with focus on Rwanda and Senegal. p. 33.

demanded from jobs created in industrial sectors, especially the manufacturing sector.[5]

Has the strategic rationale of the structural transformation been realized as planned? Have the shares of GDP and employment of the industrial and manufacturing sectors increased, while those of the agricultural sector decreased? Has the capacity of the manufacturing sector to absorb labor expanded as expected over time since the inception of the GTP? The GDP share of industry increased from 10.5% in 2010/11 to 27.0% in 2017/18,[6] while that of agriculture decreased from 44.7% to 34.9% during the same period. Although the GDP share of agriculture has continued to decrease, 67% of workers were estimated to be employed in the agricultural sector in 2018.[7] The GDP share of the manufacturing sector increased from 4.0% to 6.8%,[8] which is still quite low to realize the strategic rationale mentioned above. The proportion of the employed in the manufacturing sector in urban areas decreased from 13.4% in 2010 to 12.3% in 2018,[9] indicating that GTP I and II have not contributed to expanding the employment share in the manufacturing sector.[10] In other words, the private sector has not invested in the manufacturing sector as much as demanded to create wage jobs to accommodate the huge influx of youths expected.[11] This implies that the government of Ethiopia needs to take more active policy actions to induce private sector investment, both domestic and foreign, one of which is to train and supply quality labor.

Has the TVET system in Ethiopia been working well enough to supply quality labor to the national economy? In 2008, the government of Ethiopia introduced its National TVET Strategy, the key ideas of which are outcome-based and demand-driven TVET, to "contribute to the economic and social development of the country."[12] However, the number of TVET graduates has been smaller than demand and low quality problems have been pointed out.[13] In 2015, the Ministry of Industry projected that 3.7 million workers will be needed for six major manufacturing sectors: leather and leather products, textiles and garments, metal

5 This study focuses on the second condition.

6 Most of the GDP growth in the industrial sector has been due to massive public investment in construction. Since construction is more capital intensive, its effect on employment increases has not been as substantial as expected. Jobs Creation Commission Ethiopia (2019). Plan of Action for Job Creation 2020-2025 Briefing Document. p. 6.

7 Jobs Creation Commission Ethiopia (2019). Plan of Action for Job Creation 2020-2025 Briefing Document. p. 6.

8 Ministry of Finance and Economic Development.

9 CSA (2018, 2010). Statistical Report on the Urban Employment Unemployment Survey.

10 Recent data on the employment share of industry, manufacturing, and agriculture at the national level is not available. Considering that most manufacturing firms are located in urban areas, the author thinks that it would be reasonable to use the urban survey data for estimating the national trend of employment share in the manufacturing sector.

11 In access to finance, the public sector (63.1% of domestic credit) dominates over the private sector (36.9%). The public sector provides 48% of wage jobs in urban areas in 2018. The government plans to vitalize local private MSMEs through strengthening the support to them. Jobs Creation Commission Ethiopia (2019). Plan of Action for Job Creation 2020-2025 Briefing Document. pp. 7-11.

12 Ministry of Education (2008.8). National Technical & Vocational Education & Training (TVET).

13 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) An Integrated Executive Summary. pp. 72-78; Jobs Creation Commission Ethiopia (2019). Plan of Action for Job Creation 2020-2025 Briefing Document. p. 7. For detailed discussion, refer to sections 3.2 and 3.3.

and engineering, chemical and construction inputs, pharmaceutical, and food and beverage in 2020 and 12 million workers in 2025 and that TVET institutes need to supply 1.6 million graduates in 2020 and 5.2 million in 2025 to meet the manpower demand in three major manufacturing sectors: metal, textiles, and leather.[14] Recently the Jobs Creation Commission Ethiopia announced the five-year plan of "Action for Job Creation," the target of which is to create 14 million jobs by 2025 and 20 million jobs by 2030 to absorb young people entering the labor market (about two million every year) and the unemployed.[15] These projections indicate that it is urgent to expand the TVET system at a much faster rate. The expansion of the TVET system requires a long-term approach for the development of TVET and major budget investments.

Ethiopia is now in the stage of finalizing GTP II and preparing for starting a new 10-year economic development plan.[16] It is integral to check the results of GTP I and II implementation with a focus on the transfer of workers from agriculture and the inducement of new labor market entrants to the manufacturing sector, reviewing the current status of national TVET capacity to meet labor demand from the national economy, especially from the manufacturing sector in terms of both quantity and quality, and discuss key TVET strategies and policies for the future.

1.2. Objective and Main Contents of the Study

This KSP/PASET study of Ethiopia attempts to make recommendations on the new directions of the Ethiopian TVET strategy and policy for the successful implementation of the structural transformation of the Ethiopian economy. This study focuses on reviewing the current capacity and potential of the Ethiopian TVET system including enrolment, delivery, quality, governance, and finance from the strategic perspective and suggesting more fundamental and long-term recommendations.

Section 2 reviews the policy context of the Ethiopian economy and TVET system in terms of the changes in GDP and employment by major economic sectors during the GTP I and II period, and the projections of labor demand by TVET level and demographic structure for the future. Section 3 analyzes the Ethiopian school system, TVET delivery system, governance, and finance, reviews the appropriateness of the National TVET Strategy, and identifies critical problems of the TVET system. Section 4 introduces the Korean experiences

14 Ministry of Industry (2015.4). Human Resource Requirement Plan for Manufacturing Industries (2016-2025).

15 Jobs Creation Commission Ethiopia (2019). Plan of Action for Job Creation 2020-2025 Briefing Document.

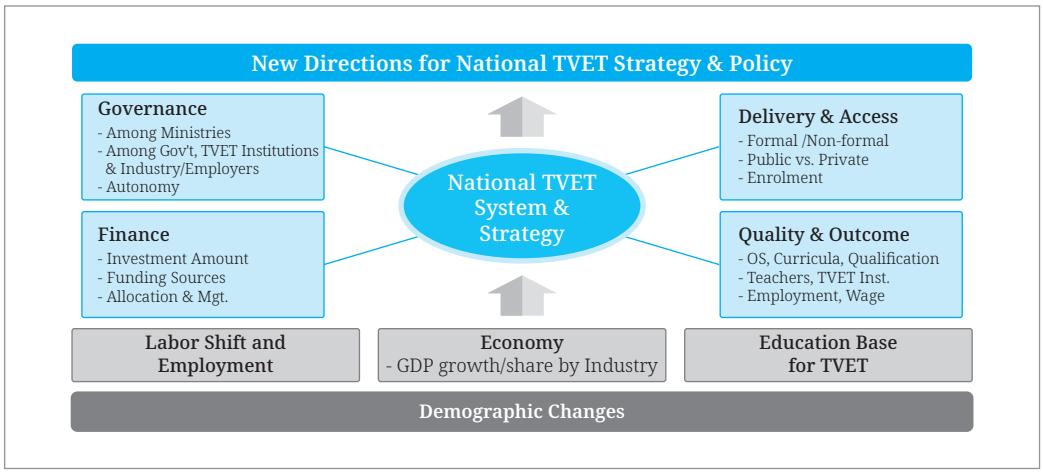
16 The Planning and Development Commission of Ethiopia unveiled a new economic development plan that aims at bringing quality-based economic growth, which is private sector-led with a 10.2 percent average annual growth rate, under the theme of 'Ethiopia: An African Beacon of Prosperity' in June 2020. https://ethiopianmonitor.com/2020/06/11/ethiopia-unveils-10-year-development-plan/ June 19, 2020.

relevant to the key problems identified in the previous section to draw meaningful implications. Section 5 makes suggestions on new directions for national TVET strategies and policies for Ethiopia.

1.3. Analytic Framework and Methodology

When diagnosing and designing a country's TVET system, strategies, and policies, it is integral to analyze the key factors of national TVET policy contexts that include demographic changes, labor shifts and employment, GDP growth and share by industry, and the education base for TVET. The analysis of these factors provides a rational basis for reviewing the current national TVET system and strategies such as the composition of vocational education and training providers, school systems, TVET governance and finance, and the ways by which TVET is delivered. The review of the Ethiopian TVET system and strategies through the analysis of policy contexts is expected to render practical ideas on how to improve the performance of the national TVET system and strategies which eventually contribute to transforming Ethiopia into a middle-income country. The analytic framework of this study is described in [Figure 1-1].

[Figure 1-1] Framework for the Analysis of Ethiopian TVET System and Strategy



With the analytic framework above, this study reviewed government documents and international organizations' reports, and conducted in-depth interviews with senior officers in central and local governments (i.e. Ministry of Education, Ministry of Science and Higher Education) and government agencies like the Federal TVET Agency and Federal TVET Institute to collect data and information on the strengths and weaknesses of the current TVET system and strategies.

This project was scheduled to conduct three mission trips to collect data and information and hold workshops for government officials, experts, TVET providers, and industry people. However, due to the spread of COVID-19 after the first mission trip on December 2019, the project team could not visit Ethiopia any more so it has been very difficult to collect data and information and get feedback from the Ethiopian side. In that sense, this study does have limitations in the coverage of data and information analyzed and discussions and recommendations made.

2. Policy Context of Ethiopia[17]

2.1. Economy

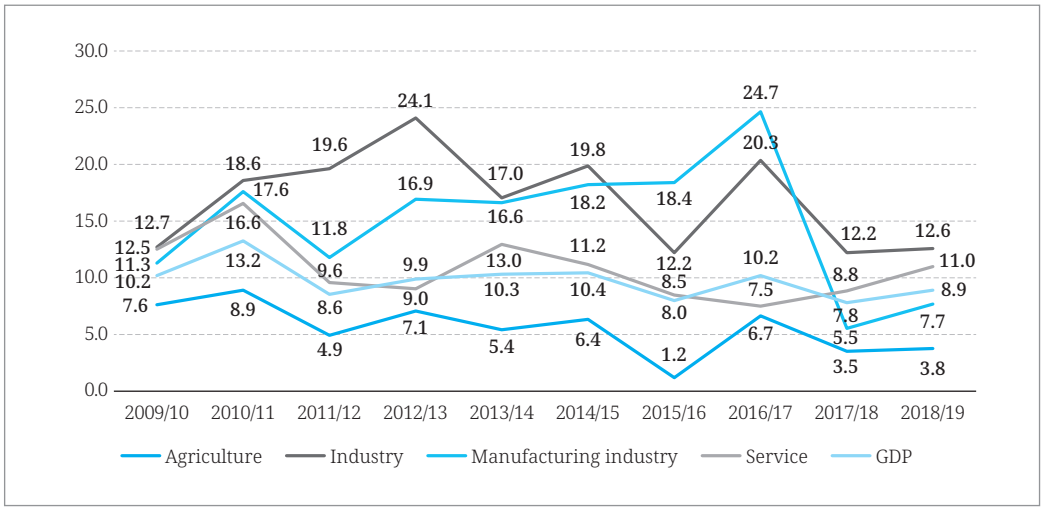
The Ethiopian economy experienced a relatively high GDP growth rate, compared to other SSA countries. During the periods of GTP I and II (2010/11-2018/19), the average GDP growth rate was 9.7%. Since 2009/10, the GDP growth rate of the manufacturing sector increased from 11.3% in 2009/10 to 24.7% in 2016/17 and sharply decreased to 5.5% in 2017/18 and then slightly increased to 7.7% in 2018/19, as [Figure 1-2] shows. The growth rate of the industrial sector increased from 12.7% in 2009/10 to 24.1% in 2012/13, decreased to 12.2% in 2015/16, increased to 20.3% next year, decreased to 12.2% in 2017/18, and maintained a similar rate in 2018/19.[18] The growth rates of the service sector decreased from 16.6% in 2010/11 to 7.5% in 2016/17 and showed an increasing trend since 2017/18. The growth rates of the agriculture sector were much lower than other sectors and showed a decreasing trend. Overall until 2016/17, the changing trends of the GDP growth rates appear to reflect the Ethiopian government' efforts for the structural transformation of the national economy. Although the growth rates of the industrial sector, especially the manufacturing sector, sharply decreased in 2017/18, which requires more in-depth analysis, this may be due to the political instability at that time. The growth rates of the manufacturing sector began to increase the next year, 2018/19.

17 This section is based on (i) information and data collected from the government and related agencies visited during the field trip to Ethiopia in December 2019, (ii) websites of the government and agencies and (iii) the country paper by Mr. Getachew Ahmed Abegaz (local consultant).

18 In Figures 2-1 and 2-2, the industrial sector includes the manufacturing sector.

[Figure 1-2] GDP Growth Rate by Major Economic Sector (2009/10-2018/19)

(Unit: %)

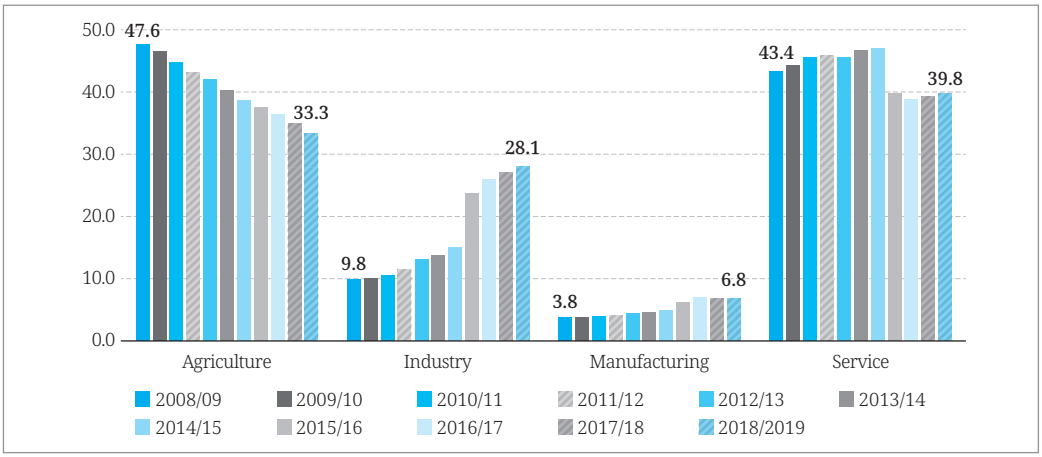


Source: Ministry of Finance and Economic Cooperation.

The magnitude and changes in the GDP growth rates of major economic sectors led to changes in the GDP share of these sectors. As [Figure 1-3] shows, the GDP share of the agricultural sector kept decreasing from 47.6% in 2008/09 to 33.3% in 2018/19, while those of the industrial and manufacturing sectors kept increasing from 9.8% to 28.1% and from 3.8% to 6.8%, respectively. The service sector's GDP share increased from 43.4% in 2008/09 to 47.0% in 2014/15 and sharply decreased to 39.7% in 2015/16, and then maintained a similar portion. Overall, the GDP shares of the industrial and manufacturing sectors increased between 2008/09 and 2018/19, while that of agriculture decreased. Although the GDP growth rates of the industrial sector, especially the manufacturing sector, have been much smaller in the last two years, the changing trends of GDP share by major economic sectors shows that the structural transformation has been realized during the past decade.

[Figure 1-3] GDP Share by Major Economic Sector

(Unit: %)



Source: Ministry of Finance and Economic Cooperation.

Ethiopia continuously put emphasis on expanding the manufacturing sector to promote its structural transformation. In the GTP II plan, the government set new visions of becoming "a leader in light manufacturing in Africa" and "global leader in overall manufacturing." For this, the government tried to produce export-oriented goods and induce the domestic private sector to invest in the manufacturing sector. The Ethiopian government planned to increase the GDP share of the manufacturing sector from 4.8 percent in 2014/15 to 8.0 percent in 2019/20 with an average annual growth rate of 21.9%, and the GDP share of the industry sector as a whole from 15.1 percent to 22.3 percent with an average annual growth rate of 20.0% for the same period, as <Table 1-1> shows. [Figure 1-2] and [Figure 1-3] indicate that the manufacturing sector seems to be on right track, except in 2017/18. The industry sector has already achieved the GDP share target of 22.3% in the first year of the GTP II, while its GDP growth rate was under the target of 20% on average.

<Table 1-1> Planned GDP Growth Rates and Share by Major Economzc Sector in GTP II

(Unit: %)

Sector	GDP Growth Rate		GDP Share		
	2014/15	2019/20*	2014/15	2019/20	2024/25
Agriculture and Related Areas	6.4	8.0	38.5	33.5	29.2
Industry	23.5	20.0	15.1	22.3	32.0
Manufacturing	21.4	21.9	4.8	8.0	18.0
Services	10.2	10.0	46.4	44.2	38.8
Real GDP	10.2	11.0	-	-	-

Note: * Annual average growth rate for the period of 2015/16-2019/20.

Source: National Planning Commission (2016.5). Federal Democratic Republic of Ethiopia Growth and Transformation Plan II (GTP II) (2015/16-2019/20) Vol. I: Main Text., pp. 94-95 and p. 103.

2.2. Employment

To check whether the intended changes of the employment share by major economic sector occurred as the GDP share by sector changed during the GTP I and II periods, it is necessary to analyze the changes in the proportions of the employed by economic sector for the same period of time.

For the analysis of the changes in employment share by economic sector before and during the GTP I period, this report analyzed data collected by the 2005 and 2013 National Labor Force Surveys. Between 2005 and 2013, the proportion of people employed in the agriculture, forestry, and fishing sectors decreased from 80.2% to 72.7%, as shown in <Table 1-2>. The proportion of the manufacturing sector, however, decreased from 4.9% to 4.5%, contrary to the strategic direction. The employment share of 'other services' increased by 7.1 percentage points, most of which occurred in rural areas. Until 2013, the employment share by economic sector did not change significantly.

The manufacturing sector failed to meet the targets of GDP growth rate and employment share of the GTP I. It grew at an average of 10.9 percent, which was far short of the 22 percent target between 2003/04 and 2013/14.[19] The GDP share of the manufacturing sector remained at 4.4 percent in 2013/14. It was pointed out that the low performance of the manufacturing sector was mainly due to the low level of private sector investment in the manufacturing sector, entrepreneurship training among young people, job creation in rural areas, and micro and small enterprises development.[20]

19 World Bank (2015.7). 4th Ethiopia Economic Update: Overcoming Constraints in the Manufacturing Sector. pp. 23-24.

20 National Planning Commission (2016.5). Federal Democratic Republic of Ethiopia Growth and Transformation Plan II (GTP II) (2015/16-2019/20) Vol. I: Main Text., p. 8.

<Table 1-2> Proportion of the Employed Aged 10 and Above by Major Economic Sector

(Unit: %)

	2005			2013		
	Total	Urban	Rural	Total	Urban	Rural
Agriculture, forestry, and fishing	80.2	13.0	88.5	72.7	13.5	83.2
Mining and quarrying	0.3	0.5	0.2	0.4	0.8	0.4
Manufacturing	4.9	14.3	3.7	4.5	14.4	2.7
Construction	1.4	5.4	0.9	1.9	7.5	1.0
Wholesale and retail trade	5.2	21.8	3.2	5.4	20.0	2.9
Other services*	8.0	45.0	3.5	15.1	43.8	9.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: * includes public administration, defense, compulsory social security, education, health and other social activities, hotel, and restaurants.

Source: CSA (2014.6). Analytical Report on the 2013 National Labor Force Survey. Summary table 5.3. p. 62; CSA (2005.5). Report on the 2005 National Labor Force Survey. Summary table 5.4. p. 37.

GTP II aims at continuously expanding the industrial sector with a focus on light manufacturing while modernizing the agricultural sector. Labor employed in agriculture and related sectors is projected to increase from 31.8 million in 2014/15 (74% of total employment) to 33.4 million (68% of total employment) in 2019/20, which indicates that agriculture will remain the cornerstone of the economy.[21] Meanwhile the number of workers in priority manufacturing sectors[22] is projected to increase from 280,000 in 2015 to 12 million in 2025.[23]

For the analysis of employment share changes during the GTP I and II periods, this study analyzed data collected by the Urban Employment Unemployment Survey.[24] The changes in the employment share by major economic sector in urban areas in the 2010s can provide us with a partial but quite reasonable picture of the structural transformation. As shown in <Table 1-3>, the proportion of the employed in the manufacturing sector slightly increased between 2010 and 2014, and decreased continuously, indicating that in urban areas GTP I and II do not seem to have an effect on the expansion of the employment share in the manufacturing sector.

21 National Planning Commission (2016.5). Federal Democratic Republic of Ethiopia Growth and Transformation Plan II (GTP II) (2015/16-2019/20) Vol. I: Main Text., p. 78 and 94.

22 Leather, textiles, metals and engineering, chemical and construction, pharmaceutical, and food and beverages.

23 Ministry of Industry (2015.4). Human Resources Requirement Plan for Ethiopian Manufacturing Industries (2016-2025). Table i in Executive Summary.

24 Same as footnote 10.

<Table 1-3> Proportion of the Employed by Major Industry Sector in Urban Areas (2012-2018)

	2010	2012	2014	2015	2018
Agriculture, Hunting, Forestry and Fishing	11.1	8.2	8.7	8.0	7.2
Manufacturing	13.4	13.2	14.0	13.1	12.3
Mining, Quarrying and Construction	7.1	7.3	9.1	7.7	7.8
Whole Sale and Retail Trade	19.8	21.6	20.3	20.7	21.1
Other Service Sectors	48.6	49.7	47.9	50.5	51.5

Source: CSA (2018, 2015, 2014, 2012, 2010). Statistical Report on the Urban Employment Unemployment Survey; CSA (2018). Key Findings of the 2018 Urban Employment Unemployment Survey.

2.3. Manpower Demand

With the expectation that the GDP share of the manufacturing sector would grow to 18% by 2025, the Ministry of Industry made labor projections for the six priority manufacturing sectors of leather, textiles, metals and engineering, chemicals and construction, pharmaceuticals, and food & beverages. According to <Table 1-4>, 3.65 million jobs are projected to be created by 2020. After 2020, the growth rate of jobs is to be accelerated, as shown in [Figure 1-4], providing about 12 million employment opportunities. As shown in [Figure 1-5], the textile and food & beverage industries are expected to provide more than half of the jobs.[25] These observations indicate that it is integral to expand basic and high school education and TVET to meet the rapid labor demand increase during the new economic development plan period and TVET focus should be given to the textile and food & beverage industries. According to the Ministry of Industry, about five million TVET graduates (77% of labor demand) as shown in [Figure 1-6] and 830,000 college graduates (12% of labor demand) need to be supplied by 2025 for the textiles, metals, and leather industries.[26]

<Table 1-4> Labor Demand Projection by Priority Manufacturing Sector (2016-2025)

(Unit: %)

	Leather and Leather Products	Textile and Garment	Metal & Engineering	Chemical & Construction Inputs	Pharma-ceuticals	Food & Beverage	Total
2015	24,023(8.7)	59,019(21.3)	33,000(11.9)	118,842(42.9)	3,365(1.2)	61,052(22.0)	277,150
2016	123,260(15.4)	213,935(26.7)	113,784(14.2)	171,275(21.4)	5,846(0.7)	170,700(21.3)	800,816
2017	223,926(15.8)	412,170(29.0)	195,285(13.8)	228022(16.1)	8,908(0.6)	349,784(24.6)	1,420,112

25 For detailed information on projection methodology including assumptions, refer to the Human Resource Requirement Plan for Ethiopia Manufacturing Industries (2016-2025) by the Ministry of Industry (2015.4).

26 Ministry of Industry (2015. 4). Human Resources Requirement Plan for Ethiopian Manufacturing Industries (2016-2025). Table i in Executive Summary.

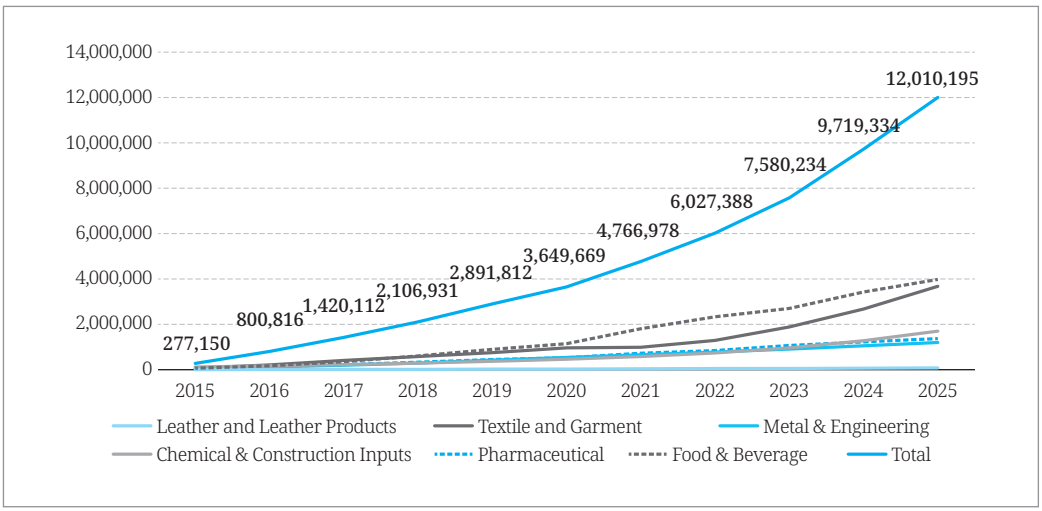
<Table 1-4> Continued

	Leather and Leather Products	Textile and Garment	Metal & Engineering	Chemical & Construction Inputs	Pharma-ceuticals	Food & Beverage	Total
2018	327,015(15.5)	581,526(27.6)	292,597(13.9)	289,500(13.7)	13,478(0.6)	600,797(28.5)	2,106,931
2019	444,447(15.4)	747,486(25.8)	423,825(14.7)	361,070(12.5)	18,870(0.7)	894,095(30.9)	2,891,812
2020	529,949(14.5)	960,055(26.3)	533,723(14.6)	452,687(12.4)	25,840(0.7)	1,145,395(31.4)	3,649,669
2021	716,561(15.0)	982,223(20.6)	652,743(13.7)	575,172(12.1)	35,558(0.7)	1,802,700(37.8)	4,766,978
2022	842,932(14.0)	1,286,443(21.3)	780,059(12.9)	738,510(12.3)	44,531(0.7)	2,332,891(38.7)	6,027,388
2023	1,071,376(14.1)	1,882,369(24.8)	909,805(12.0)	962,519(12.7)	53,337(0.7)	2,698,805(35.6)	7,580,234
2024	1,222,066(12.6)	2,679,695(27.6)	1,051,653(10.8)	1,272,592(13.1)	63,872(0.7)	3,427,432(35.3)	9,719,334
2025	1,374,377(11.4)	3,673,325(30.6)	1,199,507(10.0)	1,701,661(14.2)	74,667(0.6)	3,984,633(33.2)	12,010,195

Note: ( ) is the ratio of each sector to total.

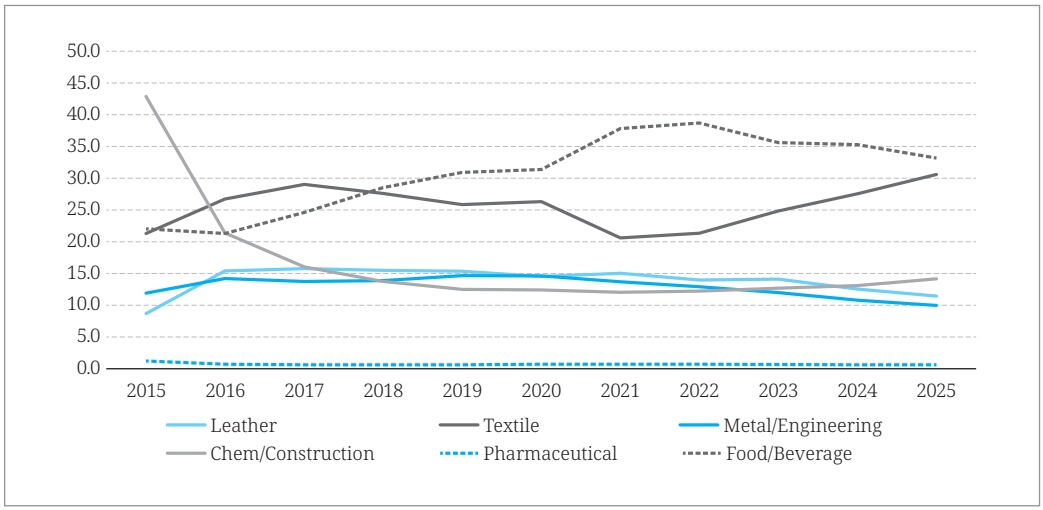
Source: Ministry of Industry (2015. 4). Human Resources Requirement Plan for Ethiopian Manufacturing Industries (2016-2025).

[Figure 1-4] Labor Demand Projection by Priority Manufacturing Sector (2016-2025)



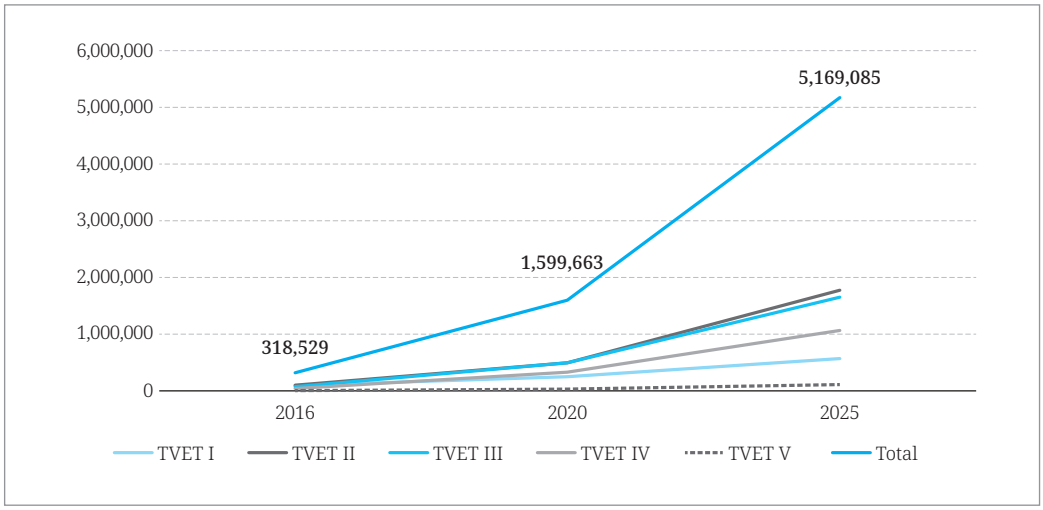
Source: same as <Table 1-4>.

[Figure 1-5] Changes in Employment Composition Ratios (%) by Six Priority Manufacturing Sectors



Source: same as <Table 1-4>.

[Figure 1-6] Projection of TVET Graduaes Demand for Textiles, Metals, and Leather Industries



Source: Ministry of Industry (2015. 4). Human Resource Requirement Plan for Ethiopian Manufacturing Industries (2016-2025). p. 28.

As the Ethiopian economy develops with an export-oriented light manufacturing-focused strategy and thus the structural transformation proceeds as planned, demand will increase for occupations that require higher levels of education and training. The continuously increasing trend of the proportion of professionals and technical professions between 2012 and 2018 in urban areas, as shown in <Table 1-5>, implies the further increase in demand for the future. As the natural product-processing industry is introduced in the agriculture, forestry, and fishery sectors, the proportion of skilled agricultural, forestry, and fishery

workers kept increasing between 1999 and 2013 in Ethiopia, as shown in <Table 1-6>. This trend is expected to continue during the GTP II and new 10 year economic development plan periods, indicating that demand for more and better TVET will increase sharply.

<Table 1-5> Percentage Distribution of the Employed by Occupation in Urban Areas (2012-2018)

	2012	2014	2015	2016	2018
Managers	2.9	2.6	2.3	3.1	3.3
Professionals, technical, & associate professionals	12.9	14.5	15.9	15.4	18.3
Clerks	5.5	3.6	3.6	3.9	3.7
Service, shop & market sales, crafts related	44.8	50.0	45.9	47.9	46.6
Skilled agricultural and fishery workers	6.0	6.4	5.5	5.3	6.2
Plant, machine operators & assemblers	5.3	6.2	6.5	6.9	7.6
Elementary occupation	22.6	16.8	20.3	17.5	14.1

Source: CSA (2018). Key Findings of the 2018 Urban Employment Unemployment Survey.

<Table 1-6> Percentage Distribution of the Employed by Occupation in Ethiopia (1999-2013)

	1999			2005			2013		
	Total	M	F	Total	M	F	Total	M	F
Managers	0.3	0.2	0.0	0.3	0.3	0.1	0.5	0.4	0.1
Professionals	0.2	0.2	0.0	0.5	0.4	0.1	1.3	0.9	0.4
Technicians and associate professionals	1.0	0.7	0.2	1.0	0.7	0.3	1.9	1.3	0.6
Clerical support workers	0.6	0.3	0.3	0.6	0.3	0.3	0.5	0.2	0.3
Service and sales workers	5.6	2.1	3.5	6.7	2.1	4.5	8.7	3.0	5.6
Skilled agricultural forestry and fishery workers	37.7	31.8	5.9	40.5	29.8	10.7	47.9	32.2	15.7
Craft and related trade workers	12.1	2.1	10.0	7.0	2.2	4.8	4.4	2.1	2.3
Plant and machine operators and assemblers	0.5	0.5	0.1	0.6	0.4	0.1	1.0	0.9	0.1
Elementary occupations	41.9	18.7	23.1	42.8	17.4	25.4	33.7	13.0	20.7
Others	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0

Source: CSA (2014.3). Key Findings on the 2013 National Labor Force Survey. p. 13.

<Table 1-7> Number of Jobs Needed to be Created in High-Yield Sectors between 2020 and 2025

	New Direct Jobs	New Indirect Jobs	Total
Horticulture	1,051,199	3,153,597	4,204,796
Poultry	552,936	1,658,808	2,211,744
Agro-processing	1,188,181	2,697,171	3,885,352
Textiles & Apparel	683,441	867,970	1,551,411
Leather	45,337	57,578	102,914
Construction	1,827,532	4,514,005	6,341,538
Renewable Energy	9,224	69,179	78,403
Mining	24,467	56,274	80,741
Tourism	86,054	250,545	336,599
ICT	48,333	241,664	289,997
Creative Arts	617,320	267,444	886,818
Total	6,134,024	13,834,235	19,968,259

Source: Jobs Creation Commission Ethiopia (2019). Plan of Action for Job Creation 2020-2025 Briefing Document.

Recently the Jobs Creation Commission Ethiopia announced the five-year plan of "Action for Job Creation." In the plan, the Commission projected that 14 million new jobs need to be created between 2020 and 2025 to absorb the young people entering the labor market (about two million every year) and the unemployed.[27] According to <Table 1-7>, 11 high-yield sectors are expected to create 6.1 million new jobs between 2020 and 2025, while these new jobs are expected to create 13.8 million indirect jobs.[28] <Table 1-7> indicates that it is important to expand and improve TVET, especially for the horticulture, agro-processing (i.e. food and beverage),[29] and construction sectors. These projections by the Ministry of Industry and the Commission indicate that it is urgent to expand the TVET system at a much faster rate.

2.4. Youth Unemployment and Skills Mismatches

The unemployment rate in Ethiopia had steadily fallen from 8.1% in 1999 to 4.5% in 2013. The youth (15-29 years old) unemployment rate also decreased from 15.5% to 6.8% during the same period. In 2013, the unemployment rate of young men was 4.6%, while that of young women was 9.1%. The youth unemployment rate in urban areas was 21.6%,

27 Jobs Creation Commission Ethiopia (2019). Plan of Action for Job Creation 2020-2025 Briefing Document.

28 Jobs created by the multiplier effect.

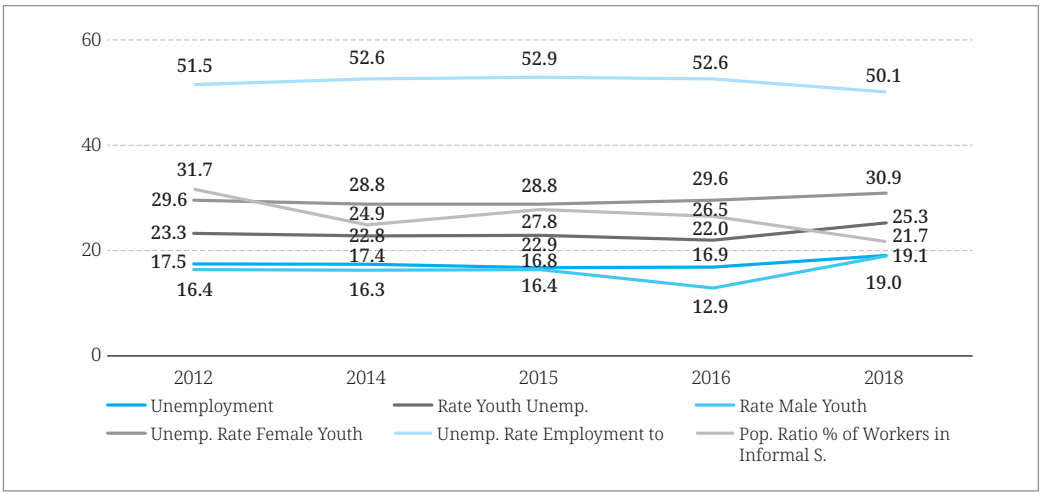
29 Chapter II discusses the topic of how to improve the performance of polytechnic TVET through the analysis of the Holeta Polytechnic with a focus on agro-processing.

while that in rural areas was 3.1%.[30] These indicate that (i) young people appeared to have greater difficulties getting employed than adults older than 30; (ii) young women tended to have more difficulties in finding jobs compared to young men; and (iii) youths in urban areas appeared to experience greater difficulties in securing employment than those in rural areas. Although these phenomena showed declining trends over the period of 1999 and 2013, youth unemployment is still a serious policy problem to tackle.

The first two observations mentioned above seem to be valid until 2018, although data analysis is limited to urban areas. Youth (15-29 years old) unemployment rates in urban areas were higher than those of the total adults over the period of 2012 and 2018, indicating that young people have more difficulties getting employed, as shown in [Figure 1-7].[31] Female youth unemployment rates were much higher than their counterpart, implying a lack of education and TVET and discrimination against females.

The highest unemployment ratio in urban areas was found among primary school graduates and the second highest ratio among secondary school graduates, as shown in [Figure 1-8].[32] This indicates the lack of jobs available for primary and secondary school graduates or skills mismatches. [Figure 1-7] and [Figure 1-8] together imply that (i) both primary and secondary schools need to check the contents of the current curriculum in terms of relevance to the needs of the economy and (ii) the expansion of the current TVET system needs to be seriously considered.

[Figure 1-7] Youth Unemployment Rate in Urban Areas (2012-2018)



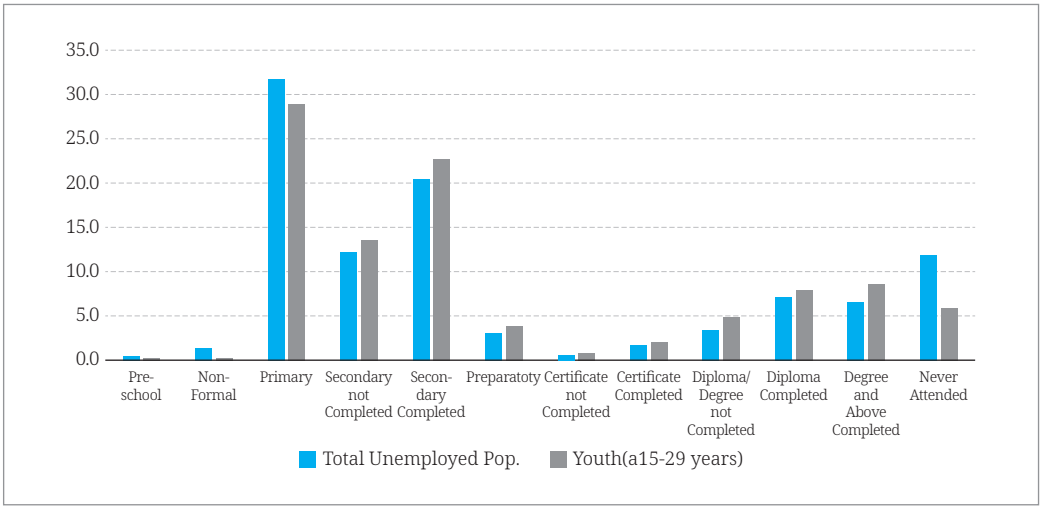
Source: CSA (2018). Key Findings of the 2018 Urban Employment Unemployment Survey. http://www.csa.gov.et/component/phocadownload/category/362-ueues-2018 (Nov. 16, 2019).

30 Central Statistics Agency (2014.6). Analytical Report on the 2013 National Labor Force Survey. p. 86 and p. 89.

31 Central Statistics Agency (2018). Key Findings of the 2018 Urban Employment Unemployment Survey.

32 Central Statistics Agency (2018). Statistical Report on the 2018 Urban Employment Unemployment Survey. pp. 240-241.

[Figure 1-8] Unemployment Ratio by Education in Urban Areas (2018)

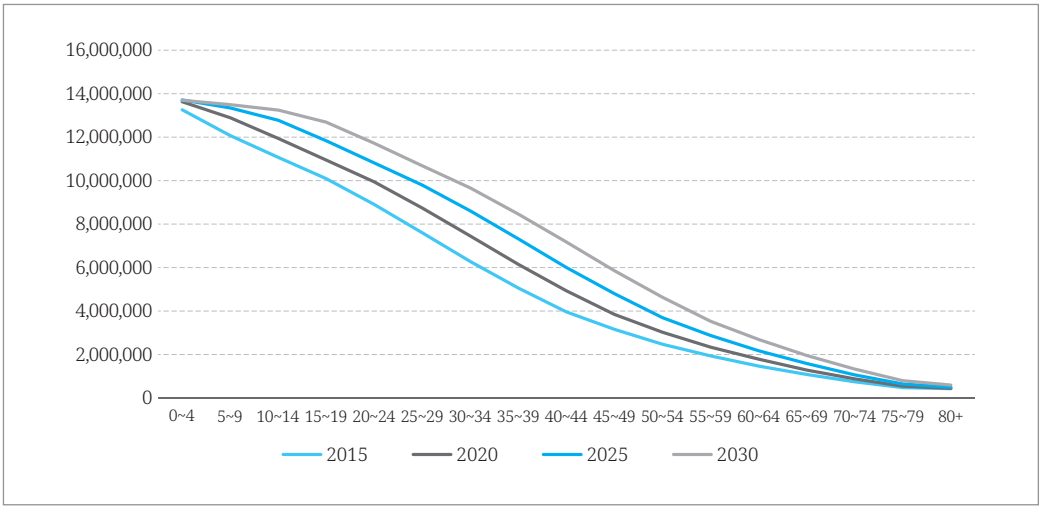


Note: Unemployment ratio is the ratio of the number of the unemployed at each level of education to the total number of the unemployed.
Source: CSA (2018). Statistical Report on the 2018 Urban Employment Unemployment Survey. pp. 240-241.

2.5. Demographic Structure Changes

Ethiopia expects a rapid population increase with changes in the age distribution. According to the projection by the CSA in 2013, the population of Ethiopia is projected to increase from 90,074,000 in 2015 to 120, 203,000 by 2030. The proportion of the population aged 0 to14 is forecasted to steadily decrease from 40.4 percent in 2015 to 33.0 percent in 2030, although the absolute number will increase. By contrast, the proportion and absolute number of people aged 30 to 64 is expected to keep increasing over the same period, as [Figure 1-9] indicates. Overall, the working age population (15-64 years) is projected to increase from 56.6 percent in 2015 to 63.1 percent in 2030. These implies that Ethiopia has great potential to reap demographic dividends if it can continuously pursue its economic transformation with a focus on manufacturing, increase wage employment opportunities, and provide more and better education and TVET.

[Figure 1-9] Projection of Population Distribution by Age Group



Source: Sung Joon Paik (2017). Stud Report on Human Resources. Unpublished Contract Paper commissioned by UNDP Ethiopia Office; Central Statistics Agency (2013.7). Population Projections for Ethiopia 2007-2037.

2.6. Implications

Data on the changes in the employment share by major economic sector imply that GTP I and II appear to have had little impact on the intended transfer of labor from agriculture to industry, especially the manufacturing sector. Possible causes can be found on both the demand and supply sides. The strategy of expanding the manufacturing sector through private sector investment to create wage job opportunities did not work mainly due to the lack of financial support to the private sector. The education and TVET systems also did not function well enough to train and supply as much quality labor as needed for expanding the manufacturing sector. It is necessary to check the qualitative and quantitative capacity of the current national education and TVET systems in terms of supplying the manpower demanded to implement the structural transformation of the GTP and fully reaping the demographic dividends.

The Ministry of Industry's manpower projection and the Jobs Creation Commission Ethiopia's projection of jobs in high-yield sectors imply that it is urgent to substantially expand and improve the education and TVET systems to meet the steadily increasing labor demand, especially for strategic industry sectors. To effectively respond to the labor demand for the future development of the Ethiopian economy and fully support the national economic development plans, it is integral to first secure a human capital base and further promote human capital flow as the national economy develops toward a more advanced level. For this, it is urgent to first increase primary and secondary school enrolment and at

the same time guarantee the quality of basic education, and to continuously increase the supply of quality labor with higher levels of qualifications as the Ethiopian economy grows.

The relatively high unemployment ratios of primary and secondary school graduates, and high youth unemployment rate indicate that Ethiopia needs to review the relevance and quality of the curriculum of primary and secondary schools and TVET institutions and take the necessary steps to close the gap between what schools and TVET institutions teach and what the labor market needs.

Overall it is urgent that the Ethiopian government reviews the current capacity of its education and TVET systems and based on the review results takes the necessary steps to strengthen the education and TVET systems to maximize the demographic dividends and supply quality labor to meet the demand and thus promote labor transfer from agriculture to manufacturing sectors.

3. TVET System and Strategies of Ethiopia

3.1. Schools and TVET Structures

3.1.1. School System

Since 2018/19, the government of Ethiopia has been designing and partly applying a new model for its school system including TVET following the key idea of the Ethiopian Qualifications Framework (hereafter the EQF), as depicted in [Figure 1-10], through the establishment and operation of the Education and Training Roadmap Preparation and Implementation Secretariat. The structure of the new school system designed by the Secretariat so far is as follows[33]: six years of primary school (grades 1-6), two years of junior school (grades 7-8), four years of secondary school (grades 9-12), and academic higher education institutions (e.g. university covering B.A., M.A., and Ph.D. degree programs) or TVET higher education institutions (i.e. TVET colleges (EQF levels 3 and 4), and polytechnics (EQF level 5)). The two stages of primary school (i.e. 1st and 2nd cycle primary) in the old system presented in [Figure 1-10] will be merged into one primary school that covers grades 1 through 6. The two stages of the secondary school (i.e. general and preparatory secondary)

33 The Education and Training Roadmap Preparation and Implementation Secretariat planned to finalize the design of a new school system structure (i.e. The Ethiopian Education and Training Roadmap (2020-2030)) by early 2020. As of July 2020, however, the new education and TVET system has not yet been finalized. The contents discussed in this section are based on the documents available before April 2020 and interviews with Dr. Theodros Shewarget (Education & Training Roadmap Preparation and Implementation Coordination Secretariat, 2019. 12. 17) and Dr. Genene Abebe (head of research department in FTI, 2019. 12. 19). If the final version of the Education and Training Roadmap is published officially, the contents of this section should be revised accordingly.

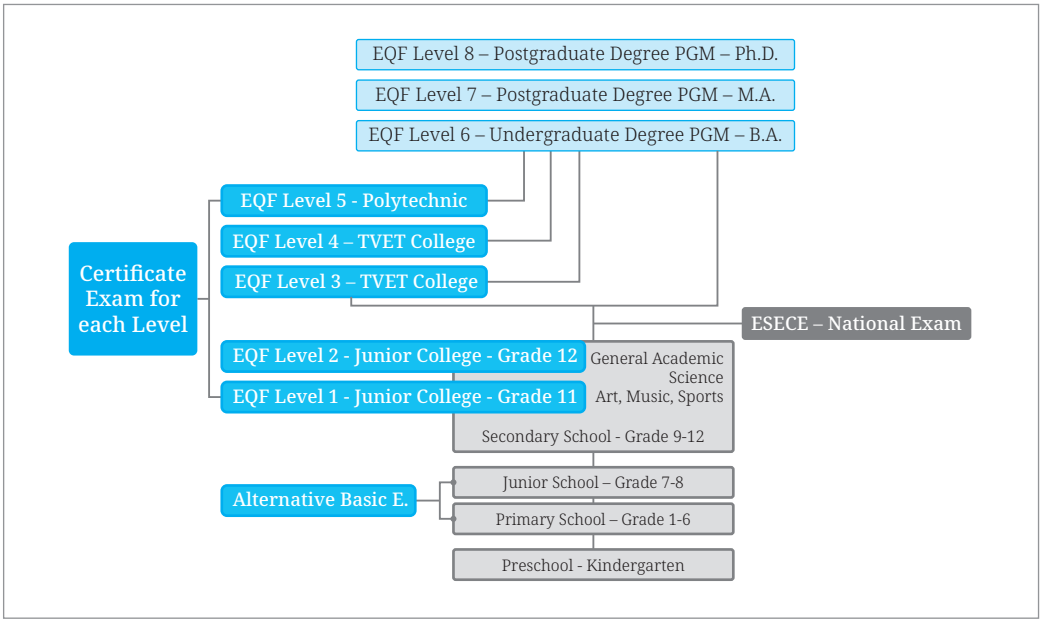
will be restructured into two-year lower secondary schools at grades 9 and 10 and another two-year upper secondary school at grades 11 and 12 that will offer four types of tracks like academic programs, science, TVET, and programs for talented students (music, arts, and sports). If a 10th grade completer wants to have TVET, s/he can select the TVET track that provides TVET programs at grades 11 and 12 (EQF level 1 and 2).

The key idea of the new school system is to introduce two parallel routes of 'academic' and 'TVET' tracks after completing secondary education and provide students in the TVET track with higher education opportunities up to doctoral degree programs. Grade 12 completers will be required to take the national general secondary education certificate exam. Those who successfully pass the exam will be qualified to make a choice of entering either a university or a TVET higher education institution. Those who fail can go to a TVET college. The Secretariat is also designing a mechanism that guarantees transfers between the two tracks, the approach of which is assumed to be based on the introduction of the Ethiopian National Qualifications Framework that is now being drafted and waiting for official approval by the government. Until 2018/19, 10th grade completers can register for TVET level 1 through 3 programs according to their scores on the Ethiopian General Secondary Education Certificate Exam. As of 2019/20, this new system has been partially implemented.

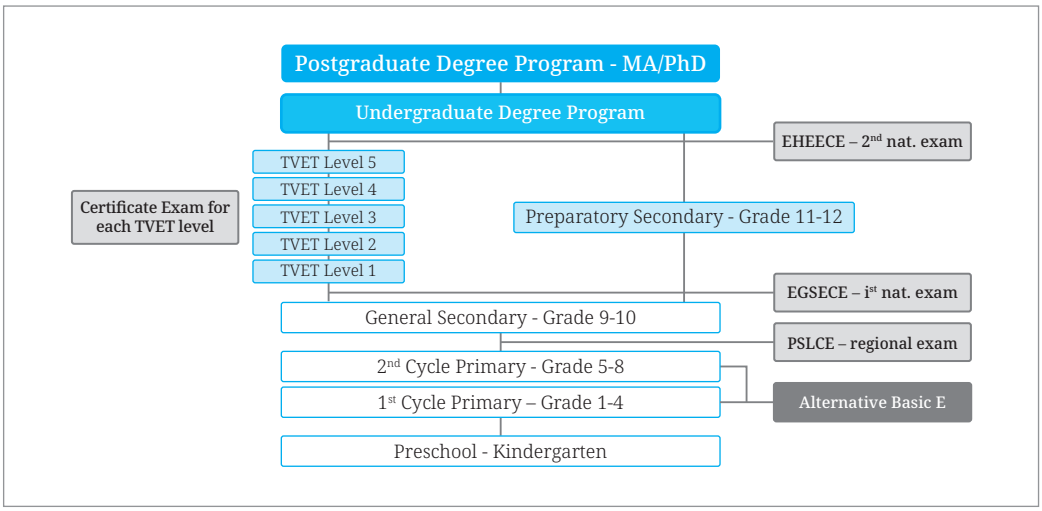
The new Ethiopian school system will encompass both academic and TVET tracks and maintain quality assurance mechanisms like the Ethiopian Secondary Education Certificate Examination as shown in [Figure 1-10], which replaces the Ethiopian General Secondary Education Certificate Examination and the Ethiopian Higher Education Entrance Certificate Examination implemented under the old system as in [Figure 1-11].[34] It is crucial to have the exit exams, the results of which provide valuable information on graduates' cognitive competencies (i.e. potential capacity of future labor) and thus the education quality of the school system.

34 Ministry of Education (2017). Education Statistics Annual Abstract.

[Figure 1-10] Tentative New School System[35]



[Figure 1-11] Old School System



Source: Ministry of Education (2017). Education Statistics Annual Abstract 2017.

35 This diagram is not a final design officially announced as explained in footnote 33. The Ethiopian government is still discussing the design of the new school system.

3.1.2. TVET System

A. TVET Program by Level

The main target groups for TVET include regular students, incumbent workers, young people out of school, and people not employed. In the old system, formal TVET programs, that had five stages from level 1 to 5, were provided to regular students (i.e. 10th and 12th grade completers), while the non-formal short-term training programs were available for the unemployed, school drop-outs, and incumbent workers, especially those in the MSEs (e.g. industrial extension programs).[36]

In the new system, TVET programs will be provided by different types of institutions according to the level of training. As described in the previous section, five levels of TVET programs will be delivered in grades 11 and 12 of secondary schools (EQF level 1-2), TVET colleges (EQF level 3-4), and polytechnics (EQF level 5).[37] Students and graduates of TVET institutions can continue their studies in higher education institutions (B.A.-EQF level 6, M.A.-EQF level 7, and Doctoral Degree-EQF level 8). TVET programs will also be delivered by TVET institutions under the FTA as well as TVET institutions managed by the ministries like the Ministry of Agriculture, Industry, and Health. For example, in the agricultural sector there are two kinds of TVET institutions, one under the FTA and the other managed by the Ministry of Agriculture.

TVET programs of EQF level 3 and higher will be delivered after the completion of 12 years of regular school education. The upward change in the starting grade from the completion of 10th grade to that of 12th grade and the vertical linkage of TVET programs to higher education (B.A., masters, and doctoral degree programs) reflecting that demand for labor with higher qualifications will increase gradually as the Ethiopian economy develops toward an advanced level. It can be said that the current government's efforts to design a new TVET delivery system is on the right track.

However, this new system assumes that (i) a substantial number of secondary school graduates will go to either academic or TVET track post-secondary education institutions and also (ii) the Ethiopian economy will be able to absorb the majority of graduates from both academic and TVET track post-secondary institutions. Considering the time period required to (i) substantially increase the enrolment and completion rates of secondary school education and consequently increase the enrolment rate of post-secondary education institutions and (ii) develop the Ethiopian economy enough to employ graduates from

36 Ministry of Education (2015). Education Sector Development Programme V. p. 98.

37 This may need to be revised after the official announcement of the new school system.

these institutions, the Ethiopian government needs to put policy priority on expanding and strengthening the TVET track in secondary education. In other words, the government needs to expand the TVET track for grades 11 and 12 in secondary school education, the main objective of which is to train EQF level 2 skilled workers. The proportion of TVET track students in grades 11 and 12 should be large enough to meet the labor demand for EQF level 2 workers and the curriculum should be hierarchically well linked to that of TVET colleges and polytechnics.

B. TVET Curriculum and the Assessment of Job Competencies

The TVET curricula were developed based on occupational standards (hereafter OSs). The FTA develops the OSs of major industry sectors by benchmarking the OSs of other countries like Australia and the Philippines together with some experts from industry. Each of TVET institutions is responsible for assessing labor demand and developing and applying the TVET curriculum based on the OSs developed by the FTA. In other words, TVET trainers in each TVET institution design and develop the curriculum and learning materials by occupation according to the OSs. This approach is based on the decentralization principle directed by the National TVET Strategy in 2008.

The job competencies of people (e.g. graduates from TVET institutions or incumbent workers) are tested by the local Centers of Competency (hereafter the CoC) at the regional level and recognized nationally by the FTA. Based on the outcome-based TVET principle announced in the National TVET Strategy in 2008, no matter where and how s/he gets trained, s/he can get a formal qualification as long as s/he passes the CoC assessment successfully.

C. Horizontal and Vertical Permeability

In the old system, a person with a level 4 or 5 certificate can enter a university in an area similar to the occupational certificate that s/he has after working for two years, although there has been limited chances for him/her to enter a public university. Transfer from universities to TVET institutions is not restricted by law. However, TVET institutions do not have an official category for screening university students or graduates. This indicates that transfers from TVET institutions to universities or the other way around is quite limited. To overcome the stigma of TVET track (i.e. second-class education and dead-end track) and induce competent young people into TVET track and thus secure quality labor, it is integral to guarantee horizontal and vertical pathways for students and graduates between TVET and academic education tracks and also between these tracks and the labor market. Along with the introduction of the new school system based on the new Ethiopian Qualifications

Framework, the government needs to prepare a legal and institutional framework including the recognition of prior learning and credit transfer to promote individual's career development within the lifelong scheme.

3.2. School and TVET Enrolment

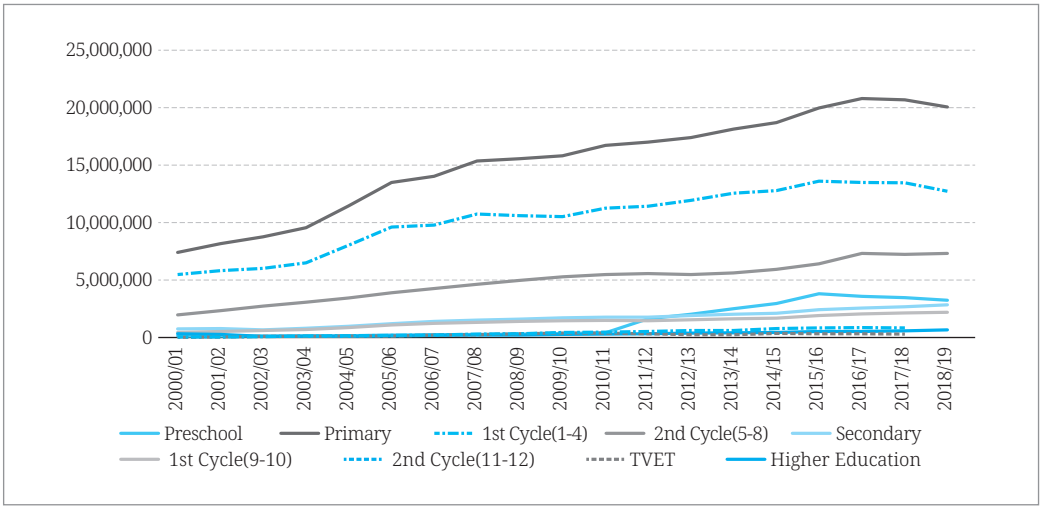
3.2.1. School Enrolment

It is integral to provide quality basic education for all to secure the human capital stock needed for initiating national economic growth (i.e. starting the structural transformation from agriculture to manufacturing) and further develop education system to supply the manpower demanded as the country's economic structure changes further toward manufacturing and a related industry-oriented economy. From this perspective, the Ethiopian school system has not performed well in both quantitative expansion and quality improvement.

Since 2000/01, the absolute number of students in each level of education increased steadily, as shown in [Figure 1-12]. However, gross and net enrolment ratios (hereafter GER and NER) of the 2nd cycle primary education and secondary education indicate that Ethiopia has the serious problem of a substantially small number of primary and secondary school students, which is severely damaging to securing the base of human capital stock and flow. To boost the labor-intensive light manufacturing sector as asserted in GTP II, the Ethiopian economy needs a large number of manual workers who can read, write, and do basic calculations, equivalent to eight years of primary education or ten years of general secondary education. The GER and NER of the 2nd cycle of primary and general secondary schools (grades 9-10) in 2018/19 were 79.8%, 48.5%, 63.1%, and 24.1%, respectively, as shown in [Figure 1-13] and [Figure 1-14]. This implies that it is urgent for the Ethiopian government to expand the enrolment of the 5th and 6th grades in primary school, junior school(grade 7-8), and secondary school in the new school system substantially. This is a pre-requisite for expanding TVET enrolment to supply the skilled workers and technicians required to expand the manufacturing sector[38] and college and university enrolment to supply technicians, engineers, and scientists to further develop the manufacturing industries to a more advanced level.

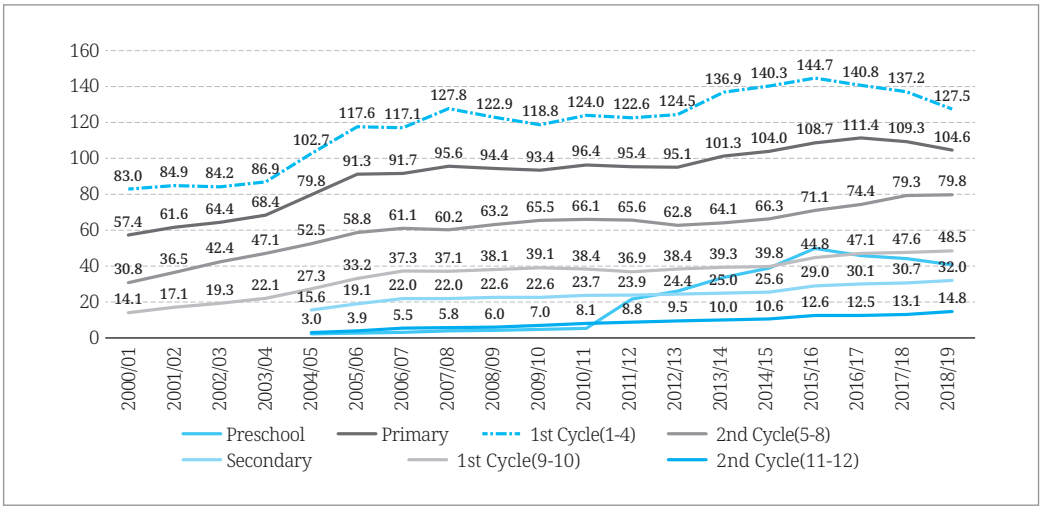
38 As shown in [Figure 2-5], the Ministry of Industry (2015) projected that 5.17 million TVET graduates will be demanded by 2025.

[Figure 1-12] Enrolment by Level of Schooling (2000/01-2018/19)



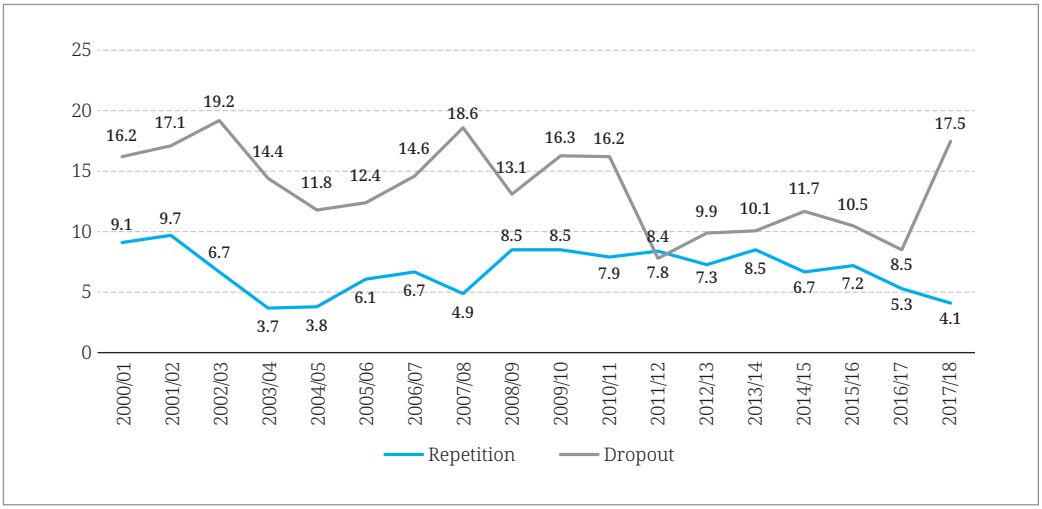
Source: Ministry of Education (each year). ESAA.

[Figure 1-13] Gross Enrolment Ratio by Level of Schooling (2000/01-2018/19)



Source: Ministry of Education (each year). ESAA.

[Figure 1-14] Net Enrolment Ratio by Level of Schooling (2000/01-2018/19)

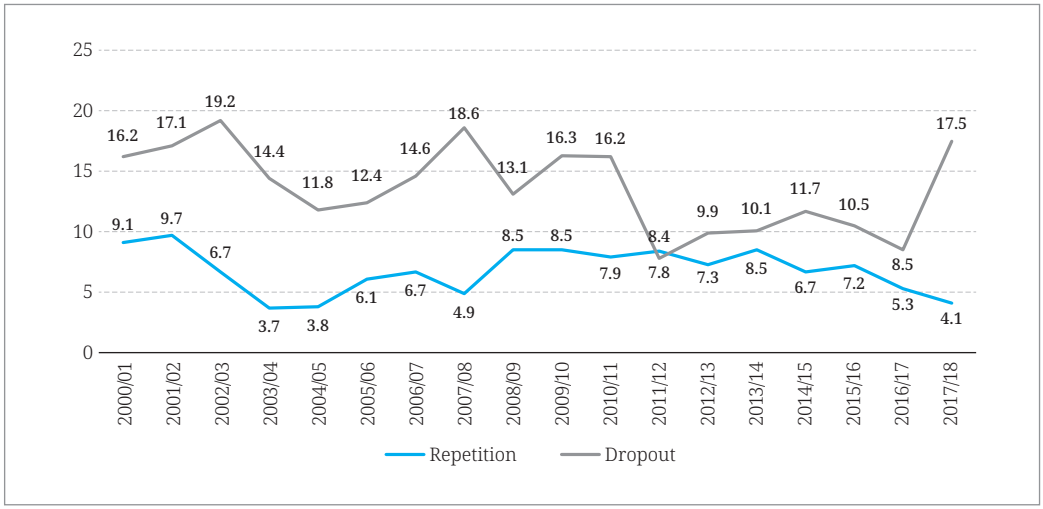


Source: Ministry of Education (each year). ESAA.

The reason for the low enrolment in secondary education can be found in the high dropout and repetition rates, and the low completion rate of primary school students. Although both dropout and repetition rates have decreased recently, as shown in [Figure 1-15], they do not reach the Education Sector Development Programme V (hereafter the ESDP) target of 2%. The completion rates of grades 5 and 8 kept increasing since 2000/01, as shown in [Figure 1-16]. The completion rate of grade 8 increased to 62.1% in 2018/19, but is still below the ESDP V target of 74.0%. This is related to the lack of school's' capacities to provide quality education. Another reason can be found in the economic situation of children's families, in which children have to work for their families. It is integral for the school system to accommodate those students by introducing alternative ways of providing education such as night classes, half-day education, and mobile schools.[39]

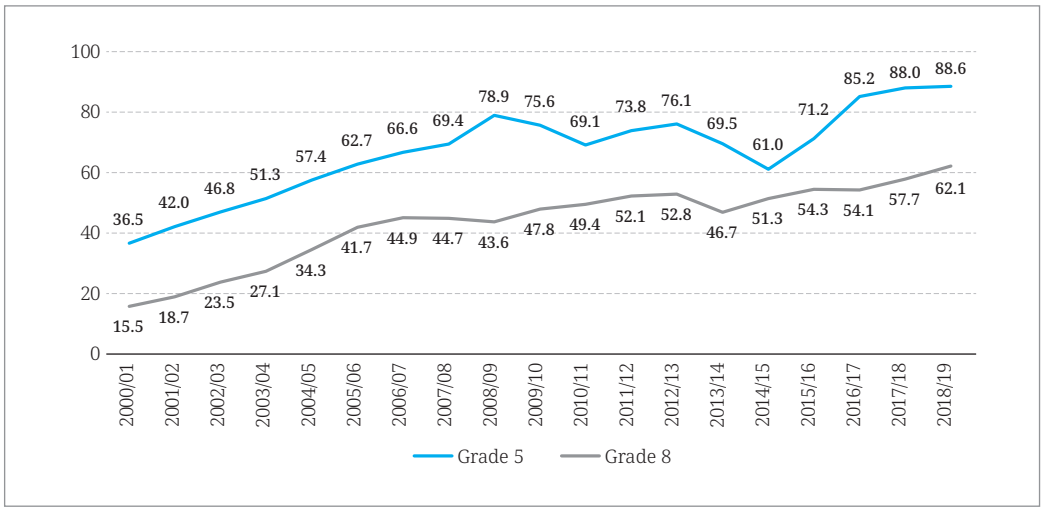
39 National Planning Commission (2018). The Second Growth and Transformation Plan (GTP II) Midterm Review Report. pp. 60-61.

[Figure 1-15] Repetition and Dropout Rates of Primary School in Ethiopia



Source: Ministry of Education (each year). ESAA.

[Figure 1-16] Completion Rates of Grades 5 and 8 in Ethiopia



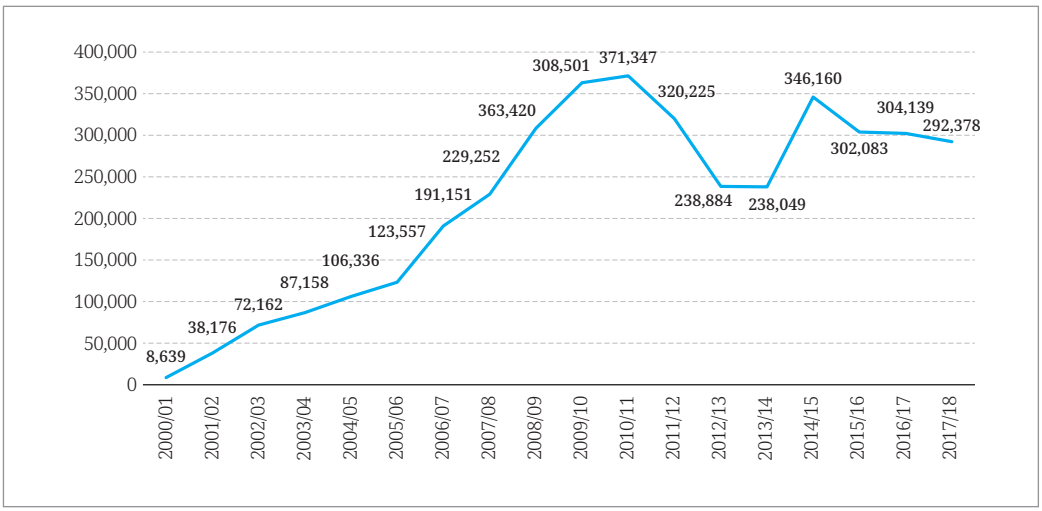
Source: Ministry of Education (each year). ESAA.

3.2.2. TVET Enrolment

The TVET system in Ethiopia did not achieve its enrolment target as planned. The Ministry of Education set the target of enrolling up to 80% of grade 10 completers into TVET programs in ESDP IV. However, the transition rate of the grade 10 completers into TVET programs declined, which led to the decrease in absolute TVET enrolment. For example, the transition rate decreased from 49% in 2010/11 to 45% in 2013/14. The number of

students also decreased from 371,347 to 238,049 students[40] for the same period. This was due to several factors: (1) the actual number of grade 10 completers was much smaller than the target; (2) the transition rate to grade 11 rose to 30-35%, greater than the initial target of 20%, as a result of the increased higher education enrollment capacity; (3) about 15% of grade 10 completers selected other programs such as teacher training institutes, the military, and police academies; (4) as of 2013/14, only 616 TVET institutions out of 1,348 could provide full training programs for the five TVET levels; and (5) the reform of the TVET system has not been explained well to the public.[41] Recently, TVET enrolment has tended to decrease as shown in [Figure 1-17]. Considering the future labor demand, especially in the manufacturing sector, the substantial enhancement of TVET capacity is required. As of 2017/18, the total number of TVET students was 292,378, far below the ESDP V target of 365,154.[42]

[Figure 1-17] TVET Enrolment Change



Source: Ministry of Education (each year). ESAA.

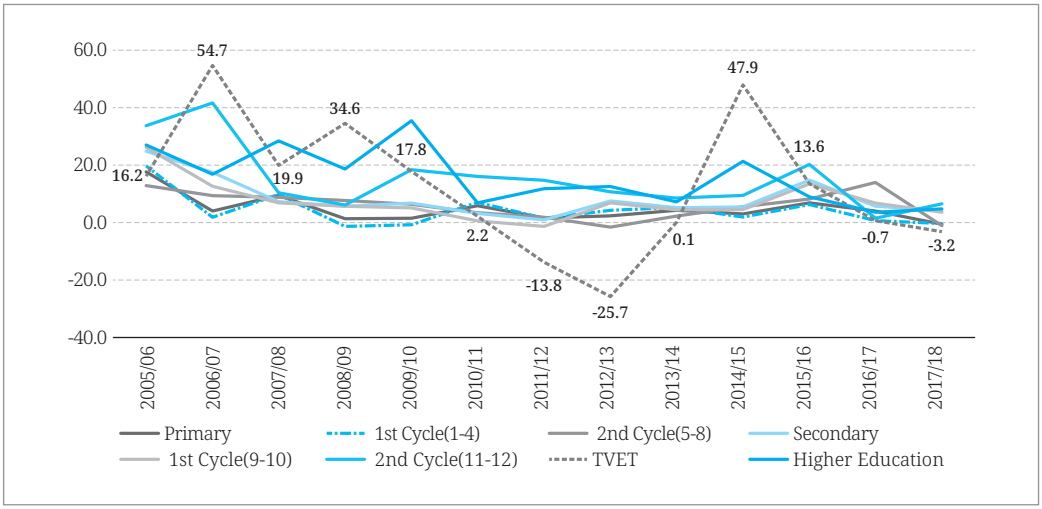
The annual growth rate of TVET enrolment between 2005/06 and 2017/18 showed large fluctuations and recently a continuously decreasing trend, as presented in [Figure 1-18], indicating higher demand for academic education due to the expansion of secondary and higher education opportunities and the lack of investment in TVET. The new school system is designed to provide TVET from grade 11 in junior college. The main challenge is how to expand the T VET system so that can effectively meet labor demand from the national economy.

40 If the transition rate were 80%, the expected enrolment would be more than 340,000 in 2013/14.

41 Ministry of Education (2015). ESDP V. p. 22.

42 Ministry of Education (2017/18). ESAA.

[Figure 1-18] Annual Growth Rate of Enrolment by Level of Schooling



Source: Ministry of Education (each year). ESAA.

The Ethiopian government plans to establish one TVET center in all 1027 woredas[43] during the GTP II period to overcome the problem of limited access to TVET. As of 2016/17, 367 woredas had their own TVET center[44] and the total number of TVET institutions was 1,409 (government 615 and private 794).[45] The proportion of TVET students enrolled in private institutions increased from 13.5% in 2016/17 to 17.9% in 2017/18. Private TVET institutions concentrate on ICT, commerce, and health services.[46] This indicates that private TVET institutions can play a crucial role in providing TVET opportunities, although programs might be limited to certain sectors.

There are large disparities in the number of TVET students among regions, as shown in [Figure 1-19]. This indicates that since TVET requires large investments for installing and operating facilities and equipment compared to general academic education, it is integral to increase public investment and at the same time mobilize financial resources from the private sector, which is a direct beneficiary from TVET. It is also urgent to reduce the inequality of TVET opportunities among regions for the balanced development of the country.

As of 2017/18, the largest number of students were enrolled in Level 2 (98,408, 33.7%) and then Level 4 (78,583, 26.9%), Level 3 (62,083, 21.3%), Level 1 (47,350, 16.2%), and Level 5 (5,184, 1.8%) as shown in [Figure 1-20]. The proportion of TVET enrolment by level indicates

43 Local administrative territory unit under regions.

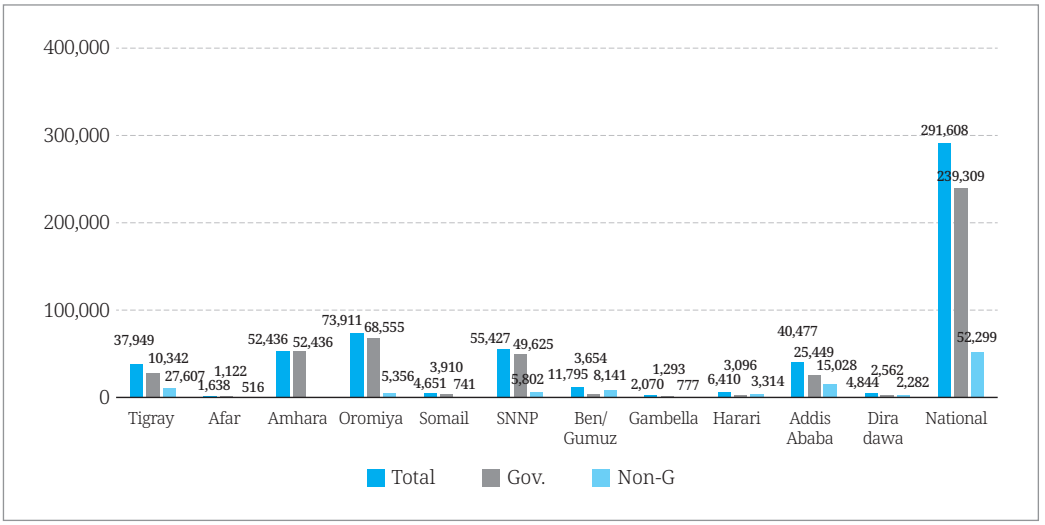
44 Ministry of Education (2018). Ethiopian Education Development Roadmap (Amharic version).

45 National Planning Commission (2018). The Second Growth and Transformation Plan (GTP II) Midterm Review Report. p. 63.

46 Ministry of Science and Higher Education (2019.8). Strategic Plan 2019-2015. p. 20.

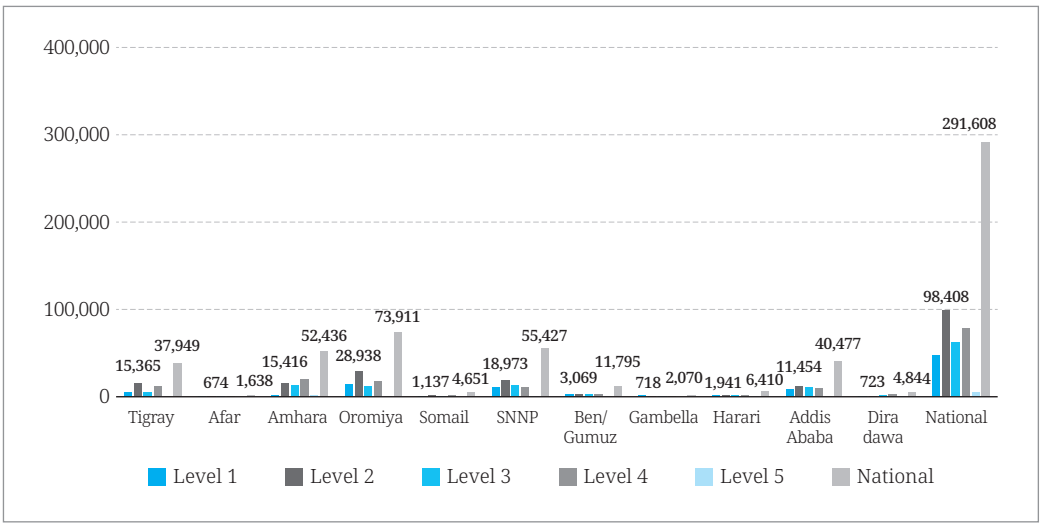
the sharp shortage of TVET opportunities after level 2, especially for level 5. This implies that in the new system it is necessary to estimate labor demands by TVET level and expand TVET institutions by level according to projected demand and at the same time to check the validity and relevance of the curriculum of each TVET level.

[Figure 1-19] TVET Enrolment by Type of Institute (Gov. vs. Non-Gov.) (2017/18)



Note: Afar, Somali, Addis Ababa and Gambella regions data from 2014/15, SNNP.
Source: Ministry of Education (2017/18). ESAA.

[Figure 1-20] TVET Enrolment by Level and Region (2017/18)



Note: Afar, Somali, Addis Ababa and Gambella regions data from 2014/15, SNNP.
Source: Ministry of Education (2017/18). ESAA.

3.3. Quality

3.3.1. School Education Quality

The quality of primary and secondary education poses another challenge to the supply of quality labor. <Table 1-8> shows that a significantly large proportion of primary and secondary school students failed to meet the national targets of learning outcomes in 2012 and 2014. The percentage of grade 10 students who passed the national exit exam between 2005/06 and 2018/19 has been below 70% level on average, although it showed an increasing trend with fluctuations. The passing rate has decreased since 2015/16 from 73.9% to 68.1% in 2018/19, as in [Figure 1-21]. The results of the school performance evaluation also indicate that the majority of primary and secondary schools did not meet the school performance standards in 2014/15, as in <Table 1-8>. These observations indicate that a large proportion of primary and secondary school students do not have basic cognitive skills. It is urgent to take policy action to improve student's academic competencies.

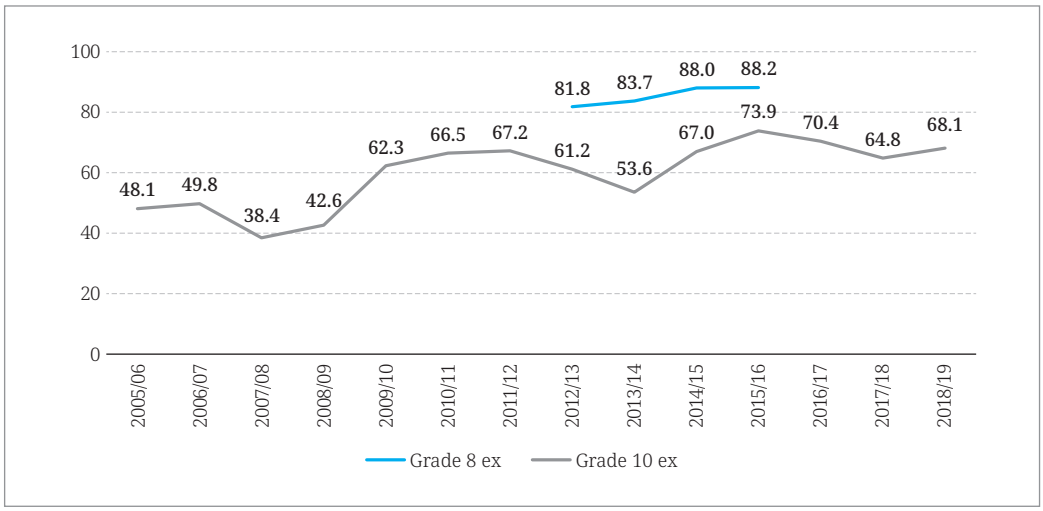
<Table 1-8> Results of National Learning Assessment

(Unit: %)

Grade (Assessment Year)	4th Grade (2012)		8th Grade (2012)		10th Grade (2014)		12th Grade (2014)	
	Target	Achieved	Target	Achieved	Target	Achieved	Target	Achieved
Scoring 50% or above	75	25	70	7.5	70	23	70	34
Scoring 70% or above	25	2.3	25	0.1	25	3	25	4

Source: Ministry of Education (2015). ESDP V. p. 18.

[Figure 1-21] Percentage of Students Who Passed Grade 8 (regional) and 10 (national) Exams

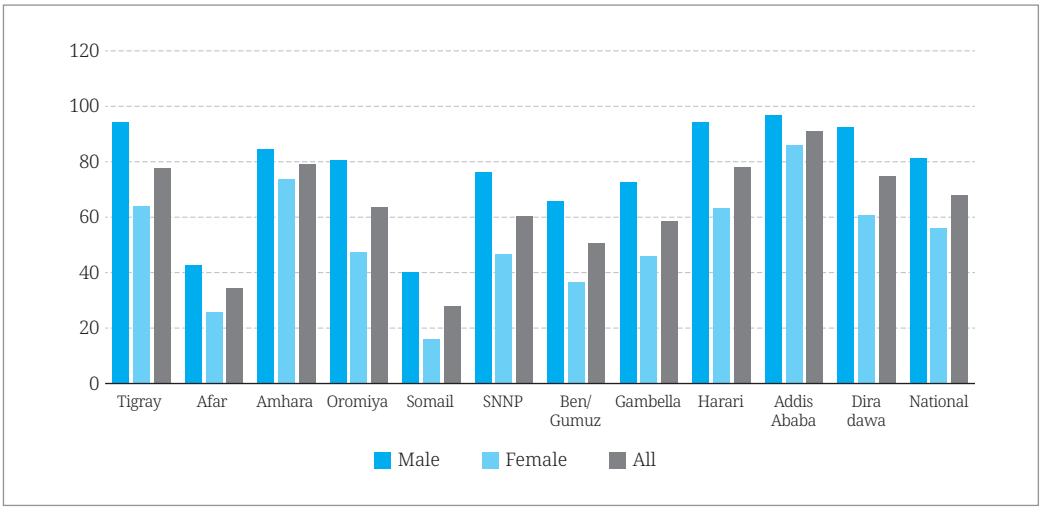


Source: Ministry of Education (each year). ESAA.

3.3.2. Adult Literacy

Adult literacy is closely related to the ability of adult trainees to absorb the contents of training programs. The Ethiopian government has provided the two-year Integrated Functional Adult Education (IFAE) program. Thanks to this program, adult literacy rates improved significantly from 46.5% in 2011 to 68.1% in 2015. However, there are regional disparities in adult literacy, as shown in [Figure 1-22].[47]

[Figure 1-22] Adults Literacy Rates by Region and Gender (2015)



Source: Ministry of Education (2016). Education Statistics Annual Abstract.

3.3.3. TVET Quality

A. Occupational Standards Not Contextualized

The Ethiopian government has tried to maintain the relevance and quality of TVET through the development of a TVET curriculum based on the OSs and the assessment of TVET student's competency by the CoC.[48] The government has developed OSs in several industrial sectors such as agriculture, economic infrastructure, manufacturing, automotive, hotel and tourism, business, health, and tourism by adapting and revising OSs used in other countries like Australia and the Philippines together with industry experts. These are used as a reference when designing training programs, curricula, and assessment tools. The OSs are linked to the National TVET Qualification Framework, which includes five levels of training and certifications. The regional CoCs are responsible for managing qualification assessment.

47 Ministry of Education (2012, 2016). Education Statistics Annual Abstract.

48 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) An Integrated Executive Summary (draft for discussion). p. 69.

The main problem with the OSs is the lack of the ownership of each industrial sector. Since only a small number of industry people participate in developing the OS of a specific industrial sector, the skills needed of that specific industrial sector are not fully reflected in the OS, implying that the industry does not have the sense of ownership. In addition, employers pointed out that the current OSs, which were broken into too many parts, do not adequately reflect the skills needed by the industry,[49] which would lead to the waste of government and industry[50] budget and the unemployment of TVET graduates. Since most of the OSs have been developed by mainly modifying other countries' (e.g. Australia and the Philippines) OSs, the current OSs are not contextualized to local industry needs.

In addition, industry has been reluctant to participate in vocational training and assessment by the CoC and thus industry people do not value the certificates tested by the CoC. Ministries related to each industrial sector and industry people do not consider the development and application of the OSs as a crucial policy agenda. In other words, both government and industry do not fully recognize the importance of identifying the types and levels of skills demanded by industry as a pre-requisite for enhancing the TVET performance and labor productivity. Although the Chamber of Commerce and Industry and sectoral associations were established and are operating, they do not have a keen interest in TVET and thus not have collaborative relationships with TVET institutions for the exchange of information on the skills demanded.[51]

All these imply that it is urgent to first review the quality and relevance of the current OSs considering the skill demands from industry, make the OSs more relevant to industry needs by enhancing the representativeness of industry, integrate common parts of the OSs and make the government and industry understand the importance of developing the OSs, and applying them to TVET curriculum development and competency assessment.

B. Lack of Industry Participation in the Cooperative Program

To improve the relevance of TVET to the skills demanded, the Ethiopian government introduced the Cooperative Training Program, which requires TVET institutions to provide training programs in collaboration with industry firms, especially with micro and small size enterprises (hereafter MSEs), in which a part of the TVET course content is delivered at the workplace. In this program, TVET trainers are required to provide MSEs with industry extension and technology transfer services for developing their technology capacities,

49 Around 670 occupational standards.

50 Industries provide additional training to graduates from TVET institutions.

51 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) - An Integrated Executive Summary (draft for discussion). p. 72. and interview with Mr. Teshale Berecha Yadessa (FTI Director General, Dec. 16, 2019) and Mr. Hailemichael Asrat at GIZ (Deutsche Gesellshaft fur Internationale Zusammenarbeit, Dec. 19, 2019).

technical skills, entrepreneurship capacities, and quality control capacities. TVET institutions have had difficulties achieving the targets of the Cooperative Training Program due to a lack of employer participation. Most of the firms are not capable of and interested in providing TVET programs in their worksites. Although state-owned enterprises (SOEs) are required to provide apprenticeship training, most of the SOEs are located in Addis Ababa. There are only a few SOEs in Oromia and Amhara where the number of trainees is quite large. This has led to a low quality of TVET and consequently a high unemployment ratio of TVET graduates.[52] As of 2013/14, this program covered 214,743 MSEs.[53] It is integral to review the practical feasibility of implementing the Cooperative Training Program considering the readiness and capacity of firms, and think about the alternatives of increasing practical training within TVET institutions.

C. Shortage of Qualified Trainers

The shortage of qualified trainers is another crucial reason for the low quality of TVET in Ethiopia. Currently trainers are recruited mainly from graduates of universities and TVET institutions, who do not have industry experiences or pedagogical knowledge and skills. Until now, there are three levels of trainer qualifications: A, B, and C-level trainers. Trainer training programs are provided by the Federal TVET Institute (hereafter the FTI) and 15 satellite institutions based on the MoU among the FTI, regional TVET bureaus, and TVET institutions.

Person who graduated from TVET college with TVET level 4 or 5 and completed a short-term trainer training course at the FTI can get a certificate as a C-level trainer. Since industry experience was not required and C-level trainers in general lack mathematics, science, and language competencies, it was pointed out that the TVET quality provided by C-level trainers tended to be lower than expected. In the new system, the government plans to close C-level certification. For the next two years, the government is going to provide an in-service training program to all C-level trainers (approximately 7,000 trainers) and upgrade them to B-level trainers, which means that after 2022 there will be only B and A-level trainers.

If a C-level trainer who has at least two years of teaching experience completed a three-year B.A. course, s/he could get a B-level certificate in the old system. The B.A. course was developed in a collaboration with industry and higher education institutions, which generally comprised of 50% theory education and another 50% of practical training. The FTI

52 World Bank Group (2015.7). 4th Ethiopia Economic Update: Overcoming Constraints in the Manufacturing Sector. p. 32. As of 2012, 36% in electrical work, 42% in computer application and usage, 43% in metal technology, 49% in masonry, 53% in carpentry, 60% in textile engineering, and 71% in plumbing.

53 Ministry of Education (2015). ESDP V. p. 23.

has had difficulties finding firms that provided practical training. Currently about 60 firms participate in the practical training for trainers. For industry areas with no participating firms, the FTI establishes workshops and utilizes them for trainer training. In the new system, the government plans to extend the B.A. course to a four-year program together with the provision of the Freshmen Program that is designed to enhance trainers' mathematics, science, and language competencies. If a B-level trainer who has at least two years of teaching experience completes an M.A. course, s/he can get an A-level certificate.[54]

Due to the low level of financial rewards and relatively heavy workload (i.e. provide regular and short-term training programs and industry extension programs to the MSEs), it is difficult to recruit and retain qualified trainers with industry experience.[55]

The FTI is going to be restructured into a four-year university of technology education in the near future. While restructuring the FTI, it is crucial for the government to redefine the key functions of the university as a key institute for training TVET trainers and make specific plans for curriculum development and operations according to the certificate level of the trainers (e.g. how to make sure a trainer does have real job experiences), the evaluation of training results, research for TVET quality assurance, and government policy support.

D. Low Quality of TVET Curriculum and Disparity in TVET Quality among Regions

The shortage of qualified trainers is closely related to the problem of the significant differences in the TVET quality among TVET institutions and regions, because individual trainers and TVET institutions are each responsible for developing their own curricula and learning materials based on the OSs developed by the FTA. In other words, the quality and relevance of each TVET institution's training programs are decided by the quality of their trainers. This implies that it is necessary to develop a national curriculum and learning materials for major common occupational skills that all TVET institutions can use. The application of the national TVET curriculum and learning materials can contribute to improving TVET quality and the validity of the competence assessment, reducing the disparities of TVET quality among regions, and consequently increasing labor productivity.[56]

TVET quality is also dependent on the quality and quantity of the facilities and equipment installed in TVET institutions, because they affect the quality and level of the TVET curricula developed by the TVET institutions. Many TVET institutions lack the facilities

54 Interview with Mr. Teshale Berecha Yadessa (FTI Director General) in Dec. 16, 2019.

55 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) An Integrated Executive Summary (draft for discussion). p. 76.

56 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) An Integrated Executive Summary (draft for discussion). p. 75 and p. 78 and interview with Mr. Teshale Berecha Yadessa (FTI Director General) in Dec. 16, 2019.

and equipment required to provide quality TVET. It is necessary to review the quality and quantity of the facilities and equipment of each TVET institution considering the level and type of skills demanded by industry and make budget plans for upgrading them to provide quality TVET.

3.4. TVET Strategies and Policies

3.4.1. National TVET Strategies

TVET strategies, policies, and plans in Ethiopia are in principle developed and implemented based on the National TVET Strategy introduced in 2008. The National TVET Strategy was established with the objective of pursuing the outcome-based and demand-driven TVET. The National TVET Strategy includes several conceptual principles of the TVET system like TVET institutions as centers of technology capability accumulation and transfer, development of a comprehensive and integrated TVET system, stakeholder involvement, public private partnerships, an outcome-based approach, decentralization, and the efficiency of the TVET system. To build outcome-based TVET, the National TVET Strategy included the development and application of the Ethiopian OSs based on the labor market skills demanded, the development of a TVET qualification framework, the assessment and certification of occupational competencies of trainees and workers, the provision of the Cooperative Training and the In-Company Training, and technology capacity development.[57]

The key components of the National TVET Strategy were well chosen and logically interconnected in theory. However, the actual implementation of the Strategy revealed huge gaps between theory and reality. For example, the OSs do not accurately reflect the skills demanded by industry because they were not contextualized accordingly to Ethiopian industries and the decentralization approach for developing a TVET curriculum and learning materials by TVET institutions caused the low quality of TVET and the disparity of TVET quality among regions as discussed in previous sections. TVET in Ethiopia needs to find more realistic policy alternatives to realize the very purposes of the National Strategy, considering the readiness and capacity of firms and TVET institutions, future labor market skills demanded by industry, and the government's budget capacity. For example, for the Cooperative Program, it is necessary to increase the role of TVET institutions in providing practical training opportunities by installing more facilities and equipment or training workshops within the institution and to induce sector associations and firms to provide information on the skills demanded.

57 Ministry of Education (2008.8). National Technical and Vocational Education and Training Strategy.

3.4.2. Education Sector Development Programme

The National TVET Strategy materialized through the design and implementation of the ESDP. For example, the ESDP V (2015/16-2019/2020) Priority Programme for TVET included three components – OS development and assessment, trainee's development and institutional capacity building, and industry extension and technology transfer services.[58] Component 1 included two sub-components of improved ownership by sector and improved recognition of competences through accessible and quality assessment and certification services, which are challenged by the lack of industries' readiness and willingness, and employers' (i.e. private firms and government) recognition and interests. Component 2 has four sub-components: capacitated industry and institution trainers, TVET system leaders, and support staff; increased access to TVET through the expansion of institutions to all woredas; the provision of competent TVET graduates; and welding capacity building for increased productivity and quality in the manufacturing sector, which were challenged by the lack of financial rewards to trainers and the TVET bureau's capacities[59] and investment rationale,[60] and the distortion of training (e.g. teach how to take the CoC's test). Component 3 was challenged by the heavy workloads of trainers in addition to regular training.

Reviews on the National TVET Strategy and the ESDP Priority Programme for TVET mentioned above and discussions in previous sections reveal that the current TVET system in Ethiopia does have the problems of skill mismatches and thus inefficiencies in its system operations.

3.4.3. Education and Training Roadmap

MoSHE and the MoE together are now developing the Education and Training Roadmap for the period of 2020 to 2030 by establishing the Education and Training Roadmap Preparation and Implementation Secretariat. The Roadmap is expected to be finalized in 2020. Although the Roadmap is not yet complete, MoSHE is making its 10-year Development Plan of MoSHE. Once the 10-year plan is made, MoSHE will make a Five-year Strategic Plan and specific action plans to realize the objectives of the Five-year Strategic Plan.

The Education and Training Roadmap, which has not been finalized yet, suggests the establishment of MoSHE, the introduction of three types of universities such as

58 Ministry of Education (2015). Education Sector Development Programme V (ESDP V) 2015/16-2019/2020. pp. 94-101.

59 Capacities in estimating the number of trainees and trainers and the amount of facilities and equipment by type and level of skills demanded in the local economy.

60 Appropriateness to establish one TVET institution per woreda without considering labor demands of the region and economies and scale.

comprehensive universities, applied science/TVET-oriented universities, and research-oriented universities, the establishment of the Federal TVET Research Institute, the upward change of starting the TVET track from 10th grade completion to 12th grade completion, and the introduction of Freshmen Courses. These have already been implemented. In addition, the school system has been redesigned and the new school structure has already been applied, as discussed in previous sections.

3.5. TVET Governance

At the federal government, MoSHE[61] is responsible for designing, implementing, and evaluating national TVET strategies and policies with support from the FTA and FTI. Since TVET has not received much attention from the government, including the Ministry of Education, the decision-making power of the administrative unit for TVET has been relatively limited compared to the general and higher education sectors.[62] MoSHE is a member of the Council of Ministers that formulates and implements national economic and social development policies. In the Council, MoSHE discusses TVET policies with other related ministries.[63]

With respect to TVET, the Federal TVET Council functions as a governing body of the FTA. Since it needs to reflect the demands from a wide range of stakeholders, the Federal TVET Council consists of representatives from federal government ministries, chambers of commerce and private sector associations, private TVET providers, trade unions, farmers, civil societies and NGOs, professional associations, and women's organizations.[64] At the regional government level, regional TVET agencies are responsible for managing all TVET-related matters. However, they have relied on guidance from the FTA.[65] This implies that there has been a lack of administrative power and expertise on TVET in both the federal and regional governments.

The FTA, as an implementing organ of the Federal TVET Council, is responsible for developing the OSs in line with the National TVET Qualification Framework, implementing the occupational skills assessment and certification system, introducing different TVET delivery programs like cooperative and in-company training, licensing TVET institutions,

61 Established in October 2018 (proclamation#1097/2018). Before Oct. 2018, the Ministry of Education was responsible for TVET.

62 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) An Integrated Executive Summary (draft for discussion). pp. 76-77.

63 Council of Ministers Regulation no.199/2011. For detailed information on members and responsibilities, refer to Proclamation No. 1097/2018.

64 Ministry of Education (2008). National TVET Strategy. pp. 47-48.

65 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) An Integrated Executive Summary (draft for discussion). p. 69 and p. 77.

providing industry extension services to the MSEs, and supporting technology transfers. The FTI, accountable to MoSHE, is responsible for providing pre-and in-service training to TVET trainers and short-term training programs to industry as well as conducting research on governance and leadership, financing, delivery, labor market, and technology innovation & transfer.[66]

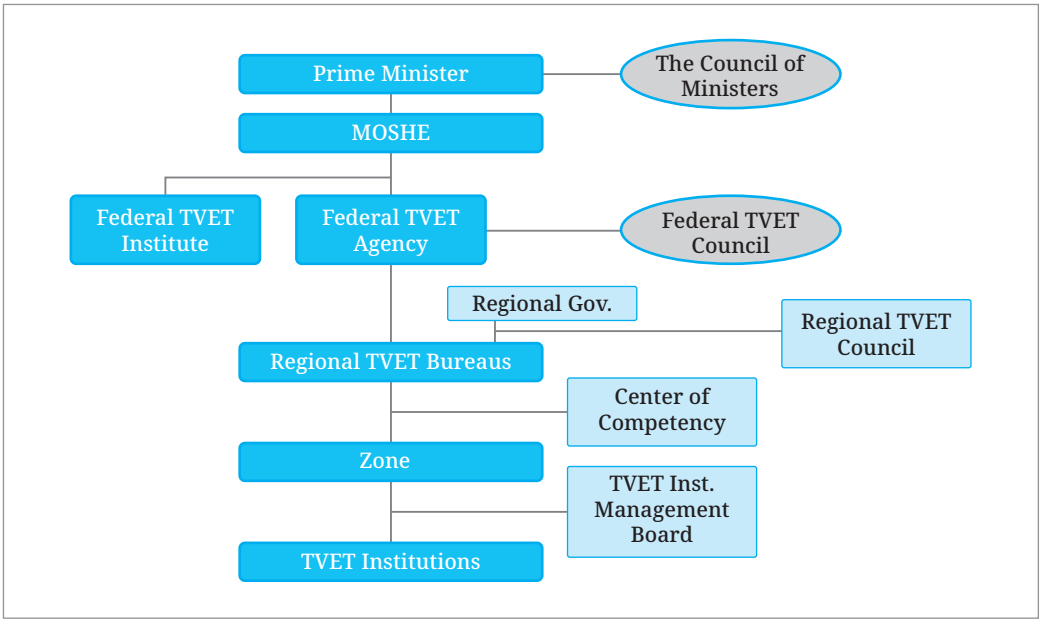
Regional TVET agencies are responsible for strengthening trainees' job competencies through vocational training, enhancing the capacities of trainers and TVET institutions, and supporting the provision of industry extension programs and technology transfers. The main missions include the training and supply of quality labor based on the OSs and the capacity building of the MSEs. The FTA is responsible for making and implementing national TVET strategies and policies, while regional TVET agencies are responsible for establishing and managing TVET institutions. The financial bureau of the regional government (e.g. Addis Ababa City government) provides the budget to regional TVET agencies and TVET institutions in its territory.[67] The federal government provides financial subsidies to the regional TVET agencies when a regional government suffers from budget constraints. TVET institutions have a substantial level of autonomy in recruiting trainers and developing TVET curriculum. In general, the TVET institution makes decisions through the review process by the TVET Institution Management Board, which consists of a regional TVET Agency director, sub-territory director, and industry people. Regional TVET agencies appoint a head of each TVET institution after the TVET Institution Management Board recommends a candidate.

At the regional government level, the Regional TVET Council consists of director generals and representatives from regional TVET agencies, industry, and the MSEs. It is established under the regional government, and provides administrative support to TVET institutions when they need to work with other administrative bodies.

66 For more detailed discussion on TVET research, refer to chapter III.

67 In Addis Ababa, for example, the budget is allocated to each of 14 TVET institutions based on the evaluation results of each TVET institution's performance. Interview with Addis Ababa Regional TVET Agency in Dec. 18, 2019.

[Figure 1-23] Ethiopian TVET Governance Structure



It was pointed out that the current vocational training programs of TVET institutions have weak connections with the manpower requirements of the national and regional economies. As explained in previous sections, the Ethiopian government selected six priority manufacturing sectors and projected the manpower needed to expand those sectors. However, the government did not make specific plans for how to train manpower, where, and by when. Since TVET centers are established and managed by regional governments (e.g. cities, woredas, or localities), it is necessary to have good coordination mechanisms among the federal government ministries, regional governments, and TVET institutions. However, there has been lack of coordination among them. In addition, although several ministries are responsible for providing skills development programs, creating jobs and securing employment like the Ministry of Labor and Social Affairs, Ministry of Industry and Trade, and Ministry of Urban Development, there has been a lack of coordination among these ministries.[68]

3.6. TVET Financing

The governments, federal and regional, are the main funding source for education and TVET. As of 2016/17, 48.9% of total education expenditures including TVET was provided by the federal government, while the other 51.1% was from regional governments.[69]

68 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) An Integrated Executive Summary (draft for discussion). p. 72 and p. 77.

69 Ministry of Education (2019. 3). Education Sector Development Program (ESDP) V Mid-Term Review Report (ppt version). p. 38. 97%.

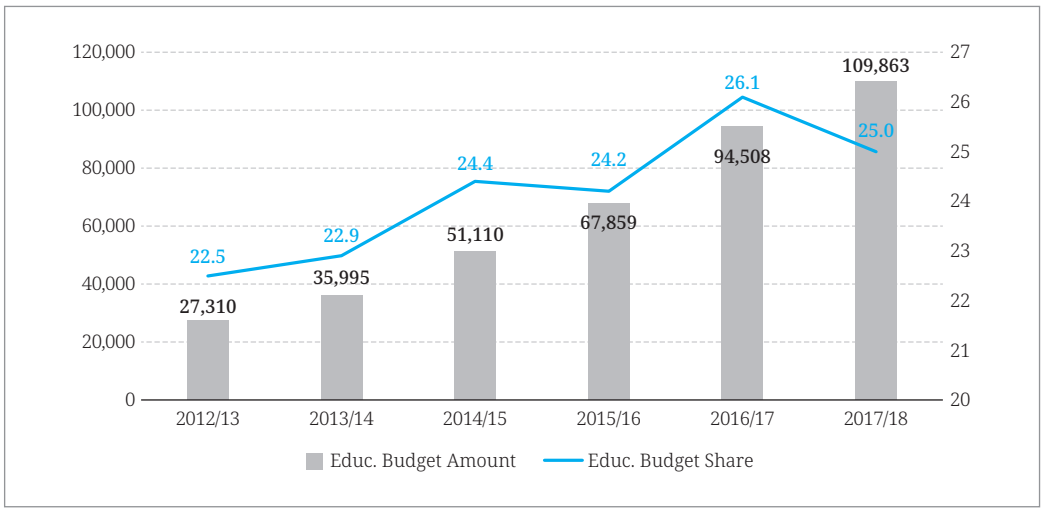
Between 2013/14 and 2016/17, the federal government bore about half of the total education expenditures, indicating that regional governments played a critical role in providing education and TVET.

With respect to TVET financing, the federal government budget is mainly used for developing TVET strategies and policies, monitoring their implementation, and capacity building. The regional governments are responsible for building and operating TVET institutions, providing facilities and equipment, and recruiting trainers. As of 2016/17, 94% of TVET budgets was provided by regional governments,[70] indicating that the federal government's role in financially supporting TVET is quite limited. In addition to the government, the private sector and NGOs have made significant contributions to establishing TVET institutions. Private companies have borne the costs of TVET programs for incumbent workers. International donors have provided financial support for establishing and operating model TVET institutions and providing capacity-building programs.[71]

During the six years between 2012/13 and 2017/18, the Ethiopian government managed to maintain the ratio of the education budget to the total government budget in a relatively consistent manner with slight increase as shown in [Figure 1-24].

[Figure 1-24] Ratios of Education Budget to Government Budget (2012/13-2017/18)

(unit: %, million ETB 2008 constant)



Source: MoE (2019.3). Education Sector Development Program V Mid-Term Review Report (ppt version). p. 37.

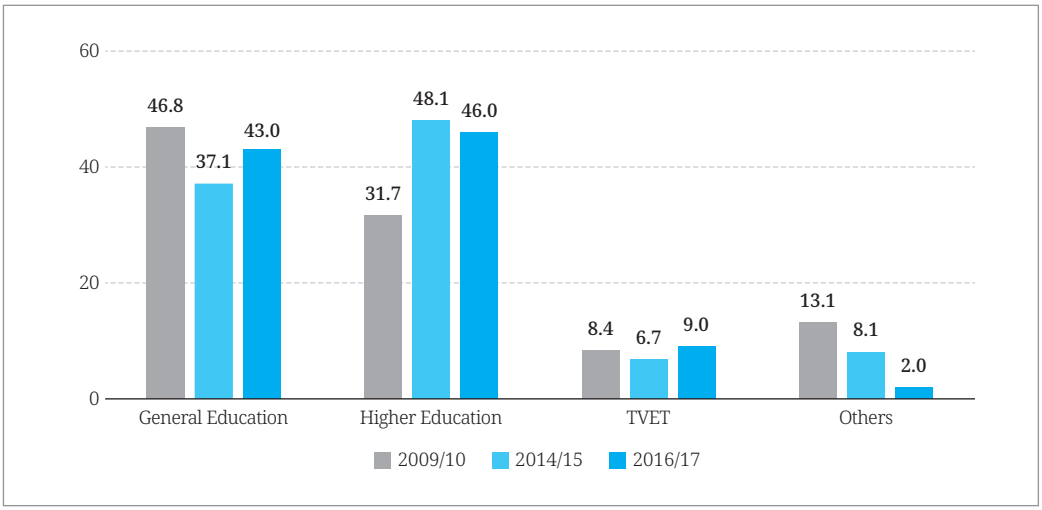
of the higher education budget was appropriated by the federal government, while 92% of the general education budget was from regional governments.

70 Ministry of Education (2019. 3). Education Sector Development Program (ESDP) V Mid-Term Review Report (ppt version). p. 38.

71 Ministry of Education (2018). Ethiopian Education Development Roadmap (2018-2030) An Integrated Executive Summary (draft for discussion). p. 69.

TVET seemed to get reasonable attention when allocating the education budget. The proportion of the education budget allocated to TVET decreased from 8.4% in 2009/10 to 6.7% in 2014/15, and increased to 9% in 2017/18 as in [Figure 1-25]. Considering that the number of TVET students was 292,378 (1.04% of total number of students), 9% cannot be regarded as small. [Figure 1-25] indicates that a relatively large proportion of the education budget was allocated to higher education considering that 83.4% of all students are enrolled in primary and secondary schools (95.7% when including kindergarten children). The government needs to estimate the unit cost of providing TVET by level as well as future TVET demand to project the budget amount needed for TVET.

[Figure 1-25] Proportion of Education Expenditure by Education Level and Type (2009/10-2014/15)



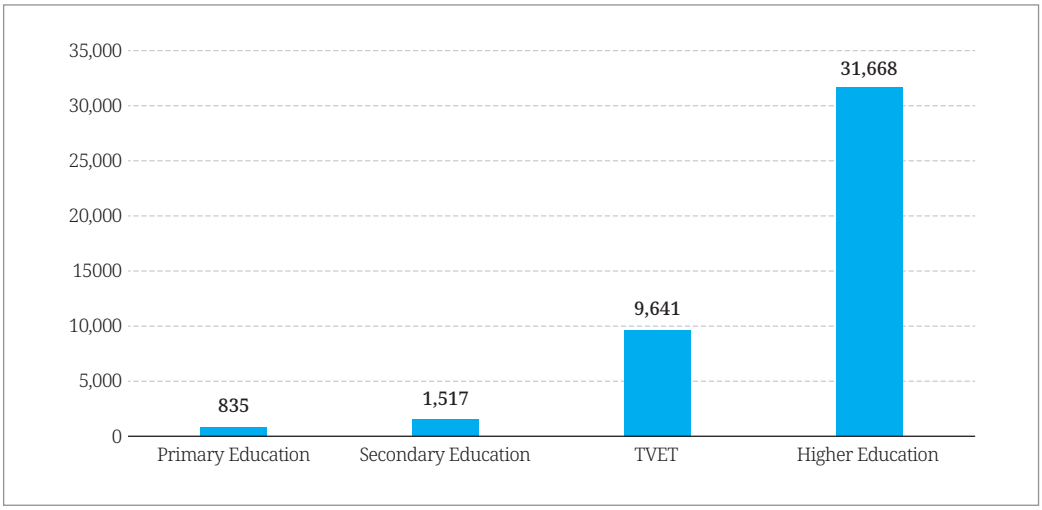
Source: https://www.unicef.org/esaro/UNICEF_Ethiopia_--_2017_--_Education_Budget_Brief.pdf (data from Ethiopia FMoE. Education Statistics Annual Abstract 2014/15 and General Education Statistical Abstract 2015/16) for 2009/10 and 2014/15 and MoE (2019.3). Education Sector Development Program V Mid-Term Review Report (ppt version). p. 39 for 2016/17.

Considering differences in the per student expenditure by education level and type, as shown in [Figure 1-26], the Ethiopian government needs to re-estimate the unit cost of education and TVET by level and type and try to balance the difference in per student expenditure among education level and type. The government might try to lower the unit cost for higher education and put the budget spared toward expanding primary and secondary education with quality improvements and/or improving TVET infrastructure.

Considering the ever increasing demand for TVET, Ethiopia needs to secure a much larger budget for TVET. Due to the government's budget constraints, it will need to diversify its funding sources. For example, public TVET institutions can collect fees from trainees and

firms for their training and assessment and undertake income-generating activities.[72]

[Figure 1-26] Per Student Expenditure by Education Level and Type



Source: https://www.unicef.org/esaro/UNICEF_Ethiopia_--_2017_--_Education_Budget_Brief.pdf (data from Ethiopia FMoE. Education Statistics Annual Abstract 2014/15 and General Education Statistical Abstract 2015/16).

3.7. Implications

As indicated in [Figure 1-10] and [Figure 1-11], TVET has been provided from the 2nd cycle of secondary education level (grades 11 and 12) as a part of the formal education system, and will be provided mainly at the post-secondary level as in [Figure 1-10]. The number of students in TVET institutions has been quite small. The manpower projections of the six priority manufacturing sectors[73] require substantial increases in the number of TVET graduates. Considering the past expansion rate of formal TVET enrolment, it is quite obvious that the current formal TVET system will not be able to train and supply as many skilled workers as demanded. This implies that it is integral to expand the capacity of TVET institutions to train and supply as many quality workers as demanded through both formal and non-formal TVET programs. It is crucial to make realistic plans to expand TVET institutions considering each region's industry demands and linkages among TVET levels. For example, the government may first expand the current non-formal short-term training programs and at the same time strengthen the TVET track (junior college of grades 11 and 12 – TVET levels 1 and 2) in the secondary school system. The TVET expansion plan should be based on scientific manpower projections by industry. In that sense, it is required to forecast manpower demand on a regular basis.

72 Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia (2016). Technical and Vocational Education and Training Proclamation. Proclamation No.954/2016. Part six budget and financial management for public training institutions.

73 Refer to section 2.3.

To induce a large number of students into the TVET track, it is critical to open the TVET system to the academic education system. In other words, TVET students and graduates should be able to transfer to academic education programs as well as other TVET programs horizontally and vertically. For this it is integral to design and implement an integrated and comprehensive education and TVET framework that guarantees transfers from the TVET track to the academic track and vice versa.

More fundamentally, it is required to first expand enrolment rate of grades 5 and 6 in primary school and junior school (grades 7-8) first and sequentially secondary school and at the same time to improve the quality of education in both primary and secondary education. This is to secure an education base for TVET and a human capital base for promoting the structural transformation and transfer of labor from agriculture to manufacturing. Thus, the Ethiopian government needs to provide adults literacy programs more actively across the country to improve the efficiency of the non-formal vocational training programs.

Practical mechanisms for boosting real collaboration between TVET institutions and employers, public and private, should be designed and supported by the federal and regional governments. The governments need to institutionalize the cooperation between the two main actors by making laws and regulations and securing the budget. With financial and administrative support from the government, employers and representatives from industries can actively participate in analyzing changes in the skills demanded, developing the OSs and making TVET curricula and certificates that are matched with the skills demanded in the Ethiopian economy.

Given the inability and unwillingness of industry to participate in the Cooperative Training Program and In-company Training Program, it is necessary to strengthen practical training within TVET institutions. In other words, until firms are prepared to provide workplace-based training, it is realistic for TVET institutions to provide practical training with the assumption that the facilities and equipment for practical training are going to be installed. In this case, for example, 70-80% of TVET would be delivered by TVET institutions, while the other 20-30% would be by firms.

To reduce the difference in TVET quality among regions and increase TVET quality, it is required for the federal government (i.e. MoSHE, FTA and TVET research institutes to be established) to make the OSs that systematically reflect the skills demanded in collaboration with industry and the TVET curriculum and learning materials for major strategic industry sectors. For this, the government needs to recruit OS experts, curriculum designers, and evaluation experts. In addition, to maximize the efficiency of the government's

administrative and financial support, it is important to enhance the capacities of government officials by recruiting experts and providing capacity-building programs together with systematic personnel management that guarantees career development of TVET experts as a government official.

To provide effective administrative and financial support to TVET and maximize the efficiency of TVET investment, the Ethiopian government needs to have overarching policy coordination mechanisms at national and regional levels. The Office of the Prime Minister can organize a policy coordination committee that deals with the linkages between national economic development and manpower supply. Several ministries should participate in this committee such as the National Planning Commission, Ministry of Labor, Ministry of Education, Ministry of Science and Higher Education, Ministry of Industry, Ministry of Agriculture, and Ministry of Finance. Communication between federal and regional governments is also crucial.

Given the government's budget constraints, the federal and regional governments should try to find better ways of optimizing the limited amount of budget to maximize the efficiency of budget investments. Currently, a disproportionately large proportion of the government's education budget has been used for higher education. Considering the low enrollment and quality of basic education in Ethiopia and the rapid increase in demand for labor in the near future, the government needs to review the cost-effectiveness of the budget invested in higher education and may need to change its investment priorities or increase the budget allocated to basic education and TVET. In addition, the government needs to diversify its funding sources. For example, the government can utilize the private sector's financial ability by collecting levies from employers for TVET considering that they are the primary beneficiary of TVET.

4. Korea's Experience

4.1. Securing a Human Capital Base for TVET

4.1.1. Policy Priority of Universalizing Primary Education First and then Secondary Education[74]

The government of Korea put its first policy priority on universalizing primary education in the 1950s before the Korean economy began to grow rapidly in the 1960s. In 1954, it

74 Paik, Sung Joon (2013). Education and Inclusive Growth. KDI School Working Paper.

launched the 'Six-Year Plan for Completing Compulsory Education (six years of primary education)' to increase the enrollment rate from 88.4% to 96.1% between 1954 and 1959. To implement this plan, the government collected an education tax, which was a special surtax for compulsory education levied on property and house taxes[75] and allocated 11.55% of the internal tax revenue for financing compulsory education based on the National Grant Law for Financing Compulsory Education enacted in 1958. The Ministry of Education kept increasing its budget for primary education, which reached 80.4% of the MoE budget in 1959. Due to the government's strong efforts, the primary school enrollment rate reached 96.4% in 1959.

Early achievement of universalizing primary education was regarded as a critical pre-requisite for national social and economic development. It played a crucial role in helping people share common sets of beliefs, norms and knowledge, improving communication among them, and supplying a large number of quality manual workers at lower wage levels to labor-intensive light manufacturing sectors in the 1960s. This strategy proved to be effective with high retention rates and learning achievements for national economic growth.[76] In other words, with the universalization of primarny education that was accompanied by higher completion rates and quality education, Korea was able to secure enough labor to start the structural transformation of the national economy from agriculture to industry and also the primary school students needed to further expand secondary school education that is an integral condition for supplying skilled workers demanded in industrial sectors.

After universalizing primary education, the government shifted its investment focus to secondary schools in the 1960s and 1970s, as social demand for middle and high school education began to rise as a result of the universalization of primary education and demand for skilled labor also rose very rapidly due to the changes of industrial structure from a light industry-based structure to a heavy and chemical industry-focused one. The government abolished the middle school entrance exam in 1968 and introduced the high school equalization policy in 1974. With these two policies, access to secondary education became more equitable in that student placement was decided on the basis of residence by lottery rather than on test scores that would reflect parents' SES. The government allocated more money to expand secondary education opportunities and make all schools comparable in terms of school infrastructure, expenditure, and teachers.

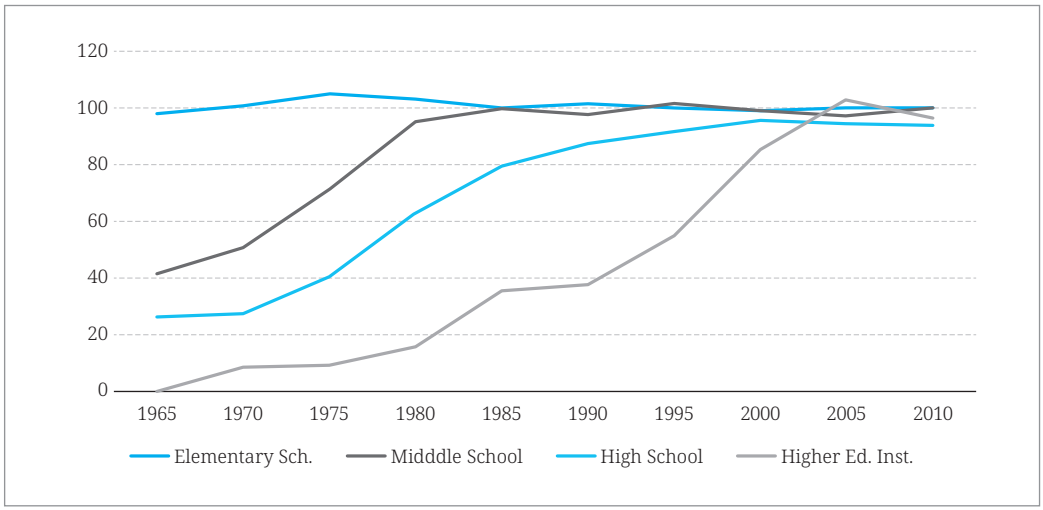
75 Special education tax was collected between 1958 and 1961.

76 Mingat, A. (1995). 'Towards Improving Our Understanding of the Strategy of High Performing Asian Economies in the Education Sector.' Presented at the ADB Conference on Financing Human Resources Development In Advanced Asian Countries (Manila, 17-18 Nov. 1995). A similar investment pattern was observed in Singapore, Japan, and Taiwan.

Both the universalization of primary education and the expansion of secondary education contributed to preparing a large number of competent trainees for vocational training institutions, especially during the development period (1960s-1980s). To fully understand the contents of TVET curriculum and acquire job skills, trainees need to have the core competencies of reading, writing, calculating, and communicating. If trainees do not have these basic competencies, it would be of no use to provide them with TVET.

As high school enrollment rates increased to the 75-80% level and demand for technicians, engineers, scientists, and managers increased due to the change of industrial structure towards technology-intensive ones in the 1980s and 1990s, the government of Korea began to put a greater emphasis on higher education. The government increased the enrolment quota of higher education institutions and provided more money for HEIs. In sum, Korea expanded its school education in a phased manner from primary education to higher education as shown in [Figure 1-27], and this strategy proved to be relatively well matched with national economic development.

[Figure 1-27] Gross Enrollment Rates by Schooling in Korea (1965-2010)



Source: Ministry of Education (each year). Statistical Yearbook of Education.

4.1.2. Adult Literacy Programs and Non-Formal Education for Youth and Adults

After Korea was liberated from the Japanese Imperial regime in 1945, during which the use of the Korean language was forbidden, the military government trained adult education leaders and provided Korean language programs for adults who could not read and write in Korean. The adult illiteracy rate decreased from 78% in 1945 to 42% in 1948. After the Korean War (1950-1953), the government of Korea launched a massive literacy campaign by

providing literacy programs in schools, companies, army units, and prisons. The illiteracy rate declined to 4.1% in 1958.[77]

For youth and adults who did not complete primary and secondary education, the government of Korea provided non-formal education programs through 'adult schools' and 'civil schools' and 'high civil schools' respectively in the 1960s. In the 1970s, the government opened 'technical schools' and 'technical high schools' that provided middle and high school level vocational education respectively. These schools provided one to three years of vocational programs in apparel, automobile repair, baking, civil engineering, electricity, mechanics, radio, TV, nursing, welding, etc. In 1977, 'secondary schools annexed to companies' were introduced to provide secondary education to employees who completed a primary or middle school education. In addition, 'open universities' were established in 1972, while 'air and correspondence high schools' were established in 1974, which contributed to providing high school and university education opportunities to youth and employed adults.[78] These literacy and non-formal education policies also played a great role in securing a human capital base for TVET.

4.2. National TVET System

4.2.1. Vocational High Schools and Junior Colleges

As the Korean economy developed very rapidly with the implementation of export-led and manufacturing sector-focused strategies in the 1960s and 1970s, demand for skilled workers and technicians increased rapidly. To respond to the increasing labor demand during the 1st five-year economic development plan period (1962-1966), the government introduced a national curriculum for vocational education to vocational high schools in 1963 and established nine five-year TVET institutions,[79] the first type of non-university TVET institution in Korea, that provided three-year vocational high school and two-year vocational junior college programs.

The government tried to expand vocational high school capacity to supply skilled workers. The ratio of vocational high school students to total high school students increased from 40% in 1965 to 45% in 1980. However, vocational high school alone could not meet the demand for skilled workers. During the 3rd five-year economic development plan period (1972-1976), 51.7% of skilled workers were supplied through vocational high schools, while

77 Kim, C.C. (1989). Education Policy Study in Korea. Education Science Co. p. 339.

78 Ministry of Education (1998). 50 Years History of Education (1948-1998). pp. 609-612.

79 In nine different regions based on the characteristics of industry composition.

the other 48.3% were from the vocational training system that was introduced in 1967.[80]

Although five-year TVET institutions contributed to supplying technicians to export industries with a quantitative increase to 23 in 1969 from 9 in 1963, they were criticized for their low performance due to high dropout rates and lack of guidance and counselling services. When the Korean government asked the World Bank for a loan to improve facilities and equipment in these institutions, the World Bank suggested restructuring them into two-year vocational junior colleges. The Korean government established five two-year vocational junior colleges in 1970 and restructured the existing five-year TVET institutions into vocational junior colleges in 1976. The number of vocational junior colleges increased from five in 1970 to 112 in 1978. In 1979, the government integrated two-year junior colleges[81] and vocational junior colleges into junior colleges. Since then, junior colleges have played a crucial role in expanding higher education and training and supplying mid-level professional including technicians to various industrial sectors such as mechanics and civic engineering in the 1970s and 1980s when the focus of the Korean economic development policy shifted to heavy and chemical engineering and further to technology-intensive industries.[82] As of 2019, 643,560 students were registered in 137 junior colleges (i.e. 12,575 in 9 public and 630,985 in 128 private junior colleges).[83]

4.2.2. National Training System

A. Compulsory Training System and Levies (1976-1998)

When the Korean government made its first five-year economic development plan in the early 1960s, it anticipated labor shortages and discussed the introduction of a national non-formal vocational training system as an another key policy measure to supply skilled workers and technicians. This was based on two key rationales: (i) to promptly respond to rapidly increasing labor demand, it is integral to have a non-formal training system that has the advantages of flexibilities in curriculum development, training period, and trainee and trainer recruitment compared to regular vocational higher schools and junior colleges that had to follow rigid laws and government regulations;[84] and (ii) employers were in the best position to know the changes in the skills demanded.

80 For details, refer to section 4.2.2.

81 There was another type of junior college (miniature version of a university).

82 Mazeran, Jacques (2007). Short-term Vocational Higher Education – A Global Challenge in Education. The World Bank / HACHETE Education / CIEP. Paris. pp. 53-56.

83 https://kess.kedi.re.kr/index Jan. 29, 2020.

84 For example, for regular vocational high school system, it took two to three years to develop or revise the curriculum and four years to train a teacher. In addition, regular schools recruited only once a year. Due to these aspects of the regular school system, it was not possible for vocational high schools alone to train and supply the skilled workers demanded to implement the five-year economic development plans.

The Korean government introduced the national training system in 1967 with the enactment of the 'Vocational Training Act' to secure the supply of skilled workers needed for industrialization and enhance the employability of individuals. The main contents of this act included the establishment of public vocational training institutions and in-company training facilities, establishing the qualifications and training of trainers, and the provision of public training. The government established the 'Central Vocational Training Center' in 1968 to train trainers, conduct research on vocational training, design and develop vocational training standards, provide vocational training, and supervise public vocational training institutes. The government also established several vocational training institutions with support from Germany, the U.S., Japan, Belgium, and international organizations like the ADB and IBRD in the 1970s.[85]

When the government first introduced the national vocational training system, it encouraged employers to provide vocational training to new entrants and incumbent workers on a voluntary basis. When a government subsidy was provided, the number of firms that delivered in-plant training increased. Right after the government stopped subsidizing in 1972 due to the oil crisis, however, the number of firms delivering training decreased sharply. The majority of employers were reluctant to providing training and instead poached skilled workers from other firms. Thus, the government made it mandatory for private firms with 300 or more employees to provide in-plant skills training to their employees by enacting the 'Basic Law for Vocational Training' in 1976.[86] The government also introduced a levy system. Employers could either provide in-plant training to employees or pay a levy[87] to the 'Vocational Training Promotion Fund', which was used to provide the budget for the training of trainers and trainees, developing a curriculum, operating the Korea Manpower Agency (now HRDKorea), and providing loans for equipment and facilities to firms.

As [Figure 1-28] shows, the number of firms subject to this law kept increasing from 1977 until 1995, while the proportion of firms that provided in-plant training kept decreasing. This observation indicates that a large proportion of firms decided to pay the levy instead of providing vocational training due to the much more expensive training cost than the levy and the complex and burdensome government regulations to follow.

To secure trainers, the Central Vocational Training Center provided short-term licensing courses focused on teaching methods to well-experienced workers of diverse occupations

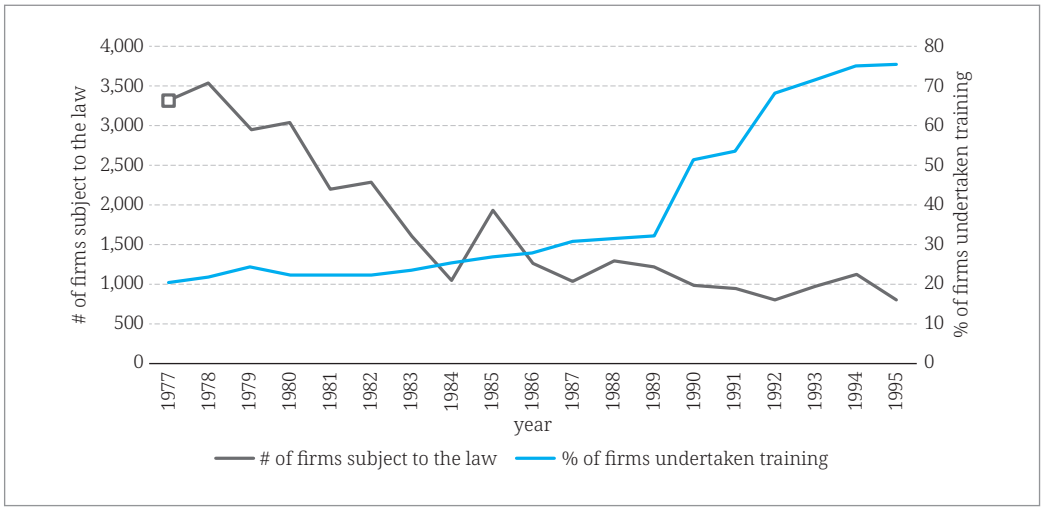
85 Suh, Sangsun (2002). Vocational Training System in Korea. Korea Chamber of Commerce and Industry. pp. 117-156.

86 Expanded to 200 or more in 1989 and 150 or more in 1992.

87 The levy was estimated by the standard training cost per trainee per month and the proportion of trainees imposed by the government until 1986 and by a certain percentage of the total wage of employees since 1987.

and also two-year regular and advanced training courses to high school and junior college graduates respectively with a special focus on job-specific skills and theories.[88] In addition, donor countries like Germany provided trainer training programs in their countries.[89]

[Figure 1-28] Implementation Results of Compulsory Training & Levy System



Source: Sung Joon Paik, HRD in Korea. ppt file. 2014.

B. Vocational Competence Development Program in Employment InsuranceSystem (1995-)

As the knowledge-based economy emerged and rapidly progressed in Korea in the 1990s, the type and level of skills demanded became diversified and rose, and thus the need for a lifelong learning system to upgrade workers' skills increased. There was another need for comprehensive and active labor market policies as rapid changes to the industrial and occupational structures were expected. To effectively respond to these policy environment changes, the Korean government introduced the Employment Insurance System (hereafter the EIS) with the enactment of the Employment Insurance Law in 1995. The EIS has three components: the employment security program, the vocational competence development program (hereafter the VCDP) and unemployment benefits. The VCDP provides financial assistance to employers, employees, and the unemployed for their training by using the Employment Insurance Fund (hereafter the EIF) to which every employer is required to pay an insurance fee[90] for all three components and employees for unemployment benefits.

88 Kim. Jun Su et al. (2004). Qualification Standards for Vocational Training Instructors in Korea. KRIVET. pp. 16-18.

89 Suh, Sangsun (2002). Vocational Training System in Korea. pp. 122-128.

90 Employers are required to pay 0.25% to 0.85% of total payroll for the employment security and the VCDP depending on the firm size and 0.55% for the unemployment benefits.

The new vocational training system, the VCDP, can be characterized as a demand-oriented and incentive system compared to the old system in which employers, employees, and the unemployed can make their own choice of training programs and institutions based on their training needs and as they get trained they can be reimbursed for their training costs from the EIF. In the VCDP, the training market became open to all private training institutes including colleges and universities; the focus of training shifted from initial training to continuing training; and the main target groups also changed from youth without skills to incumbent workers and the unemployed in all industries and occupations. The government produces data and information on the performance of vocational training institutions and programs and makes them public. Employers, employees, and the unemployed make informed decisions based on the data and information provided by the government, which promotes competition among vocational training institutions. The government expects this choice and competition mechanism to contribute to improving the quality of vocational training and consequently enhancing labor productivity.

The VCDP of the EIS has contributed to providing continuing training to incumbent workers, especially those in the SMEs[91] by applying smaller insurance fees and high reimbursement rates to the SMEs, which is believed to contribute to increasing the productivity of the SEMs. Key success factors of the VCDP of the EIS can be identified as follows: securing enough budget for training through the EIF, expanding the training market to private providers, and providing financial support differentially by firm size.

4.3. Open Pathways for TVET Students

4.3.1. 50:50 Policy

In the late 1980s, Korea experienced a shortage of skilled workers in the manufacturing sector due to the rapid expansion of higher education and the continuous decline of vocational high school enrolment. Since the government introduced the graduation quota system in 1980, enrolment in junior colleges and universities increased by 15% and 30% respectively. As the general living standards increased, more parents wanted to send their children to college or university. The proportion of vocational high school students to total high school students decreased from 45% in 1980 to 35% in 1990.

The government introduced a policy to strengthen vocational high schools, the main objectives of which was to increase the proportion of vocational high school students up

91 The proportion of the number of trainees from firms with 1-149 employees to total number of trainees kept increasing from 12.2% in 1998 to 29.6% in 2012.

to 50% by 1995 and the proportion of technical high school students from 24% in 1990 to 45% by 1995. To achieve these objectives, the government increased freshmen enrolment, established new schools, and converted general high schools to vocational high schools. The proportion of vocational high school students increased from 35% in 1990 to 42% in 1995 but after that kept decreasing, while the proportion of technical high school students increased from 24% in 1990 to 35% in 1995, far below the target. The government postponed the target year to 1998 and discarded the policy in 1998.

One main reason for the failure was that the government interpreted manpower forecasting data too narrowly and applied a manpower demand approach rigidly. It failed to take into account the substitutability of labor saving technology / automated machines with routine and repetitive labor. This indicates that increasing the demand for skilled workers did not necessarily mean the need to increase vocational high school students. The government should have utilized short-term training programs provided by private firms with government support.

Another reason was that the government paid little attention to social demand for general and higher education. It failed to consider individual's desire toward general and higher education and provide further and continuing education opportunities. The government should have designed a vocational education system within a lifelong learning context and tried to guarantee vertical and horizontal pathways toward an academic education track to students in the vocational education track.

4.3.2. Meister High Schools

While labor demand for technicians increased in the 2000s, the demand for mid-level skilled workers still remained. Despite changes in the skills demanded in new areas like e-business, information processing, robots, energy, and software, however, vocational high schools failed to adapt their curricula to the new skills demanded. SMEs, which accounted more that 85% of employment in Korea, suffered from the shortage of a technical workforce supplied by vocational high schools. There was excessive demand for higher education, which resulted in high unemployment rates of university graduates. Only 19.2% of vocational high school graduates joined the labor market in 2010.[92] In the 2000s, Korea experienced a shortage of skilled workers with high school qualifications, skills mismatches, and youth unemployment, and anticipated a sharp decrease in the high school age cohort for the next 20 years.

92 It was 76.6% in 1990.

The Korean government implemented the vocational high school restructuring policy in 2010, which planned to increase the number of the Meister high schools to 50 by 2015, reducing the number of regular vocational high schools from 792 to 350 for the same period of time. In addition, the government launched 'Get Employed First, then Study while Working' campaign with several supporting policies like tax incentives for companies, support for industry initiatives to establish corporate colleges, the provision of degree programs for incumbent workers in universities, and the expansion of student loans. For example, if a graduate from Geoje Technical High School got employed in Samsung Heavy Industries and s/he could study at Samsung Heavy Industries College of Engineering. After getting an associate bachelor degree from the corporate college, s/he could continue her/his studies at the contract department of Pusan National University to get B.A. degree. Through this policy effort, the employment ratio of vocational high school graduates increased from 19.2% in 2010 to 46.4% in 2016.

Meister high schools were introduced in 2008 as a new model of vocational high school to provide students with opportunity to be trained as professionals in specific areas like mechanics, automobiles, mechatronics, steel, shipbuilding, energy, electronics, communications, and medical equipment. Meister high schools select high-caliber middle school students through in-depth interviews by industry people and aptitude tests, and provide a customized curriculum developed based on the skills demanded and job analyses in collaboration with industry. Meister schools recruit ex-CEOs as principals and industry people as teachers. More than 80% of students in Meister schools opened in 2010 have been employment contracted. The level of employers' satisfaction with the job competencies of Meister high school graduates has been high.[93]

Graduates from Meister schools are allowed to study at higher education institutions while working. As of 2016, more than 20% of Meister high school graduates (26.0% of graduates in 2013 and 20.5% of graduates in 2014) studied at junior colleges and four-year universities through taking night courses in colleges and universities or courses at the Korea Air and Correspondence University. More than 60% of graduates who did not study at higher education institutions expressed their plans to enter a college or university.[94] This indicates that the government policy to guarantee open pathways to students in the TVET track worked.

93 Jong Woo Kim & Sung Nam Kim (2017). Employers' Satisfaction with the Job Competencies of Meister High School Graduates. KRIVET Issue Brief no.115. The percentage of employers who expressed their satisfaction increased from 87.7% in 2013 to 91.0% in 2015.

94 Sung Nam Kim & Jong Woo Kim (2017). Higher Education Participation of Meister High School Graduates. KRIVET Issue Brief. no.133. It was pointed out that companies needed to provide financial subsidies for their employees' higher education and reward employees appropriately who get a B.A. or associate B.A. degree.

4.4. Private Sector Involvement in TVET – Sector HRD Councils and Industry Skills Councils[95]

The Korean government has experienced two kinds of industry representative organizations: the Sector HRD Council (hereafter the SHRDC) and the Industry Skills Council (hereafter the ISC). The former was introduced in 2004 through the collaborations among the Ministries of Industry and Resources, Labor, and Education. Since three SHRDCs were established in the areas of IT, electronics, and mechanics in 2004, 17 SHRDCs, in which industry associations, leading companies, and experts participate, are in operation. Key functions of the SHRDC include the analysis of changes in skills and TVET demand, the development of qualification standards and TVET curricula. The Ministry of Industry and Resources has provided financial support to the SHRDCs.

Another representative organization of industry, the Industry Skills Council (hereafter the ISC), was introduced by the Ministry of Employment and Labor (hereafter MoEL) in 2015. The ISC, in which employers' associations, companies, and workers' organizations including labor unions participate, analyzes changes in labor supply and demand, and develops and revises the National Competency Standards and qualification standards. As of 2016, 13 ISCs were in operation. MoEL subsidizes the ISCs according to the size of the respective industry.

Since Korea does not have the tradition of a guild system and apprenticeship training in industry sectors like the UK, the Korean government took the leadership role in establishing the SHRDCs and the ISCs and supporting their operation by providing financial support. However, the two kinds of councils, separately operated by the Ministry of Industry and MoEL, indicates the conflict between the two ministries that led to the inefficiency of the central government's role in inducing the private sector's contributions to the analysis of skills demand changes and the development of the National Competency Standards and TVET curriculum.

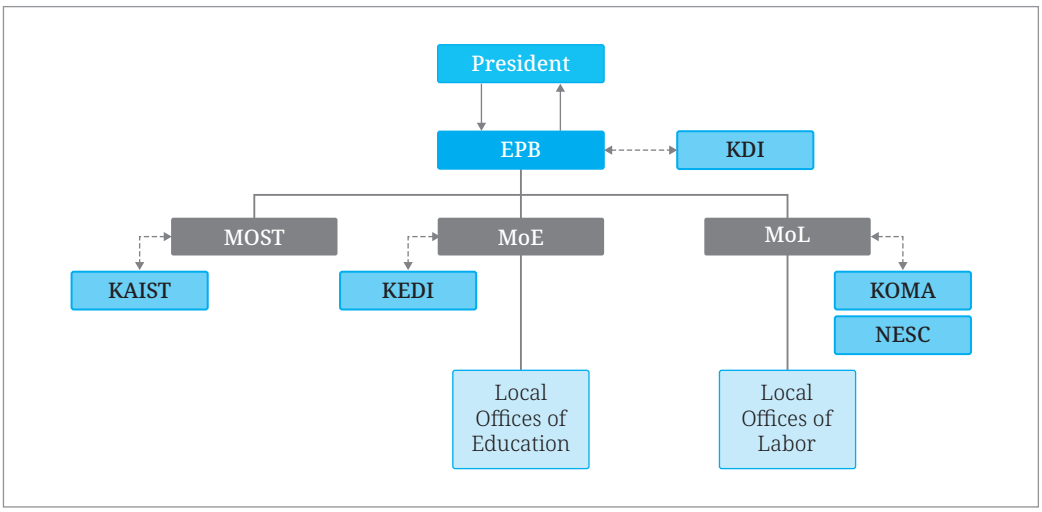
95 Sung Joon Paik (2017). Strengthen National HRD System for Senegal's Economic and Social Transformation, 2016/17 Knowledge Sharing Program with PASET: National HRD Strategy to Support the Economic and Social Transformation of PASET member countries with focus on Senegal, 2017. pp. 87-89.

4.5. TVET Governance – Policy Coordination at the Central Government Level[96]

4.5.1. Economic Planning Board (1960s – mid-1990s)

During Korea's rapid development period of the 1960s through mid-1990s, the Economic Planning Board (EPB), headed by the Deputy Prime Minister, formulated economic development plans, coordinated economic policies implemented by other ministries, and evaluated them. The EPB had strong power and leadership based on budget control and the president's consistent support. The EPB played a critical role in linking and coordinating HRD-related policies and economic development policies. The EPB wielded budget appropriation power, allowing it to lead discussions on key HRD issues related to economic development with HRD-related ministries like the Ministries of Education, Labor, and Science & Technology. The EPB also coordinated HRD policies in an integrated way within the framework of the national economic development plan.

[Figure 1-29] Policy Coordination between EPB and HRD-Related Ministries in Korea



Note: Government funded research institutes like the Korea Development Institute (KDI), Korea Advanced Institute of Science and Technology (KAIST), and Korea Educational Development Institute (KEDI), and government agencies like Korea Manpower Agency (KOMA, later HRDKorea) and the National Employment Stabilization Center (NESC) supported corresponding ministries.

Source: Sung Joon Paik (2014). Governance and Coordination Structure for Skills Development System in Korea. ppt file.

96 Sung Joon PAIK (2017). Strengthen National HRD System for Senegal's Economic and Social Transformation, 2016/17 Knowledge Sharing Program with PASET: National HRD Strategy to Support the Economic and Social Transformation of PASET member countries with a focus on Senegal, 2017. pp. 81-84.

4.5.2. Inter-ministerial Meeting on HRD

In 2000, the Korean government recognized that it lacked coordination among HR-related projects of ministries and government agencies, which led to duplications and blind areas and consequently the inefficiency of government work. Labor demand in high value-added industries like IT and BT increased as these industries emerged as new growth engines. The government felt a sense of urgency to upgrade HRD systems at the national level. The government expanded the Ministry of Education into the Ministry of Education and HRD headed by the Deputy Prime Minister for HRD in 2001. The new ministry was empowered to oversee and coordinate major policies related to the development and utilization of HR like education and vocational training. The government also established the Inter-Ministerial Meeting on HRD (2001-2007), presided over by the Deputy Prime Minister for HRD. The Meeting consisted of Ministers of Labor, Science & Technology, Industry & Resources, Information & Communication, Culture & Tourism, Government Administration, Health & Welfare, and Gender Equality. The main functions of the Meeting were to make a five-year national HRD plan, coordinate HRD policies among ministries, and monitor and evaluate the implementation and results of the national HRD plans.

Although the Meeting was established to enhance the national HRD system's efficiency, it did not function as effectively as expected for the following reasons: (i) the Deputy Prime Minister did not have practical authority, such as budget allocation and evaluation of policy performance, to lead discussions among ministries and coordinate the ministries' HRD policies, which resulted in hegemony conflicts among ministries, (ii) the Ministry of Education and HRD lacked professional expertise; and (iii) the Meeting lacked input from industry. The Meeting was reorganized into the Presidential Committee on National HRD (2007-2008), chaired by the president. The Committee consisted of ministers, representatives from industry, and labor unions. Cooperation between the government and the private sector was emphasized.

4.6. Implications

The government needs to establish a formal vocational education system (e.g. vocational high schools, vocational junior colleges, and polytechnics) in the national education system, especially when the institutional infra of TVET is not well formed, and at the same time a non-formal vocational training system as a supplement to the regular vocational education system because the regular school system alone cannot meet the diverse TVET needs of people and the economy. For the successful implementation of both formal and non-formal TVET, the government needs to secure the budget and personnel capable of designing and

managing the TVET system, and have a national qualification system to officially recognize the TVET results of an individual wherever s/he got TVET.

When the government designs its TVET system, it needs to take into account how to provide students and graduates with horizontal and vertical pathways, which means that it should consider not only manpower demand but also social demand for academic general education and higher education. It is critical to overcome TVET's negative image of being a 'dead-end track' and 'second-class education'. By making the TVET track open to other TVET tracks or the academic education track, the government can encourage students to select the TVET track in secondary school to train and supply the skilled workers needed for the manufacturing sector.

It is critical to get employers, public and private, involved in developing TVET policies, curricular and learning materials, and assessment tools of TVET results because they are in the best position to understand the changes in skills demand and financing TVET because they are the first beneficiaries of TVET. The government can take a leadership role in forming the representative associations of major industries, the main roles of which are to analyze changes in the skills needs by type and level, provide information on the skills demanded to TVET providers and the government, and participate in curriculum development, TVET provision and assessment, policymaking, and financing TVET.

With respect to TVET governance, it is important to make the right choice regarding governance and coordination schemes according to the national policy context. When a country is in the beginning stages of development with the training market not yet formed and local governments lacking infrastructure and capacity, it would be better to have a centralized system. After the training market is well established and functioning and local governments become capable of managing TVET policies, a decentralized and market-based TVET system can be implemented. When setting up the coordination and collaboration mechanisms among ministries, government agencies, and the private sector, it is necessary to specify the roles and responsibilities of each actor (e.g. what to do for who and how in making and implementing TVET policies) and the decision-making process in laws. It is also integral to provide real power to responsible person(s) and ministries to allocate the budget and personnel and do the monitoring and evaluation work.

Overall, Korea has constantly adapted formal and non-formal TVET systems to the changes in skill demands. As the Korean economy has expanded and grown to a more advanced level, the Korean government changed its TVET policy focus from the secondary to the tertiary education level and from initial training to continuing training.

5. Policy Recommendations

5.1. Underlying Premises

5.1.1. Designing a Comprehensive, Systematic, and Integrated Education and TVET System

It is integral for the government to have a clear vision for its national education and TVET system and design a comprehensive, systematic, and integrated education and TVET system that encompasses the entire spectrum of education and TVET by level and type and has close linkages to the national economy.[97] In other words, it is necessary for the government to have one design for its education and TVET system in which (i) each level and type of education and TVET including pre-school, basic education, secondary education, higher education, lifelong learning, and TVET, are functionally and logically interconnected to each other and (ii) the integrated education and TVET system itself is also functionally linked to the economy. There has to be vertical and horizontal linkages among different levels and types of education and TVET and the national economy. In other words, with this integrated education and training system, upward and horizontal pathways of individuals should be guaranteed through the Ethiopian Qualifications Framework. When the government makes specific plans and policies (e.g. TVET programs at secondary schools, STEM programs at universities) within the framework of the one integrated design of the education and TVET system, the chances of duplications, conflicts, and/or blind spots among policies and targets will be substantially reduced.

5.1.2. Produce and Utilize Labor Supply and Demand Information

As a basis for making a national education and TVET development plan, the Ethiopian government needs to make manpower projections for strategic industries selected for national economic growth including six manufacturing industries, tourism, and the agro-processing industry in close collaboration with related ministries and industry.[98] Each of the sectoral ministries should review the existing projection data considering specific strategies and policy measures for labor supply, make new projections based on the latest national economic development plans, and discuss them with MoSHE, the MoE, and related ministries to identify gaps between labor supply and demand for the future. Although the

97 The Ethiopian government has been preparing a new education system that includes a TVET system with eight levels. For this, refer to section 3.1.1. When designing a new education and TVET system, the government needs to think about horizontal and vertical pathways among different types and levels of schools and TVET institutions and their close linkages to the national economy to improve the efficiency, effectiveness, and equity of the system.

98 For this, refer to section 2.3.

projections of labor supply and demand cannot provide accurate numbers of workers by skill level and type, they can be used as a reasonable base for setting up the directions of education and TVET development strategies and policies in terms of volume and the quality of learning.

5.1.3. Expanding the Education Base with Quality Improvement for TVET

In order to promote the structural transformation from agriculture to the manufacturing sector by implementing a series of GTPs successfully, it is integral to first secure a human capital base that is labor reservoir that can be effectively used to boost manufacturing sector development and promote human capital flow to continuously supply labor with higher qualifications as the national economy develops.[99] Currently, Ethiopia does not have enough primary and secondary school completers and thus TVET completers. To improve the TVET system's capacity in terms of both quantity and quality, it is necessary to expand primary and secondary education together with quality improvements. Without a sufficient number of primary school completers who can read, write, and do basic mathematics, there will not be enough secondary education completers and thus TVET students.[100] In this case, the problem of a quality labor shortage in Ethiopia will never be solved. Strategic directions presented in the next section assume that Ethiopia succeeds in securing its education base for expanding and improving the TVET system.

5.2. Strategic Directions

5.2.1. Strategies for Formal TVET

Adopt and strengthen TVET institution-based TVET: For this, it is necessary to expand the accommodation and practical training capacity of TVET institutions**.** In order to meet the urgent challenge of supplying as many skilled workers, technicians, and engineers as demanded for the development of industry including the manufacturing sector during the periods of the new 10-year economic development plan, it is necessary to increase the number of seats in each TVET institution and establish workshops for practical training with the installment of more training facilities and equipment as an alternative of the Cooperative Training Program.[101] Workshops can be established by major skill areas like mechanics and agro-processing and shared by several TVET institutions.

99 For this, refer to sections 2.6 and 4.1.

100 For this, refer to sections 3.2 and 3.3.

101 For this, refer to sections 3.3.3.3 and 3.4.1.

Expand and strengthen vocational education track for grades 11 and 12 in the new system: According to the manpower projection by the Ministry of Industry in 2015, labor demand for workers with level 2 qualifications was expected to increase very rapidly to 1,772,412 by 2025, indicating that it is necessary to substantially expand secondary schooling in the new education system.[102] Assuming that the advancement rate from grade 10 to 11 will increase rapidly[103] and the Ethiopian economy will grow enough to absorb secondary school graduates, the government needs to consider expanding the TVET track in grades 11 and 12.[104] The regular TVET track can guarantee the supply of a certain number of skilled workers to strategic industries in a consistent manner for a long period of time. To properly function as a supplier of skilled workers, the TVET track at grades 11 and 12 in the new system needs to have practical training opportunities via workshops and through internship programs utilizing school-industry collaboration[105] and close linkages with TVET colleges and polytechnics. It also would be better to provide basic courses for grade 9 and 10 students, in which they can learn the types of occupations and core competencies that will help students smoothly enter TVET track.

Revise existing OSs, develop new OSs if necessary, and improve national TVET curricula and learning materials: In order to improve the quality of TVET programs and reduce the quality disparity among TVET institutions and regions, it is urgent for the federal government (i.e. the FTA) to revise the existing OSs or develop new OSs if necessary to accurately reflect the real skills demanded by industry through close collaboration with experts and industry, because the quality and relevance of the OSs decide the effectiveness of TVET curricula development and application.[106] Based on the revised and new OSs, the FTA needs to revise or develop national TVET curricula and learning materials for key skills common to strategic industries together with industry. Based on the contents of new national TVET curricula and learning materials, the local governments can make informed decisions on which facilities and equipment to install and how many and what level of trainers qualified for the new curricula to recruit. TVET curricula should be well interconnected vertically by level and industry. For example, TVET curriculum for training production machine mechanics of level 2 in junior colleges needs to be well linked to that for mechanics of level 3 in TVET colleges.[107]

102 For this, refer to sections 3.1.2.1 and 3.2.2.

103 As of 2017/18, the proportion of grades 11 and 12 in secondary school students was 20.8% (554,018/2,666,741).

104 For this, refer to sections 3.1.2.1 and 4.2.1.

105 In the initial stage, the government needs to design and support school-industry collaboration.

106 For this, refer to sections 2.4., 3.1.2.2, and 3.3.3.

107 For this, refer to section 3.1.2.1.

Promote employers' active participation in TVET: It is reasonable to require employers to contribute to designing and implementing TVET curricula and programs (i.e. contents, methods, and assessment) because they are direct beneficiaries of TVET. To activate employers' participation in TVET, the government can enact laws and regulations that mandate that employers participate in TVET activities and provide financial incentives such as tax exemption and bonus points when applying for government projects.[108] Considering that the private sector is not interested in providing TVET or utilizing TVET as a key component of personnel management yet, the government may take a long-term step-by-step approach from inducing the private sector to TVET to gradually expanding the scope and further insuring substantiality.

Recruit and retain qualified TVET trainers: Recruiting and retaining qualified TVET trainers is a pre-requisite for improving the quality of TVET. It is integral to first redefine the roles and responsibilities of TVET trainers and the competencies required for TVET trainers by major and level, and develop pre-service trainer training programs that include practical training for getting real job experiences and providing sufficient in-service training opportunities to catch up to the most up-to-date skills and knowledge. For this, it is important to strengthen the capacity of the FTI and its satellite institutions. In addition, it is necessary to increase salaries and provide financial rewards according to the performance of TVET trainers.[109]

Guarantee equity in access and quality among regions: For the balanced development of the national economy, it is necessary to improve access to TVET and the quality of TVET in disadvantaged regions.[110] When making TVET expansion plan to provide equal TVET opportunities, the government should take into account the skills demanded by type and level in each region and decide what type and level of TVET institutions to establish in each woreda.

Guarantee horizontal and vertical permeability: As a way of overcoming people's reluctance to enter the TVET track due to its stigma and dead-end image, the government needs to make regular schools, including higher education and TVET systems, open to each other and also make it flexible for graduates to move between general education and TVET and the labor market.[111] In other words, by providing graduates and students with horizontal and vertical pathways from general education schools to TVET institutions or vice versa

108 For this, refer to sections 3.3.3.3 and 4.4.

109 For this, refer to section 3.3.3.4.

110 For this, refer to sections 3.2.2 and 3.3.3.5.

111 For this, refer to sections 3.1.2.4 and 4.3.

and also from general education schools and TVET institutions to the labor market or vice versa, the government can reduce the stigma and dead-end image of TVET and induce more competent students into the TVET track, which will contribute to increasing the enrolment of TVET students and enhancing the performance of the TVET system.[112] For promoting horizontal and vertical transfers, it is integral to provide systematic career guidance and job search services to students in both TVET and the academic track from secondary school.

5.2.2. Strategies for Non-Formal TVET

Institutionalize the national vocational training system for youths and adults not employed and incumbent workers: Formal TVET institutions (e.g. junior colleges, science/TVET-oriented HEIs) alone cannot supply as many skilled workers and technicians as demanded to successfully implement the national economic development plans like GTP II and the new 10-year economic development plan. It is necessary for the government to design and institutionalize the national non-formal training system to fully utilize the manpower available and provide the unemployed with valuable chances to pursue meaningful economic lives. In the early stage of national economic development in which the training market is not well formed yet, the government should take a leadership role and provide public vocational training programs like diverse short-term training courses through public TVET institutions. The government also needs to induce employers to provide in-plant training programs for new entrants and incumbent workers by mandating the provision of in-plant training and providing financial incentives like tax exemptions.[113]

Provide short-term training programs for manufacturing and commercial agriculture sector: It is urgent to provide skilled workers and technicians to the manufacturing and commercial agriculture sectors, which are strategic industries selected for the development of the Ethiopian economy. The focus of the national training system mentioned above should be on designing and providing short-term training programs. The short-term training programs need to be flexible in terms of developing curricula and learning materials, recruiting trainees, and deciding training periods according to the skills demanded.

112 For an example, refer to section 4.3.2.

113 For this, refer to section 4.2.2.

5.2.3. Strategies for TVET Governance[114]

Enhance policy coordination among federal government ministries and between federal and local governments: The primary objective of improving the TVET system in terms of quantity and quality is to supply as much quality labor as demanded at the right time especially to strategic industry sectors. This means that the Planning and Development Commission, Ministry of Industry, the Ministry of Agriculture, and other ministries related to the implementation of national economic development need to know the current capacity of the TVET system, while MoSHE, the MoE, and other ministries that have their own training programs also need to know how many workers are demanded by type and level of skills. It is critical to make national TVET plans systematically linked to the national economic development plan. For this, it is integral to establish an Inter-Ministerial Meeting on HRD that deals with overall national HRD strategies and policies including TVET to effectively respond to labor demand and institutionalize the coordination and collaboration of TVET-related policies among HRD-related ministries at the federal level and between MoSHE and local governments. The Council of Ministers can play a critical role in the government-level coordination of TVET policies.

Promote collaboration between the government (both federal and local governments) and the private sector: In order to make the TVET system effective, the government and TVET institutions need to have close working relationships with industry sectors. For this, it is necessary to first establish or strengthen the representative organizations of the strategic industry sectors (e.g., leather, textile, agro-processing, etc.) and let them play crucial roles in operating the TVET system, such as the analysis of the changes in skill demands, development and provision of training programs, design of occupational and qualification standards, and evaluation of people's occupational competencies. In addition, the governments need to introduce institutional mechanisms to promote constructive communication with these representative organizations. Representatives from industry sectors can participate in the inter-ministerial meetings as a member. To promote the systematic participation of the private sector, the government needs to provide financial and administrative support for forming representative organizations of key industry sectors, expanding these organizations to other areas, and strengthening their functions in a stepwise manner. The Federal TVET Council needs to be activated to carry on these functions.

Enhance the government officials' TVET capacity: In order for the government to take on a leadership role in making TVET relevant to industry demands and enhancing TVET

114 For this, refer to sections 3.5 and 4.5.

quality, it is integral to recruit experts and provide capacity-building programs on a regular basis together with systematic personnel management that guarantees TVET experts' careers as government officials.

Strengthen the TVET research and information system: In order to make TVET strategies and policies most suitable to industry demands, it is necessary to analyze the changes in skills and consequently TVET demands, develop new curricula and learning materials, and evaluate the training results in more scientific ways. For this, the Ethiopian government needs to strengthen the FTA and FTI's function of research. The government can also establish a national TVET research institute based on the identification of TVET research needs from the national economic development point of view.[115] In addition, it is necessary to establish and manage a comprehensive TVET information system that covers quantitative and qualitative data and information on TVET students and graduates, trainers, industry demands and participation, contents, and facilities and equipment.

Establish and strengthen a TVET quality assurance system: To improve and maintain the capacity of TVET institutions, it is necessary to establish and strengthen the TVET quality assurance system by which federal and regional governments assess the relevance and quality of TVET programs and provide guidance services for teaching, learning, and administration. The TVET quality assurance system is expected to play a critical role in realizing the very intention of the Ethiopian Qualification Framework.

5.2.4. Strategies for Finance[116]

Secure the government budget for TVET: It is integral for the government to secure the TVET budget by estimating the future budget demand for TVET based on the unit cost by level and type as well as labor demand projections by skill type and level. TVET development requires quite a large amount of budget investment due to the cost of facilities, equipment, and training materials. The government needs to prioritize TVET when allocating the government budget and make special efforts to secure a certain amount of budget necessary to expand the TVET system like introducing a special TVET tax and/or grant for TVET.

Institutionalize employers' contributions to TVET financing: The government can require employers' financial contributions for providing vocational training programs to incumbent workers, new entrants, and the unemployed because firms use the trained

115 For a detailed discussion on TVET-related research, refer to Chapter II.

116 For this, refer to section 3.6.

labor.[117] The Ethiopian government can introduce a levy collection system to form and operate the skill development fund that can be used for providing training in the formal sector first and expanding training to the informal sector. The levy should not be a substitute for the government budget to provide training.

Diversify funding sources: Due to government budget constraints, it is necessary to look for other funding sources. TVET institutions themselves can generate revenue by selling products that trainees make in the practical training classes and collecting training fees from trainees and firms. The governments can get financial support from international donors by applying for the funding projects designed to support TVET.

117 For the current status, refer to sections 3.2.2 and 4.2.2.

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02

CHAPTER

Organizational Capacity Diagnosis and Strategy Development of Holeta Polytechnic College in Ethiopia

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Keywords
TVET(Technical and Vocational Education and Training), ToT (Training of Teacher), Organizational Capacity Diagnosis, Gap Analysis, Agro-processing Sector

Organizational Capacity Diagnosis and Strategy Development of Holeta Polytechnic College in Ethiopia

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Summary

The target of this study, Holeta Polytechnic College, is an institution in charge of teacher education in the agricultural vocational education sector of Ethiopia. The College is facing a new challenge as it has recently started a teacher qualification program in the field of agro- processing. The agro-processing sector requires high-level skills compared to the skills required for traditional agriculture, and for this, it is essential for Holeta Polytechnic College to add adequate training facilities and equipment, curriculum, and teachers with industry-relevant skills. In this regard, Holeta Polytechnic College has an opportunity to improve its hardware and quality of training through EASTRIP projects. The EASTRIP project is a great opportunity for Holeta Polytechnic College, but it also demands accountability to maximize performance given such a large budget. In this context, the main objective of this study is to provide useful recommendations to improve quality of training offered at Holeta Polytechnic College based on the diagnosis of the current TVET delivery system.

Background analysis of the current status of Ethiopia's agro-processing industry shows that agro-processing has a large share in Ethiopia's manufacturing industry. Also, even in the group of SSSI, value-addition of the agro-processing sector for the GDP is higher than that of other sectors. However, despite the high emphasis on the agro-processing sector, there are several challenges including unskilled labor forces with limited experiences.

With regard to gap analysis on the Holeta Polytechnic College, five actions including "A4.1. Ensure stable funding from federal and state government"; "A6.1. Ensure adequate building, classroom, workshop room"; "A6.2. Ensure adequate and appropriate modern equipment"; "A5.2. Ensure availability of teachers with related industry experience"; "A6.3. Provide quality learning materials for both trainers and trainees" were selected as the top five priorities in terms of importance for future and the discrepancy between "as-is" and "to-be."

Generally, members of Holeta Polytechnic College consider "lack of budgets and appropriate facilities and equipment" as the core problem of quality training. It is expected that this issue can be solved through EASTRIP, but this study found that supervision by industry experts in the agro-processing filed is essential to optimize utilization of EASTRIP budget. Also, lack of qualified teachers with industry-relevant skills was identified. Especially, the teachers' lack of work experience has affected overall teaching quality. The third problem was related to providing sufficient learning materials for both trainers and trainees. Especially, given that C-level trainers have limited experience with developing learning materials based on occupational standards, it is hard to guarantee the quality of TTLM. Additionally, weak partnership between college and industry and lack of efficiency in governance of satellite programs were highlighted in the gap analysis.

Korea has experiences that are relevant to the problems of Holeta Polytechnic College, and these experiences can be utilized to provide meaningful policy: (i) it is a prerequisite to build a central body at the regional level to establish a link between schools and industry to extend the network; (ii) the government needs to provide sufficient short-term training for teachers to equip them with industry-relevant skills; (iii) it is crucial to develop standardized learning modules based on occupational standards; (iv) school based enterprises could be effective measures to generate income for financial sustainability.

The policy recommendations drawn from the gap analysis of Holeta Polytechnic College and Korea's experiences are as follows:

(1) Strengthening the TVET teacher training system: (i) improving practical skills of teachers through short-term training with industry; (ii) improving teachers' skills in development of curriculum and learning material through the initial and continuous training system.

(2) Strengthening mutual relationship between industry and college: (i) institutionalize industry-college cooperation to establish formal relationship; (ii) provide enough opportunities to convince industry of the capacities of colleges.

(3) Ensuring quality of learning material: (i) develop teaching-learning material at government level; (ii) provide sufficient learning material to trainees.

(4) Planning an exit program for the EASTRIP project including financial sustainability in terms of costs of equipment maintenance.

1. Introduction

1.1. Backgrounds of the Study

Over the past decade, Ethiopia has initiated efforts to strengthen the country's system for Technical and Vocational Education and Training (TVET). TVET reforms such as establishment of the Vocational Qualification Framework and occupational standards have been institutionalized. Another major area of Ethiopia's focus in the TVET sector is to increase quality of teachers and trainers. It is universally acknowledged that the quality of teachers and trainers highly influences the quality of Technical and Vocational Education and Training (TVET) institutes. In particular, in the school-based vocational education system, it is vital to ensure that teachers and trainers' skills are industry-relevant. The target of this study, Holeta Polytechnic College, is an institution in charge of teacher education in the agricultural vocational education sector of Ethiopia. Holeta Polytechnic College is facing a new challenge as it has recently started a teacher qualification program in the field of agro- processing. The agro-processing sector requires high-level skills compared to the skills required for traditional agriculture, and for this, it is essential that Holeta Polytechnic College acquires adequate training facilities and equipment, curriculum, and hires teachers with industry-relevant skills.

In this regard, Holeta Polytechnic College has an opportunity to improve its hardware and quality of training through EASTRIP projects conducted by the World Bank. The aim of EASTRIP projects is to increase and improve the quality of training programs in selected TVET flagship institutes. A total 16 TVET colleges in STEM fields have been selected based on government nomination and rating by independent technical experts. African countries including Ethiopia devote only 2 percent to 6 percent of education budgets to TVET, compared to 10 percent to 30 percent allotted to higher education. This has led to inadequate and inequitable financing mechanisms for TVET, which in turn undermine access and efficiency. Holeta Polytechnic College was selected as one of the TVET flagship institutes eligible for financing under the EASTRIP projects. To become a regional center of excellence, Holeta Polytechnic College plans to offer internationally recognized diploma and degree programs in the agro-processing field. The five-year budget for the Holeta Polytechnic College is $21,850,000, which is to be invested in the acquisition of modern training facilities and equipment.

The EASTRIP project is a great opportunity for Holeta Polytechnic College, but it also demands accountability to optimize performance given such a large budget. During the

project periods, Holeta Polytechnic College should prioritize budgets to address the issues related to quality of training. The approach might include overall strategy fostering a demand driven approach, ensuring quality of teachers and trainers, and strengthening industry relevance of the training program. Therefore, the successful restructuring of Holeta Polytechnic College is a precondition for the College to function as regional center of excellence. Also, this will directly influence and maximize the efficiency and effectiveness of investment.

1.2. Objective and Scope of the Study

The main objective of this study is to provide useful recommendations to improve the quality of training offered by Holeta Polytechnic College based on the diagnosis of the current TVET delivery system. Especially, this study mainly focuses on the agro-processing field of Holeta Polytechnic College. This is for the reason that the main objective of EASTRIP is to improve the college's capacity in terms of hardware such as class rooms, laboratories, workshops, administrative offices. The other area of emphasis is how the College can set their goals and strategies to use these modern facilities and equipment. Thus, this study will focus on the College's strategies and training delivery system to propose suggestions to improve the training program such that it meets the demands of the labor market.

Holeta Polytechnic College offers a number of training program including traditional agricultural production (crop production and animal production) and courses in the non-agricultural field (Hardware Networking, IT Services, Building Electrical Installation). However, the budget of the EASTRIP project is mainly focused on the agro-processing field, and hence traditional agricultural production and non-agricultural fields are out of this study's scope.

1.3. Main Contents of the Study

The aim of this paper is therefore to analyze the current status and issues of Holeta Polytechnic College and to provide hands-on recommendations for improvement of training quality. More specifically, this study performs gap-analysis based on diagnostic tools within the agro-processing field of Holeta Polytechnic College. Additionally, we explore the best practices of Korean agro-processing training institutes and propose benchmarks for the College.

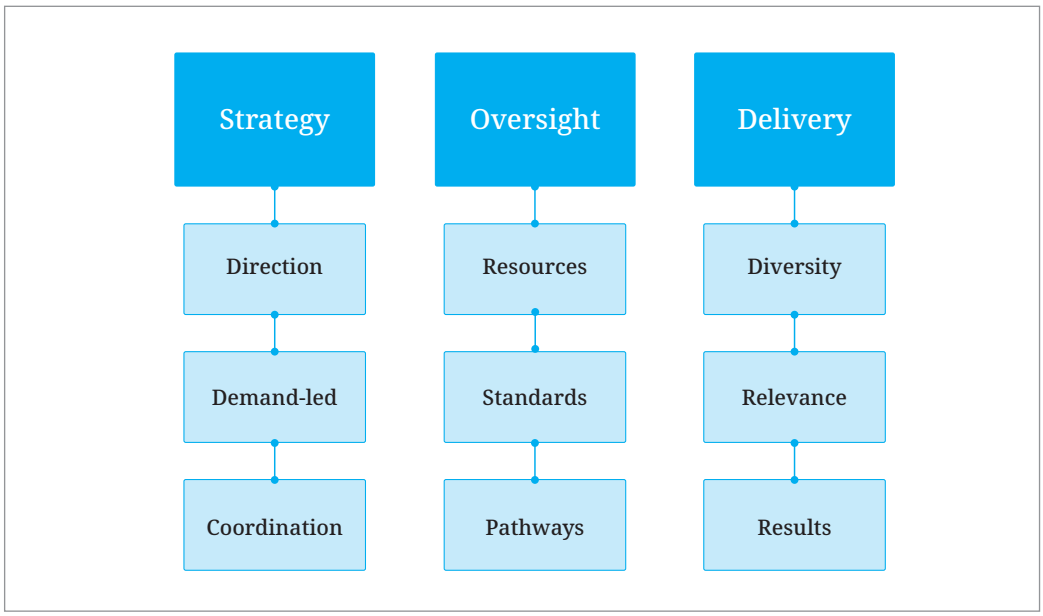
With this logic, the remainder of this article is structured as follows: Section 2 analyzes several backgrounds related to aim of this study. More specifically, current-status of agro-

processing industry and current status of Ethiopian TVET teacher training system are included. Section 3 analyzes organizational capacity diagnosis of Holeta Polytechnic College. Section 4 analyzes Korea's experiences matches with the major issues identified in Section 3 to find out success factors and benchmarks to tackling the current issues of Holeta Polytechnic College. Section 5 summarize conclusions and provide recommendations for policy and further implications.

1.4. Diagnostic Tools of the Study

To analyze current status of Holeta Polytechnic College and provide useful recommendation, this study designed a new TVET diagnostic tool. This new tool is based on existing VET analysis framework, which is part of the World Bank's initiative on Systems Approach for Better Education Results (SABER). The aim of SABER-WfD is to provide systematic documentation and assessment of the policy and institutional factors that influence the performance of education and training systems. The SABER – WfD tool encompasses initial, continuing and targeted vocational education and training that are offered through multiple channels, and focuses largely on programs at the secondary and post – secondary levels. [Figure 2-1] shows a total of nine policy goals, three under each dimension.

[Figure 2-1] Framework of SABER-WfD



However, this diagnostic tool is mainly focused on policy implications. Therefore, this study used a modified version of SABER-WfD to develop a new analytical framework

focused on a single TVET institution. More specifically, under the SABER-WfD's dimensions, nine goals are listed in <Table 2-1>.

<Table 2-1> Analytical Framework of the Study

SABER-WfD	Diagnostic Tools of This Study	
Dimension 1. Strategic Framework	Dimension 1. Strategic Framework	-
G1. Setting a strategic direction	G1. Setting a strategic direction	-
G2. Fostering a demand-driven approach	G2. Fostering a demand-driven approach	-
G3. Strengthening critical coordination	G3. Strengthening critical coordination	-
Dimension 2. System Oversight	Dimension 2. System Oversight	-
G4. Ensuring efficiency and equity in funding	G4. Ensuring efficiency and equity in funding	-
G5. Assuring relevant and reliable standards	G5. Assuring the quality of teaching and training profession	Modified
G6. Diversifying pathways for skills acquisition	-	Deleted
-	G6. Providing a strong learning environment (Learning material, equipment/facilities)	Added
Dimension 3. Service Delivery	Dimension 3. Service Delivery	
G7. Enabling diversity and excellence in provision of training	-	Deleted
G8. Fostering relevance of public training programs	G7. Fostering industry relevance of the training program	Modified
-	G8. Ensuring students are equipped enough skills	Added
G9. Enhancing evidence-based accountability for results	G9. Improving the transition from school to work	Modified

To conduct gap analysis, this study developed more detailed components of the diagnosis framework. The prerequisites of each goal are called "actions" (See Table 2-2). Based on this framework, data from administrators, trainers and students of Holeta Polytechnic College was collected and used in Section 3.

<Table 2-2> Sub-Components of the Diagnostic Tools

Goals	Actions
G1. Setting a Strategic Direction	A1.1. Establish clarity on the demand for skills and set a strategy based upon priorities
	A1.2. Evaluate strategy and implement control actions including performance measurements

<Table 2-2> Continued

Goals	Actions
G2. Fostering a Demand Driven Approach	A2.1. Establish a formal system for school-industry cooperation
	A2.2. Provide benefits for employers
G3. Strengthening Critical Coordination	A3.1. Communicate and cooperate with government ministries and agencies to achieve the institution's goals
G4. Ensuring Efficiency and Equity in Funding	A4.1. Ensure stable funding from federal and state governments
	A4.2. Improve the income generation program for financial sustainability
G5. Quality Assurance of the Teaching and Training Profession	A5.1. Provide appropriate further training for trainers
	A5.2. Ensure teachers are equipped with related industry experience
	A5.3. Balance pedagogical and technical skills of trainers
G6. Providing a Strong Learning Environment	A6.1. Ensure availability of adequately equipped buildings, classrooms, workshop rooms
	A6.2. Ensure availability of enough and appropriate modern equipment
	A6.3. Provide quality learning materials for both trainers and trainees
G7. Fostering Industry Relevance of the Training Program	A7.1. Integrate industry and expert input into the design and delivery of the training program
	A7.2. Update the training program in response to industry's needs
G8. Ensure Students are Equipped with Enough Skills	A8.1. Ensure students are equipped with technical skills
	A8.2. Ensure students are equipped with soft skills
G9. Improving School to Work Transition	A9.1. Facilitate sustained partnership between industry and school
	A9.2. Ensure quality of workplace learning
	A9.3. Provide career guidance services

2. Background Analysis

2.1. Current Status of Agro-processing Industry in Ethiopia

The Ethiopian economy with over a 100 million population is seeking to move forward from the agricultural mainstream sector to the industry sector. In such transformation, the abundant resources of the agricultural sector can be used as a springboard and feed for nurturing the industry sector. Anchoring onto this fact, the economy policy of Ethiopia, the GTP-II, emphasizes the industry sector including the agro-processing domain. Thus, rather than starting the industrialization endeavor out of the blue, the GTP II has prioritized and selected manufacturing industries that are labor intensive and use agricultural products as

inputs. Owing to the policy direction, the industry sector in Ethiopia is showing expansions in recent years. Accordingly, <Table 2-3> below presents data on the industry sector that exhibited an upward improvement of 20 % over the past five years, which is two to four folds better than the growth rates recorded by the agricultural and service sectors. Of the different sub-sectors embedded in the industry sector, the manufacturing sector is the second sub-sector with greatest growth rates next to the construction sub-sector.

<Table 2-3> Growth Rates of GDP by Economic Activity

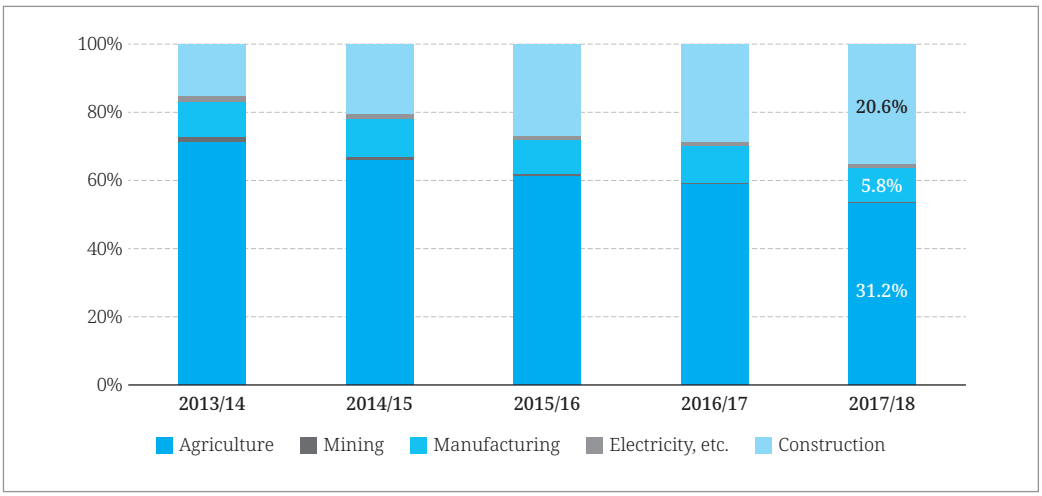
(Unit: Annual rate, %)

	2013/14	2014/15	2015/16	2016/17	2017/18	Average
Agriculture	5.4	6.4	3.7	6.7	3.5	5.1
Industry	19.7	24.6	23.1	20.3	12.2	20.0
Mining & Quarrying	-3.2	-25.6	-3.3	-29.8	-20.8	-16.5
Manufacturing	16.6	18.2	22.9	24.7	5.5	20.6
Electricity & Water	6.8	4.5	5.7	4.9	3.3	5.0
Construction	23.9	31.6	25.0	20.7	15.7	23.4
Services	12.3	10.2	12.0	7.5	8.8	10.3
All Sectors	10.3	10.5	10.7	10.2	7.8	10.1

Source: National Planning and Development Commission of Ethiopia.

However, the specific contribution the manufacturing sub-sector has been making to the GDP is rather limited. The graph below shows that the sub-sector accounted for only 5-6% of the overall GDP during the aforementioned periods. Thus, the manufacturing sub-sector's contribution to the GDP growth has been rather minimal.

[Figure 2-2] Composition of GDP by Economic Activity



Source: National Planning and Development Commission of Ethiopia, NPDC.

For official purposes, the manufacturing subsector in Ethiopia is classified into two groups. The first group is the Large and Medium Scale Manufacturing (LMSM), which includes establishments that employ a minimum of ten persons and use power-driven machineries. The second group is Small Scale and Cottage Industries, SSCI. For an industry to be stratified under this category, it should be an establishment that employs less than 10 persons and uses power-driven machineries and/or non -power driven machineries.

The aggregate number of both kinds of Ethiopian establishments engaged in manufacturing (as of 2017) was 146,595 of which 97.5% were categorized as the SSCI. The total number of manpower in manufacturing was about 2.5 million, with SSCI accounting for 86.7% of the total employment in the sub-sector. In terms of value-added, LMSM held the lion's share by accounting for 82.1% of the total manufacturing value-added.

<Table 2-4> Distribution of Manufacturing Sector by Type (2016/17)

	No. of	No. of Persons	Value Added (%)
LMSM	3,627	298,510	82.1%
SSCI	142,968	2,140,668	17.9%
Total	146,595	2,439,178	100.0%

Source: The Large and Medium Manufacturing Industry and Small Scale Manufacturing Surveys of the CSA data.

<Table 2-5> below portrays the distribution of large and medium scale manufacturing industries by regions and industrial groups. The total number of large and medium scale manufacturing industries reported in 2016/17 FY was 3,627. About 40% of the industries were positioned in Addis Ababa. The Oromiya region was the second most preferred vicinity for hosting the LMSM manufacturing industries and holds about 26% of the manufacturing establishments.

Most of the industries are placed under the sub-category of agro-processing. Thus, over 26% of the manufacturing industries are compartmented in the agro-processing sub-category. Nonmetallic mineral products with about 18% and the furniture industry with more than 11% come second and third. The same industrial composition is also observable in the Oromiya region. <Table 2-5> below shows that one third of the industries in the region have been operating in the agro processing sub-sector. The relative industry type for the region also shows that the agro-industry is the most available kind of industry in the region.

<Table 2-5> Number of LMSM in Ethiopia by Sub-Sector and Region

Manufacturing sub-sector	Tigray	Amhara	Oromia	SNNP	AA	Other Regions	Total	%
Agro-processing	63	151	303	97	259	76	949	26.6
Textiles/Apparel	4	20	42	3	315	8	392	10.81
Non-metallic	99	119	179	76	132	44	649	17.89
Metal	24	30	42	13	98	16	223	6.15
Iron/Steel	18	1	12	0	47	3	81	2.3
Chemicals	8	4	63	1	70	2	148	4.08
Leather	7	7	22	0	122	1	159	4.38
Other Manufacturing	32	157	279	107	387	64	1,026	28.29
Total	255	489	942	297	1,430	214	3,627	100
%	7.03	13.48	25.97	8.19	39.43	5.90	100	-

Source: CSA.

In terms of employment, agro-processing remains the largest sector for employment in the LMSM sector, followed by textiles/apparel (17.4%) and non-metallic production (12.1%). However, the relative employment share of the agro-processing industry declined by 18.2 points from 39.5% of the total employment share it had in 2010/11. Different researches show automation and relative expansion of the other industry types have been crowding out manpower from the agro-processing sector. Oromiya Similar employment pattern is also observable for the Oromiya region.

<Table 2-6> Distribution of Employment by Manufacturing Sub-Sector

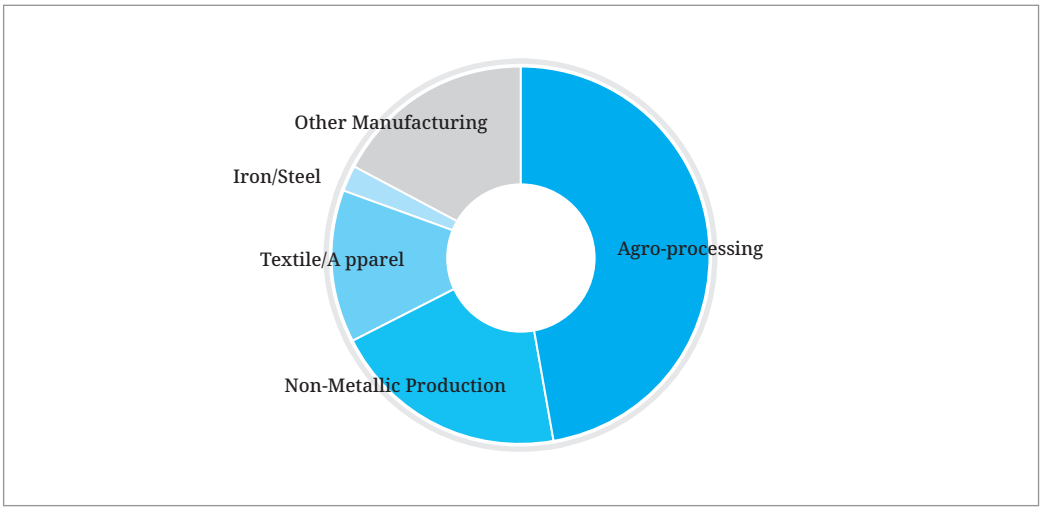
(Unit: %)

Sub-sector	2010/11	2016/17
Agro-processing	39.5	21.3
Textiles/Apparel	11.1	17.4
Non-Metallic Production	9.9	12.1
Metal	3.5	4.3
Iron/Steel	3.5	2.2
Chemicals	5.6	5.8
Leather	8.1	4.8
Machinery/Equipment	1.3	3.2
Other Manufacturing	18.2	29.0

Source: CSA.

[Figure 2-3] below shows the share of value added across sub-sectors within LMSM. As of 2016/17, agro-processing accounted for almost 47% of the total value added in manufacturing. The second largest sector was non-metallic production (16% of total value added), followed by textile/apparel (10.6%) and iron/steel production (4.6%). In general, all the indicators discussed show that agro-processing is the most dominant kind of LMSM in Ethiopia.

[Figure 2-3] Value Added by Sub-Sector 2016/17



Source: Computed based on the CSA data.

When we delve into the SSCI, in the last two decades the Ethiopian industry trajectory has placed a great emphasis on the SSCI due it is overarching effects on transformation of employment and industry. Accordingly, the CSA data indicated there were 142,968 small-scale manufacturing establishments in the country in the fiscal year of 2016/17. Out of this total number, the largest portion, at 36.84%, was comprised of grain mills. Manufacturing of furniture and fabricated metal establishments were in second and third positions, at 26.7% and 13.27% respectively. The agro-processing/food production category stood fourth with 11.2% share.

In the same year, the SSCI establishments served as source of employment for 2.1 million people. Here also, grain mill services employed the most at 32.4 %, followed by furniture and fabricated metal manufacturers. According to the National Bank's Annual Macro Report, the Oromiya Regional state had 31% share of the SSCI and 40.5% employment during the same fiscal year. These parameters show that the region is placed on the very top of other regions. In terms of Gross Value of Production (GVP), the biggest piece of the pie was occupied by manufacturers of food products that contributed 23.7 billion, which is 36.7 % of

the total GVP. Manufacturers of furniture accounted for 14.3 billion birr, which is ahead of manufacturers of grain mill services that had GVP of 8.57 billion. Another most important indicator to look for is the contribution of the small-scale industries to the GDP. According to the rough calculation that was made by this study, the share of SSSI in the GDP was around 1.3%. Here also it is worth noting that the value add of the food-sector for the GDP is higher as compared to other kinds of SSCIs.

<Table 2-7> Distribution of Number of Establishments, Number of Persons Engaged, Gross Value of Production, and Value Added by Industrial Group (2016/2017)

Industrial Group	No. of Establishments		No. of Persons Engaged		Gross Value of Production		Value Added	
	Number	%	Number	%	Value(Birr)	%	Value(Birr)	%
Agro-processing except grain mill services	17,061	11.9	267,209	12.5	15,146,628,745	33.7	9,302,570,006	41.2
Grain mill services	41,975	29.4	538,198	25.1	6,152,844,856	13.7	3,299,831,559	14.6
Textiles	1,414	0.99	24,657	1.15	171,010,806	0.38	100,757,709	0.45
Apparel	25,100	17.6	364,892	17.1	2,745,861,980	6.12	1,383,814,056	6.13
Leather products	483	0.34	8,092	0.38	345,534,147	0.77	191,104,289	0.85
Wood and products of wood and cork except furniture	1,401	0.98	25,990	1.21	835,745,198	1.86	276,438,151	1.22
Publishing/ Printing	254	0.18	4,554	0.21	226,124,971	0.5	79,542,852	0.35
Chemicals and chemical products	1,029	0.72	18,401	0.86	996,873,313	2.22	393,174,171	1.74
Non-metallic	3,680	2.57	72,516	3.39	2,357,168,036	5.25	863,582,531	3.82
Metal	15,349	10.7	237,989	11.1	5,112,389,626	11.4	1,819,962,307	8.06
Machinery and equipment	1,100	0.77	20,431	0.95	480,772,452	1.07	173,030,082	0.77
Furniture	34,122	23.9	557,740	26.1	10,324,294,062	23	4,694,690,147	20.8
Total	142,968	100	2,140,668	100	44,895,248,193	100	22,578,497,860	100

Source: CSA.

Based on the contribution made by the external sectors, the policy direction for the industry sector in general and the manufacturing sector in particular is shaped with a dual concept, i.e., export promotion and import substitution. However, Ethiopia's exports have been more of primary products than value added products and manufacturing goods.

<Table 2-8> Share of Different Goods in the Ethiopia's Export

(Unit: %)

	2000/01	2005/06	2010/11	2015/16	2017/18
Primary Products					
Coffee	45.0	35.4	30.6	25.2	29.5
Oilseeds	8.0	21.1	11.9	16.6	14.9
Gold	7.0	6.5	16.8	10.1	3.5
Chat	15.1	8.9	8.7	9.2	9.3
Pulses	2.2	3.7	5.0	8.1	9.5
Flower	0.0	2.2	6.4	7.9	8.0
Live animals	0.0	2.8	5.4	5.2	2.2
Fruits & vegetables	1.4	1.3	1.1	1.9	2.2
Total primary goods	86.7	81.9	85.9	84.2	79.1
Manufactured Products					
Leather and leather products	18.8	7.5	3.8	4.0	4.7
Meat products	0.4	1.9	2.3	3.4	3.6
Textile and textile products	0.0	1.1	2.2	2.7	3.7
Total manufactured goods	21.3	18.1	14.1	15.8	20.9

Source: National Bank of Ethiopia, NBE.

Looking at exports of manufactured products, textiles and garments, chemicals and pharmaceuticals had shown a marginally better growth. On the other hand, leather and leather products, meat and milk had relatively lower growths. The slightly better growth of the textiles and garments sector can be attributed to major investments that took place in the sector. However, the principal reason why the agro, leather and meat sectors fared less well (they are in many ways connected to each other) is that there are greater supply side challenges in the sector. Most value chains in the sector are smallholder-driven, geographically dispersed and completely fragmented (UNIDO, 2016/17).

The other notable feature of the industry sector in Ethiopia that is worth note is the establishment of industrial zones and integrated agro-industrial parks. The approach can transform the Ethiopian agricultural production from being fragmented and supply-driven to becoming organized and quality oriented. Thus, the approach may have a positive agglomeration consequence on the manufacturing sector. Though the government policy has placed high emphasis on the manufacturing sector, its growth is hampered by several challenges. The major ones include unskilled labor forces with limited experience; limited

infrastructure; external pressure from the global market; shallow industrial research and development activities; underdeveloped market information system; and problems related to trade logistics (Tekeba Eshetie, 2018). These problems are common across all types of manufacturing businesses. Thus, working toward development of human capital and improvement of other impediments would have a far-reaching positive effect on strengthening the manufacturing sector in Ethiopia.

2.2. Challenges of Ethiopian TVET Techer Trainer System

2.2.1. Overview of the TVET Teacher Trainer System

Ethiopia has embarked on a mission of streamlining access to the TVET program. The system is designed to play a crucial role in up-skilling most of the country's workforces to achieve greater productivity and competitiveness. However, the programs by-and-large do not address the economy's actual competence needs with most programs being of low quality and theory-driven, because of resource constraints and lack of skilled TVET teachers. Hence, the shortage of a sufficient corps of TVET teachers/instructors represents one of the obstacles to TVET development in Ethiopia.

Acknowledging the importance of having highly competent and qualified teachers and the current state of insufficient corps, Ethiopia's TVET sector development strategy aims to create a corps of TVET teachers/instructors capable of preparing skilled trainees. The direction of getting qualified TVET corps is designed through systematic trainings and further trainings.

In the current configuration, two actors, viz. TVET Trainers and Industry Trainers, are operating as trainers/instructors in the TVET scheme of Ethiopia. By a broad definition, a TVET Trainer is defined as an instructor, developer, facilitator or supervisor who is qualified to facilitate the activities and programs of a particular occupation with a minimum qualification certification level of C. Besides teaching, facilitation and supervision, the TVET Trainers would be expected to deliver industry extension services. On the other hand, an Industry Trainer is an industry practitioner who usually joins a TVET institution on a part time basis to teach and share his/her immense practical experiences. The Industry Trainer has high involvement in assisting cooperative trainings. To join the TVET as an Industry Trainer, the industry practitioner must pass through National Competence (NC) tests. Although the TVET has two broad teacher staff categories, the overwhelming majority of the teachers fall under the category of the TVET Trainers. The subsequent paragraphs take a brief look at the scope of the TVTE Trainer's work.

In Ethiopia there are five levels of TVET Education, i.e., Levels I, II, III, IV and V. For each of these levels different categories of teachers are required. Hence, there are three categories of TVET Trainers, namely, A-level, B-level and C-level teachers. Levels I up to III are to be taught by at least C-Level teachers. C-level teachers must graduate from TVET institutions with at least level three completed, and they must additionally undertake C-level Training Methodology (TMC). Level-IV is anticipated to be delivered by B-level trainers who should have a bachelor degree and be assessed as competent to train at level four. Additionally, they must also complete a course in the B-level Training Methodology (TMB). On the other hand, level-V trainees are expected to be taught by A-Level trainers. A-level trainers must have master's degree, be assessed as competent to train at level five, and complete training in A-level Training Methodology.

<Table 2-9> TVET Teachers and Type of Qualification Required

TVET-Level	Minimum Trainer's Profile	Descriptions/Requirements
Level- I	C-level trainer	* Has graduated from a TVET institute at a level above three * Has been assessed as competent to train at the levels Level- II * Has undertaken C-level training methodology
Level- II		
Level-III		
Level-IV	B-level trainer	* Has a bachelor degree * Assessed as competent to train at Level-IV * Has undertaken B-level training methodology
Level- V	A-level trainer	* Has a master's degree * Has been assessed as competent to train at Level- V * Has undertaken A-level training methodology

Source: Professionalization of VET Teachers in Ethiopia: The Current Practices, the Challenges and the Way Forward, 2017.

To recruit competent candidates to the profession, four potential sources are usually considered:

1. Recruiting from candidates who completed higher level TVET training; trainers for C-level institutions are recruited from these kinds of entities.

2. Upgrading trainers to the next level; this is usually applied in the light of the five years' pathway. It is used for updating and upgrading C-level to B-level and B-level to A-level. The upgrading takes place in the TVET trainer Institutes/satellite polytechnics as well as in higher education centers.

3. Direct recruitment from market; when the upgrading strategy fails to meet the demand for trainers, direct recruitment from the market takes place. This is mostly done for B-level and A-level trainers.

4. Recruiting from industries; industry based trainers who provide cooperative training and can also serve as assessors are recruited from industries.

2.2.2. Intra-TVET Teacher Training System

To recruit these categories of TVET professionals the TVTE sector uses TVET related entities (intra-teaching system) and the general higher education facilities existing in the country. Within the intra-TVET teachers training system, the establishment of the Technical and Vocational Education and Training Institute (TVETI) in 2011 has been a break though achievement. Before the establishment of TVETI there had been no tailor made institutions that train TVET teachers and leaders on graduate and post graduate programs based on the occupational standards and the outcome based system. Currently, the institution is providing 14 courses at BA level and 10 courses at the Masters level. We also learnt that none of these courses are directly related with agro-processing. The second kind of Intra TVET-teacher training spot is a satellite – institution. It consists of selected TVET polytechnics that are used to train TVET Trainers at B-Level and provide teaching methodology courses for all kinds of TVET teachers. <Table 2-10> below shows that there are 14 satellite schools around the country and most of the courses they are rendering are unrelated to agro processing.

<Table 2-10> Number of Satellite Polytechnics by Region

Regions	Numbers of Satellite Colleges	Field of Study
Addis Ababa	2	Non-Agro Industry
Oromiya	4	Agro-Industry and Non-Agro Industry
Amhara	2	Non-Agro Industry
SNNP	2	Non-Agro Industry
Tigray	2	Non-Agro Industry and Agro Industry
Diredawa	2	Non-Agro Industry
Total	14	Non-Agro Industry

Source: Federal TVET Agency.

TVET schools are also main actors in providing C-level teachers. However, since it requires a C-level teacher to obtain training in teaching methodology, the TVET schools should have lead trainers well-versed in trainee pedagogy, to provide a full qualified Level C Trainer. If they don't have the lead trainers they could send the C-level candidate trainers to clusters and satellite TVET institutions to help them get trainings in the teaching methodologies known as TMC. All higher educational institutions serve as non-TVET/ external sources for producing TVET teachers. Higher education graduates are free to join

the TVET-teaching profession after they take tailor-made preparatory, TM and bridging courses. This is a major source to obtain TVET teachers at degree/master levels. In sum, the trainers are recruited from FTI, satellite colleges, industries, TVETI/institutions and/or colleges, and higher learning institutions.

Based on the data from the MoE (Now it is renamed as the Ministry of Science and Higher Education, MoSHE), there were 26,976 trainers in year 2016/17. The number of teachers declines when we go from C to A level. According to MoE, the teacher-student ratio is neck to neck with the planned ratio. However, there is high scarcity of B and A level trainers. In addition, females were meagerly represented as trainers; they comprise only 21.6 % of the total number of trainers.

<Table 2-11> Trainers by Rank, Region, and Sex, 2009 E.C. (2016/17)

Regions	No. of Institutions	No. of Trainers by Level or Rank					
		A		B		C	
		M	F	M	F	M	F
Tigray	22	510	95	1,017	156	1,541	513
Afar	6			40	5	134	23
Amhara	92	175	79	2,344	527	4,799	1,156
Oromiya	253	209	33	1,100	175	4,643	1,275
Somali	11			58	9	190	44
Benishangul-Gumuz	11	7	3	80	19	255	87
SNNP	74	100	61	376	159	1,178	709
Gambella	8			18	2	58	10
Harari	9	68	6	306	62	56	14
Addis Ababa	90	117	65	616	207	791	291
Dire Dawa	6	23	8	149	14	195	15
Total	582	1,209	350	6,104	1,336	13,840	4,137

Source: Annual Education Abstract, 2017.

In general, the government policy places exceptional emphasis on recruiting TVET teachers. The first indicator for this is seen in creating a clearly defined profile for TVET teachers of different levels. The second is the use of a rigorous procedure for filtering outstanding TVET teachers into the system. Thirdly, the country is using a pre-service training for new staffs that enter the system as teachers. In addition, in-service training is provided for teachers based on gap analysis and occupational standards and this has been

done since 2010. Thus, professional development has been provided on continual basis in response to the dynamic nature of the needs and demands of the labor market (Adula Bekele Hunde and Giuseppe Tacconi, 2017).

However, the sector still finds it difficult to get an adequate number of TVET teachers both in quality and quantity. Even the previous analysis demonstrates that TVET teachers were not utilizing relevant pedagogies in their teaching despite all these endeavors. Lack of competent candidates for TVET trainers, particularly B-level trainers; high shortage of industry-based trainers; unavailability of universities and institutes that provide an adequate number of A-level and B-level trainers; and weak relation between universities and TVET institutes (right now their relation is limited to absorbing trainees for apprenticeship) are among the lists of problems observed in the sector(ibid).

Finally, existing TVET teachers/instructors (mostly) have inappropriate practical skills, i.e. they are not competent to provide TVET in accordance with the occupational standards. This is a result of a training system that long emphasized theoretical knowledge (though often not aligned with modern technology requirements), disregarding the importance of practical skills and appreciation of the world of work (TVET strategy, 2008).

3. Capacity Diagnosis of Holeta Polytechnic College

3.1. Basic Review of Holeta Polytechnic College

3.1.1. Program and Enrollment

Holeta Polytechnic College established in 1975 in Oromiya Regional State is one of the oldest government-owned colleges. Its location is about 30km from the capital city and on the way to Ambo. Because of its historical significance, the College has produced significant numbers of middle and lower level agricultural practitioners who are now providing technical support and services to the farmers on the countryside. The College was first established in 1975 as Holeta Agricultural Training Center to provide training through short term courses (3 to 6 months). From 1977 to 1993 the College used to be a spot to train Development Agents (DAs) on 9 month courses. Starting from 1994 till 2001 it had been in service to train members of women's associations, short term service providers and rural road construction technicians. The College continued providing trainings for the Das in the same period. It was also in this period that the institution started cooperating with the TVTE camp by means of providing 10+3 training for the DAs.

Based on the augmented experiences the College had in providing various kinds of trainings it was chosen as an outcome based TVTE training providing institution in 2010. From this landmark year on the College has been providing various TVET and BSc courses mainly related with the agriculture. Accordingly, in its effort to produce human capital for the agricultural sector, the College has produced 21,425 graduates at the diploma level and I-IV level since its establishment. It has also rendered short-term trainings for over 9,200 trainees.[1]

The forty-five year old institution was promoted into a polytechnic a year ago in 2019. The college was also on the spotlight as a center of excellence, and accordingly it was picked as one of the satellite TVET colleges by FTI in 2017, although it is the smallest satellite college in the country. The current deliverables of the college are not confined only to TVET-level courses, but it is providing BScs in agricultural and agro-processing programs. Additionally, the College is in the services of providing technical supports for framers and micro and small scale enterprises. Moreover, the College serves as the center for examining CoCs.

The main activities of the Holeta Polytechnic College are: (1) Training of trainees from levels I to IV in a variety of agricultural and non-agricultural fields, based on EOS and labor market demand; (2) Providing short-term training and advisory services to SMEs and farmers on various agricultural and non-agricultural occupations; (3) Generating income for the college by managing the college farm and renting its facilities; (4) Implementing cooperative training with relevant industries, companies, SMEs, government organizations and unions; (5) Selecting, testing and disseminating appropriate technologies to the end users.

The training programs of the College include Crop Production, Animal Production, Animal Health and Natural Resources from level I to IV as well as courses in agro-sector at BSc level. In addition, the College provides courses in the Industrial Development sector at Levels I to II, and in the Economic Infrastructure sector, at levels I to IV. Regarding the BSc programs, three courses in agricultural production technology (plant, animal) and two courses in agro-processing technology (dairy, fruit& vegetable, meat) are being provided since 2017/2018. Initially it started with 107 trainees, but is the numbers are expected to increase to 530 trainees by 2022/2023 (See Table 2-12).

1 The numbers are extracted from the Center of Excellence in Agro-Processing (CEAP) Holeta Polytechnic College Ethiopia,:EAS-TRIP,2019.

<Table 2-12> Trainee Enrollment by Training Occupation

no	Occupation	Level	2014 /15	2015 /16	2016 /17	2017 /18	2018 /19	Targets		
								20 /21	21 /22	22 /23
1	Plant Production Technology	BSc	0	0	0	27	26	61	90	100
2	Animal Production Technology	BSc	0	0	0	30	60	90	100	110
3	Dairy Processing Technology	BSc	0	0	0	27	26	56	86	110
4	Fruit & Vegetable Processing Technology	BSc	0	0	0	23	47	77	97	110
5	Meat Processing Technology	BSc	0	0	0	0	24	54	84	100
Sum			0	0	0	107	183	338	457	530
6	Crop Production & Marketing Mgt.	IV	216	267	195	159	87			
7	Animal Production & Marketing Mgt.	IV	66	81	160	161	56			
8	Natural Resource Conservation	IV	156	196	150	320	113			
9	General Animal Health Care	II	68	67	58	59	532			
10	Advanced Animal Health Service	IV	124	145	70	164	125			
11	Horticulture Crops Production	II	0	26	81	29	0			
12	Field Crops Production	II	109	91	52	0	4			
13	Intermediate Animal Production	II	32	31	37	51	4			
14	Forest Development & Utilization	II	0	30	52	58	0			
15	Hardware Networking Service(HNS)	IV	89	94	28	68	69			
16	IT Support Service	II	96	81	33	40	9			
17	General Metal Fabrication & Assembly (GMFA)	II	28	36	34	31	9			
18	Building Electrical Installation (BEI)	II	0	64	52	36	0			
19	Building Construction	II	59	0	36	32	8			
Sum			1,043	1,209	1,038	1,208	1,016			

Source: EASTRIP(2019).

3.1.1.1. Trainee Recruitment

For the satellite program, trainee recruitment is conducted by the TVET Agency and TVET Institute by requesting TVET Colleges in the country to send their academic staff/trainers to the TVET Institute. Next, the TVET Institute administers an entrance exam and sends those who passed the entrance exam to Holeta Polytechnic College. Current trainees of the BSc program in Holeta Polytechnic College are C-level trainers, so the aim of the program is to upgrade the skills of C-level trainers to B-level. Currently, most of the trainers in Ethiopia still remain at C-level, and only 7,000 trainers achieved B-level qualification. Since C-level trainers have a lack of work experience, the Ethiopian government has introduced efforts to upgrade every C-level trainer to B-level trainer by 2022.

For the BSc program of Holeta Polytechnic College, the enrolled trainees are all TVET trainers and earn a monthly salary. Also, all trainees have an Agriculture background at level based training, as shown in <Table 2-13>. Regarding the drop-out rate of trainees, it seems to be relatively stable in the case of Holeta Polytechnic College. The College's close proximity to Addis Ababba could have affected this situation. Based on a general interview with the college's administrator, since the wage levels of the trainers are not high and the work burden is considerable, there are many cases of trainers moving into the private sector.

<Table 2-13> Trainee Profile of the BSc Program Offered by Holeta Polytechnic College

Program	Female Ratio	Level/		Background	Training Experience			
		IV	Diploma		Below 2yrs	3-5yrs	6yrs-	n/a
Dairy Processing	14.3%	75.0%	25.0%	Animal Related: 100%	-	35.7%	39.3%	25.0%
Fruit and Veg. Processing	7.4%	100%	0%	Natural Resource Management: 14.8% Crop and Plan Related: 85.2%	22.2%	63.6%	-	25.9%
Meat Processing	12.5%	100%	0%	Animal Related: 100%	-	-	-	100.0%

Source: EASTRIP(2019).

3.1.1.2. Curriculum and Assessment of the BSc Program

Unlike training programs from level 1 to level 4, which are developed by the TVET institution based on OS, BSc programs are developed by FTI (Federal Technical and Vocational Education and Training Institute). In this process, the College directly communicates with FTI unlike the procedure followed for level based training programs. Also, the basic principle of curriculum development for BSc is 50: 50 (theory: practice),

making the course rather focused on theory than the level based program. Further, 50% of practice can be done both in workshops and industry. Current trainees of the BSc program are C-level trainers, so the aim of the program is to upgrade skills of C-level trainers to B-level. During the 3 or 4 years of BSc, the training institution from which the trainers are selected pays for their salary. Therefore, after BSc they have an obligation to go back to the training institution and stay for an equivalent period of three to four years.

<Table 2-14> shows the structure of the BSc curriculum of Holeta Polytechnic College. It only shows by way of example the curriculum followed by the dairy processing department, but other programs are also very similar to this. The BSc program consists of a total of six semesters, and in each semester, 18 to 21 credits are required. At this time, for practical sessions, 1 credit refers to 2 or 3 hours per week, during 14 weeks per semester.

The overall curriculum consists of common subjects and major subjects, and the common subjects include liberal arts and pedagogy related subjects. In the first grade, the proportion of liberal arts subjects account for about 33.3%, and in the next grade, the subjects related to pedagogy increase to 47.4%. Most major subjects are part of the third grade.

<Table 2-14> Curriculum Structure of the BSc Program (Dairy Processing)

Program		1		2		3		Total
		1st	2nd	1st	2nd	1st	2nd	
Common	Liberal Arts & Fundamental Sciences	6 (33.3%)	6 (33.3%)	3 (15.8%)	-	3 (14.3%)	3 (14.3%)	21 (18.1%)
	TVET Pedagogy and Related	3 (16.7%)	3 (16.7%)	3 (15.8%)	9 (47.4%)	-	-	18 (15.5%)
Major Related		9 (50.0%)	9 (50.0%)	13 (68.4%)	10 (52.6%)	18 (85.7%)	18 (85.7%)	77 (66.4%)
Total		18	18	19	19	21	21	116

Source: EASTRIP(2019).

This begs the question how the college could ensure that the BSc students are equipped with appropriate skills? Unlike the level-based training program, the BSc program does not have an official exit exam. The level-based program adopted the CoC system to identify trainees' ability, but the BSc program lacks an appropriate evaluation system. Currently, the accountability of evaluation rests with each professor or lecturer. Also, there is the problem of lack of CoC in their major for students enrolled in the BSc program. Since the agro-processing field is very new in Ethiopia, every C-level trainer only has Level 4 training in traditional agricultural production. So after the BSc program, they have to prepare CoC based on their self-study because B-level trainers are required to have at least Level 4 qualification in the selected major.

3.1.1.3. Teaching Staffs of the BSc Program

Currently there are 92 academic and 61 administrative staffs to serve the capacity intake of over 1,000 trainees per year, as shown in <Table 2-15>. Since the number of students per teacher is over 100, it is expected that the teachers' burden of teaching and related duties will be considerably high. In terms of academic qualifications, 39.1% have master's degree, 39.1% have bachelor degree qualifications and the remaining 16% have level IV (higher diploma) qualifications.

With respect to the lecturers of the BSc program, all of the current lecturer staffs belong to FTI. FTI is responsible for the recruitment, providing salaries and other activities related to lecturers. Currently, there are 13 lecturers for the satellite program, and 8 are specialists in agro-processing field and 5 are from other fields. Also 14 part-time lecturers were hired in the College.

Another consideration is how the lecturers upgrade their practical skills. Based on interviews with lecturers and administrator of the College, lecturers in the satellite program are all master degree holders, but do not possess enough practical skills. For example, agro-processing, food science or theoretical subjects can be taught by current lecturers but they face difficulties in dealing with specific practical training subjects. According to interview with FTI, only a few trainers have opportunities to join an upskilling program, so more short-term practical training programs should be provided at national or regional level.

<Table 2-15> Teaching Staffs by Type of Qualification

Type of Qualification	Number of Teachers	%
MSc/MA	36	39.1%
BSC/BA	36	39.1%
PhD/DVD/DVM	4	4.3%
Level-IV	16	17.4%
Total	92	100.0%

Source: EASTRIP(2019).

3.1.1.4. Future Planning under the EASRIP

The overall objectives of EASTRIP are to deliver quality outcome-based training to supply competent, motivated and innovative middle and low-level workforce with the necessary technological skills to ensure the realization of an agriculture-led industrial economy of

Ethiopia. To attain this objective, the EASTRIP addresses the following key components: Strengthening governance and management of the Centre; Institutionalizing industry linkages; Developing market-relevant and competency-based training programs; Training of school managers and teachers; Upgrading key training facilities and equipment; Outreach and support for TVET institutions that are not covered under the project; and Provide in-service-teachers, farmers, and youth with training.

Along with the above descriptions, Holeta Polytechnic College is planning to develop a new training program under EASTIP. In line with this, CEAP programs will focus on producing technicians (level I-IV) for the agro-processing sector. To ensure that the Center has an adequate number of teachers for the technical courses, the current Bachelor of Science degree in Dairy, and Fruit and Vegetable Processing for TVET teachers will be reviewed and revised. The college shall employ the teachers that graduated from the above programs and the rest by other TVET institutions in Ethiopia.

In addition to the review of the above mentioned program the center will acquire, adopt and offer Internationally Accredited Food Safety and Management System certification and Trainer Courses targeting Industry Practitioners. The aim will be to equip industry practitioners with the skills required to respond to complex challenges in today's food supply chain. All of the world's largest food retailers are demanding food safety certification schemes such as Hazard Analysis and Critical Control Point (HACCP), British Retail Consortium (BRC), GLOBALG.A.P. Good Manufacturing Practices (GMP), ISO 22000:2018-Food safety management systems among others. Therefore, the center will seek to train lead trainers and food safety auditors. It will offer training to upgrade food safety certification and management system skills of practitioners currently working in the agro-processing sector. Skilled human resources are crucial for the implementation of the SIP. To ensure that the CEAP continues with Holeta Polytechnic College tradition of producing technicians, the following new Level I-IV and short-term programs will be developed and introduced in year 3 : Dairy processing and Fruit and vegetable processing.

Holeta Polytechnic College also expects that when the Center of Excellence is in operation and being recognized, the demand for skilled agro-processing technologists becomes bigger. Therefore, the center will consider in the planning the upgrade of the training facilities and adding some new courses such as degree program or level 1 to 4 programs including Meat processing and Honey and Beeswax processing.

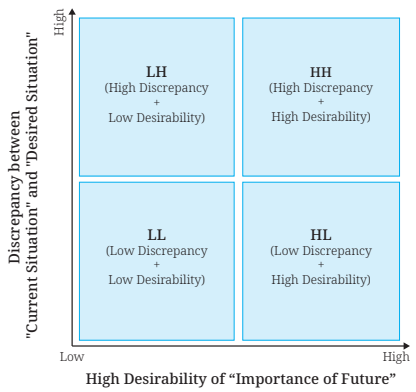
3.2. Results of Gap Analysis

To analyze the gap between 'as-is' and 'to-be' of Holeta Polytechnic College, this study designed new TVET diagnostic tools. As mentioned in Section 1 above, this tool consists of 9 goals and 20 actions. The key assumption of the gap analysis of this study is that internal members know the organization's problems and challenges better than anyone else. The second assumption is that all problems cannot be solved at the same time, so priorities should be set based on the importance and urgency of problems. In line with this, participants in the gap analysis included six administrators, six trainers and six students from the Department of agro-processing. For data collection, every participant was asked to fill out the gap analysis tool kit that included scoring of discrepancy level and importance of each 20 actions. The term "Discrepancy" in this context refers to the gap between "current situation" and "importance for future" and "Importance" refers to the desired level of importance to be accorded in the future. All questions were to be answered on a 5-point Likert Scale. Not only the scores of each component, but quantitative descriptions of current and expected status were also collected. In this process, to avoid misunderstanding or biased results, the researcher or local consultant explained the purpose and process of the HPC gap analysis.

After collection of the data, a modified Borich Needs Assessment Model (B-NAM) was used to compute strategy requirements identified by the respondents. Original B-NAM defines discrepancy as the gap between importance rating and proficiency rating. In this project, discrepancy score is defined as "Discrepancy between current situation and desired situation." The scale consisting of 20 components was derived from gap analysis tools. Respondents were asked to select the option that best described their perceived importance/discrepancy of each component across five points with 1 depicting very low importance/discrepancy and 5 referring to very high importance/discrepancy.

With the Borich Index, the Locus for Focus Model was adopted as the second indictor to identify priorities of problems. It is a four dimensioned model using "desired level of importance to be accorded in the future" axis and "discrepancy between current status and desired situation." In this model, the first dimension refers to "HH" which means high discrepancy and high importance.

<Table 2-16> Methodology of Gap Analysis

Calculation for Borich Index	The Locus for Focus model
$WDS_i = DS_i$ x Ā $MWDS = \sum WDS_i/N$ Where DS = discrepancy score A = importance rating i = components (each actions) WDS = weighted discrepancy score $\bar{A}$ = mean importance rating $MWDS$ = Mean Weighted Discrepancy Score N = number of observations	

<Table 2-17> shows five actions including "A4.1. Ensure stable funding from federal and state governments", "A6.1. Ensure availability of an adequate number of buildings, classrooms, workshop rooms", "A6.2. Ensure availability of adequate and appropriate modern equipment", "A5.2. Ensure teachers are equipped with related industry experience", "A6.3. Provide quality learning materials for both trainers and trainees" were selected as the top 5 priorities. In addition, two actions including "A9.1. Facilitate sustained partnership between industry and school", "A3.1. Communicate and cooperate with government ministries and agencies to achieve the institution's goal" were also selected based on Borich Index and the Locus for Focus model. "A2.1. Establish a formal system for school-industry cooperation" is highly ranked by Borich Index, but on the Locus for Focus index, it is relegated to the next rank.

The summary of gap analysis presented below.

(1) *Lack of budget and insufficient hardware:*

Generally, members of Holeta Polytechnic College consider "lack of budgets from government" and "lack of appropriate facilities and modern equipment" as core problems of quality training. It is expected that the limited budget and hardware problem could be somewhat solved through the EASTRIP project which started at 2019. However, according to the interview with the coordinator of the EASTIP project, the college faced difficulties due to lack of expertise in the agro-processing field. The purchase of all equipment and facilities is a continuous decision-making process. What kind of equipment to purchase and how to use it for education requires the intervention and supervision of industry experts in the agro-processing field. Another linked problem is about the maintenance of equipment. Currently,

in the EASTRIP project, there is limited plan or budget for maintenance. Maintenance and troubleshooting are the most important considerations regarding modern equipment. It should be noted, especially in the developing countries, that equipment with a considerable budget is often stored only in warehouses after several years. Also, if the maintenance problem is not resolved, equipment tends to be insufficiently used for education. It is difficult for teachers to allow students to use equipment considering the responsibility for expensive equipment or machine breakdown. Budget from the government or guarantee from the company that sells the equipment to maintain the equipment for a certain period could be a solution, but it is not enough. Holeta Polytechnic College should consider sustainability issues in terms of their modern facilities and equipment.

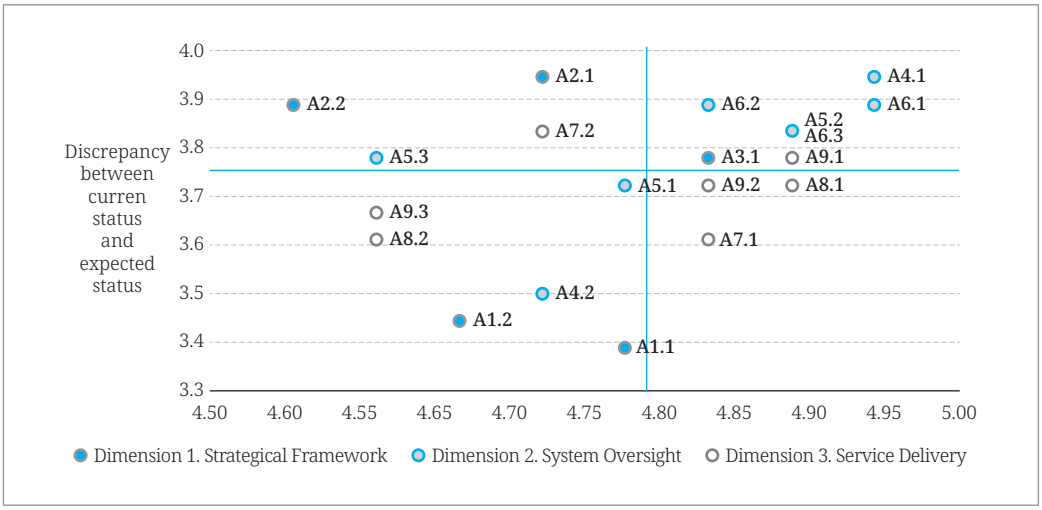
<Table 2-17> Gap Analysis Results of Holeta Polytechnic College

Goal	Action	Mean of Discrepancy	Mean of Imp.	Borich Index	Order	Locus for Focus
G1. Setting a Strategic Direction	A1.1. Establish clarity on the demand for skills and set a strategy based upon priorities	3.39	4.78	16.19	19	LL
	A1.2. Evaluate strategy and take control actions including performance measurements	3.44	4.67	16.07	20	LL
G2. Fostering a Demand Driven Approach	A2.1. Establish a formal system for school-industry cooperation	3.94	4.72	18.63	6	LH
	A2.2. Provide benefits for employers	3.89	4.56	17.72	13	LH
G3. Strengthening Critical Coordination	A3.1. Communicate and cooperate with government ministries and agencies to achieve the institution's goal	3.78	4.83	18.26	8	HH
G4. Ensuring Efficiency and Equity in Funding	A4.1. Ensure stable funding from federal and state governments	3.94	4,94	19.50	1	HH
	A4.2. Improve income generation programs for financial sustainability	3.50	4.72	16.53	18	LL
G5. Assuring Quality of Teaching and Training Profession	A5.1. Provide appropriate further training for trainers	3.72	4.78	17.78	12	LL
	A5.2. Ensure teacher have related industry experience	3.83	4.89	18.74	4	HH
	A5.3. Balance pedagogical and technical skills of trainers	3.78	4.61	17.42	15	LH

<Table 2-17> Continued

Goal	Action	Mean of Discrepancy	Mean of Imp.	Borich Index	Order	Locus for Focus
G6. Providing a Strong Learning Environment	A6.1. Ensure adequate numbers of buildings, classrooms, workshop rooms	3.89	4.94	19.23	2	HH
	A6.2. Ensure availability of adequate and appropriate modern equipment	3.89	4.83	18.80	3	HH
	A6.3. Provide quality learning materials for both trainers and trainees	3.83	4.89	18.74	5	HH
G7. Fostering Industry Relevance in Training Program	A7.1. Integrate industry and expert input into the design and delivery of training programs	3.61	4.83	17.45	14	HL
	A7.2. Update training programs in response to industry's needs	3.83	4.72	18.10	10	LH
G8. Ensuring that Student are Equipped with Adequate and Appropriate Skills	A8.1. Ensuring that students are equipped with technical skills	3.72	4.89	18.20	9	HL
	A8.2. Ensuring students are equipped with soft skills	3.61	4.61	16.65	17	LL
G9. Improving School- to- Work Transition	A9.1. Facilitate sustained partnership between industry and schools	3.78	4.89	18.47	7	HH
	A9.2. Ensuring quality in workplace learning	3.72	4.83	17.99	11	HL
	A9.3. Provide career guidance service	3.67	4.61	16.91	16	LL

[Figure 2-4] Priorities of 20 Actions Needed of Holeta Polytechnic College



Note: Blue lines show the mean score of each index.

(2) *Lack of industry-relevant skills among trainers*

Meanwhile, other factors adversely affecting the quality of training were also observed. The first one is about teacher quality regarding industry-relevant skills. Even though the lecturers of the satellite program all hold master's degree in agro-processing field, administrators, lecturers and students indicate that lack of work experience of lecturer affected teaching quality, especially in practical subjects. According to interviews with lecturers of BSc program in Holeta Polytechnic College, teaching of theoretical subjects is going well since teachers had obtained related knowledge from their bachelor's and master's degrees. However, they were placed in a very difficult situation regarding the practice-oriented subjects required by the industry because they had no experience dealing with modern equipment. In addition, it was pointed out that there were not many additional training opportunities because, institutionally, the lecturer's educational qualification is enough for teaching BSc classes. In other words, Ethiopia's vocational teacher training system itself is designed to be very sophisticated, but it can be said that there is a limit to the flexibility in terms of actual operation.

(3) *Lack of appropriate learning materials for both trainers and trainees*

According to interviews with lecturers and administrators, they consider "Low quality of learning material" a significant factor that affects the quality of training. In Ethiopian TVET system, which uses a modularized curriculum, standardized textbooks do not exist. Because of the characteristics of the modularized TVET curriculum, teachers or trainers are responsible for developing learning and teaching materials. Therefore, to ensure the quality of learning and teaching material which is known as TTLM, competencies of trainers and lecturers play vital roles. However, since C-level trainers have limited experience with developing learning materials based on occupational standards, it is hard to guarantee the quality of TTLM. Even the B-level trainers who are responsible for the development of learning materials for the BSc program, showed a lack of capabilities for development of learning material. This problem is more serious in practical training subjects due to lecturers' insufficient industry experience in agro-processing.

In addition, it is essential to provide enough textbooks or learning materials to each student to ensure the quality of training. However, in most classes, students rely only on the teacher's oral lectures, so students are often faced with difficulties with additional learning out of college.

(4) *Weak partnership between college and industry*

It is worth highlighting that partnership between college and industry is essential for efficient utilization of the TVET. The Ethiopian government also has emphasized establishing a strong link with industry and narrowing the gap between school and the practical field. However, Holeta Polytechnic College has only limited relationship with the agro-processing industry, so it is hard to expect a strong cooperative learning environment. Even though the Oromiya region is famous for the presence of a large number of agro-processing firms, most of them are relatively small or micro-small sized companies. Due to their size, it is difficult to take a formal and systemized approach toward industry-academic cooperation. For this reason, Holeta Polytechnic College has relied on personal and informal networking with a few agro-processing firms. Another reason for this is related to the limited role of skill councils. Like other developing countries, skill councils or skills associations do not exist or they play only a limited role in the TVET field.

(5) *Lack of governance efficiency of the satellite program*

Unlike the level-based training program, the satellite program is directly managed by FTI (Federal Technical and Vocational Education and Training Institute). Regarding the budget, FTI funding for satellite program is directly granted to the College without intervention from Oromiya TVET bureau. Also other important functions including recruitment of the trainees, development of curriculum, and dispatch of lecturers are managed by FTI. On the positive side, this system enables centralized management of the TVET teacher training system, but it also causes lack of active attitude of the satellite college. For improving the quality of teacher training, colleges should take the initiative for each training component such as curriculum development.

4. Korea's Experiences in Strengthening the Quality of TVET

4.1. How to Improve Partnership in School-based VET System?

In Korea's vocational education, industry-academic cooperation is vital to the success of education. Indeed, the significance of industry-academic cooperation is emphasized by Korea's school-based VET system now more than ever. However, in school-based VET systems including Korea's system, the area of industry-academic cooperation still has issues to tackle. When it comes to exploring methods of industry-academic cooperation, both

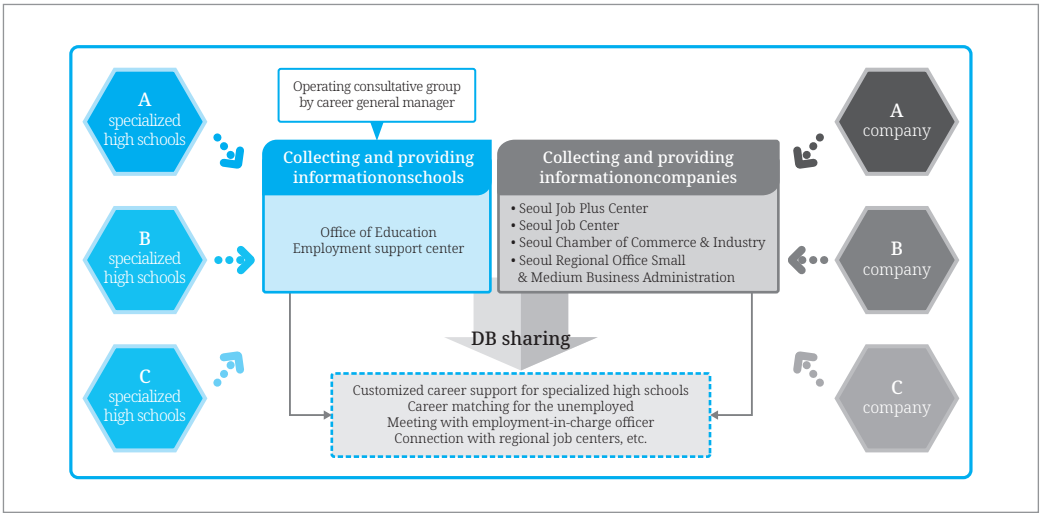
enterprises and schools have difficulties in finding organizations for proper cooperation, and they establish relations only based on schools' reputations and personal connections. Due to the different objectives of enterprises and schools, viz. profits and human resource development respectively, there are many barriers to building mutual cooperation. In this context, the Korean government has attempted to introduce various policies and interventions to help TVET schools and colleges.

4.1.1. Building a Central Body at the Regional Level to Establish a Link between Schools and Companies

To build mutual relationship between industry and schools, it is important to establish a separate center or organization to support both sides. In Korea, the Metropolitan and Provincial Offices of Education run "Employment Support Centers", which are a part of the infrastructure of industry-academic cooperation (See Figure 2-5). These centers play a pivotal role in linking schools and companies, because it is hard to explore each school and company as suitable target. They also support vocational high schools to improve their capability in terms of job placement. Also Employment Support Centers play a role as the central body of industry-academic cooperation. They establish cooperative relations with the relevant institutions and agencies, including the Regional Employment and Labor Administration and the Employment and Labor Center.

Recently, Korean government expanded this model to the national level, and institutionalized the National Employment Support Center for VET schools. The main function of this Center is to strengthen the links between schools and companies. Also at the national level, various ministries and institutions, led by the National Employment Support Center, established a network for VET schools.

[Figure 2-5] Roles and Network of Employment Support Centers under the Office of Education



Source: Employment Support Center of the Seoul Metropolitan Office of Education (2013).

4.1.2. Institutionalize the School-industry Cooperation System at the School Level

In Korea, single VET schools organized independent divisions (for example, an industry-academic cooperation division, an employment support division, etc.) that deal with industry-academic cooperation. In general, it is mandatory for every school to establish such divisions. The divisions consist of a team of two or three teachers and one job placement support officer. The officer is responsible for exploration and building a network of businesses. Teachers in the division carry out administrative tasks related to industry-academic cooperation. The problem is that those teachers have to handle these tasks while also managing teaching duties like the other teachers do. This arrangement often causes burn-out of the teachers who are part of this division.

To solve the problem, the Ministry of Education led "A Project for Job Placement Capability Reinforcement of Specialized High Schools/Meister High Schools," which includes supporting manpower to carry out various activities related to industry-academic cooperation in vocational high schools. Based on this project, a school hires an excellent industrial instructor who has work experience as a part-time or full-time teacher. Also, the government supports the hiring of employment support officers in each vocational high school. They are responsible for various industry-academic cooperation activities (exploring cooperation targets, support of workplace learning, etc.) for vocational high schools. Because the government draws up a separate budget for these extra workforces, this project has been very helpful for schools to improve the quality of industry-academic cooperation.

4.2. How to Ensure that Teachers are Equipped with Industry-relevant Skills

Recently, VET in Korea has made considerable achievements in various fields. However, it is recognized that there has been insufficient strengthening of teachers' professionalism. The quality of education is directly linked with the quality of teachers. In other words, qualified teachers are means of delivering the customized curriculum based on industrial demands. In general, teachers who are responsible for vocational subjects are trained in universities without work experiences, and this lack of practical skills turns into a weakness. To solve this problem, a Memorandum of Understanding (MOU) was signed by the Ministry of Education, Science and Technology, the Ministry of Knowledge Economy, and the Ministry of Employment and Labor to start the "Workplace Training Program for VET Teachers." The purpose of the MOU was to provide VET teachers the opportunity to improve industry-relevant skills. In this context, KRIVET (Korean Research Institutes for Vocational Education and Training) developed a model of "Workplace Training Program for VET Teachers" with participation from various industries and companies.

<Table 2-18> shows various forms and durations of workplace training program for VET teachers. The duration ranges from two weeks to six months. Schools and companies could choose short-term or long-term training based on their circumstances. Unlike the existing theory-oriented training for VET teachers, this type of training is provided by companies, so teachers could have relevant experience in the actual work setting.

<Table 2-18> Workplace Training Program for VET Teachers

Classfication	Name of course	Training location	Total number of students	Curriculum component ratio	Companies providing in-service training
Short-term course (2 weeks; 50 hours)	CNC lathe/machining center	The Human Resources Development Institute (HRDI) of Korea University of Technology and Education	Within 10 persons	2:4:4	NST Co. Ltd.
	Autoamated production control system using PLC			2:3:5	LS Industrial System Co. Ltd., Device ENG, etc.
	Practical skills in hydaulic and pneumatic controls for factory automation			2:3:5	Festo Korea, Bosch Korea, etc.
	LED driving circuit design and applied practical skills			2:3:5	ACE Electronics, etc.

<Table 2-18> Continued

Classfication	Name of course	Training location	Total number of students	Curriculum component ratio	Companies providing in-service training
Short-term course (2 weeks; 50 hours)	Practical skills in electronic controls for automobiles	Seoul Jungsu Campus of Korea Polytechnics	Within 10 persons	2:4:4	Hyundai Motor Co., Ltd.
	Practical skills in LED applied and light controls	Gwangju Campus of Korea Polytechnics		2:4:4	Korea Photonics Technolgy Institute, Innocem Korea Co., Ltd.
	Practical skills in machining center and an introduction to five-axis processing machine	New Technology Training Center of Korea Polytechnics		2:4:4	Advantech Korea Co., Ltd.
	Multi-machine PLC integrated MPS control			2:4:4	UREATac Co., Ltd, Seojin Instech, etc.
Mid-term course (1 month; 120 hours)	Practical skills in semiconductor processes	The Human Resources Development Institute(HRDI) of Korea University of Technology and Education	Within 5 persons	2:3:5	RUSSELL
	Practical skills in network installation and operation	New Technology Training Center of Korea Polytechnics		1:4:5	Force 10Networks, SNETSYSTEMS, Co, Reputer Co., Ltd., etc.

Source: Kang et al. (2011).

4.3. Developing Standardized Learning Module Based on NCS[2]

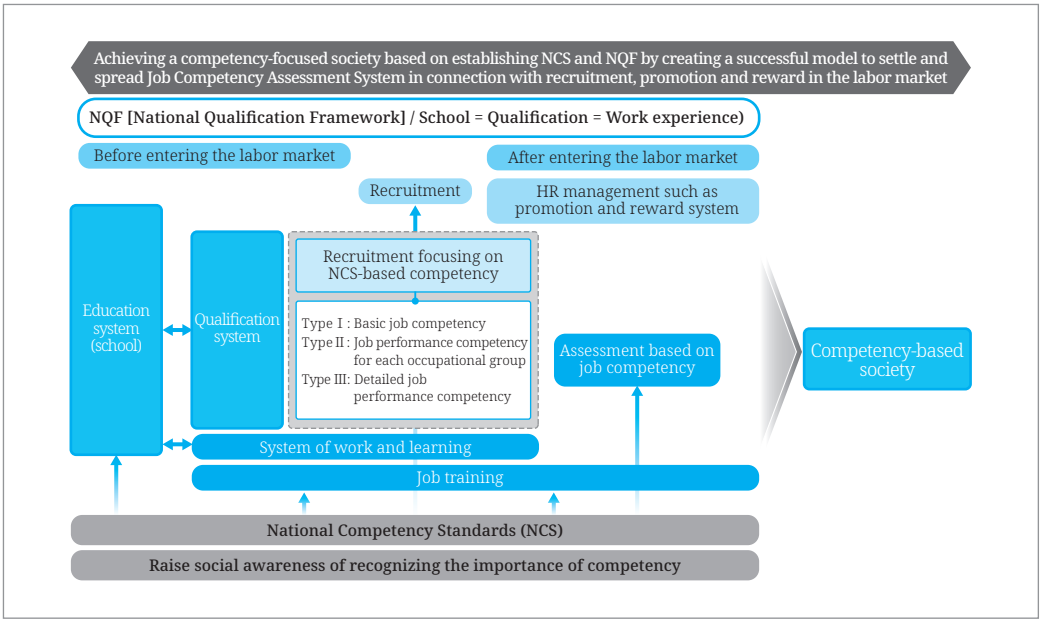
In 2010, the Ministry of Education and Ministry of Employment and Labor began to develop National Competency Standards (NCS) to improve the quality of Korea's VET system. Through the National Competency Standards (NCS) the country standardized the skills (knowledge, technology, and attitude) required to perform its functions successfully at the national level, with the knowledge, expertise, and attitude needed to complete the tasks of the job environment organized by industrial sector and by standard (See Figure 2-6). NCS is mainly developed by the Ministry of Employment and Labor, and the Human Resources Development Service of Korea (HRD Korea). In practice, it is developed with inputs from industrial personnel, educational personnel, and qualification experts by each job.

2 This chapter was based on Kim & Chung (2018).

The classification of NCS is shown in a step-by-step configuration, focusing on the type of job. It presents the overall roadmap of NCS development. NCS is composed of major categories (24), middle categories (77), small categories (227), and subdivisions (857). The duty refers to subdivision at the classification system of NCS. In principle, standards are developed at the level of subdivision. The competency unit is the sub-units of the classification system of NCS, and corresponds to the basic components of NCS. The competency unit consists of competency unit code, competency unit name, competency unit definition, competency unit elements (e.g. performance criteria, knowledge, skills, and attitudes), coverage and working conditions, evaluation guidelines, and basic vocational ability. The level system of NCS systematizes the level of jobs in the industrial field. It is used in establishing connections between work, education and training, and qualifications, presentation of the achievement level of lifelong learning, and composition of the level system of qualification. When the NCS is developed, it is presented by evaluating the levels of competency units and competency unit elements according to the system of eight levels (minimum Level 1 to maximum Level 8).

In order to strengthen the linkage between work, education and training, and qualifications, the government is making efforts to develop/operate the curricula of education and training, and to disseminate the manuals utilizing NCS. The Ministry of Education revised the curriculum of the vocational high schools based on NCS from 2013, and announced it as the “2015 Revised Curricula” in September 2015. The vocational colleges suggested the reform of NCS-based curriculum as a basic requirement of the financial support project in 2014, and developed and distributed the manuals to support the development of NCS-based curriculum at vocational colleges in 2015. The Ministry of Employment and Labor has improved the training standards based on NCS from 2013 and is providing support based on the premise of NCS-based training for all training institutions and polytechnics operating the training programs. In the second half of 2013, the Ministry introduced the 25 Work-Learning Parallel System which is a Korean-style apprenticeship scheme.

[Figure 2-6] Concept of National Competency Standards



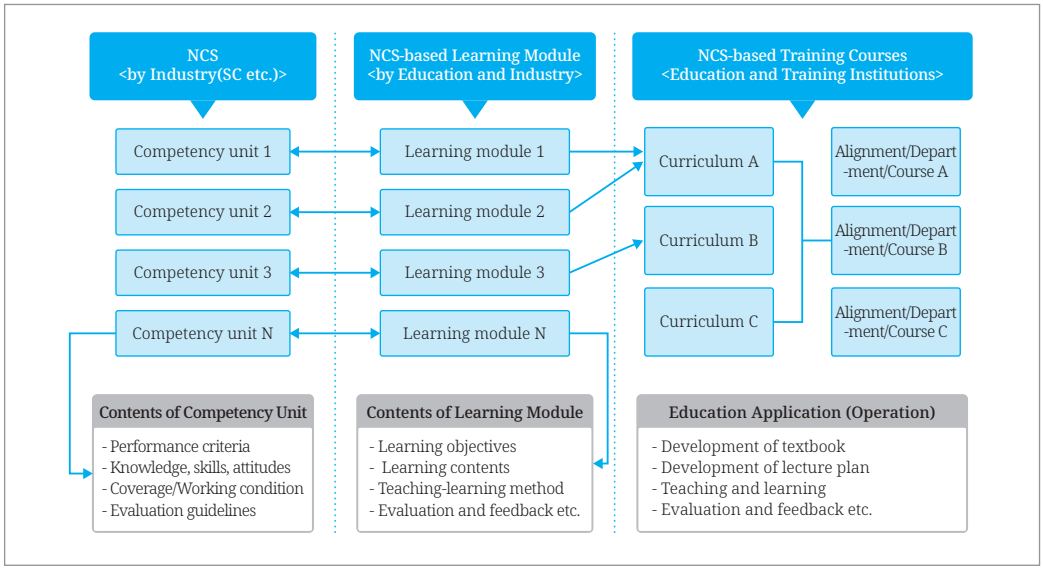
Source: HRD Korea (2020 archived).

The Ministry of Education has developed a "NCS-based Learning Module" as part of its efforts to apply NCS. The NCS-based Learning Module is a detailed description of the contents related to theories, knowledge, and practices providing the specific tasks based on NCS in the field (Ministry of Education, 2016). The NCS-based Learning Module is intended to be used as a basic teaching and learning material in the vocational educational and training institutions, and to be used in the reform of curriculum. As for the development status of NCS-based learning modules, 772 kinds based on subdivision of NCS have been developed since 2013, as shown in [Figure 2-7].

In sum, NCS refers to the 'requirements for duty', and the NCS Learning Module refers to a 'teaching and learning material.' It was organized so that the students can learn the NCS by the units of capability in education and training. The NCS Learning Module provides details related to theory and practice so that specific skills can be learned. First, the NCS Learning Module serves as a guideline to provide achievement goals and directions for learning so that the job skills required by the industry can be utilized at training sites.

Second, NCS study modules can be used as standard teaching materials in specialized high schools, meister high schools, community colleges, four-year university education institutions, training institutions, and work education institutes, and can also be used to improve the curriculum.

[Figure 2-7] Concept of NCS-Based Learning Modules



Source: HRD Korea (2020 archived).

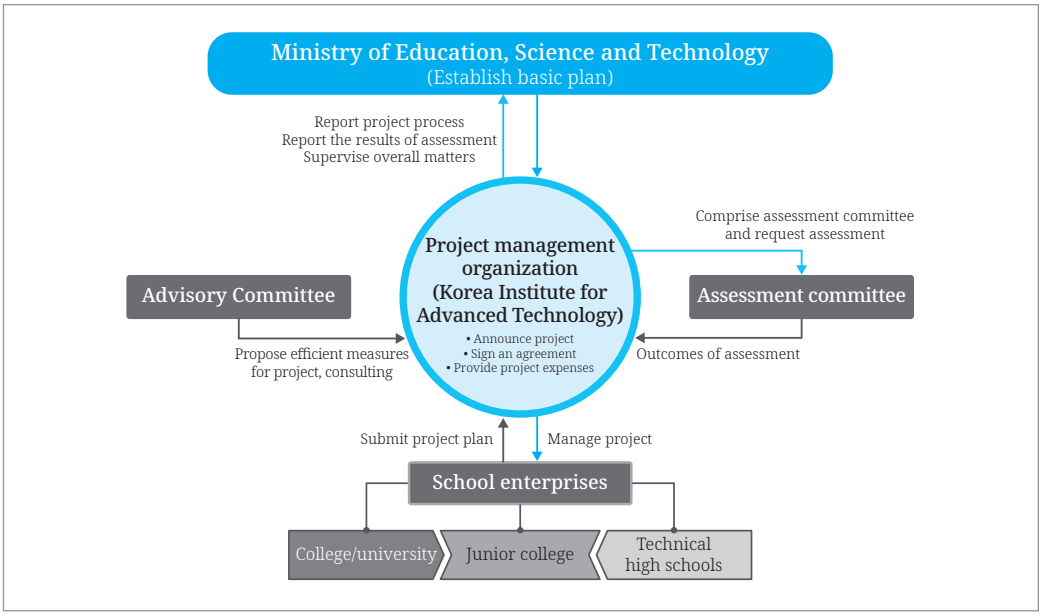
4.4. School Enterprises

The School Enterprises Support Project provides support to utilize school enterprises for the on-site training and research of students and teachers, and to promote commercialization by transferring technologies to industries (Article 36 of the Promotion of Industrial Education and Industry-Academic Cooperation Act). Based on this Act, VET schools are entitled to establish a division that directly manufactures, processes, and sells products; provides services, etc. while linking with curriculum. In August 2004, the Ministry of Education launched a support project for school enterprises in VET schools. With this project, an enterprise could be established as part of a school to provide students with work experiences. Also, school enterprises encourage entrepreneurship of students by enabling them to run their own businesses.

The extra income generated in this process could be reinvested in education, thereby creating a virtuous circle. School enterprises cultivate both skills- practical skills and business skills-by participation in the actual activity of business. Schools also take the benefits because they could learn more about work settings in terms of industry demands. Not only the students, but also teachers can acquire industry relevant skills through this program. However, the most important advantage is linking with soft skills such as team work, communication, and working with others. Through participation in actual business activities, students and teachers can understand more about the importance of soft skills.

However, due to the complexity of school enterprises, the government is required to support and supervise the whole process until it is settled in the field. [Figure 2-8] shows how the Korean government supported the initial project of school enterprises in VET schools. Also <Table 2-19> shows that as of 2010, 473 of universities, colleges and vocational high schools participated in school enterprise projects.

[Figure 2-8] The System for School Enterprise Support Projects



Source: Kim et al. (2010).

<Table 2-19> Number of Schools and Budgets of School Enterprise Projects

(Unit: Korean won in 100 milions, schools)

College/university		Junior college	Vocational high schools	Total	Budget
First graduating class	2004	18	5	40	230
	2005	18	7	45	
Second graduating class	2006	19	13	50	300
	2007	17	13	48	
Third graduating class	2008	16	27	66	300
	2009	19	24	68	
10th~14th graduating class	2010	13	19	53	120
	2011	13	17	51	110
	2012	18	16	52	130
Total		151	141	473	1,190

Source: Ministry of Education, Science and Technology (2010b).

5. Policy Recommendations

5.1. Strengthening the TVET Teacher Training System

5.1.1. Improving Practical Skills of Teachers

The quality of vocational education is determined by teachers' capabilities. The rapidly changing industrial environment and technology demand constant skills development from teachers. In particular, changes to agro-processing technology are faster than the changes occurring in traditional agriculture. Therefore, constant, ongoing training is essential for teachers at all levels. For this, short-term training programs need to be expanded significantly. Short-term training programs for skills development should be provided using vacation. Currently, Ethiopia's teachers' training programs in TVET sector have a level-based system, but after the teacher acquires the qualification, additional training programs are not fully provided.

Such training programs can also be operated through cooperation with industries. As described above, based on Korean experiences, the government's financial support allows the industry to operate teacher training programs in the TVET sector. Teachers can acquire field-based skills by completing various training programs through working in companies and industrial sectors.

5.1.2. Improving Curriculum and Learning Material Development Skills of Teachers

Ethiopia's vocational education system follows a modular curriculum based upon the occupational standards. The advantages of a modular curriculum are flexibility and autonomy but it also has the disadvantage of poor quality of training where the educational system is not fully equipped. Ethiopia's teachers in the TVET sector should simultaneously carry out the tasks of developing curriculum and teaching/learning materials as well as teaching. If such excessive burdens are given when the number of students per teacher and the number of hours of teaching are also demanding, the result may be poor quality of training.

As mentioned above, there may be insufficient knowledge and skills regarding curriculum and teaching materials development, since the current teacher training system emphasizes industry-specific skills rather than pedagogical skills. In fact, teachers at Holeta Polytechnic College did complain that the burden of developing teaching materials was considerable.

Therefore, sufficient training for development of curriculum and teaching material should be secured in the system for teacher training and continuous training. It is necessary to improve capabilities throughout the entire process of ISD (Instructional System Design) model development such as needs analysis, designing curriculum, development of teaching-leaning material, teaching method and evaluation.

5.2. Strengthening Mutual Relationship between Industry and Colleges

5.2.1. Institutionalize Industry-College Cooperation

TVET institutes depend upon industry as a means of accessing the latest technology and practices, as well as indicating the level and types of skills. An effective relationship between TVET teachers and industries will thus ensure that TVET curricula and teaching methodologies are relevant and up-to-date. There is considerable empirical evidence that close collaboration between TVET teacher education and industry would significantly improve the quality and relevance of TVET. The success of TVET teacher education and TVET education is highly dependent on the quality of these linkages.

However, administrators and teachers from Holeta Polytechnic College pointed out that many industries in agro-processing field show reluctance in supporting TVET. In particular, it is difficult to establish cooperative ties with small and micro size firms. Most networks with companies have relied on trainers' personal connections, so it has been poorly managed. In fact, in the context of the school-based vocational education system, it is hard to expect high commitment of private sector toward the TVET sector. Even in developed countries, government and schools strive to provide various incentives to encourage industry's participation. This is because the purpose of the business is to generate profit, and therefore they are only interested in hiring ready-to-work skilled workers.

For mutual cooperation between industry and school to be fruitful, it is necessary to establish a formal relationship between firms and the College. It is essential to launch a formal industry-academic cooperation board and formalize regular meetings. At this time, the committee should be headed by dean of the College, and members of committee should include experts from agro-processing industries and sector council members (if it is possible). In addition, a separate division in charge of industry-academic cooperation should be established in the College. The Industrial-Academic Cooperation Committee should promote cooperation with industry in various aspects, including team teaching, field training and evaluation, as well as consulting on the development of curriculum and teaching materials.

5.2.2. Provide Opportunities to Convince Industry of the College's Capacities

One interviewee from Holeta Polytechnic College argued that only a small minority of industries are willing to participate in TVET, as industries are typically not convinced of the capacity of TVET institutes and do not trust them to generate qualified skilled workers. It is somewhat true, because industry did not have enough opportunities to identify capacities of colleges in terms of training skilled workers. In this case, various cooperative education activities could be helpful for both sides to understand each other. For example, the College can display a hands-on project that is the overall result of the training program, and invite the cooperative companies to the exhibition to provide them an opportunity to check the quality of training. It is also very important to provide a variety of opportunities for companies to observe the training process from time to time. This convinces companies of the quality of the training and the skill level of the potential workers.

5.3. Ensuring Quality of Learning Material

5.3.1 Developing Teaching-learning Material at Government Level

In Ethiopia, even for the BSc program, the teaching/learning material, called TTLM is developed by lecturers. The development of teaching materials should take more time and effort than any other educational activity. This is because the level of students' academic achievement is determined by how systematically teaching materials are developed. It is very difficult to guarantee the minimum quality of training if such important educational activities are entrusted to professors' responsibilities. No matter how well-developed occupational standards are, it is useless if specific, well-organized learning content is not developed.

Also, a number of BSc subjects are general contents that are already published as textbooks in institutions or other countries. Therefore, it is desirable to develop teaching materials at the school or government level, not at the teacher level. At this time, schools or the government need to concentrate their budget and human resources to ensure the quality of teaching materials. These developed textbooks can be modified and supplemented and utilized in schools as needed.

5.3.2. Providing Sufficient Learning Material to Trainees

For students, textbooks are essential resources for preparing and reviewing classes. Learning is not only done in the classroom, but also outside the classroom and at home.

Therefore, it is very important for students to be provided with all textbooks. Hence, the government-level budget should be channelized to develop and provide textbook to trainees. In the case of Holeta Polytechnic College, the budget for EASTRIP needs to be fully allocated to the development and distribution of teaching materials as well as physical resources.

5.3.3. Establishment of a Center for Teaching and Learning (CTL)

Generally, in universities and colleges, the Center for Teaching and Learning (CTL) supports excellence and innovation in teaching and learning. More specifically, CTL seeks to support and provide leadership to foster an institutional climate that facilitates effective teaching and learning across the school. Usually, the activities and services of CTL include faculty development and recognition, learning technologies and blended instruction, and media and production services.

This is extremely important in the context of COVID-19. CTL could provide online resources and workshops to help faculties adapt to teaching online and prepare for remote teaching. Especially, for Holeta Polytechnic College, video production and online teaching systems such as Zoom should be prepared based on support of CTL. Also, a video production studio, which incorporates green screen, video monitor, and cameras, should be run by CTL.

5.4. Planning the Exit Program for the EASTRIP Project

The five-year budget of EASTRIP for the Holeta Poly technic College is over $20,000,000, and most of this budget is allocated to the setting up of modern training facilities and equipment. It is time for Holeta Polytechnic College to prepare an exit program for EASTRIP. Particularly it is worth noting that maintenance and repair of equipment should be considered. With regard to hardware investment program in ODA, there are several cases where the school often fails to utilize equipment properly after purchasing them. In particular, in developing countries, the utilization rate is often significantly low due to breakdowns of equipment and materials. Hence the College also requires an additional budget corresponding to the maintenance of equipment and materials. Therefore, it will be necessary to ensure a stable budget in preparation for the termination of EASTRIP projects.

In addition, teachers' training on equipment maintenance skills needs to be conducted using the EASTRIP budget. The most desirable solution is to ensure that teachers are provided maintenance skills by various training programs. Therefore, it is necessary to provide training programs to the teachers in Holeta Polytechnic College in terms of basic mechanics and electrical work. Another way is to operate an income generation program

by providing advice to companies and conducting experiments for their benefit using the expensive equipment and materials acquired by the College. The “School Enterprise Program”, mentioned in the Korean Experiences section, could be another solution to generate income using modern equipment for actual production activities.

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Appendix

Data Collection Tool for Gap Analysis

Date: 2019/12/17

Dimension	Goal	Action
1. Strategic Framework	G1. Setting a Strategic Direction	A1.1. Establish clarity on the demand for skills and set a strategy based upon priorities
		A1.2. Evaluate strategy and do control actions include performance measurements
	G2. Fostering a Demand Driven Approach	A2.1. Establish a formal system for school-industry cooperation
		A2.2. Provide benefits for employers
	G3. Strengthening Critical Coordination	A3.1. Communicate and cooperate with government ministries and agencies to achieve the institution's goal
2. System Oversight	G4. Ensuring Efficiency and Equity in Funding	A4.1. Ensure stable funding from federal and state governments
		A4.2. Improve income generation programs for financial sustainability
	G5. Assuring Quality of Teaching and Training Profession	A5.1. Provide appropriate further training for trainers
		A5.2. Ensure that teachers are equipped with related industry experience
		A5.3. Balance pedagogical and technical skills of trainers
	G6. Providing a Strong Learning Environment	A6.1. Ensure availability of an adequate number of buildings, classrooms, workshop rooms
		A6.2. Ensure availability of adequate and appropriate modern equipment
		A6.3. Provide quality learning materials for both trainers and trainees
3. Service Delivery	G7. Fostering Industry Relevance in the Training Program	A7.1. Integrate industry and expert input into the design and delivery of training programs
		A7.2. Update training programs in response to industry's needs

<Data Collection Tool for Gap Analysis> Continued

Dimension	Goal	Action
3. Service Delivery	G8. Ensuring Student are Equipped with Adequate and Appropriate Skills	A8.1. Ensuring students are equipped with appropriate technical skills at a desirable level
		A8.2. Ensuring students are equipped with soft skills
	G9. Improving School to Work Transition	A9.1. Facilitate sustained partnerships between industry and school
		A9.2. Ensuring the quality of workplace learning
		A9.3. Provide career guidance service

Name	
Current Position (Department)	
Phone and Email	

NOTE

- Current situation: Please describe the current status and challenges(AS-IS) pertaining to each component
- Desired situation: Please describe expected status and goal (TO-BE) for each component
- Discrepancy: Level of discrepancy between “current situation” and “desired situation”
  (5) Very high discrepancy, (4) High discrepancy (3) Medium discrepancy,
  (2) Low discrepancy, (1) Very low discrepancy
- Importance: Desirable level of importance to be accorded in the future
  (5) Extremely important, (4) Very important, (3) Somewhat important,
  (2) Not very important (1) Not at all important

Dimension 1. Strategic Framework

	Current Situation	Desired Situation	Discrepancy	Importance
G1. Setting a Strategic Direction				
A1.1. Establish clarity on the demand for skills and set a strategy based upon priorities			( )	( )
A1.2. Evaluate strategy and take control actions including performance measurements			( )	( )
G2. Fostering a Demand Driven Approach				
A2.1. Establish a formal system for school-industry cooperation			( )	( )
A2.2. Provide benefits for employers			( )	( )
G3. Strengthening Critical Coordination				
A3.1. Communicate and cooperate with government ministries and agencies to achieve the institution's goal			( )	( )

Dimension 2. System Oversight

	Current Situation	Desired Situation	Discrepancy	Importance
G4. Ensuring Efficiency and Equity in Funding				
A4.1. Ensure stable funding from federal and state governments			( )	( )
A4.2. Improve outreach program for financial sustainability			( )	( )
G5. Assuring Quality of Teaching and Training Profession				
A5.1. Provide appropriate further training for trainers			( )	( )
A5.2. Ensure that teachers are equipped with related industry experience			( )	( )
A5.3. Balance pedagogical and technical skills of trainers			( )	( )
G6. Providing a Strong Learning Environment				
A6.1. Ensure availability of an adequate number of buildings, classrooms, workshop rooms			( )	( )
A6.2. Ensure availability of adequate and appropriate modern equipment			( )	( )
A6.3. Provide quality learning materials for both trainers and trainees			( )	( )

Dimension 3. Service Delivery

	Current Situation	Desired Situation	Discrepancy	Importance
G7. Fostering Industry Relevance in the Training Program				
A7.1. Integrate industry and expert inputs into the design and delivery of training programs			( )	( )
A7.2. Update training programs in response to industry's need			( )	( )
G5. Assuring Quality of Teaching and Training Profession				
A8.1. Ensuring students are equipped with appropriate technical skills			( )	( )
A8.2. Ensuring students are equipped with soft skills			( )	( )
G9. Improving School to Work Transition				
A9.1. Facilitate sustained partnership between industry and school			( )	( )
A9.2. Ensuring the quality of workplace learning			( )	( )
A9.3. Provide career guidance service			( )	( )

03

CHAPTER

Strategic Plan for Establishing of Ethiopian National TVET Research Institute

Hyunsoo KIM (Soonchunhyang University)

Keywords
National Research Institute, Technical and Vocational Education and Training, TVET Policy Making, Think Tank, Quality Assurance

Strategic Plan for Establishing of Ethiopian National TVET Research Institute

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Summary

The main purpose of this study was to provide the Ethiopian government with policy recommendations to establish the National TVET Research Institute. TVET plays a crucial role in each nation's economic development through providing competent human resources. The national think tank's involvement in TVET policy making is also essential to planning and implementing effective TVET measures. Lessons learned related to the establishment of a national TVET research institute could be found from many international organizations and developed countries including Korea.

This report presents the results of analyzing the Ethiopian context for establishing a national TVET research institute. It covers aspects such as: the Ethiopian research landscape and national TVET research system, Ethiopian national plan for strengthening the research system on TVET, needs analysis on newly introducing a TVET research institute, Korean and global experience on TVET research, and policy recommendations.

Ethiopia offers various forms of research facilities and there are about 20 research institutions in the country funded by the government, and a few R&D centers run by industrial corporations. Currently, TVET research function in Ethiopia is fragmented in various institutions. The Higher Education Strategy Center (HESC), Federal TVET Agency (FTVETA), and Federal TVET Institute (FTVETI) take care of some research functions; however, some TVET organizations are not focused on R&D (FTVETA, FTVETI), or conversely some R&D institutions are not focused exclusively on TVET (HESC). As a result, the R&D outcomes in the TVET field are insufficient and there is no think tank at the national level to plan and implement TVET policy systemically.

The Ministry of Science and Higher Education (MoSHE) of Ethiopia has prepared a strategic plan that will strengthen the current TVET system over the period of 2019-2025. The plan includes restructuring the current TVET system and curriculum, and developing a framework that differentiates TVET and higher education institutions in identifying their own niche areas and competencies. Executing this plan will need detailed investigation and analysis of the sector, which will further strengthen the research system.

Agriculture accounts for about 46% of the total GDP and 85% of the labor force, but presently, the Ethiopian government is actively promoting industrialization by fostering the manufacturing industry. It is time to prepare a plan for establishing and operating a realistic TVET policy research institute that can be linked with future economic development strategies based on Ethiopia's industry and employment situation.

Opinions from the government ministries (MoSHE), agencies (FTVETA, FTVETI, and HESC), TVET institutes (TVET polytechnics and colleges), industries, Chamber of Commerce and also from those who have experience on TVET (including teachers, students, and consultants) are presented in this study report.

In order to achieve the research objectives, the background and necessity of establishing an Ethiopian TVET policy research institute are presented through analysis of similar processes followed by international organizations and TVET research institutes in major countries.

TVET is a key area specified in the SDGs of the United Nations with regard to the provision of quality educational opportunities. National Institutional Arrangements (NIA) proposed by UNDP can be used as a basis for preparing the logic for institutional maintenance to establish an Ethiopian TVET policy research institute. UNDP's NIA checklists define clear roles and responsibilities, and provide directions for streamlining business processes, performance-based evaluation system, coordination system, etc.

UNESCO-UNEVOC network, UNESCO Strategy for TVET (2016-2021), World Bank's PASET, and ESTRIP project were reviewed for TVET policy and to form an understanding of the transition towards sustainable societies and economies.

The Korean case of KRIVET was reviewed focusing on establishment, roles and functions, major projects and achievements, and future tasks. KRIVET has been successful in linking vocational education with vocational training, research and policy development for school-level vocational education and adult vocational skills, establishing a human resource

development system, reflecting industry demands, systemizing qualifications systems, and advancing career education. Currently, KRIVET operates research centers that carry out not only policy research but also many related projects.

The policy recommendations drawn from the analyses of Ethiopia's TVET context and Korea's experiences are as follows:

(i) Legal background is needed so TVET research institute has the rights to operate proactively and express views independently.

(ii) It is recommended that the responsible government official be the Prime Minister. However, as in the opinion survey, it may start at the department level in the short term.

(iii) The TVET research institute could be newly established or alternatively it is possible to consider ways to strengthen research functions in existing organizations.

(iv) In the case of the establishment of a new institution, as in the case of KRIVET, it is necessary to initiate measures related to the formation of relevant foundational laws, differentiation from existing organizations, securing of budget, design of organization and functions, selection of responsible ministries, etc.

(v) In the case of strengthening the research function of an existing organization, it is necessary to decide which organization to be selected.

(vi) The institute needs to perform policy research functions at the level of the federal and local governments.

(vii) The national TVET research institute should establish a master plan for lifelong vocational education and training and encourage the government to promote the development of TVET consistently in response to environmental changes in the medium and long term.

Detailed policy recommendations in areas such as mission, governance, status, organization, research areas, human resources, financing, rule and regulation, and quality assurance are included in this study.

1. Introduction

1.1. Background

Ethiopia recently established the Ministry of Science and Higher Education (MoSHE) through the reorganization of government departments and provided a Vice Minister for Technical and Vocational Education and Training (TVET) to pursue an integrated policy approach in the fields of vocational education, higher education, and science and technology. In particular, these measures are expected to strengthen the capabilities of the Federal TVET Agency, which is an execution institution, with regard to the overall policy-making function in the field of TVET, which is relatively weak at present.

MoSHE (2019) has prepared a strategic plan for the period of 2019-2025 to strengthen the current TVET system. The plans include restructuring the current TVET system and curriculum, and developing a framework for differentiating TVET and other higher education institutions in terms of identifying their niche areas and competencies. Executing these plans will need detailed investigation and analysis of the sector that will further strengthen the TVET research system.

Agriculture in Ethiopia accounts for about 46% of the total GDP and 85% of the labor force, but presently the country is actively promoting industrialization by fostering the manufacturing industry (Ministry of Foreign Affairs, 2019). The 2nd Ethiopia Growth and Transformation Plan II (GTP II, 2016) was established in 2015-2020 as the roadmap for national development plan, to promote policies for economic growth and sustainable development.

In this regard, the Ethiopian government is working with the World Bank (WB) to develop human resources in the fields of science and technology and TVET through the virtuous cycle of economic growth and social development by means of the KSP project. Based on Ethiopia's industrial and employment situation, it is necessary to prepare and establish an operation plan for a realistic TVET policy research institute that can be linked with future economic development strategies

1.2. Objectives

The objective of this study is to develop a plan to establish and operate a policy research institute for TVET in Ethiopia. The specific purposes are as below:

(i) To propose a plan to establish and operate a policy research institute for TVET

(ii) To come up with suggestions to strengthen the capacity for establishing and enforcing sustainable TVET related policies

(iii) To propose ways to link with World Bank support projects such as ESTRIP

1.3. Methodologies

1.3.1. Data Collection and Analysis

- Data on Ethiopian economy, industry, employment, TVET legislation and operational status
- Operation and research project status of KRIVET
- Data on TVET policy and research institutes of International organizations and major countries

1.3.2. Focus Group Interview (FGI)

- A survey of the local conditions through interviews with officials of relevant ministries and institutions (high-level policy officials and policy practitioners)

1.3.3. Cooperation with Local Expert

- Local consultant: Ms. Mahlet Getachew Gezahegn
- Role: Secure local data necessary for conducting research and support operation of local seminars

1.3.4. Holding of Seminars

- Seminars, such as kick off meetings, interim reporting sessions, and final reporting sessions for relevant departments and institutional officials
- Discuss research topics and directions through local seminars, identify and materialize policy demands raised by high-level policy makers, and enhance the applicability of research results to local applications

1.4. Scope

In relation to TVET research institutes of partner countries, we have analyzed the status of TVET in Ethiopia and the history and status of the overall national research system, related organizations, budget support, and research materials.

In addition, toward suggesting an organization that can be responsible for operating TVET research institutes, the functions and roles of the Ministry of Science and Higher Education (MoSHE), the Federal TVET Agency (FTVETA), the Federal TVET Institute (FTVETI), and the Higher Education Strategy Center (HESC) were examined.

We collected opinions from the government personnel (MoSHE) as well as representatives of related organizations (FTVETA, FTVETI, and HESC), vocational education and training institutions, industries, and chambers of commerce for establishment of TVET research institutes. Based on Korea's experience, we examined the socio-economic situation and TVET-related policies at the time of KRIVET's establishment to develop a plan to establish a national TVET policy research institute appropriate for Ethiopia's situation.

KRIVET's functions and organization, budget, performance management, planning and operation of research projects, and network and cooperation system with the government's stakeholders were analyzed to suggest a sustainable development strategy, and then draw implications.

2. Rationale for Introducing a TVET Research Institute in Ethiopia

2.1. TVET Policy Trends of International Organizations

2.1.1. UNDP

TVET is a key area specified in the SDGs of the United Nations with regard to the provision of quality educational opportunities. At the level of National Institutional Arrangements (NIA) proposed by UNDP, TVET policy research institutes play an important role in promoting TVET policy. The NIA refers to the policies, systems, and processes that the state uses to efficiently perform legislation, planning and management, and to coordinate effectively with other agencies to fulfill its mission (UNDP, 2017).

NIA is closely related to the market, country, business class, network, association, and community (UNDP, 2017). The NIA includes formal governmental structures as well as informal norms existing in the country to prepare and carry out policy work (UNDP, 2017). This arrangement is important because it provides a framework for governments to establish and implement policies at all levels (Federal, State and Local) (UNDP, 2017).

The NIA checklist presented by UNDP can be used as a basis for preparing the reference to establish an Ethiopian TVET policy research institute. UNDP's NIA checklists define clear roles and responsibilities, and propose ideas for streamlining business processes, performance-based evaluation system, coordination system, etc.

The NIA cannot directly provide a reason for establishing a TVET research institute, but it can provide the necessary rationale to start an institution.

<Table 3-1> UNDP's National Institutional Arrangements (NIA) Checklists

Program Outputs	Indicative Activities
1. Functional Clarity	a. Mandate and role clarifications b. Streamlined business processes c. Enforcement and compliance mechanisms
2. Effective Human Resources Management	a. Knowledge access and skills development b. Predictability and types of monetary and non-monetary incentives c. Ethics and values interventions, attitudinal change interventions
3. Robust Coordination Mechanisms	a. Horizontal/peer coordination convened by an apex agency b. Vertical coordination between central and local state bodies c. Convening authority and capacity of coordination bodies
4. Monitoring and Evaluation Systems	a. Integrated M&E framework b. Independent and peer review mechanisms c. Feedback loops and feedback mechanisms
5. Partnerships for services delivery	a. Public-Private Partnerships for service delivery b. National Implementation and procurement capacity c. Public interface for services delivery

Source: UNDP (2009). Capacity Development: A UNDP PRIMER.

It is not easy to accurately assess the extent to which UNDP's National Institutional Arrangements can be adopted as is into the Ethiopian situation. However, if TVET systems and policy research institutes are established in the future, rationale can be prepared based on these standards.

2.1.2. UNESCO

UNESCO is working together with 250 UNESCO-UNEVOC International Centers on TVET worldwide to develop the TVET policies of member countries. As UNESCO's designated center for Technical and Vocational Education and Training (TVET), UNESCO-UNEVOC supports UNESCO's member states in their efforts to strengthen and upgrade their TVET systems. The UNEVOC Network is UNESCO's global network for institutions specialized in Technical and Vocational Education and Training (TVET). The Network is comprised of more than 250 UNEVOC Centers in 166 member states across the globe (UNESCO, 2020).

Coordinated by UNESCO-UNEVOC, the Network provides a platform for exchange, cooperation and mutual assistance for its members by linking and fostering interaction and learning among diverse TVET institutions and stakeholders around the world. The UNESCO-UNEVOC International Centre undertakes activities through this knowledge-rich and extensive community (UNESCO, 2020).

UNESCO-UNEVOC is committed to supporting UNESCO member states in ensuring access to quality skills development by:

- Facilitating knowledge exchange, networking and collaboration between global TVET stakeholders through its platforms;
- Developing quality TVET programs that enable gainful youth employment, entrepreneurship, lifelong learning and respond to the dynamic skill demands; and
- Promoting broad-based skills development opportunities that are equitable and accessible by all segments of the society, globally.

The UNEVOC Network is composed of four types of Centers: ministries, national bodies, training providers and research institutions (UNESCO, 2020). Through international collaboration and peer learning, UNEVOC Centers continue to enhance the quality of TVET teaching and learning opportunities offered in their respective countries. The Centre assists member states in their efforts to develop policies and practices concerning work-related education work and skills development for employability and citizenship, to achieve (UNESCO, 2016);

- Access for all
- High quality, relevant and effective programs
- Learning opportunities throughout life

The International Centre achieves this through taking action to strengthen and upgrade the worldwide UNEVOC Network (Flagship Program), with particular reference to (UNESCO, 2016);

- Stimulating international and regional cooperation concerning human resource development
- Promoting UNESCO normative instruments and standards
- Promoting good and innovative practices in TVET
- Knowledge sharing

- Mobilizing expertise and resources
- Strengthening partnerships with other relevant agencies

As part of the UNESCO Strategy for TVET (2016-2021), UNESCO-UNEVOC released its Medium-Term Strategy II (MTS-II) for the period of 2018-2020. The Strategy focuses on strengthening TVET capacities and cooperation in member states to enable quality education from a lifelong learning perspective and to ensure that education and training pave the way to better responses to combat climate change and enable adaptation to its impacts (UNESCO, 2020). The Strategy takes into account the Education 2030 Framework for Action (FFA) for the implementation of Sustainable Development Goal 4, which aims to mobilize all countries and partners around SDG4 and its targets, and proposes ways of implementing, coordinating, financing and monitoring SDG4. TVET is directly related to SDG4 with special reference to targets 4-3, 4-4 and 4-5. In SDG4, target 4-3 refers to equal access to affordable technical, vocational and higher education. Target 4-4 aims to increase the number of people with relevant skills for financial success. Target 4-5 is focused on elimination all discrimination in education (UNESCO, 2020).

The Strategy supports the efforts of UNESCO member states to enhance the relevance of their TVET systems to equip all youth and adults with the skills required for employment, decent work, entrepreneurship and lifelong learning, and to contribute to the implementation of the 2030 Agenda for Sustainable Development as a whole. It also proposes indicative strategies that countries may wish to draw upon in developing contextualized plans, taking into account different national realities, capacities and levels of development, and respecting national policies and priorities (UNESCO, 2016).

UNESCO's Strategy for TVET aims to support member states in their efforts to contribute to the transition towards sustainable societies and economies. The vision highlights the right to education, the principles of equity, inclusiveness, and quality and the importance of lifelong learning (UNESCO, 2016). TVET is concerned with the acquisition of knowledge and skills for the world of work, and is expected to help youth and adults develop the skills they need for employment, decent work and entrepreneurship, thereby promoting equitable, inclusive and sustainable economic growth, and supporting transitions to green economies and environmental sustainability (UNESCO, 2016).

The Strategy aims to enable Member States' efforts to enhance the relevance of their TVET systems, and has three priority areas (UNESCO, 2016);

- Fostering youth employment and entrepreneurship

- Promoting equity and gender equality
- Facilitating the transition to green economies and sustainable societies

2.1.3. World Bank

2.1.3.1. Regional TVET Initiative: PASET

PASET focuses on increasing the capacity of universities, research centers and Technical and Vocational Education and Training (TVET) centers to generate knowledge and create skilled workforces, researchers and innovators relevant to Africa's development challenges. It is conducting the project at 3 levels: regional, national, and center levels (PASET, 2019).

i. Regional level

- Harmonization of standards and mutual recognition of qualifications for priority occupations
- Establishment of regional technical TVET centers for policy research, development of strategy, and dissemination of knowledge
- Capacity development for Africa skills competition

ii. National level

- Strengthening of national TVET quality assurance system
- Capacity building for TVET policy development and implementation
- Promotion of regional integration

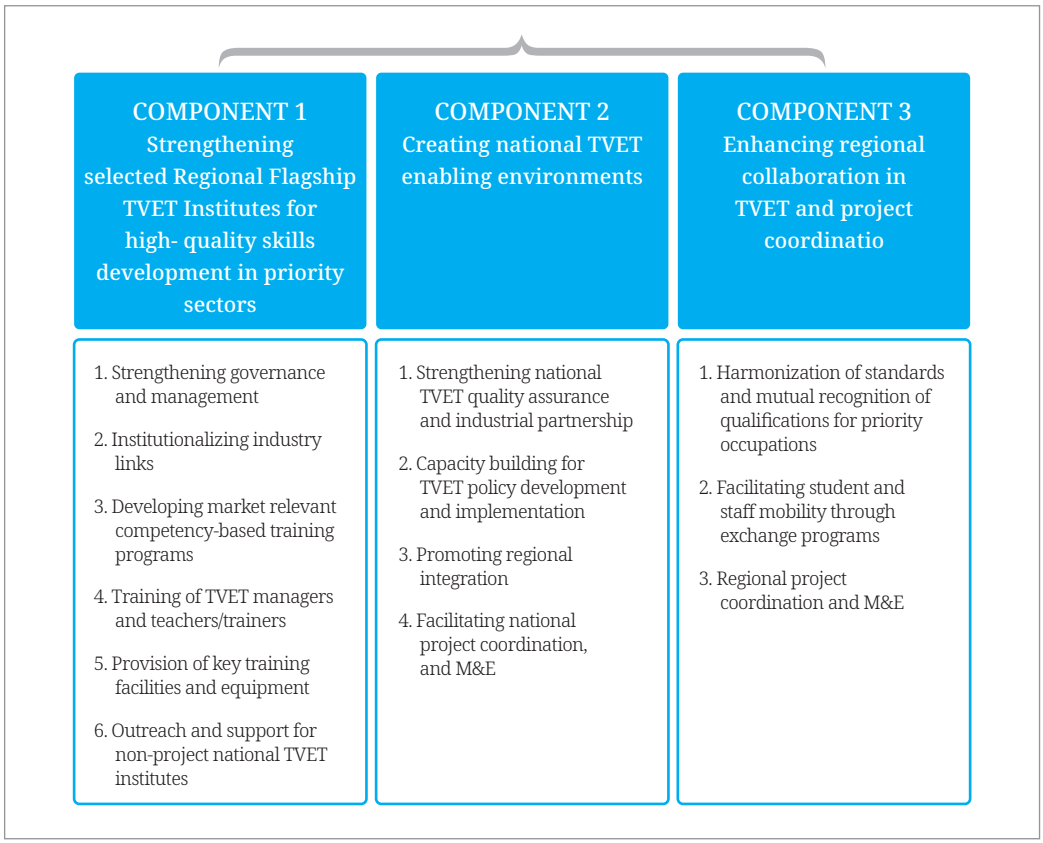
iii.Center level

- Strengthening of center governance and management
- Institutionalization of industry linkage
- Development and implementation of market-relevant and competency-based training programs
- Upgrading of instructional facility and equipment
- Support for national TVET centers that are not covered by the project

2.1.3.2. Regional TVET Initiative: EASTRIP

EASTRIP is East Africa Skills for Transformation and Regional Integration (2019-2024). Project objectives are to increase access and improve the quality of TVET programs and to support regional integration (PASET, 2019).

[Figure 3-1] Components of EASTRIP



Source: The World Bank (2018). East Africa Skills for Transformation and Regional Integration Project (EAS TRIP).

2.2. Cases of Major Countries

2.2.1. Germany

The Federal Institute for Vocational Education and Training (BIBB) was founded in 1970 based on the Vocational Training Act as a federal government institution for policy, research and practice in the field of vocational education and training (BIBB, 2020). It is funded directly from the federal government's budget and is subject to the legal supervision of the Federal Ministry of Education and Research. It is one of the UNEVOC Centers in Germany.

i. Areas of activity

- Regulatory work
- Vocational education and training based on international and European standards
- Vocational education and training research
- Research-based policy consultation
- Vocational education and training in practice

ii. Vocational education and training research

- Examine the ongoing and systematic developments and structures
- Review of the training market's situation
- Transitions into vocational education and training
- Competency development and continuing vocational education and training
- Survey of labor forces
- Collaborates closely with universities and other research institutes in research projects

2.2.2. USA

TVET is known in the United States as Career and Technical Education (CTE). The Center on Education and Training for Employment (CETE) at The Ohio State University is the TVET research institute at the federal level (CETE, 2020). It is an UNEVOC center. The Office of Vocational and Adult Education (OVAE) is the responsible organization for legislation and implementation of TVET at the federal level.

2.2.3. France

The Center for Research on Education, Training and Employment (CEREQ) is responsible for TVET research. Furthermore, French Association for the Development of Technical Education is an UNEVOC Center (UNESCO, 2020).

2.2.4. Australia

The National Centre for Vocational Education Research (NCVER) is a federal level policy institute (NCVER, 2020).

2.2.5. Switzerland

The Swiss Federal Institute for Vocational Education and Training (SFIVET) is a federal level policy institute (SFIVET, 2020). It is also an UNEVOC Center (UNESCO, 2020).

2.3. Lessons Learned

The following implications can be obtained from reviews of international organizations and TVET research organizations in major countries.

2.3.1. Common Providing Access to TVET is a National Responsibility

It is universally understood that it is the responsibility of the state, not the individual, to ensure access to TVET and related opportunities. In this respect, most major countries follow the policy decision-making process through research institutes in order to establish a TVET system and deliver policies effectively.

2.3.2. Research-based TVET Policy and Implementation

Research-based TVET policy and implementation is broadly adapted. Major countries, as well as UNESCO and other international organizations, establish TVET policies and manage quality through TVET policy research institutes. The TVET field requires involvement of not only the education sector in charge of school education, but demands cooperation among the industry, various government departments, and related organizations. Therefore, there is a need for specialized research institutes that can establish TVET policies, coordinate with stakeholders, effectively communicate, and evaluate them.

2.3.3. National TVET Policy Developed by Expert Groups

It is a global practice to implement national TVET policy developed by expert groups such as the national research institute. TVET policies should be established based on opinions from various stakeholders. The policy delivery process should also be coordinated with schools, teachers, students, the industry and employers. Research institutions that can perform these roles smoothly are more appropriate than government organizations to be

tasked with developing TVET policies. Hence, TVET should be promoted based on policies and analysis data that experts in related fields collect and analyze and present scientifically.

2.3.4. Bridging Ideas on TVET and the Real Situation

It is crucial to bride ideas (research) on TVET and the real situation (practice) prevalent in the country. In the field of TVET, theory is important indeed, but balancing the theoretical understanding with reality is more important. In many major countries, research institutes are used to establish and deliver policies taking into account the realistic conditions of the professional world and industry. Governments make and communicate policies, but these policies may be inadequate in addressing real-world situations. Hence research institutes are required to bridge the gap between theory and reality.

2.3.5. Development and Updating of TVET Regulations and Manuals

Development and updating of TVET regulations and manuals periodically is a global practice. For example, BIBB of Germany is a research institute and a regulator in the TVET field. This means that the organization not only conducts research, but also develops and applies regulations and systems related to TVET. Timely development and dissemination of TVET-related regulations, guidelines, and manuals is one of the important tasks that TVET research institutions must perform.

2.3.6. Gathering, Analyzing and Disseminating Data and Information

Gathering, analyzing and disseminating TVET related data and information are important for future-oriented sustainable development. The development and implementation of TVET policies based on data and information are some of the high-priority tasks for TVET policy research institutions. Collecting and analyzing quantitative and qualitative data in the TVET field are very important to scientifically develop a country's TVET system. TVET policy based on accurate data and information is an international standard promoted by major countries and international organizations.

3. Analysis of Ethiopian Situation

3.1. The Ethiopian Research Landscape

3.1.1. Research History

Research in Ethiopia has a long history that evolved with its ancient civilization and literate culture. Ethiopia has a longstanding tradition of scholarship accompanied by outstanding engineering and technological attainments in building and construction, agriculture, food and beverage, metal works, minting, book binding, to mention only a few. The famous stele of Axum, the rock-hewn churches of Lalibela, the Palaces of Gondar and the Walled City of Harar, all stand testimony to the technological know-how of Ethiopians in the past. These technological achievements, which have left their marks in the long history of the country, must have been based on some kind of study and research before they were realized (Ethiopian Academy of Sciences (EAS, 2015).

In the field of agriculture, the late 1940s marked the first phase of agricultural research in Ethiopia following the establishment of agricultural and technical schools in the cities of Ambo and Jimma. Ethiopian agricultural research is one of the oldest and largest systems in Africa. The birth of scientific agriculture in the country was marked in 1955 with the establishment of a full-fledged agricultural experiment station in Debrezeit.[1] Subsequently, the Imperial Ethiopian College of Agriculture and Mechanical Arts (IECAMA)[2] continued as the major research entity until the mid-1960s. In 1966, the Institute of Agricultural Research (IAR) was established by the American staff of the college, as the first nationally coordinated agricultural research system in Ethiopia. It was an autonomous entity assuming the national mandate for addressing all issues related to the country's agricultural research. IAR was later renamed the Ethiopian Agricultural Research Organization (EARO) and is currently known as EIAR - the Ethiopian Institute of Agricultural Research.[3] EIAR is the umbrella federal institution with a large number of centers, sub-centers and trial sites under it. Moreover, agricultural researches conducted at the federal, regional, and university levels constitute the National Agricultural Research System (EAS, 2015).

As one of the world's ancient civilizations, Ethiopia has had its own traditional medical practice that has persisted to the present day. There is no documented evidence of any formal health research or health related audit being conducted in its long history of

1 Now named Debre Zeit Agricultural Research Center.

2 Now named Haremaya university.

3 www.eiar.gov.et/index.php/en/about/eiar-in-brief.

traditional medicine prior to the arrival of modern medicine introduced by European visitors in the 15th and 16th centuries. Anecdotal documents from historians provide the only available information on the health situation of the era, such as outbreaks of epidemics and their aftermath. Establishment of modern institutions of health research in the country started in the past seven decades. Most academic and research institutions related to health were established in the 1950s (Gaym, 2008). The institutions set up by the government (outside the academia) for accelerating research activities in the country include: 1) the Ethiopian Nutrition Institute (ENI) established in 1950, now merged with the Ethiopian Public Health Institute (EPHI)); 2) Pasteur Institute of Ethiopia (now EPHI) established in 1951; and 3) Armauer Hanson Research Institute (AHRI) established in 1969 (EAS, 2015).

The history of research in the natural sciences could be traced back to the establishment of the University College of Addis Ababa in 1950, the precursor of the Addis Ababa University (AAU). For many years, research in the core natural science areas has been and still is limited to teaching departments and schools within the College of Natural Sciences (CNS) mostly as part of PhD and MSc programs. Moreover, significant numbers of recently started research laboratories are housed at different university departments and programs. The AAU has established three research centers related to natural sciences: the Institute of Geophysics, Space Science and Astronomy (IGSSA); the Institute of Biotechnology and the Ethiopian Water Institute (EAS, 2015). In addition to the above, the government recently established two dedicated federal research institutes, viz. the Ethiopian Biotechnology Institute and the Geospatial Information Institute.

Modern technology in Ethiopia may be said to have started in the 19th century with the starting of the foundry at Gafat (north-central Ethiopia) and a road-building enterprise, both established by Emperor Tewodros II. However, teaching and research related to modern engineering and technology started with the establishment of the Imperial College of Engineering in 1953 and the Ethio-Swedish Institute of Building Technology in 1954. These two institutions later merged as faculties with the AAU (EAS, 2015). The Ethio-Swedish Institute of Building Technology is now known as EiABC.[4] It was restructured in 2010 as an autonomous institute of technology under the umbrella of AAU. It provides study programs, conducts research and offers consultancies in all fields concerning the built environment.[5] It was a pioneer in starting rudimentary research in the improvement and development of building materials (EAS, 2015). The Imperial College of Engineering, now known as AAiT[6], started to engage in applied research in 1974 and is currently the leading institute of

4 123The Ethiopian Institute of Architecture Building Construction and City Development.

5 www.eiabc.edu.et/index.php/aboutt/eiabc-history.

6 Addis Ababa Institute of Technology.

technology in Ethiopia. At present, it is functioning with special autonomy with AAU.[7]

The development of social science and humanities research in Ethiopia is embedded in its ancient civilization and literate culture. The two dominant religions – Christianity and Islam – took root in the country early on in their history, and gave rise to indigenous processes of knowledge creation and dissemination, and inspired what we have come to call Ethiopian Studies (EAS, 2015). A book on the modern history of Ethiopia that was written in the 17th century as well as dictionaries and grammar books led the development and expansion of Ethiopian studies in subsequent decades (EAS, 2015). Moreover, the Institute of Ethiopian Studies (IES), since its taking roots in the 1950s and official establishment in 1963, has played an important role in conducting and promoting research in humanities and social sciences.[8]

It has been argued that before the 1970s, research in Ethiopia was largely academic and individualized rather than collective, and sporadic rather than coordinated. The first step towards socially relevant research was taken with the founding of the Institute of Development Research[9] at Haile Sellassie I University in 1972 (EAS, 2015).

Similarly, the first measure to coordinate and regulate research at the national level was taken with the establishment of the Ethiopian Science and Technology Commission (ESTC) in 1975. ESTC was re-established in 1994 following the change in the regime and later changed its name to ESTA (Ethiopian Science and Technology Agency) in 1995. It was further upgraded to a ministry level with the establishment of the Ministry of Science and Technology (MoST) in 2008 and was again re-structured in 2010. In more recent times, it was re-established as the Ministry of Innovation and Technology (MiNT) in 2018, with proclamation no. 1097/2011.[10]

In this respect, ESTC first formulated the Science and Technology (S&T) policy in 1993. Based on this policy, four national sectoral polices were formulated. The 1993 S&T policy was also modified and amplified into the STI (Science Technology Innovation) Policy, issued in February 2012.

The STI policy is aimed at promoting research geared towards technology learning and adaptation, defining the national science and technology landscape and strengthening linkages among the different actors in the national innovation system, among others (EAS,

7 www.aau.edu.et/aait/ and EAS 2015.

8 www.aau.edu.et/ies/.

9 Now named as Institute of Development and Policy Research (IDPR).

10 www.mint.gov.et.

2014). The policy has identified eleven critical issues based on analysis of the national STI situation. Moreover, policy directions and strategies have also been defined for each of the critical issues. These are: technology transfer; human resources development; manufacturing and service providing enterprises; research; financing and incentive schemes; development of national quality infrastructure; universities, research institutes, TVET institutions and industry linkages; intellectual property system; science and technology information; environmental development and protection; and international cooperation (STI Policy, 2012).

The National Science, Technology and Innovation Council (NSTIC) chaired by the Deputy Prime Minister was set up as the highest decision-making body on STI policy, with MiNT serving as the secretariat and the main entity responsible for implementation (STI Policy 2012 and EAS 2014). The council is designed to coordinate, support, and regulate science and technology research within the country. The NSTIC has adopted various guidelines to provide details for the implementation of the policy (EAS, 2014). The guidelines include:

- Strategy for implementation of the National STI Policy
- Guidelines to foster linkage between universities and industry
- Guidelines for establishment of the National Science Technology Research Council and working manual
- Guidelines for research grant
- Guidelines for management of research grants and budget utilization

3.1.2. Research Organizations

Ethiopia offers various forms of research locations: institutions run by federal and regional authorities, universities, non-academic institutes and companies. All in all, there are about 20 research institutions in the country funded by the government, in addition to a few research R&D centers run by industrial corporations. Basically, agricultural sciences, medical & health sciences, and engineering & technology, in the order, are the major fields of research in the government sector (EAS, 2015). Likewise, there are also non-government non-profit organizations, think tanks, and professional associations that are actively engaged in research. Moreover, several international organizations have played a major collaborative role in the Ethiopian research system. The list of federal and regional institutions, universities, industrial institutions, think tanks and collaborative organizations that actively engage in research is presented in the Annex 1.

There are also research departments related to some sectors under federal ministries and the National Bank where their research is directly related to and provides the necessary scientific basis for the execution of independent tasks in each ministry's field of activity. The outcomes of many of the researches conducted in these departments are most impactful in terms of policy issues since most of the studies are commissioned based on high priority policy needs of the country. The government funds the research expenditures in these departments.

Federal research institutions perform research in several areas: agriculture, healthcare, infrastructure, natural resources, animal protection, development, and economic and legal policies. The federal regions of Ethiopia also operate several research institutes that support their respective research activities. At present, regional research institutes focus on agriculture and healthcare (EAS, 2015).

Many of the public universities in Ethiopia act as centers where research, teaching, and outreach are integrated. In these institutions, teaching, basic and applied research, and outreach activities are carried out based on a wide range of themes in the agricultural, medical, engineering, natural sciences, social sciences and humanities domains. Research expenditure at these institutions is borne by public (federal and regional) as well as international funding (EAS, 2015). Public funding to universities is disbursed by the Ministry of Science and Higher Education (MoSHE) and the Ministry of Innovation and Technology (MINT).

The numbers of private universities and colleges are on the rise in Ethiopia. However, the majority of them are more focused on education and training than research activities. However, a few of them are expanding their research activities, mostly in the areas of economics, development, business and law. For instance, the research activities at Unity, St. Mary, and Admas Universities are worth mention here.

Research undertakings by the Ethiopian industrial sector are at present negligible. Whatever limited R&D there is tends to focus on the creation or invention of new products and services or more commonly on the incremental improvement of existing products and services (EAS, 2015).

There are also non-government, non-profit organizations, think tanks, and professional associations that are actively engaged in research. Three institutions that are worth mentioning in this respect are the Ethiopian Economic Association (EEA, set up in 1991), the Forum for Social Studies (FSS, founded in 1998) and Ethiopian Academy of Sciences

(EAS, set up in 2010). EEA established the Ethiopian Economic Policy Research Institute (EEPRI) in 2000 as its research arm with a view to carrying out sustained policy research in the economic sphere. The Association has also established chapters at major towns in collaboration with regional universities to broaden its activity at the regional level. Likewise, the FSS has been conducting policy research and dialogue since its inception with a focus on alleviation of poverty, environmental management and education. Similarly, the EAS is undertaking consensus studies, convening activities such as public lectures, conferences, workshops and symposia on issues of national priority, as well as promoting science, technology and innovation.

3.1.3. Publications

A significant number of researches on various areas have been conducted by several research institutes, universities, and sector based professional associations etc. These research outcomes are mostly disseminated through publications either on national or international journals. There are many sector-specific national and international journals where research results are publicized.

Moreover, think-tanks like the EEA, FSS and the government think tank Policy Study Institute (PSI) conduct conferences, seminars and round table discussions on the country's national development agendas in addition to the research work they are tasked with. They disseminate the results of their activities through publications that include research reports, working papers, periodic reports, journals and proceedings of conferences.

3.1.4. Policy Relevance

Many of the research activities undertaken at the academic and government research institutions have not focused so far on issues of major relevance to policies and strategies in their respective sectors, except perhaps for very limited areas of research such as EIAR, EPHI and the IDR of AAU (EAS, 2015). Moreover, studies conducted at the research departments of a few federal ministries are also exceptions. This is because many of the researches in such departments are conducted to answer specific policy needs. Likewise, the Higher Education Strategy Center (HESC) is worth mentioning in that it is actively engaged in research to prepare policies and strategies that enhance the quality and relevance of the country's education and training system (Proclamation no. 1152-2019).

The most sustained policy-relevant researches are conducted by the independent think tanks such as the EEA, FSS and the government think tank PSI, as well as the sub-regional

research network Organization for Social Science Research in Eastern & Southern Africa (OSSREA). These think tanks have managed to develop research agenda of immediate social and national relevance and disseminate their research findings through policy dialogues, publication of research reports, working papers and policy briefs tailored to the needs of policy-makers (EAS, 2015).

3.1.5. Monitoring of Research

Most of the Ethiopian institutions involved in research have not put the necessary effort toward translating their research outputs into activities in their sectors. Nor have they devised mechanisms for monitoring the implementation of their research results, even in the rare cases where there are operational linkages to their particular sector (EAS, 2015).

3.1.6. Research Funding

Sectors performing Research and Development (R&D) receive their funding from different sources. In the Ethiopian fiscal year (FY) 2016/17 Ethiopia's gross expenditure on R&D was 5.02 billion ETB. The majority (66%) of this expenditure was from the government sector, which increased from its FY 2013/14 level by 158%. This shows the government sector is giving more attention to R&D activities. However, gross expenditure on research and development in FY 2016/17 decreased by 4% compared with the FY 2013/14 level (5.24 billion ETB). Direct provision of funds to R&D performers by all four sectors , local business and other national sources together contributed 2% of the total (Tech-In 2016/2017) expenditure.

According to the FY 2016/17 R&D survey, the amount Ethiopia spent on R&D activities (5.02 billion ETB) was 0.28% of the country's GDP. The budget was used for long-term result-oriented investments in research and experimental development throughout the country. Some of the funds were used to purchase equipment and improve facilities as well as to increase employed capital in R&D (Tech-In 2016/2017).

According to the survey, in FY 2016/17 the largest (32%) R&D investment was made into agricultural sciences. Agricultural sciences consist of forestry, fisheries, animal & dairy science, veterinary science, agricultural biotechnology, and other agricultural studies. The next largest area of investment was the medical and health sciences field, which accounted for 22.2% of the gross expenditure on R&D in FY 2016/17 (Tech-In 2016/2017). This was followed by R&D investments in social sciences and engineering and technology that accounted for 21.3% and 14.7% respectively. The remaining 8.2% and 1.7% of R&D investments went to natural science and humanities respectively (Tech-In 2016/2017).

3.2. The National TVET Research System

3.2.1. TVET Related Organizations

The followings are the lists of TVET related organizations TVET stakeholders mentioned during interview.

3.2.1.1. Ministries of Federal Government

i. Ministry of Science and Higher Education (MoSHE)

The Ministry was established by Proclamation Number 1097/2018 in October 2018. It leads efforts toward the development of science, higher education as well as technical and vocational education and training (TVET) in Ethiopia.[11]

ii. Ministry of Innovation and Technology (MiNT)

The MiNT was established by the Proclamation No. 1097/2011. One of its responsibilities incudes the preparation of national innovation and technology research and development programs based on the country's development priorities. It is the main agency responsible for implementation of the STI-2012 policy that looks at TVET as one of its crucial issues.[12]

iii. Ministry of Labor and Social Affairs (MoLSA)

The Ministry of Labor and Social Affairs was established in 1957 by Legal Notice No. 15. Some of its key responsibilities are to enhance the accessibility of efficient and equitable employment services and undertake studies on manpower employed in the formal and informal sectors, unemployed manpower and occupational classifications in the country.[13]

iv. Ministry of Industry and Trade

The Ministry of Industry and Trade coordinates sector-specific institutions and works with small, medium and large-scale industries that are vital in the TVET system.

11 www.moshe.gov.et.

12 www.mint.gov.et.

13 www.molsa.gov.et.

3.2.1.2. Federal Institutions

i. Federal TVET Agency (FTVETA)

The agency is established under the Council of Ministers Regulation No. 199/2011. It is responsible for development of the TVET system; it plans, organizes, monitors and coordinates the entire TVET system, and stimulates the growth of the country creating competent, motivated and innovative work force. It is also responsible for technology accumulation and transfer in promoting the economic growth. The agency is accountable to the MoSHE (Proclamation No. 954/2016).

ii. Federal TVET Institute (FTVETI)

The Institute serves as training grounds for young and upcoming TVET teachers, leaders and technicians, and is responsible to give initial and further training for all technical and vocational education and training (TVET) teachers in Ethiopia and to provide demand-driven, short term and long-term training for industry. It was established as per Proclamation No. 245/2011, and is accountable to MoSHE.[14]

iii. Higher Education Strategy Center (HESC)

The Center was established based on 1152/2009/Act.no. 88. It is responsible to set strategic directions for higher education and training sub sectors; initiates policy and strategy proposals on the administration of education, education programs, research, and teachers and human resource development; and advices the Ministry on policy issues (Proclamation No. 1152/2019).

iv. Ethiopian Investment Commission

The Commission is mandated with promoting investment opportunities and conditions to foreign and domestic investors. The entity's engagement with the TVET system is in creation of employment opportunities for the young and skilled labor.

v. Job Creation Commission

The Commission was established as per Proclamation 1097/2018. The Commission is mandated with the authority to lead the job creation agenda, coordinate with stakeholders, and monitor and evaluate performance.[15]

14 www.ftveti.edu.et.

15 www.jobscommission.gov.et.

vi. Center of Competence (CoC)

The Centers of Competence are established to develop independent assessment competencies, establish a sustainable financing system for TVET with efficient and cost-effective delivery systems, set management structures, etc. The Centers are accountable to the appropriate regional organ in order to effectively coordinate the occupational competence assessment (Proclamation No. 954/2016).

3.2.1.3. Regional TVET Bureaus/Agencies

The Regional TVET Bureaus/Agencies are accountable to regional governments to undertake duties and responsibilities related to TVET in their respective regions.

3.2.1.4. TVET Institutions

These include public, private or non-governmental institutions engaged in the provision of technical and vocational education and training programs.

3.2.1.5 Industries

i. Industries

Industries' involvement in TVET is crucial as the whole system is "outcome based." Their engagement is required most importantly in the preparation of occupational standards (OS) on cooperation training and as employers.

ii. Ethiopian Chamber of Commerce and Sectoral Association (ECCSA)

ECCSA is an apex organization of Chambers and Sectoral Associations in Ethiopia. It has eighteen members including nine Regional, two City-level, one National and six Sectoral Associations organized at the national level.[16] Their engagement in the TVET system is in providing technical and skill development and employing the TVET trainers.

iii. Ethiopian Employers Federation (EEF)

The EEF is the premier employers' organization of Ethiopia. It is associated with sister federations and branches all over the country as well as sectoral associations of the private sector. It is a vital, highly regarded voice with regard to business, employment, labor, industrial relations, social issues, etc. in the nation.[17]

16 www.ethiopianchamber.com.

17 www.eef-ethiopia.org.

3.2.2. Organizations Engaged in TVET Research Function

Based on the interview results the following government institutions are engaged in TVET research function.

3.2.2.1. Higher Education Strategy Center (HESC)

To formulate policies as well as devise strategic directions for higher education and the TVET sector, an autonomous research-based center, HESC, was established in 2003 by parliamentary legal provision (through Higher Education Proclamation). HESC's mandate was broadened by the Proclamation No. 650/2009 including general education and TVET sub-sectors. The Center was known as Education Strategy Center (ESC) till 2018. In the new administration, the Center got its current name HESC by Proclamation No. 1152/2019, and was mandated to include higher education and TVET sub-sector but not general education. The Center is accountable to the Ministry of Science and Higher Education (MoSHE).

To accomplish its objective, there is a dedicated department at HESC with two teams that develop and analyze policies and strategies related to TVET and higher education. The organizational structure of the Center can be found in the Annex 2 of the Report.

Currently, the key responsibilities of the Center include:

- Setting strategic directions for higher education and training sub sectors (TVET)
- Initiate policy and strategy proposals on the administration of education, education programs, research, and teachers and human resource development
- Advice the Ministry (MoSHE) on policy issues

The Center prepares thematic research areas based on the country's GTP II (Growth and Transformation Plan) and ESDP V (Education Sector Development Program). The Center also conducts on-demand studies on higher education and TVET areas as requested by the Ministry or other federal organizations. The Center organizes validation workshops before finalizing these studies to collect feedbacks from various stakeholders.

The followings are a few of the activities that HESC will be engaged in the next 6 years (2019-2025) to strengthen TVET sector together with MoSHE and other relevant stakeholders.[18] The activities are:

18 FDRE Ministry of Science and Higher Education, draft strategy plan (2019-2025), August.

- Revisit the National TVET qualification framework
- Align TVET qualification framework with the national framework
- Integrate a policy approach that combines TVET, general education, higher education, workplace training and lifelong learning within a broader skills strategy
- Build regional collaborative research capacities of TVET in the priority areas of regional development
- Overhaul the existing national standards for TVET occupational competence assessment and certification that guide input provision, process and output measurement
- Develop a national framework for differentiation of TVET and higher education institutions
- Develop a strategy that enforces institutions' provision and expansion of training based on national and local economy demand and distinctive areas of institutions' competencies
- Increase A & B level enrolment in TVET
- Prepare research strategy to examine links between TVET and the labor market
- Design a policy that promotes curricular and extracurricular activities to facilitate students' interaction with people who are different from them
- Develop a national management and incentive system to enhance productivity of staff in research and community services
- Develop a national polytechnic strategy that governs the selection criteria, arrangement of entrance examination, student's admission, the awarding of qualifications (Bachelor tech. Degrees or applied technology) and others

3.2.2.2. Federal TVET Institute (FTVETI)

The Institute is not only responsible to provide trainings for TVET teachers, but is also accountable in efforts to support a result-oriented TVET system through effective research undertakings. To accomplish its objective, the Institute mandatorily pursues research/project and technology transfer activities by establishing the "Research and Community Service Directorate."[19] The department was established with the necessary facilities and personnel in fulfillment of its core missions along with research/projects.

19 The organizational chart of the Federal TVET Institute can be foundin the Annex 3 of the Report.

The department is responsible to

- Establish close links with industries and TVET institutes and colleges to coordinate studies and consultancy services in various ways.
- Identify major research areas and project works; develop procedures, rules and regulations for the given research; and carry out project work and consultancy services.
- Create an enabling environment and strive to promote the Institute towards being a research and TeCAT project work center
- Organize different fora and panels for dissemination of research/project outcomes
- Properly document research/project outputs, patents and project reports etc.

The Department has identified seven research thematic areas based on need assessment and by collaborating with industries. The lists are as follows:

- TVET governance and leadership
- TVET financing
- TVET delivery
- TVET partnership
- TVET and the labor market
- Equity in TVET
- Technology innovation and transfer in TVET

Based on the identified thematic areas, the Institute invites research papers from both in-house experts and other stakeholders. In collaboration with the TVET agency, they are encouraging TVET trainers to conduct action researches by giving awards.

The Federal TVET institute and its research department organized the First National Research Conference on July 15, 2019. The theme of the conference was “TVET for Technology and Socioeconomic Transformation.” The objective of the conference was to provide a platform for researchers of different disciplines, from academic and research institutions, industry and organizations with the aim of collecting, exchanging and promoting knowledge and new advances. About 16 papers were presented at the conference; four of them were prepared by the Institute. Among the papers presented at the conference, 14 were action researches of which 3 were awarded. The target groups of the papers were elements of the TVET sector (workers, trainers, industries, trainees). The Department

prepared abstracts of the researches, published them as a booklet and disseminated to the participants of the Conference. The titles of the presented research papers are mentioned in the Annex 4 of the report.

Currently, 20 undergraduate and eight post graduate programs are offered at the Institute. On average 40-50 master's dissertations especially in TVET leadership and management areas are produced annually.

3.2.2.3. Federal TVET Agency (FTVETA)

Based on the interview, it was learnt that the Federal TVET Agency does not have its own research department. Whenever there is a need, the Agency requests HESC to conduct studies. The organizational chart of the Agency can be found in the Annex 5 of the Report. FTVETA has been serving as a UNESCO-UNEVOC Centre since 2006 when it acquired government ministry status. So it has a research related function of developing and implementing TVET policy at a federal level.

3.3. National Plan for Strengthening Research System and Competencies on TVET

3.3.1. Federal Level

The MoSHE has prepared a draft strategic plan that will strengthen the current TVET system over the period of 2019-2025. The plans for instance include restructuring the current TVET system and curriculum, and developing a framework for differentiating TVET and higher education institutions in identifying their own niche areas and competencies. Executing these plans will need detailed investigation and analysis of the sector that will further strengthen its research system.

There is an on-going national plan to convert the Federal TVET Institute (FTVETI) to a national technology university. This process will expand research on TVET and introduce measures to include research component to be part of the curriculum.

In line with the process of converting the TVET Institute to technical university, FTVETI also has a plan to establish an inter-institutional research center and also design/develop masters' program on TVET research. These will further strengthen the TVET research system.

3.3.2. Institutional Level

TVET poly-technic colleges and TVET centers do not have their own development plans. However, the regional TVET Bureaus first prepare annual and medium-term plans and invite centers to give feedbacks.

TVET colleges conduct annual market researches on the occupations they provide training in and semi-annually monitor the graduating students (conduct tracer studies).

Research departments are established at TVET colleges; however; these are not currently functional in a significant way. However, the colleges have a plan to strengthen their research departments and also create linkage/networks with other training centers and regional TVET research teams.

3.3.3. Other Policies

The National TVET Qualifications Framework (NTQF), occupational standards, cooperative training, and Center of Competency (COC) are the main policy elements to promote TVET in the education and training field.

There is a formal institutional framework based on aspects such as NOS, NTQF, apprenticeship, and competency oriented TVET. However, it is necessary to prepare a system for performance management and quality improvement from a mid- to long-term perspective.

3.4. Needs Analysis for the Launch of TVET Research Institute

The followings are the opinions collected during interviews with personnel of the government ministries (MoSHE), agencies (FTVETA, FTVETI, and HESC), TVET institutes (TVET polytechnics and colleges), industries, Chamber of Commerce and also with those who have experience on TVET (including teachers, students, consultants). Only the main results are presented here, and detailed information is presented in Annex 7.

3.4.1. Necessity for establishing an independent TVET research institute

- To strengthen the TVET research system and competencies
- To continuously improve the TVET system
- To empirically check whether the TVET system complies with international standards
- Io investigate whether the industry needs NOS
- To improve efficiency and effectiveness and produce a competent work force
- To solve gaps in available information

3.4.2. Legal status of the research institute

- Autonomous and independent without external pressure or interference

3.4.3. Responsible government organization (accountable to)

- Prime minister, MoSHE, MoE, Federal TVET Agency and the Federal TVET Institute
- There were also suggestions to first establish the research department at a directorate level at the FTVETA, and then expand it to an institutional level by gradual development.

3.4.4. Federal or regional

- At federal level with research centers (as a branch) in regions and TVET colleges

3.4.5. Expected roles and functions

- Conduct coordinated research to create the expected human capital and technology
- Regulate the TVET system
- Conduct studies and forecasting of the labor market
- Conduct research on TVET policy and strategy
- Provide necessary information for TVET policy making and planning; collect, organize and disseminate information on TVET
- Create linkage between education, training and industry
- Develop and revise occupational standards and the TVET curriculum
- Research on TVET delivery, TVET assessment criteria and methods, TVET

qualification system, leadership capacity building

- Evaluate TVET institutions and set standards
- Provide career guidance
- Create networks with other national and international research institutions

3.4.6. Expected focus areas

- TVET policy and strategy
- TVET access, equity, quality, relevance, efficiency, governance and leadership
- Financing of TVET
- Industry extension services and technology transfer
- Monitoring and evaluation
- Forecasting the labor market
- Linkages between education and training with employment
- Linkages with other national and international research institutions

3.4.7. Expected target groups

- Policy makers
- Industries and enterprises
- TVET institutes (Trainers, trainees, TVET leaders at different levels, TVET colleges)
- Centers of Competency
- Ministries

3.4.8. Funding

- The Government of Ethiopia should be the major source of fund together with some support from the development agents

3.4.9. Obstacles expected in establishing and running the research institute

- Lack of experience, government and industry engagement, finance, etc.
- Shortage of qualified researchers, leaders, experts, good governance, etc.

3.5. Key Issues Related to TVET Research Institute

Currently, TVET research function in Ethiopia is fragmented in various institutions. The Higher Education Strategy Center (HESC), Federal TVET Agency (FTVETA), and Federal TVET institute (FTVETI) manage some research functions, but the organizations in charge of TVET are not focused on R&D (FTVETA, FTVETI), and conversely the organizations with R&D capabilities are not specifically focused on TVET research (HESC). This causes insufficient R&D in the TVET field and there is no think tank at the national level to plan and implement TVET policy systemically.

4. Korean Experience

4.1. Background of Establishing TVET Research Institute

4.1.1. Korean Context of the Need to Integrate Vocational Education and Vocational Training

Korea has had a system of vocational education that was part of school-based curriculum from late 19th century. Vocational training started as a short-term program to meet the demand for industrial manpower during the period of industrial development in the 1970s. Korea's vocational education and training policy to nurture and supply industrial manpower were divided into vocational education and vocational training until the late 1990s (KRIVET, 2007).

In order to cultivate professional workers, the policy was promoted by separately managing vocational education to develop basic skills for students over a relatively long period, and vocational training to increase professional skills for workers in a short period (KRIVET, 2007). The Ministry of Education has been in charge of vocational education centered on vocational high schools and colleges. The Ministry of Employment and Labor has been in charge of vocational training for workers.

Research and development of related policies for vocational education have been conducted by the Korea Educational Development Institute (KEDI) under the Ministry of Education, and vocational training has been conducted by the Industrial Technology Manpower Research Institute of the Korea Institute of Technology and Education (Korea Tech) under the Ministry of Employment and Labor. However, since the 1990s, with the rapid transition of Korean society into a knowledge-based economy, there is rising

social demand for linking or integrating the hitherto separated vocational education and vocational training.

With the advancement of knowledge and information, and the infinite competition on the global stage, it has become clear that Korean society can no longer grow with the uniform system for training skilled workers as in the past. The vocational education and training system did not reflect changes in the social environment, such as upgrading the industrial structure, higher education, and aging.

The vocational education and training system needed a change in its approach of producing uniform skilled workers, far from the needs of the industrial field. It was necessary to develop an education system that can bridge the gap with the changing labor market and cultivate talents suitable for the vocation and industry field.

This could be solved by integrating and managing vocational education at the pre-employment level and conducting vocational training after entry into the labor market. In order to secure policy consistency and strengthen the establishment of an organic cooperation system among ministries, it was necessary to integrate and manage vocational education and vocational training.

4.1.2. Establishment of KRIVET

On February 9, 1996, the Presidential Advisory Council on Education Reform reflected the needs of the times and introduced the seven major reform tasks for the Establishment of a New Vocational Education System in the Educational Reform Plan for Constructing a New Vocational Education System (II). The Plan proposed the establishment of the Korea Research Institute for Vocational Education and Training (KRIVET) as a research institute to implement these tasks.

The establishment of KRIVET did not take place without disagreement among relevant government ministries. However, with the strong will of the Presidential Advisory Council, the establishment of a research institute could be promoted. It can be seen that strong leadership is needed when stakeholders such as government ministries cannot form consensus.

KRIVET is assigned four main functions, centered on the roles commissioned by the newly enacted Vocational Education 3 Acts. At the very beginning, KRIVET had seven major research projects: first, research and development of policies related to vocational education

and training; second, collection, management and distribution of vocational education and training information; third, development and distribution of vocational education and training programs; fourth, policy research and development on the qualification system; fifth, survey and research for national accreditation of private qualifications; sixth, commissioned business on evaluation and recognition of vocational education institutions and training programs; and seventh, related subsidiary projects of the above.

As work for the establishment of the KRIVET began in earnest, a planning organization for the purpose was formed as a supporting organization. In line with the purpose of integrating vocational education and vocational training, the related staff from relevant organizations such as Ministry of Education, Ministry of Labor, KEDI, and Human Resource Development Service of Korea (HRD Korea) participated in the work.

The establishment work did not progress smoothly as there were conflicting interests of different institutions. Many controversies between the Ministry of Education and the Ministry of Labor over the functions, roles, and organizational status had to be overcome. There were also problems related to research, projects, and adjustment of manpower to be transferred from the KEDI and HRD Korea.

Overcoming these challenges, the Board of Directors was formed in September 1997 and an opening ceremony was held on October 18, 1997. The organization consisted of a board of directors, president, vice president, audit division, planning office, department of policy research, department of curriculum development, department of evaluation and qualification, and department of general affairs. A budget of about 5.6 billion Korean won was secured in 1997 and 8.3 billion Korean won in 1998 from the Ministry of Finance and Economy.

The number of seats secured from the government was 130, but the total number of staff employed at the time of opening was 98. The staff consisted of personnel transferred from the KEDI, HRD Korea, Industrial Technology Manpower Research Institute of the Korea Institute of Technology and Education (Korea Tech), and newly hired personnel.

The opening of the KRIVET had great historical significance in that this research institute dedicated to vocational education and training was born 100 years after Emperor Gojong declared a decree on the establishment of a vocational education institution in 1899.

In most developed countries, based on the recognition that vocational education and training of a country should be centrally managed and nurtured, national research institutes

and related organizations were established to actively promote various research initiatives and projects. The National Center for Research in Vocational Education (NCRVE) of the United States, Qualification and Curriculum Authority (QCA) of the United Kingdom, Centre d'Etudes et de Recherches sur les Qualifications (CEREQ) of France, and Bundesinstitut fur Berufsbildung (BIBB) of Germany are good examples.

In Korea, vocational education managed by the Ministry of Education and vocational competency development under the Ministry of Labor, which lacked mutual cooperation, were integrated and linked to form the basis for comprehensively dealing with human resource development projects at the government level. In a knowledge and information society that demands lifelong vocational competency development, integration of vocational education for students and vocational training for workers helps to maximize synergies beyond the inefficient system that was operated separately. This made it possible to form the basis of the lifelong vocational education and training system.

In July 1998, separate management by each government ministry and individual laws on government-funded research institutes were abolished and incorporated into five sectoral research societies (Economics Society, Humanities Society, and Societies for Basic Science, Industrial Technology, and Public Technology) under the Prime Minister. In 2005, KRIVET was affiliated to National Research Council for Economics, Humanities and Social Sciences (NRCS).

From the beginning of the establishment, KRIVET has made a lot of effort to create a research base and secure talented manpower. Management innovation was continuously promoted. A two-year contract appointment system for hiring a new research position was introduced, and in the case of excellent work and research performance during the contract period, the concerned personnel would be employed in a regular research position. In order to create a competitive atmosphere for research, salaries were also introduced to research and administrative positions. By evaluating individual performances such as research achievements and contributions to institutions at the end of the year, contracts are made to maximize performance through a competitive approach.

Since research and development on vocational education and training has a multi-disciplinary characteristic, KRIVET attempts to secure competent researchers majoring in education, economics, business administration, sociology, psychology, and engineering. At the same time, according to the nature of the research project, a system for joint research was established. In order to maximize the effectiveness of the research outcomes while pursuing minimization of demand for research manpower, an outsourcing system that

actively utilizes external experts was introduced.

KRIVET consisted of employees from different institutions, and because of the multi-disciplinary nature of the research subjects, there were many difficulties in enhancing and integrating mutual understanding. In order to solve this, KRIVET introduced efforts to harmonize bottom-up and top-down decision-making and promote exchange of views for conflict management by collecting opinions through various channels.

4.2. Mission and Functions of KRIVET

4.2.1. Vision and Mission

KRIVET has the mandate of promoting vocational education and training, and contributing to the enhancement of vocational skills of the Korean public. KRIVET is a national policy research institute under the Prime Minister with the vision of serving as 'a global skills development policy research institute that spearheads creation of linkage between education and training with employment' (KRIVET, 2020a). To that end, KRIVET is endeavoring to carry out various research and projects, from policy research on national human resources development and vocational education and training to development of qualification systems and education and training programs, evaluation of vocational training institutes and training programs, management of nationally recognized private qualifications, and provision of job and career information and counseling service (KRIVET, 2020a).

KRIVET conducts forward-looking research and programs that link education/training, employment, and qualifications as well as vocational competency development to promote lifelong vocational education and training and help people build their career competencies (KRIVET, 2020a).

Key responsibilities of KRIVET by regulation are (KRIVET, 2020b):

(i) Conduct research and development for vocational education and training (VET) policy

(ii) Collect, manage, and share information and resources on VET

(iii) Develop and disseminate VET programs

(iv) Conduct research and development for qualification policy

(v) Examine and evaluate private qualification systems for government accreditation

(vi) Perform commissioned work, including the evaluation of VET institutions and the assessment and accreditation of VET programs

(vii) Conduct other projects needed to deliver the missions of KRIVET

4.2.2. Functions

KRIVET's functions are as below (KRIVET, 2020a):

(i) Conduct research on national policies for human resource development and support policy implementation

(ii) Assist the network of stakeholders in technical and vocational education and training (TVET) and human resource development (HRD)

(iii) Conduct research on TVET as part of lifelong learning for all and carry out related projects

(iv) Develop and propagate programs for TVET as part of lifelong learning

(v) Conduct research on national and private qualification systems and support related projects

(vi) Evaluate TVET institutes and their programs upon request from the government

(vii) Provide information and career counseling for employment and career development

(viii) Establish and manage a system for collecting information and analyze the labor market trends on a regular basis

(ix) Promote international exchange of information on TVET

(x) Collect, organize, and disseminate information on TVET

4.2.3. Organization

The organization comprises a President's Office, Vice President's Office, Auditor and Audit Office, and Research Advisory Committee. KRIVET also has four (4) research divisions and two (2) assistant divisions (See Figure 3-2). The research divisions are as below:

(i) Future Human Resources Research Division

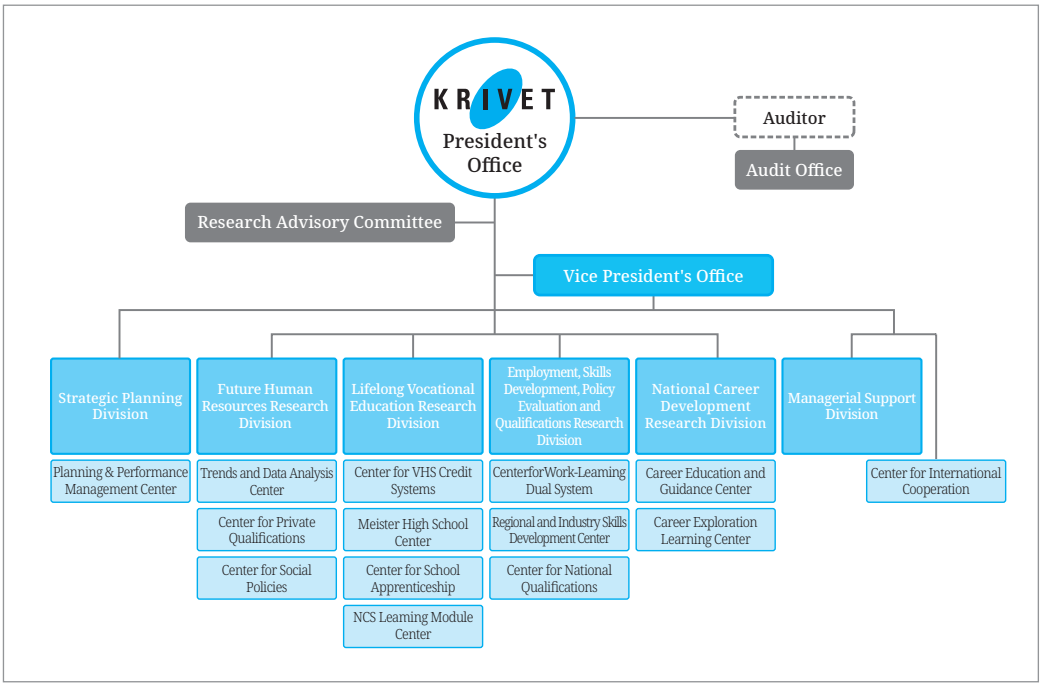
(ii) Lifelong Vocational Education Research Division

(iii) Employment, Skills Development, Policy Evaluation and Qualifications Division

(iv) National Career Development Research Division

The two assistant divisions are Strategic Planning Division and Managerial Support Division.

[Figure 3-2] Organizational Structure of KRIVET



Source: https://www.krivet.re.kr/eng/eu/ea/euGEADs.jsp.

There are a total of 207 employees including the president (KRIVET, 2020a). Among them, 107 are researchers, 34 are administrative workers, and 66 are personnel in other categories. Most researchers have a Ph.D.

4.3. Research and Management

4.3.1. Major Stakeholders

KRIVET conducts three (3) types of research projects, which are academic oriented, policy planning based, and policy implementation based (KRIVET, 2020b). In addition, its projects are divided into basic projects and entrusted projects according to the sources of the research funding. Basic projects are carried out with KRIVET's own budget. An entrusted project is performed at the request of an external agency. About 67% of the total budget

comes from projects commissioned by external organizations and almost all of the funding comes from the government (KRIVET, 2017). So the major stakeholder of KRIVET would be the government for policy making. This means that KRIVET serves as a national think tank for TVET and HRD policy. However, broadly speaking, students, workers, unemployed people, industries, schools, etc. are all stakeholders.

4.3.2. Research Directions

KRIVET set its research directions to lead vocational competency development and strengthen on-site improvements. To achieve this goal, it set up five (5) sub directions (KRIVET, 2020b):

i. Strengthen research for forward-looking vocational competency development

- Create policies for human resources development in response to social advances and future changes
- Modify policies and systems for lifelong vocational education in line with future changes
- Develop a credit system plan for vocational high schools
- Strengthen support for citizens' lifelong career development
- Improve the career education system to prepare for future needs
- Create policies for vocational competency development in response to changes in the job market and the Fourth Industrial Revolution

ii. Expand research aimed at delivering social values

- Conduct research in vocational competency development for the socially disadvantaged groups
- Strengthen research into policies for job seekers with high school education
- Explore ways to support vocational education and training for the socially disadvantaged and the youth who are not into formal education
- Develop ways to ensure access to career education for the socially disadvantaged
- Identify issues and conduct research to advance social policies
- Promote labor-management partnerships for vocational competency development

iii. Innovate lifelong vocational & career education to establish a link between education and employment

- Promote job creation through successful operation of apprenticeship schools
- Strengthen support for employment of high school graduates by improving the competitiveness of the specialized vocational high schools
- Support specialized vocational high schools in strengthening teacher competencies and improving classes
- Support the designation of Meister high schools and evaluation of their operation
- Create a system for supporting career education tailored to individual students and lifelong learners
- Develop smart technology-based contents and teaching methods for career education
- Explore ways to improve career experience programs
- Build sophisticated information and database systems to facilitate lifelong vocational competency development

iv. Build platforms for innovation in vocational education and training

- Support the development and application of learning modules in line with the National Competency Standards (NCS)
- Support the establishment of a national competency system
- Ensure the effective management and operation of qualifications offered by private entities
- Improve the work-learning dual system and support their performance management to strengthen their link to employment
- Strengthen the capabilities of Regional Councils (RCS) and Industry Skills Councils (ISC)
- Build a smart platform for vocational training
- Improve predictions of the demand for vocational development in response to future changes in the job market

v. Promote and improve global research networks

- Share and disseminate KRIVET's research findings across the globe

- Build global networks and strengthen cooperation
- Promote global cooperation to ensure innovative growth and nurture talented individuals

The main research areas in recent times are vocational education, Meister School, vocational training, qualification system, HRD in Korea, industry-academia apprenticeship vocational school, apprenticeship in Korea, and career education (KRIVET, 2020b).

4.3.3. Management

From the time of opening, KRIVET divided the research activity into the types of basic research, policy research, and field research. This was further categorized into long-term tasks and short-term tasks to conduct balanced research.

The research projects suggested by each department were selected through discussion within each research department, organized by the Planning Office, and finally selected by the Research Deliberation Committee. In particular, the needs analysis of external organizations, including the Ministry of Education and the Ministry of Employment and Labor, were investigated, and in the case of appropriate and urgent issues, they were immediately reflected in the research projects.

In order to improve the quality of the research, an intermediate presentation was held during the research phase, and the Research Deliberation Committee conveyed its opinions so that the researcher could reflect the feedback in the research.

The research results were also presented to the Research Review Committee. The research deliberation committees submit opinions for each research project, and the researchers reflect the opinions or submit their suggestions to the deliberation committees so that they consider the researchers' opinions and apply them to improve the quality of the research results.

In order to evaluate quality in a fair manner, a system for evaluating the research and project from the planning stage to the final output was introduced. Not only the internal research deliberation committee but also external experts participated in the deliberation to evaluate the research and project results. To publicize the research and project results, timely themes were selected and seminars, workshops, discussion forums, and HRD policy forums were held periodically. The researchers were provided opportunities to attend long- and short-term training programs at home and abroad to develop research competency.

4.3.4. Rules and Regulations

Rules and regulations are in place at KRIVET to manage research and organizations. The regulations for managing the research project are as follows.

- Research project management guidelines
- Trusted research project management guidelines
- Consignment research project management guidelines
- Rule of research ethics

The regulations for managing the organization are as follows.

- Rules of the organization
- Regulations for personnel
- Rules for assessing employee performance
- Rules of service
- Rules for hiring employees
- Guidelines for external activities of employees
- Articles of incorporation
- Employee code of conduct
- Guidelines for implementing overseas education and training
- Guidelines for overseas business trips
- Guidelines for incentives

4.4. Achievements and Challenges

4.4.1. Major Outcomes

Since its opening, KRIVET has expanded its research areas by constantly striving for the development of policy research projects that are consumer-oriented and in line with the environmental changes surrounding vocational education and training (KRIVET, 2017).

First, a Career Guidance Information Center was opened in August 1999 as a career guidance research and development institute to respond to the society's need for lifelong learning and to support individual career development. The Center develops policy research,

programs and information related to career guidance, and provides career guidance services to schools and institutions including students and adults at each level (KRIVET, 2017). In particular, the Career Information Center developed a cyber career counseling site, CareerNet, on December 27, 1999, to provide help to teenagers who are worried about their career setting. CareerNet has been providing high-quality service as a differentiated menu by targeting elementary, middle and high school students, college students, adults, teachers, and researchers, reflecting the perspective of skill development throughout life (KRIVET, 2017).

Second, KRIVET prepared the cornerstone for human resource development research. In the early days of the opening of the Institute, the research was conducted within the independent domain of each field such as vocational education, curriculum, qualifications, vocational training, and career path, rather than the macro perspective of human resource development (KRIVET, 2017). This is because the policies of the Ministry of Education and the Ministry of Labor were limited to specific areas such as vocational education, vocational training, qualifications, etc. in accordance with the direction of government policy at that time.

In order to establish a vocational education and training policy, first of all, it is necessary to know the size and level of manpower the industry requires. In addition, it is essential to grasp the size of human resources available to cultivate through vocational education and training such that they can meet these demands. It was evaluated that the outlook for the supply and demand of skilled workers was advanced and a more specific perspective, deviating from the existing method of predicting the supply and demand of human resources from a macroscopic approach, was developed (KRIVET, 2017).

Third, KRIVET contributed to the linkage of school-level vocational education and the youths' smooth transition from schools to the labor market through improvement of related textbooks, teaching and learning methods and evaluation (KRIVET, 2017). Through vocational training research KRIVET also contributed to the efforts solve unemployment problems. Policy research raised the construction of a vocational training system that can respond flexibly to unemployment, vitalization of vocational competency development for the socially vulnerable groups in the blind spot of vocational competency development, and development and utilization of human resources for the middle-aged and older people (KRIVET, 2017). From 2013, in line with the development of NCS across all industries, the Ministry of Education started promoting the project for development of the NCS learning module, which presents the core principles of NCS learning materials.

Fourth, research and development of policy related to the qualification system could be organized through systemic research works. It aims to standardize the skills required in common by industry at the national level, emphasize the national competency standards so that education, training and qualifications can be developed using a consistent framework, and comprehensively improve the problems of the qualification system (KRIVET, 2017). It provided the basic data for decision-making regarding policies related to qualifications by analyzing the national and private qualifications market at that time when even the status of qualifications was not properly understood. Research has also been conducted to improve the utilization of qualifications. These studies analyze the linkages and problems of vocational education and qualifications systems, comprehensively evaluate and recognize effective linkage measures and integrate prior learning and experiences acquired by individuals into the newly developed framework (KRIVET, 2017).

Fifth, in order to establish a policy for efficient management of national human resources and career guidance, researches such as the analysis of the changing job world, the identification and dissemination of information regarding promising jobs, and the systemization of job information were performed.

Sixth, based on research related to revitalizing workers' vocational competency development through e-Learning, SMEs were induced to increasingly adopt e-learning, which in turn acted as a catalyst for activation of e-learning (KRIVET, 2017).

Seventh, in order to secure a firm position in the field of vocational education and training, KRIVET established an organic cooperative relationship with domestic and foreign institutions from the very beginning. The government, as well as domestic research institutes, industries, and vocational education and training institutions, actively pursued policy development, joint research, and program development (KRIVET, 2017).

4.4.2. Challenges

KRIVET expanded from the early traditional role of vocational education and training research into diversification of school vocational education, career education and career information provision, vocational qualification system, NCS, Industry Skills Council (ISC), RSC (Regional Skills Council), etc.

KRIVET has so far focused on the quantitative expansion of vocational education and training projects; however, in the future society, TVET needs a close design as a social safety net. Vocational competency development is not the selective right of a certain class,

but rather the basic right of all citizens (natural persons) with sovereignty, and hence the function will be expanded further.

Even in the future society, vocational education and training blind spots, which are most likely to remain as a result of government and market failures, have their impact mostly on vulnerable and marginalized people. Because of the relatively low level of proficiency and the difficulty in participating in vocational education and training, differentiated services are needed to develop customized education and training methods and contents for the vulnerable and marginalized classes, so KRIVET needs to focus more on preparing these improvement plans (KRIVET, 2017).

4.5. Implications and Applicability of Korean Experiences

Korea achieved high-speed economic growth in a short period of time and attracted the world's attention. Human resources were the only factor that could contribute to economic development without accumulated capital in this land without considerable natural resources. Vocational education and training served as a successful mechanism for developing human resources as industrial personnel.

According to the stages of economic development, human resources have been fostered and provided through flexible and rapid adaptation in response to socio-economic environmental changes. In the past industrialization process, the role of office workers who faithfully work for their jobs while exerting the skills and knowledge acquired in school was emphasized and this period was appropriately expressed as the era of lifelong workplace.

However, with the ever-increasing pace of change and development of science and technology and the shortening cycle of knowledge generation and destruction, the world has entered an era where lifelong learning is needed. Rather than working for a long period of time in one workplace, today's workforces follow the goal of lifelong employment where it is desirable for the individual to continuously improve their professionalism and move the workplace with vocational skills.

In the Era of the 4th Industrial Revolution, the national competitiveness must be continuously strengthened by advancing vocational education and training in line with the accelerated changes in science, technology and industry. It is important to secure basic technical skills that can be easily applied to any changes and developments through vocational education and training in the face of a new era of change. In order to improve basic vocational skills, the curriculum and methods of school vocational education and

lifelong vocational training should be reorganized, and support measures to implement them effectively should be expanded.

Given the rapid development of industry and technology, the NOS and NOS curriculum and learning modules must be continuously supplemented and expanded. In order to respond to the era's demand for the development of advanced professional human resources, it is necessary to foster vocational education not only at the secondary level but also higher level.

The vocational education system should be developed in such a way that it contributes to the resolution of youth unemployment, which is the current challenge. At the same time, in order to strengthen social awareness of vocational education and training contributing to industrial development, successful cases must be promoted.

The fundamentals of vocational education and training policy change every time the regime changes, resulting in insufficient policy consistency and difficulties in the pursuit of stable development in the long run. The national TVET research institute should establish a master plan for lifelong vocational education and training and encourage the government to promote the development of TVET consistently in response to environmental changes in the medium and long term. The institute is expected to increasingly assume the role of the think tank and provide research-based advice and leadership in the government's development and implementation of lifelong vocational education and training policies and systems.

5. Policy Recommendations

The success of a research institute depends on accurately selecting the research and development tasks to be performed and producing qualitatively excellent results. In addition, it is also very important to meet the requirements presented by the state and society in a timely manner through TVET research and development.

In terms of TVET delivery, the TVET training institution in Ethiopia needs to upgrade curriculum, facilities, teachers, and methods of teaching and learning. Industry is the most important stakeholder, so it is necessary to ensure industry participation in TVET policy development and delivery system. In order to link industry and TVET training institutions it is imperative to establish a legal basis and an overall financial support system.

The current TVET research function of Ethiopia is in a somewhat ambiguous state. It is not clear which agency is conducting research on TVET. FTVETA, FTVETI, and HESC have some research functions, but either R&D on TVET is not the main function (FTVETA and FTVETI), or R&D is not focused on TVET (HESC). This causes insufficient R&D function in TVET field and there is no think tank at the national level.

This study suggests that the establishment of an independent research institute focusing on TVET is necessary. The necessary matters for the establishment of the institute are presented below. Hereinafter, the name Ethiopian Federal Research Institute for TVET (EFRIT) will be tentatively used for the institute.

5.1. Mission

EFRIT will be an institution focused on research in the field of TVET. Based on the examples of TVET research institutes such as KRIVET, the following missions and roles are presented.

The mission of EFRIT can be set as follows:

- Serve as the leading national think tank on TVET
- Development of industry-friendly policy
- Competency development for TVET teachers and students
- Improving TVET quality and validity
- Improving equity and fairness of access opportunities for TVET
- Facilitate linkage and engagement among stakeholders within TVET

The role of EFRIT would be suggested as below:

- Analysis and forecasting of national human resource supply and demand
- Planning and monitoring on TVET policy
- Design and delivery of National Qualification Framework (NQF), National Occupational Standards (NOS), and a professional certification system
- Performance evaluation of TVET agencies (quality, feasibility, etc.)
- Research on the state of the labor market
- Promote the transition from school to labor market

- Development of TVET curriculum and learning materials
- Enhancing industry-school cooperation (apprenticeship, cooperative education, etc.)
- Provide information on TVET programs and institutions
- Support professional development of TVET teachers and trainers (continuous professional development: CPD)
- Support the setting up and operation of sector skills council (SSC)
- Ensure access and opportunities for career education and service for students and adults (career development information system)
- Promotion of international cooperation

The above missions and roles are just some examples, and it is necessary to supplement the contents that fit Ethiopia's reality with reference to these guidelines. In general, an institution presents a vision, mission, function and role, and task. EFRIT also needs to work on this in the future.

It is necessary to establish an initial institutional operation plan for the establishment of EFRIT, considering factors such as internal and external environmental changes (global, economic and social environment, etc.), EFRIT institution status, mid- to long-term development goals and focus targets, sector-wise implementation strategies and systems, and annual action plans (tasks).

5.2. Governance

Legal groundwork is needed so EFRIT could have the right to operate proactively and express views independently without external pressure or interference. This also helps ensure institutional sustainability. It is desirable to designate the Prime Minister as the responsible federal government official. However, as expressed in the opinion survey, the Institute may start at the departmental level in its early stages.

EFRIT could be newly established, or alternatively it is possible to consider ways to strengthen existing research functions in HESC, FTVETA and FTVETI. In the case of establishing a new institution, as in the case of KRIVET, it is necessary to establish relevant legal grounds, consider the mode of differentiation from existing organizations, secure budget, design organizational structure and appoint responsible ministries, etc.

The legal basis may differ depending on whether a new organization is established or an existing one reorganized. When starting a new institution, it is necessary to have in place laws and regulations related to the establishment of public institutions. Also, KRIVET has the status of a public institution. EFRIT may be based on a separate law, or a law related to the establishment of a public research institute funded by government.

In the case of strengthening the research function of an existing organization, it is necessary to decide which organization to be selected. Currently, although it mainly focuses on the general administrative function, the FTVETA is considered to be the most appropriate institution in terms of the related business progress. As an institution focusing on research function, HESC currently has only five researchers, and if choosing this institution, it is necessary to greatly complement the researchers.

There would be two options for the EFRIT:

- Option 1: Establish a new one.
- Option 2: Restructure existing organizations; a suitable candidate would be FTVETA, which is now responsible for the implementation of TVET strategy and oversees the activities of the sector.

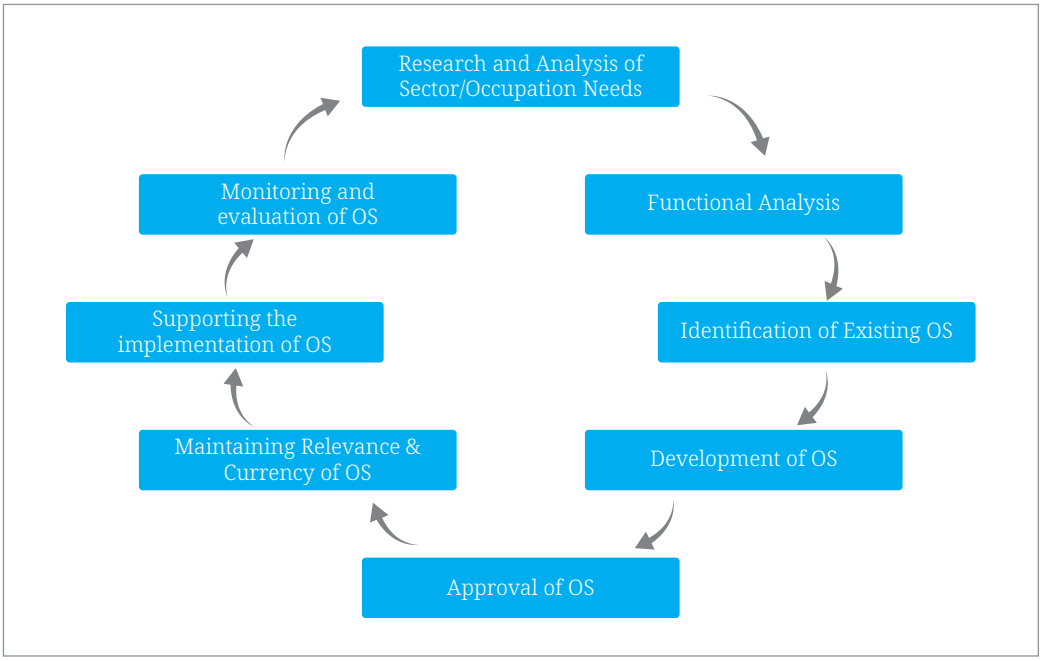
To secure sustainable budget, it is also necessary to strengthen the legal background. Legislation for financing of TVET policy and research institute should be regarded.

It is important to establish an operational structure (virtual circulation, ecosystem) that can be applied in practice, considering that it is very difficult to establish link and cooperation between related organizations due to the nature of the TVET field.

5.3. Status

It is necessary to expand the currently insufficient level of TVET research function in Ethiopia. For example, [Figure 3-3] shows the current function of FTVETA. It is mainly focused on development and implementation. It is relatively vulnerable when it comes to development of curriculum, teaching & learning materials and assessment tools. Thus, it needs to engage in more research and quality assurance function. It could cooperate with other organizations in performing some sort of such function.

[Figure 3-3] Current Function of FTVETA



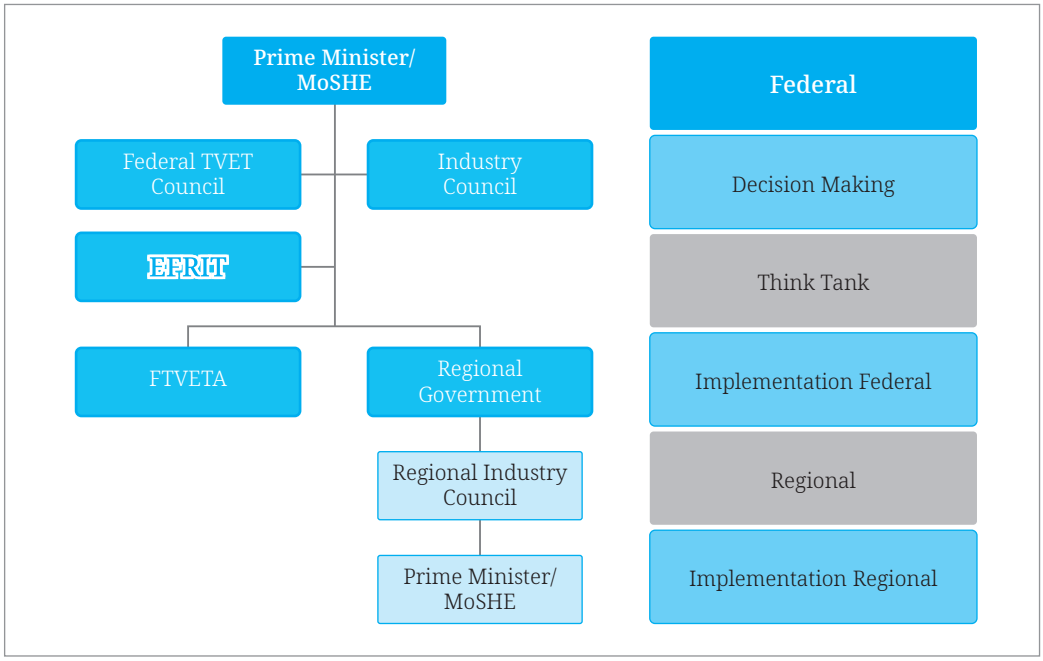
Source: FTVETA (2019). Ethiopian TVET System, presentation document for the 1st Seminar of KSP.

HESC also has a quality assurance team and policy and a strategy development team, but it has too small a number of researchers to conduct policy research and development. FTVETI also has an Office of Research & TECAT at the deputy directorate level. It is oriented toward teacher training rather than overall policy research on TVET.

As already suggested above, it is necessary to reorganize the roles and functions of these institutions in a way that focuses on TVET research or alternatively establish a new institution. This is because research-related functions currently performed by related institutions have limitations in covering the entire Ethiopian TVET policy research.

[Figure 3-4] shows the desirable position of TVET research institute within the current Ethiopian TVET system. The institute needs to perform policy research functions in cooperation with the federal and local governments. KRIVET is also a public institution, not a government organization, and plays the role of linking the central government, local governments, and related organizations. In this position, it is necessary to facilitate the linkage between related organizations and policies. However, in order to play a stable role, it is desirable for the institute to be assigned a pan-governmental status under the Prime Minister's Office such as in the case of KRIVET.

[Figure 3-4] Suggested Position of TVET Research Institute in Ethiopia



EFRIT should establish a master plan for lifelong vocational education and training and assist the government in its efforts to promote the development of TVET policy consistently in response to environmental changes in the medium- and long-term period.

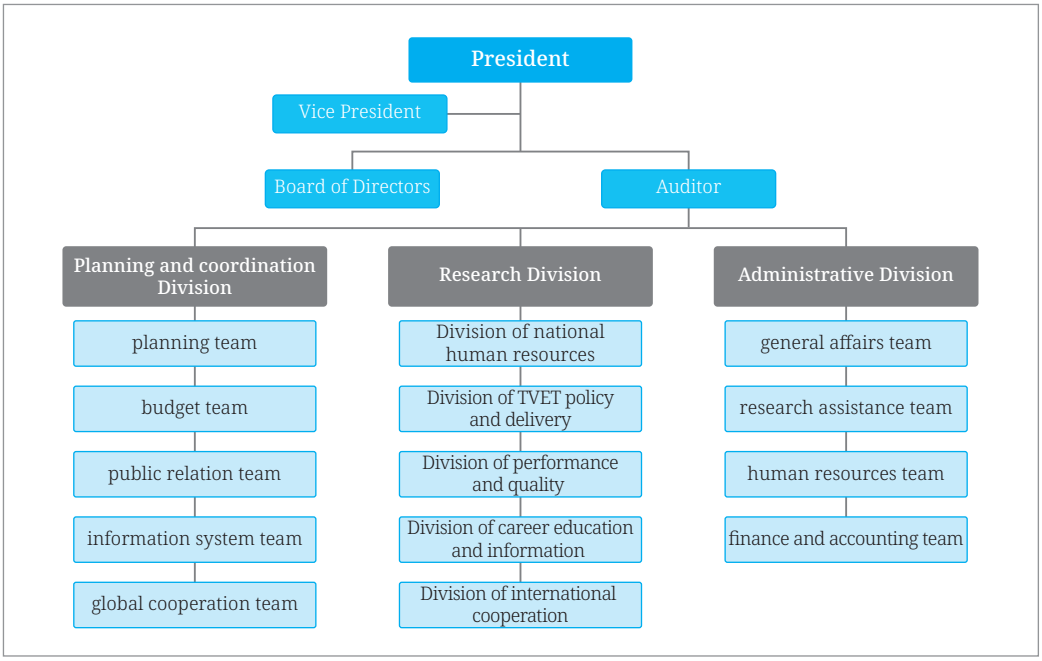
5.4. Organization

The organization of EFRIT can be largely divided into research, planning, and administration functions.

The main organizations are consisted as follows, including the President or Director:

- President/Director
- Vice President/Director
- Board of Directors
- Auditor
- Planning and Coordination Division: planning team, budget team, public relations team, information system team, global cooperation team
- Research Division: divisions for research areas (described in the next article)
- Administrative Division: general affairs team, research assistance team, human resources team, finance and accounting team

[Figure 3-5] Suggested Organizational Chart



5.5. Research Areas

The research functions of EFRIT need to deal with the following fields centering on TVET in connection with the roles already presented above. It is necessary to set detailed research topics for each research field.

5.5.1. Division of National Human Resources

- Forecasting and analysis of human resources supply and demand by industry
- Linkage of TVET policy between federal and regional governments
- Sector Skills Council (SSC)
- Transition from school to labor market
- Policy linkage between government departments

5.5.2. Division of TVET policy and delivery

- National Qualification Framework (NQF)
- National Occupational Standards (NOS)
- National TVET Qualifications Framework (NTQF)

- Professional certification system
- TVET curriculum and learning materials
- Identification and dissemination of best practices
- Industry-school cooperation (apprenticeship, cooperative education, etc.)
- TVET teachers and trainers

5.5.3. Division of Performance and Quality

- Evaluation of TVET policy
- Analysis of the employment and labor market
- Evaluation of TVET institutions and programs
- Quality assurance of TVET institutions and programs
- Vocational competency development for the vulnerable

5.5.4. Division of Career Education and Information

- Information on TVET programs and institutions
- Policy on national career education and service
- Job research
- Career education curriculum in school
- Career services for adults
- Career development information system

5.5.5. Division of International Cooperation

- International joint research and projects
- Consulting and support for international cooperation projects
- Collection and dissemination of overseas information materials
- Official Development Assistance Research and Cooperation

The above research fields and topics are presented by way of example. EFRIT is advised to find its own research topics that fit Ethiopia's situation. Opinions from various stakeholders must be collected in this process.

5.6. Human Resources

Securing competent human resources is essential to improving the competitiveness of institutions. In principle, fairness must be secured through an open recruitment process. In the early stage of establishment, it is also a common practice to transfer personnel with experience from related organizations (FTVETA, FTVETI, and HESC). At the time of establishment, KRIVET started with manpower transferred from related organizations and newly hired employees. We believe that the appropriate number of people would be at least 100. KRIVET started with around 100 people and currently has over 200 staff. Appropriate personnel will be able to determine the size and business of the institution (KRIVET, 2007; KRIVET, 2020a).

In particular, researchers need to have a master's or doctorate degree in a related field. In order to confirm that there is sufficient research capability, the research performance should be checked through review of related papers. In addition, it should be made mandatory for candidates to present research proposals to confirm the planning, presentation, and creativity of the research project. Applicants with work experience or qualifications from related industries may be treated preferentially. The staff recruitment process may include documentation, exams (if necessary), and interviews.

EFRIT should provide continuous opportunities for professional development of employees such as sabbatical, paid learning leave, short term training programs, and etc. In order to develop competencies, it is also possible to set the rules for employees to mandatorily participate in learning programs for a certain period of time. KRIVET mandates researchers and administrators to participate in minimal learning.

5.7. Financing

As mentioned before, it is necessary to secure a legal basis for the stable operation of the institution. Through this, the government should ensure that EFRIT has the budget to carry out sustainable research projects.

EFRIT can secure budget in two ways. The first is related to the basic tasks carried out by government budget. This includes basic research and mid- to long-term research projects related to TVET. In particular, it is necessary to carry out programs related to major policies implemented at the national level through the government budget.

Second, research expenses can be secured through the execution of tasks entrusted by

external organizations. This is a mode in which research projects are received from public institutions, local governments, TVET institutions, and industries by exerting capabilities that only EFRIT can perform.

The government's full funding is another way to ensure stable operation of the institution. However, in order to secure the competitiveness of the institution in the long term, it is advisable to increase the financing while responding to the needs of the external market. In the case of KRIVET, only 70% of the labor cost is secured through government budget. The rest is covered through the execution of tasks entrusted by external organizations (KRIVET, 2020a).

It is also possible to secure financial support from international organizations such as the World Bank at the beginning of the institute's operations. This will require close consultation with international organizations involved in the establishment and operation of the institution. It is believed that the operation of EFRIT can be supported through the EASTRIP promoted by the World Bank.

5.8. Rules and Regulations

Rules and regulations of EFRIT are needed to manage research and organizations. Some exemplar regulations for managing the research project are as follows. These are based on KRIVET's research project management regulations.

- Guidelines for management of research projects
- Guidelines for management of trusted research projects
- Guidelines for management of consignment research projects
- Rules of research ethics

The regulations for managing the organization are as follows. These are based on KRIVET's organizational management regulations.

- Rules of organization
- Regulations for personnel
- Rules for assessing employee performance
- Rules of service
- Rules for hiring employees

- Guidelines for external activities of employees
- Articles of incorporation
- Employee code of conduct
- Guidelines for implementing overseas education and training
- Guidelines for overseas business trips
- Guidelines for incentives

These regulations and guidelines need to be revised periodically. To this end, it is necessary to operate an organization such as the Regulatory Amendment Committee.

5.9. Quality Assurance

Quality management of research projects is absolutely essential to ensure the sustainability of the research institute. To this end, it is necessary to establish an organizational-level research quality management system as well as strengthen individual research capabilities. In order to manage the quality of research projects, it is advisable to organize and operate quality management mechanisms such as a Research Project Deliberation Committee.

It is necessary to check whether the projects are progressing properly in each stage of planning, execution, and finalization. This is a process that requires collective intelligence. Collective experiences and ideas should be supported and prioritized over individual opinions of researchers. Various opinions of industry and TVET personnel should be gathered in this process. The participation of government policy makers is also necessary. Of course, research ethics must be clearly observed in the course of conducting research.

In addition to research projects, regular monitoring of the organization's management and operation is necessary. It is also recommended that the institute submit to management diagnosis from an external professional consulting institution every year to determine whether the research institution's management is moving in an appropriate direction. KRIVET receives regular evaluations by the supervisory institution every year.

5.10. Sustainability

It is necessary to develop a framework for securing the sustainability of EFRIT from the perspective of capacity development by extending further from the NIA of UNDP

(2017), which has been already presented in <Table 3-1>. UNDP (2009) suggested a capacity development approach that identifies four core issues representing the domains where changes in capacity take place most frequently (See Annex 6). These four core issues are institutional arrangements, leadership, knowledge, and accountability.

The UNDP provides a comprehensive set of issues from which an institution can choose as it defines the scope of its performance assessment (UNDP, 2009). These might be applicable in securing sustainability for EFRIT. UNDP (2008) also suggested a checklist for quality program and project formulation. Given that UNDP identifies capacity development as its overarching contribution to development, the programs and initiatives it supports should contribute to sustainable development of national and local capacities (UNDP, 2009).

Capacity development can be measured in terms of changes in the performance (efficiency and effectiveness), stability (risk mitigation and institutionalization) and adaptability (investment for growth and change and continuous improvement) of a given institution (UNDP, 2009, see Annex 6).

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Appendix 1

• List of Institutions Involved in Research

Sector	Federal and Regional Institutions	Universities	Non- Gov., Non-Profit, Think Tanks, Professional Associations	International Collaboration
Agricultural Research	Ethiopian Agricultural Research Organization (EIAR) (15 research centers) Regional Agricultural Research Institutes (RARIs) (32 research centers) Agricultural Transformation Agency	Haramaya University Jimma University Hawassa University Mekele University Bahir Dar University Ambo University Arbaminch University Addis Ababa University	Ethiopian Academy of Science	International Agricultural Research Centers (IARCs) International Livestock Research Institute International Water Management Institute (IWMI) International Food Policy Research Institute (IFPRI) The United Nations Food and Agriculture Organization (FAO/ UNDP) The National Animal Health Diagnostic and Investigation Center (NAHDIC) The Tsetse and Trypanosomiasis Surveillance and Control Technology (Blue-Black-Blue Trap) International Atomic Energy Agency
Health Research	Ethiopian Public Health Institute (EPHI) Armauer Hanson Research Institute (AHRI)	Ababa Ababa University Jimma University Bahir Dar University Haramaya University Mekele University Gondar University Hawassa University Arba Minch University	Ethiopian Public Health Association (EPHA) Save the Children Federation Young Lives Project Ethiopian Academy of Science	WHO, UNAIDS, UNDP and UNICEF Swedish International Development Agency (SIDA) Centers for Diseases Control and Prevention (CDC), Dutch, Irish, Austrian and Norwegian Embassies The World Bank

<List of Institutions Involved in Research> Continued

Sector	Federal and Regional Institutions	Universities	Non- Gov., Non-Profit, Think Tanks, Professional Associations	International Collaboration
Engineering and Technology Research	Ministry of Urban Development, Housing and Construction (MUDHC) Ministry of Water, Irrigation and Energy (MoWIE) Ethiopian Roads Authority (ERA). Technology and Innovation Institute Ethiopian Space Science and Technology Institute Leather Industry Development Institute (LIDI) Textile Industry Development Institute (TIDI) Metal Industry Development Institute (MIDI) Ethiopian Kaizen Institute (EKI) Metal and Engineering Corporation (METEC) Ethio-telecom	Ababa Ababa University Addis Ababa Institute of Technology (AAiT) Ethiopian Institute of Architecture, Building Construction and City Development (EiABC) Jimma University Bahir Dar University Mekele University Hawassa University	Ethiopian Academy of Science	Collaborative research and PhD programs with AAiT and various foreign universities
Natural Science Research	Ministry of Mines Geological Survey of Ethiopia Ethiopian Mapping Agency Meteorological Agency of Ethiopia Ethiopian Biotechnology Institute Geospatial Information Institute	Ababa Ababa University AAU - Institute of Geophysics, Space Science and Astronomy (IGSSA) AAU - Institute of Biotechnology AAU - Ethiopian Water Institute Jimma University Bahir Dar University BDU - Institute of Biotechnology BDU - Blue Nile Water Institute. Haramaya University Mekele University Gondar University GU - Climate Change Research Center Adama Institute of Sustainable Energy	Ethiopian Academy of Science	Several international agencies and foreign universities fund and assist the research programs carried out at the College of Natural Sciences

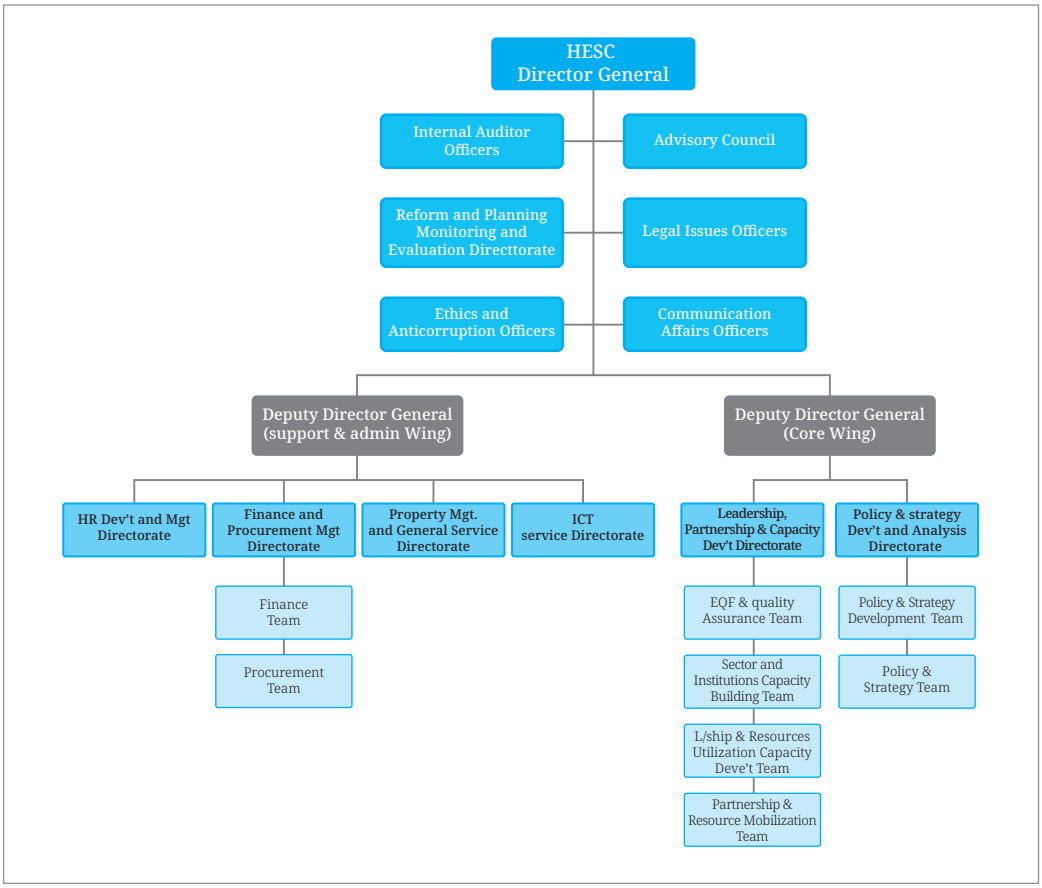
<List of Institutions Involved in Research> Continued

Sector	Federal and Regional Institutions	Universities	Non- Gov., Non-Profit, Think Tanks, Professional Associations	International Collaboration
Social Science and Humanities Research	Policy Study Institute (PSI) Ministry of Culture, Sports and the Young National Museum of Ethiopia National Archives and Libraries Ethiopian Justice and Legal Research Institute Ethiopian Economic Policy Research Institute International Peace and Security Institute	Ababa Ababa University Bahir Dar University AAU – higher education institution (HEI) AAU – Institute of Ethiopian Studies (IES) AAU – Institute of Development Research (IDR) AAU – Centre for Research, Training and Information for Women in Development (CERTWID) BDU – Abbay Culture and Development Research Center BDU – Institute of Pedagogical and Educational Research (IPER) GU – Research Center for Social Sciences and Humanities Unity University – Centre for Ethiopian Strategic Studies (CESS)	Ethiopian Economic Association (EEA) Ethiopian Economic Policy Research Institute (EEPRI) Forum for Social Studies (FSS) Organization for Social Science Research in Eastern and Southern Africa (OSSREA) Ethiopian Academy of Science	International collaborative agreements with AAU for research and PhD programs African Capacity Building Foundation (ACBF) International Food Policy Research Institute (IFPRI) Ethiopian Strategy Support Program (ESSP) – IFPRI International Growth Center (IGC) Think-Tank Initiative of IDRC UNDP DFID Embassies (Netherlands, the Irish, the Norwegian and the Danish) Civil Society Support Program (CSSP)

Source: Ethiopian Academy of Sciences (EAS), 2014, "Ethiopia Country Study", IFS-AAS Project on Developing an Enabling Scientific Equipment Policy in Africa, Addis Ababa, Ethiopia Websites of various research institutes.

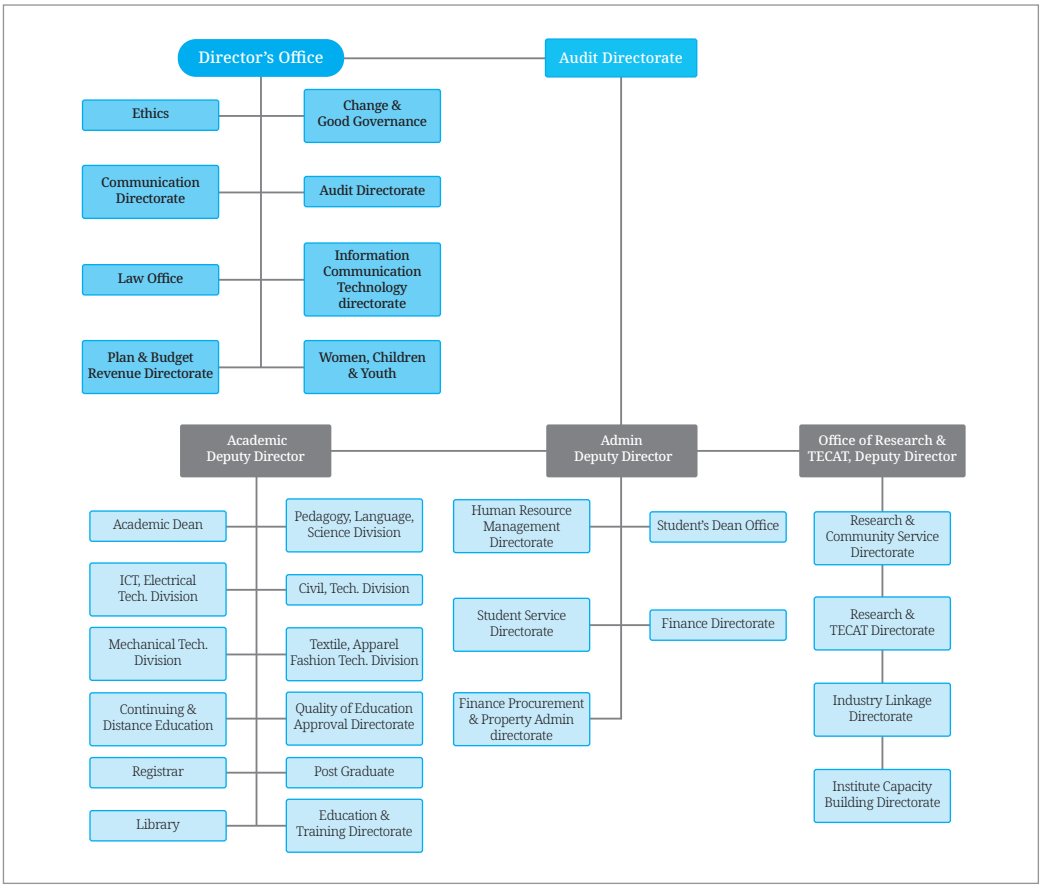
Appendix 2

• HESC Organizational Structure



Appendix 3

• Federal TVET Institute Organizational Structure



Appendix 4

List of Research Titles Presented in the First National Conference

Theme: TVET for Technology Development and Socioeconomic Transformation

Subtheme: TVET Quality, Equity and Relevance

1. Quality of TVET delivery in Ethiopia
2. Skilling, technology development and industrialization: Implications to Ethiopian skill development while part of the world is catching up the fourth phase of industrial revolution?
3. Quantitative analysis of higher education quality in Ethiopia: application of standard based management and recognition tool (SBM-R)
4. Gap assessment on technology and transfer, Somalia region

Subtheme: TVET Trainers and Leaders' Preparation and Development

5. Coached cooperative learning and students' test score: impact assessment using randomized control trials
6. Analyzing trainees' English language needs of selected TVET colleges in Addis Ababa city administration and Oromia regional state

Subtheme: TVET Technology Adoption, Innovation and Transfer

7. Development of Kaizen sustainability model for medium manufacturing enterprises of Ethiopia
8. Efficiency of slow sand filtration in removing bacteria and turbidity from drinking water in rural communities of central Ethiopia
9. Design and development of manual textile chemical mixing and processing machine
10. Eco-friendly dyeing of single Jersey knitted fabric with a natural dye extracted from flower of bottlebrush (Callistemon Citrinus) by using Mordant (Juniper)
11. Leather and leather products from chicken leg waste

12. Analysis of factors influencing transfer of technology among micro and small enterprises in Ethiopia

Subtheme: TVET and Entrepreneurship

13. Uncovering the backings to passion: why do small firm owners/managers engage in entrepreneurship?

14. Determinants of participation in entrepreneurial activities in Arsi zone, Oromia, Ethiopia

Subtheme: TVET System and the Labor Market

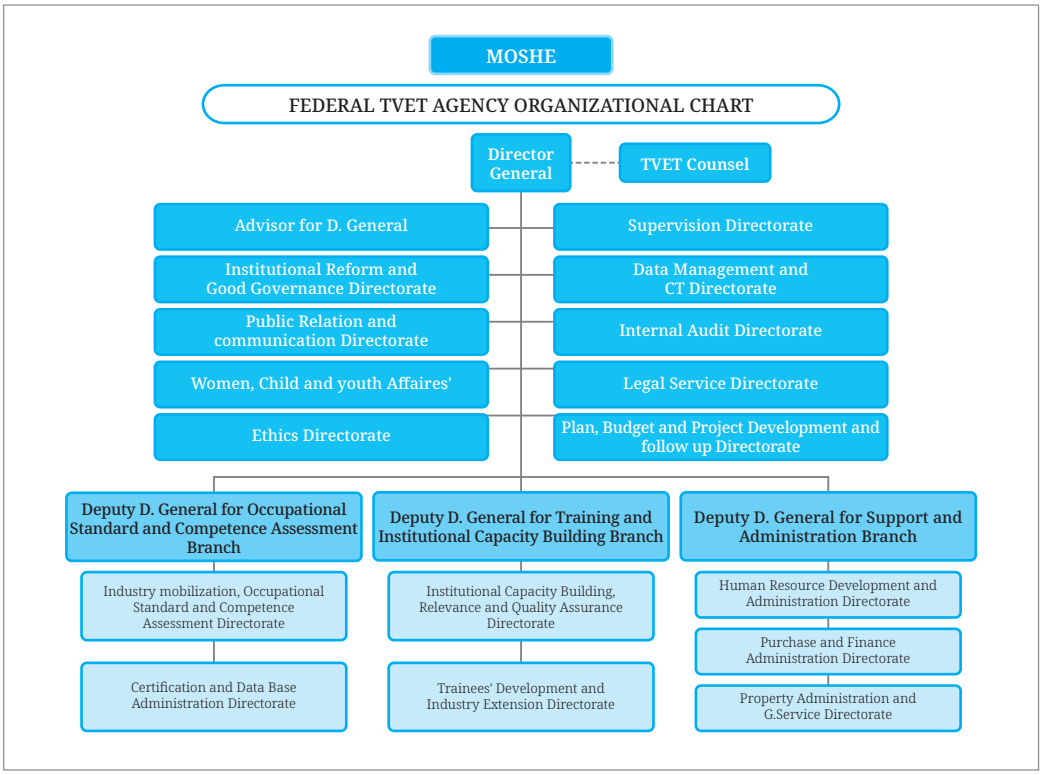
15. Unleashing the capability asset of TVET graduates for Ethiopian economic development

16. Assessing the roles of TVET program to enhance youth employment in selected TVET colleges of Addis Ababa city administration

Source: Federal TVET Institute, 2019, "Book of Abstracts", Research and Community Service Directorate, Addis Ababa.

Appendix 5

• Federal TVET Agency Organizational Structure



Appendix 6

• UNDP's (2008) Core Issues and Action Areas for Capacity Development

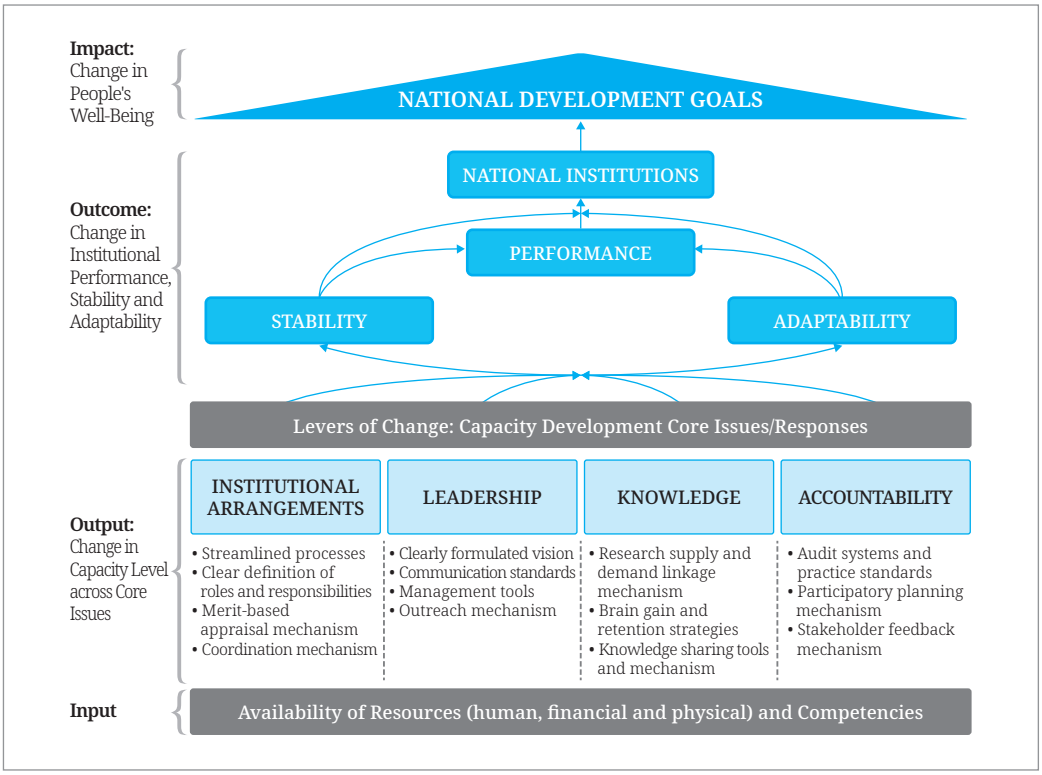
Core Issue	Program Outputs	Indicative Activities
A. Institutional Arrangements	1. Functional Clarity	a. Mandate and role clarifications b. Streamlined business processes c. Enforcement and compliance mechanisms
	2. Effective Human Resources Management	a. Knowledge access and skills development b. Predictability and types of monetary and non-monetary incentives c. Ethics and values interventions, attitudinal change interventions
	3. Robust Coordination Mechanisms	a. Horizontal/peer coordination convened by an apex agency b. Vertical coordination between central and local state bodies c. Convening authority and capacity of coordination bodies
	4. Monitoring and Evaluation Systems	a. Integrated M&E framework b. Independent and peer review mechanisms c. Feedback loops and feedback mechanisms
	5. Partnerships for Delivery of Services	a. Public-Private Partnerships for service delivery b. National Implementation and procurement capacity c. Public interface for services delivery
B. Leadership	1. Clarity of Vision	a. Joint visioning exercises – systems thinking b. Setting priorities; sequencing & strategic planning techniques c. Advocacy & communications
	2. Coalitions Management Services	a. Process facilitation b. Identification & support to champions and agents of change c. Negotiations techniques d. Cross-cultural and gender modules; confidence building modules
	3. Transformation and Risk Management Skills and Services	a. Decision-making skills b. Risk assessment & analysis c. Ethics and values d. Executive/technocratic management skills
	4. Leadership Attraction and Retention Systems and Mechanisms	a. Coaching & mentoring b. Experimental learning c. Incentives d. Succession planning e. Brain gain strategies
C. Knowledge	1. Education Reform Strategy	a. Linking issues of learning and knowledge needs to access and introduction of educational reforms b. Advocacy, voice and support to coalitions that look at increased investments in, and improving quality of, education. c. Mapping of human skills, institutions and investments that support CD d. PPPs in education sector

<UNDP's (2008) Core Issues and Action Areas for Capacity Development> Continued

Core Issue	Program Outputs	Indicative Activities
C. Knowledge	2. Methodologies for Continued Learning	a. Expertise on training and learning methodologies b. Bringing the CD approach into in-service civil service training and incentives.
	3. South-South Learning Solutions	a. Linking to regional education networks and institutions - facilitation and support for learning networks b. Brain gain and retention strategies c. Institutional twining arrangements
	4. Domestic Knowledge Services, Knowledge Management Mechanisms and Knowledge Networks	a. Seeding a pool of local talent/national expertise; local consulting market b. Supporting local knowledge capture mechanisms in a more robust, systematic and concerted manner. c. Local Community of Practice and local networks.
D. Accountability	1. Clarity of Accountability Systems	a. Checks and balances: Result-based management b. Horizontal accountability c. Regulatory and oversight capacity of public institutions
	2. Stakeholder Feedback Mechanisms and Systems (also mentioned under institutional arrangements)	a. Developing monitoring capacities of both state and non-state entities b. Independent partner review mechanisms c. Identifying and strengthening feedback loops, to enhance institutional responsiveness and enforcement mechanisms
	3. Voice Mechanisms	a. Promoting participatory monitoring processes and instruments b. Institutionalizing participation frameworks, methods and tools c. Advocacy on literacy and civic education d. Language reforms and access to information

Appendix 7

• UNDP Framework for Measuring Capacity Development



Source: UNDP (2009). Measuring Capacity Development Practice Note, UNDP/BDP/CDG.

Appendix 8

- **Result of Needs Analysis on Newly Introducing a TVET Research Institute**

(i) Establishing an independent TVET research institute is important for Ethiopia because:

- It will strengthen the TVET research system and competency.
- It will bring continuous improvements to the TVET system.
- Ethiopian TVET is not researched well and none of the existing organizations are engaged in full-fledged research.
- It is through research that we can empirically check whether the country is on the right path or not, it complies with international rules and checks if it will take us to what we want to achieve.
- It is through research that we can investigate whether the currently identified occupations are certainly needed by the industry.
- It is the only through a scientific approach that we can improve the efficiency and effectiveness of TVET that will enable us to produce a competent work force that meets industry demand.
- It will strengthen research capacity and innovation,
- It will solve the available information gap by creating a systematized and organized system.

(ii) Legal status of the research institute

- It is suggested that the institute be autonomous with no political pressure, able to make its own decisions, have the rights to operate proactively and express views independently without external pressure or interference.

(iii) Responsible government organization (accountable to)

- It is suggested that the research institute be accountable to the Prime minister, MoSHE, MoE, Federal TVET Agency and Federal TVET Institute.

- It is also advisable to first establish a research department at a directorate level within the FTVETA rather than having a separate research institute, and then enable the department to pursue gradual development to an institutional level.

(iv) Federal or regional

- It is recommended that the institute be established at federal level with research centers (as a branch) in regions and TVET colleges.

(v) Standalone or integrated

- It is advisable for the institute to be a standalone institute with no political influence and also integrated with all possible stakeholders (which includes FTVETA, FTVETI, TVET institutes, industries, enterprises, universities, development organizations, private and concerned researchers).

(vi) Expected roles and functions

- Conduct coordinated research to create the expected human capital and technologies
- Regulate the TVET system
- Conduct study and forecast of the labor market
- Conduct research on TVET policy and strategy
- Identify employment areas
- Provide necessary information for TVET policy making and planning; collect, organize and disseminate information on TVET
- Create linkage between education, training and industry
- Create linkage between university-industry-TVET
- Develop and revise occupational standards and TVET curriculum
- Research on TVET delivery, assessment TVET criteria and methods, TVET qualification system, leadership capacity building
- Conduct tracer study, comparative studies, research on efficiency
- Awareness creation
- Control, monitor and evaluate the TVET system and delivery
- Evaluate TVET institutions and set standards

- Capacity building on action research
- Research on source of finance and supply of necessary inputs
- Support TVET institutions (centers, colleges, polytechnic etc.) and Small and Medium Enterprises
- Facilitate short term trainings
- Create an enabling environment for innovation
- Research on technology accumulation
- Create technology transfer mechanisms
- Provide career guidance
- Coordinate/support the network of all major actors of the TVET sector
- Create networks with other national and international research institutions

(vii) Expected focus areas

- TVET policy and strategy
- TVET access, equity, quality, relevance, efficiency, governance and leadership
- Financing for TVET
- Industry extension service and technology transfer
- Image building
- Monitoring and evaluation
- Employability
- Social values
- Forecasting of the labor market
- Linkages between education, training and employment
- Linkages with other national and international research institutions

(viii) Expected target groups

- Policy makers
- Industries and enterprises
- TVET institutes (Trainers, Trainees, TVET leaders at different level, TVET colleges)

- Centers of Competency
- Donors
- Ministries
- The society

(ix) Who should fund the research institute?

- It is suggested that the government of Ethiopia be the major source of fund together with some support from the development agents

(x) Expectation from the research institute

- Bring organized study and concrete solutions for the sector
- Research outputs that will contribute to grow the sector and are empirically tested, confirmed, professionally accepted
- Enhance the capacity of the TVET sector
- Serve as a source of information that could help to improve quality and relevance of the TVET program
- Solve unemployment and other problems of the economy to some extent
- Encourage TVET trainers and trainees to conduct research
- Explore international best practices, identify findings and come-up with recommendations
- Create quality assurance for the TVET research system
- Support TVET researchers

(xi) Obstacles the research institute is likely to face in the future

- Lack of experience, government and industry engagement, finance, etc.
- Shortage of qualified researchers, leaders, experts, good governance, etc.

Technology gap, political interference, implementation follow up, etc.

04

CHAPTER

Policy Recommendations for Enhancing the Human Capital Index (HCI) in Rwanda

Hwanbo Park (Chungnam National University)

Keywords
Human Capital Index(HCI), Educational Opportunities, Quality of Education, Learning Outcomes, Korean Experience

Policy Recommendations for Enhancing the Human Capital Index (HCI) in Rwanda

Hwanbo Park (Chungnam National University)

Summary

This is one project within the 2019/20 KSP with PASET (the Partnership for skills in Applied Sciences, Engineering and Technology). The purpose of this research is to provide the government of Rwanda with policy recommendations that can contribute to enhancing the Human Capital Index (HCI) with a focus on school indicators. For this purpose, this research reviewed the current state of Rwanda's education system focusing on educational opportunities and academic achievements, and share Korea's experiences that are relevant to these issues.

The government of Rwanda has designated human resource development as a top priority in their national development plan, Vision 2020, and is spending more on education than other African countries (MINECOFIN, 2011). However, the World Bank's HCI value for Rwanda was 0.37 and it ranked 142nd among 152 countries in 2018. Among the three components, school indicators such as expected years of school and harmonized test score were lower than the Sub-Saharan African average.

Despite the enrolment rate of primary education being almost 100%, the enrolment rate in lower secondary schools dropped sharply. There is need to improve the participation rate before and after the primary schooling age. The government emphasizes strengthening human capital formation, particularly through the education service delivery of two key components, access and quality. In terms of access, Rwanda has achieved universal access to primary education; however, it is still a challenge to ensure the right to access to 12YBE. While progress in terms of providing access to basic education is an achievement, more effort is needed to reduce dropouts. As much as the access to education has tremendously improved at both the primary and lower secondary levels, it is important to focus on quality so as to identify gaps and suggest strategies to improve student learning achievement. In

Rwanda, national examinations have been used to select students for the higher levels of education. There is a question of whether the test scores can prove intended learning outcomes that meet curriculum objectives.

Successful primary school cases illustrate that the school climate managed by the principal's leadership, teacher's efforts and incentives, and maximizing student learning time could make the school more effective, even if it is located in a rural area.

Korea's policy experiences can be a one exemplar regarding these issues. Korea has experienced a rapid and sequential expansion of its education system from primary to higher education in a short period of time. The government responded to graduates' demands for the next level of education by abolishing the entrance examination for lower and upper secondary schools without additional financial support. The reason that the low-cost approach succeeded was that qualified teachers with relatively high educational backgrounds were secured and thoroughly utilized. In the process of expanding educational opportunities, teachers were required to struggle to teach in overcrowded classrooms and they utilized strong discipline to control the students. It is clear that this low-cost approach contributed to the expansion and equity of educational opportunities and provided a foundation for the nine years of compulsory education. However, it caused a decline in the quality of secondary education and led to arguments about equality.

Although Korea has made great accomplishments in terms of the quantity and quality of education, challenges remain about the human capital accumulation of the next generations and educational inequalities. Especially, ensuring educational opportunities for students with disadvantaged backgrounds and the improvement of the below basic level students are still critical issues. Against this background, the Korean government established a support system and implemented educational policies to improve the achievement of the below basic level students.

Based on these results, this research suggested four policy recommendations as follows:

First, Rwanda should focus on lower secondary education and consider how to increase the number of students, even if the quality of educational conditions is declined temporarily. In order to do this, we suggest improving the transition system that ensures all primary school graduates who want to advance to a lower secondary school be admitted regardless of their test score. In addition to this system improvement, intensive support for secondary school teachers is needed to achieve real results.

Second, the abolishment of the P6 national examination should be considered in order to ensure the opportunities of basic education for all and expand the years of schooling. Abolishing the P6 national examination means that Rwanda would consolidate primary and lower secondary schools into a single basic education cycle of nine years of schooling. This change could contribute to improving the transition rates from primary and lower secondary school in the short term, however, the establishment of new schools and hiring of qualified teachers should accompany this to ensure the success of this change.

Third, Rwanda should try to increase the average academic achievement level through intensive support for the below basic level students for improving learning outcomes in primary and secondary education. For this, above all, it is necessary to establish a system to diagnose and support below basic level students. ICT technology could be used in the establishment of this system.

Fourth, Rwanda should consider establishing an educational policy research institute to collect and analyze data to develop educational policies. In order for the Rwandan government to continuously enhance its human capital competitiveness, it is essential to develop and implement evidence-based education policies that are suitable for the Rwandan context. This research institute would provide necessary advice from policymakers as a think tank and could also serve as a platform for linking education policy and practice.

1. Introduction

This is one project within the 2019/20 KSP with PASET (the Partnership for skills in Applied Sciences, Engineering and Technology). The purpose of this research is to provide the government of Rwanda with policy recommendations that can contribute to enhancing the Human Capital Index (HCI) with a focus on 'school' indicators.

The government of Rwanda has designated human resource development as a top priority in their national development plan, Vision 2020 (MINECOFIN, 2011). Major emphasis has been placed on increasing the quality of TVET and higher education in the fields of science, technology, and engineering. The Ministry of Education also set three goals: 1) promoting access to education at all levels, 2) improving the quality of education and training, and 3) strengthening the relevance of education and training to meet labor market demands, in their ESSP (Education Sector Strategic Plan) for achieving this vision.

However, the World Bank's HCI value for Rwanda was 0.37 and it ranked 142nd among 152 countries in 2018. According to 'The Human Capital Project' by the World Bank Group in 2018 (World Bank, 2019), the Human Capital Index (HCI) was designed to highlight how investments that improve health and education outcomes today will affect the productivity of future generations of workers. The HCI measures current education and health outcomes since they can be influenced by current policy interventions to improve the quantity and quality of education and health. The HCI has three components (Survival, School, and Health) and five indicators. The school component uses two indicators for quantity (expected years of schooling by age 18) and quality of education (relative performance on international student tests). Among the three components, school indicators such as expected years of school and harmonized test score were lower than the Sub-Saharan African average (World Bank, 2019).

Against this background, the government of Rwanda recognized the challenge and decided to embrace the Human Capital agenda along with national HRD projects such as 'Rwanda Quality Basic Education for Human Capital Development Project 2019-2024'. This project aims to improve teacher effectiveness and the school environment to support student learning (Wang & Kidwai, 2019). Before launching this project, cooperative projects related to human capital, such as 'Rwanda Priority Skills for Growth' or 'Rwanda Skill Development Project', mainly focused on the expanding opportunities and improving the relevance of the technical vocational education and higher education (Aristorenas, 2017). The government identified target sectors for economic growth and supported the education and training programs that create skilled labor or high-quality engineers for these priority areas. Such an approach presupposes the expectation that well-educated individuals will be continuously supplied.

In order to increase the number of high-quality Ph.D.s and engineers in the science, engineering, and technology sector, the more students should progress to secondary and higher education. However, only a few student progress to secondary and higher education in Rwanda. The net enrolment rate (NER) for primary education was almost 100%, but the NER for lower secondary education was still low at 27.2% in 2018 (MINEDUC, 2019). Even though the 12 Years basic education policy was implemented in Rwanda in 2012 (MINEDUC, 2013), the NER for lower secondary education is still very low compared to primary education. In order to transition from primary to secondary school, every student should pass the Primary Leaving National Examination that consists of mathematics, science, social studies, English, and Kinyarwanda at the end of their primary education. The students who pass will be granted leaving certificates, and they are selected and placed in a lower secondary school based on their grades (JICA, 2012). The national examination at the end of

Grade 6 has the function of selecting the candidates according to the number of available slots in secondary schools.

Rwanda gained independence from Belgium on July 1, 1962, but the experience of colonial rule and complex political changes had a significant impact on language policy and the educational system. After several language policy shifts, Rwanda has two official languages of instruction in its education system since 2008, Kinyarwanda until P3 and English from P4 through university (World Bank, 2011). In December 2019, Rwanda's ministry of education announced that from 2020, English will replace Kinyarwanda as the language of instruction in all schools. However, there are serious educational problems such as dropouts and low academic achievement due to differences in the mother-tongue language and the official language of instruction in school. In addition, there are still only a few teachers who can speak English fluently and teach their subject in the English language (Park et. al., 2019). Despite the government of Rwanda emphasizing the expansion of educational opportunities and improving learning outcomes, it is still difficult to achieve these policy goals.

Korea's policy experiences can be a one exemplar regarding these issues. Korea has been known as a country that has achieved two major goals, expanding educational opportunities at all levels of education and high learning outcomes in a short period of time (Oh et. al., 2015). When comparing Rwanda and other Sub-Saharan African countries, the WB's HCI data on Korea was 0.84 and it ranked 2nd among 152 countries in 2018. School indicators were also at the top (World Bank, 2019). Although Korea has made great accomplishments in terms of the quantity and quality of education, issues ensuring educational opportunities to vulnerable social groups and the improvement of the below basic level students have still not been completely solved. Korea gained valuable experience from trial and error in the process of ensuring quality education for all, which can provide useful implications for Rwanda.

Therefore, this research reviewed the current state of Rwanda's education system focusing on educational opportunities and academic achievements, and shares Korea's experiences that are relevant to these issues. This research will also suggest policy recommendation that can contribute to enhancing HCI school indicators in Rwanda.

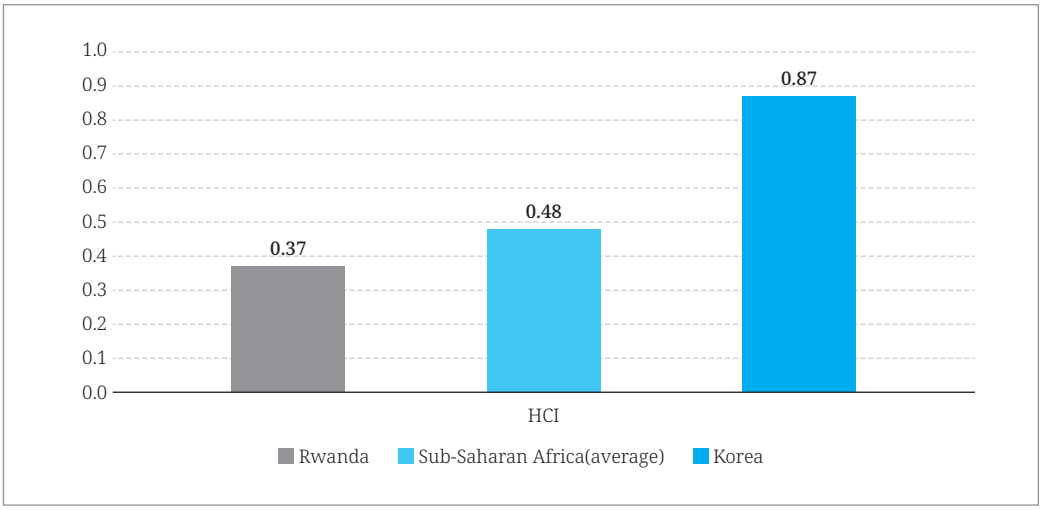
2. Review of the Rwandan Education System

2.1. Human Capital Index (HCI)

The HCI is designed to measures the human capital of the next generation, defined as the amount of human capital that a child born today can expect to achieve in view of the risks of poor health and poor education currently prevailing in the country where that child lives (World Bank, 2018). The HCI has three components (Survival, School, and Health) and five indicators. The school component uses two indicators for the quantity (expected years of schooling by age 18) and quality of education (relative performance on international student tests).

According to the World Bank's report (World Bank, 2019), Rwanda's HCI value for 2018 was 0.37 and positioning it 142nd out of 152 countries. As [Figure 4-1] shows, Rwanda's 2018 HCI value was below the average of 0.48 for countries in Sub-Saharan Africa. When compared to the Republic of Korea, the HCI for Korea was 0.84, which ranked 2nd out of 152 countries in 2018.

[Figure 4-1] HCI for Rwanda, Korea, and Sub-Saharan Africa in 2018



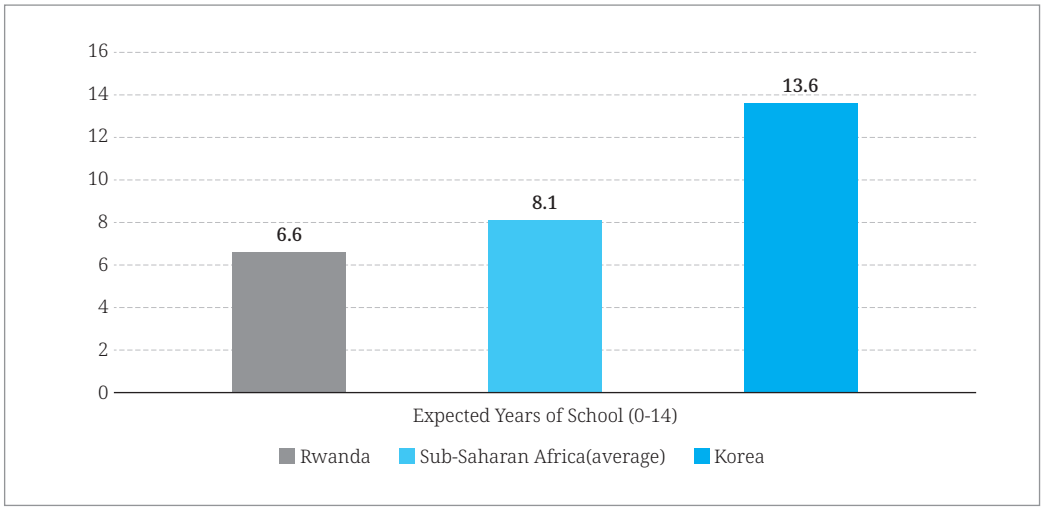
Source: World Bank (2019). World Development Report 2019: The Changing Nature of Work. DC: World Bank.

Among the three components, school indicators such as expected years of school and harmonized test score were lower than the average value of Sub-Saharan Africa (World Bank, 2019). School component uses two indicators for the quantity and quality of education. The quantity of education is measured as the number of years of school and the quality of

education is measured by how much children learn in school based on countries' relative performance on international student achievement tests (World Bank, 2018).

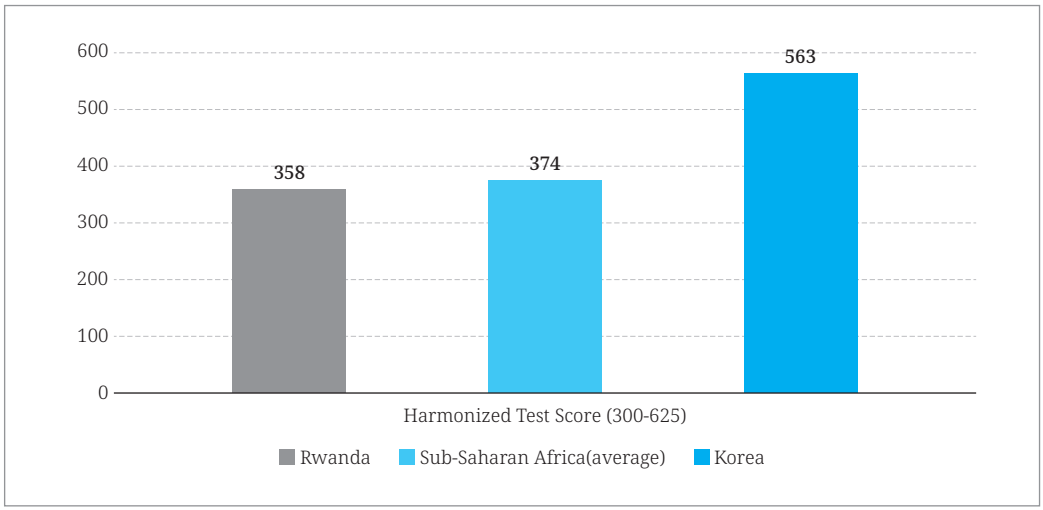
[Figure 4-2] and [Figure 4-3] show Rwanda's achievement in each of the HCI school indicators. Rwanda's expected years of school of 6.6 years was lower than the average of 8.1 years for Sub-Saharan Africa and 13.6 years for Korea, which ranks at the top out of all countries (World Bank, 2019).

[Figure 4-2] Expected Years of School for Rwanda, Korea, and Sub-Saharan Africa in 2018



Source: World Bank (2019). World Development Report 2019: The Changing Nature of Work. DC: World Bank.

[Figure 4-3] Harmonized Test Scores for Rwanda, Korea, and Sub-Saharan Africa in 2018



Source: World Bank (2019). World Development Report 2019: The Changing Nature of Work. DC: World Bank.

2.2. Overview of the Education System in Rwanda

2.2.1. Brief History of Education in Rwanda

Prior to the colonial era, Rwanda had an informal education system that was delivered largely through the family. The training was delivered through 'Itorero' training schools that included mainly military and war skills, iron smiths and foundries, poetry, basket making, etc. (Obura, 2003). The education was gender driven; boys were expected to follow in their father's footsteps while girls were taught housekeeping and childbearing duties (McNab & Mohamed, 2006).

The colonial era was characterized by the beginning of formal education being introduced in the 1900s. Colonizers, the church, and later the government influenced education primarily to serve their own interests rather than those of Rwandans. Following national independence in 1962, administrative structures including the Ministry of Education were established and some laws regulating education were introduced. Teaching and learning materials were in short supply and teachers were insufficiently trained. Education was discriminatory and schooling was on a discriminatory basis. Education was ruled by favoritism and prejudice (MINEDUC, 2003).

After the 1994 genocide against the Tutsi, the education sector experienced an crisis where the main objective was to reshape and try to restart the education system that had broken down (MINEDUC, 2003). Since 1994, the government of Rwanda and international organizations have been committed to rebuilding and enhancing the education system as a fundamental strategy for the broader development of the country. The education sector is now regarded as one of the few sectors to have developed a comprehensive plan with Sector Wide Approach (SWA). Specific policies and plans pertaining to education will be discussed in separate sections.

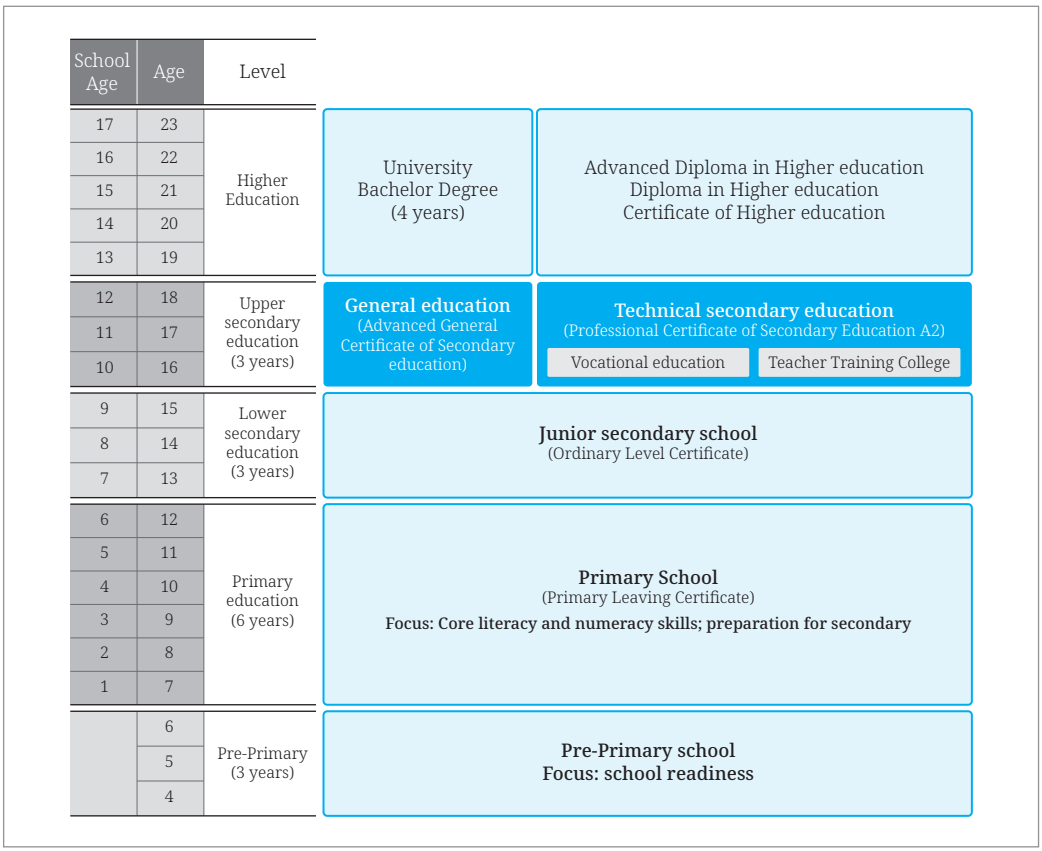
Despite its independence from Belgium, the experience of colonial rule and complex political changes had a significant impact on language policy and the educational system. After several language policy shifts, Rwanda has had two official languages of instruction in its education system since 2008, Kinyarwanda until P3 and English from P4 through university (World Bank, 2011). However, there are serious educational problems such as dropouts and low academic achievement due to differences in the mother-tongue language and the official language of instruction in school. Additionally, there are still only a few teachers who can speak English fluently and teach their subject in English (Park et. al., 2019).

2.2.2. Structure of Education System in Rwanda

The current structure of the education system in Rwanda consists of six years of primary school, three years of lower secondary school, three years of upper secondary school, and three or four years of higher education (MINEDU, 2013). The education system in Rwanda is structured following the International Standard Classification of Education (ISCED) of the United Nations Educational, Scientific and Cultural Organization (UNESCO) (UNICEF, 2017). Rwanda adopted an education structure comparable to other education systems internationally and in the region.

Rwanda's constitution of 2003 and its revision of 2015, Article 20, stipulates that primary education is compulsory and free in public schools. When the Nine Years Basic Education policy was introduced in 2006, free and compulsory basic education was expanded from six years covering Primary 1 (P1) to Primary 6 (P6) to encompass nine years covering Primary 1 (P1) to Senior 3 (S3). And the 12 Years Basic Education Program (12YBE), established in 2012, guarantees free education for 12 years, including primary and secondary levels.

[Figure 4-4] Education System in Rwanda



Source: Created by author based on MINEDUC (2018).

Pre-primary education: Attended by 3-6 year olds, encourages the socialization of young children and ensures that they are ready to start school on time and have begun to develop foundational skills needed for learning at primary school and beyond.

Primary education attended by 7-12 year olds ensures that all children receive intellectual, physical, and moral education. Statistics from MINEDUC (2008) indicate that very few children who enroll for primary education have had pre-primary education (28.1% in 2017, and 47.7% in 2018). Primary education ends with the national primary leaving examination which determines eligibility for lower secondary education.

Lower secondary education is attended by children aged between 13 to 15 who have passed primary leaving examination. Statistics from MINEDUC (2008) indicate that transition rates from primary to lower secondary in 2015, 2016, and 2017 were 71.1%, 74.5, and 71.6% respectively. Lower secondary education lasts for three years. It is a general academic program that prepares students for upper secondary streams, vocational training courses, or early employment. The transition rates from lower secondary to upper secondary as indicated by MINEDUC (2018) were 82.8% in 2015, 85.1% in 2016 and 85.4% in 2017.

Upper secondary is attended by children aged 16 to 18. It encourages students to enter into different fields including general education (science, mathematics, technology, humanities, and languages), primary teacher education, and technical studies in preparation for higher education or employment.

Higher education is attended by students aged 19 to 23 in different academic and technical disciplines. Higher education institutions grant diplomas, bachelor degrees, post-graduate certificates and diplomas, and masters and doctor of philosophy (PhD) degrees. The University of Rwanda through its College of Education provides pre-service teacher education for secondary schools.

In 2000, the government of Rwanda embarked on a decentralization process in all sectors including education (MINALOC, 2012). Rwanda felt the need to encourage her citizens to be ready to work together in order to put a system in place where people's voices are heard and considered. In education, the Ministry of Education started to initiate and implement policies and plans at the district, sector, and school levels with the involvement of local personnel at grassroots levels (MINEDUC, 2003).

The education system stressed the importance of decentralization as a way of empowering the population to participate in development activities that affect education.

While the central government remains responsible for policymaking, monitoring and evaluation, curriculum production, and the approval of education materials, local governments are responsible for the execution of policies, planning, and follow up for education activities at district, sector, and school levels (UNESCO, 2015). This division of roles and responsibilities between the MINEDUC and MINALOC is regarded as a major step forward, however, there has been a need for better coordination of educational activities between local leaders and educational leaders.

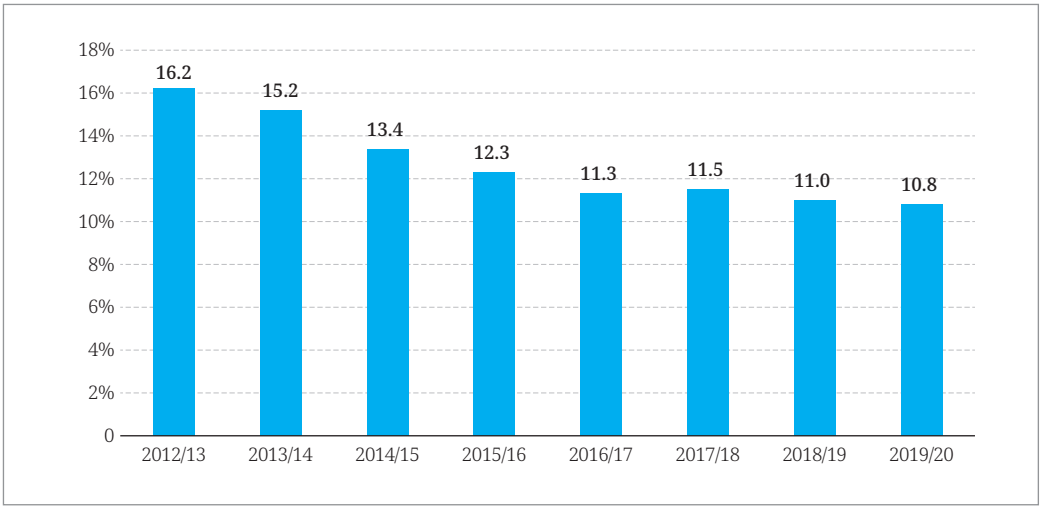
2.3. Educational Finance in Rwanda

Education funding in Rwanda has three main elements (IPAR, 2012): public funding directly to schools, private contributions to the running costs of the schools (direct private contributions), and private contributions to the indirect costs of education. The abolition of primary school fees in 2003 opened the gates for 100,000 additional students who enrolled in primary school that year (MINEDUC, 2012). The government created a capitation grant of 300 Rwanda francs per student per year to be used for general operations and teaching resources. The capitation grant was extended to lower secondary education to extend the Nine Years Basic Education (9YBE) for all in the hope of increasing enrolment while reducing the dropout rate, although it is still high.

MINEDUC (2018) identified in the ESSP that the current budget allocation to education of 13.1% is below the international guidelines (15%-20%) of the government's overall budget. This created a risk to the sustainable expansion of quality education. Insufficient funds are a threat to all education program. With the ambition to continue to expand access as well as increase the quality of education, it is essential that key priorities are decided based on projected resources. In the ESSP 2017/8-2023/4, an increase in educational financing in the range of 13% to 24% is expected.

Funding allocation efforts were made to support major initiatives such as the 9YBE program, the Twelve Years Basic Education program (12YBE), teacher recruitment and training, increasing remuneration for school personnel, the construction of new classrooms, and the rehabilitation of existing ones (MINEDUC, 2014). The same report from MINEDUC revealed that education development partners (DPs) play an important role in education funding contributions in the form of results-based aid, program funding, or technical assistance in primary and secondary education. For example, the DFID provided direct education support of approximately 8-10% of total expenditures in 2014. Other DPs and affiliated non-governmental and Faith-Based Organizations (FBOs) are providing considerable off-budget support through discreet projects aligned with the education sector strategic plan (ESSP).

[Figure 4-5] Education Sector Budget as a Proportion of Total National Budget from 2012/2013 to 2019/2020



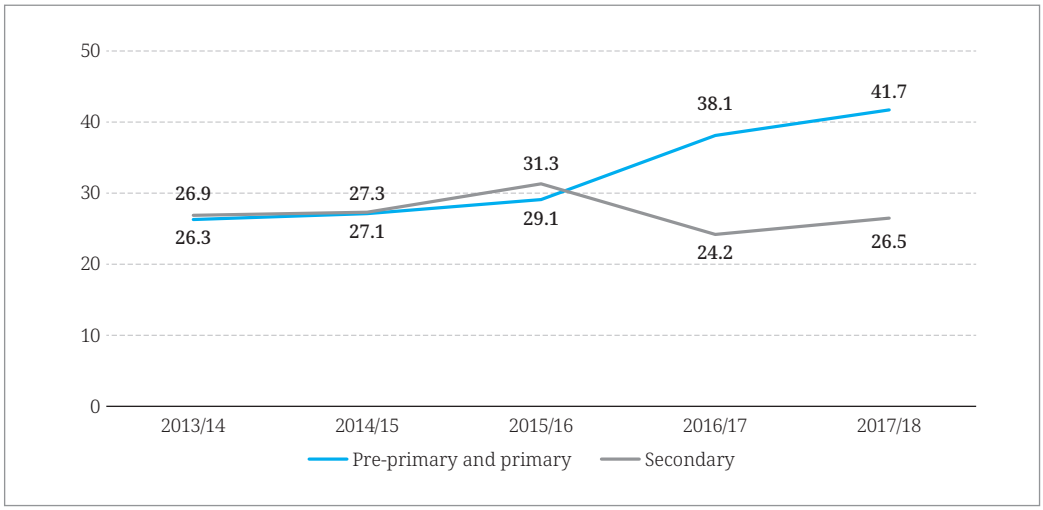
Source: UNICEF(2017), UNICEF(2018), UNICEF(2019).

The budget allocated to the education sector has fluctuated since 2012 and its share as a proportion of the total national budget declined from 16.2% in 2012/13 to 10.8% in 2019/2020. Over the years, the education share of the total government budget has remained below the government commitment to reach 20% of the total government budget share and has nominally fluctuated with decreases. A continued decrease in the education budget relative to the total government budget could challenge the quality of learning across all education levels. In other words, the decreasing education expenditure is likely to contravene the government's efforts to reduce inefficiencies in its school system.

The budget allocated to education is further allocated to education sub-sectors in line with set priorities. [Figure 4-6] below shows that more than 60% of the education budget is allocated to pre-primary, primary, and secondary education. Since 2012 the education budget allocated to secondary education declined from 36.5% in 2012/13 to 26.5% in 2017/18, while for the same time period the share of the budget allocated to pre-primary and primary education levels increased from 27.8% to 41.7%. This shows strong government commitment to ensuring universal education (UNICEF, 2017). The relatively balanced spending between the levels of education reflects Rwanda's plans to increase access to all levels of education. External contributions reflect the government's priorities and support is given on and off budget. In 2016/17, donors contributed an additional FRW 32 billion in off-budget projects, with 36% going to pre-primary, primary, and secondary education (WorldBank, 2018).

[Figure 4-6] Share of Education Sector Budget by Sub-sector

(Unit: %)

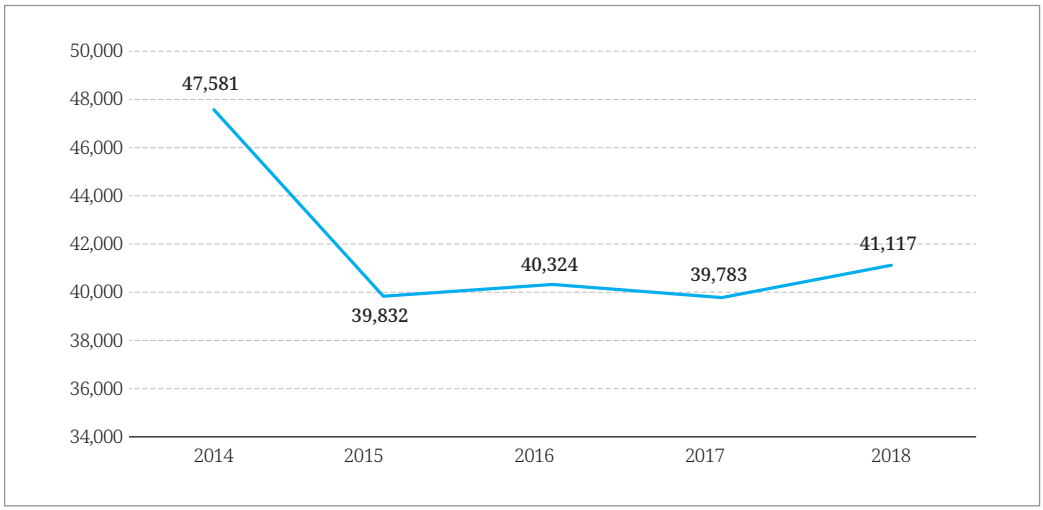


Source: UNICEF (2019).

Budget allocation at the sub-sector level as illustrated in [Figure 4-6] indicates an increasing budget allocation from 26.3% in 2014 to 41.7% for pre-primary and primary education. However, as the enrolment trend increases there will be need for more investment in education as the current level of government expenditure is still low and cannot cover the whole cost of education. The government expenditure on education is also calculated per student as shown in the figure below.

[Figure 4-7] Per Capita Spending in Education Per Student Equal or Below 18 years from 2013/14 to 2017/18

(Unit: FRW)



Source: UNICEF (2018).

[Figure 4-7] indicates the trend of per capita spending in education per student equal or below 18 years. Accordingly, per capita spending decreased from 47,581 in 2014 to 41,117 in 2018 as illustrated in [Figure 4-7]. It seems that as the enrolment rate increases, funding becomes a challenge.

2.4. Recent Educational Policies and Strategies

In an attempt to ensure access to education and improve student learning achievement, the Ministry of Education in collaboration with relevant agencies and development partners and in line with national aspirations has initiated policies and strategies for that purpose.

<Box 1> MINEDUC Policies and Strategic Plans

- Education Sector Strategic Plan 2018-2024
- Quality Standards in Education (2008)
- Girls' Education Policy (2008)
- Special Needs Education (2008)
- Higher Education Policy (2008)
- Nine Year Basic Education Strategy (2008)
- Technical & Vocational Education and Training (TVET) Policy (2008)
- Technical Education Strategic Plan 2008-12
- ICT in Education Policy (2008, revised 2013)
- Higher Education Strategic Plan (2009)
- Teacher Development and Management Policy (revised 2011)
- Early Childhood Development Policy and Strategic Plan (2011)
- School Health Policy (2014)
- Teacher Incentives Policy (2014)
- National Science, Technology and Innovation Policy

2.4.1. Rwanda's Education Sector Policy

Rwanda's education sector policy of 2003 provides a philosophical basis for the role of education. Its objectives guide the development of other sub-sector policies and programs.

This education policy identifies the following eight major specific objectives:

(i) To ensure that education is available and accessible to all Rwandan people

(ii) To improve the quality and relevance of education

(iii) To promote the teaching of science and technology with a special focus on ICT

(iv) To promote trilingualism in the country

(v) To promote an integral, comprehensive education oriented towards the respect of human rights and adapted to the present situation of the country

(vi) To inculcate in children and sensitize them to the importance of the environment, hygiene, and health and protection against HIV/AIDS

(vii) To improve the capacity for planning, management, and administration of education

(viii) To promote research as a mobilizing factor for national development and harmonize the research agenda

2.4.2. Nine Year Basic Education (9YBE) and 12YBE

The Nine Year Basic Education (9YBE) policy is a fee-free education policy aimed at ensuring that all children in Rwanda can access and complete the full cycle of nine years of basic education. It consists of six years of primary education and the first three years of secondary school without paying school fees. In 2012, the 9YBE program was upgraded to 12 Year Basic Education (12YBE). The objectives of the policy are:

(i) Each child must start and complete primary education within the specified period; starting school at age seven and completing within six years.

(ii) A rapid increase in the number of children enrolling in lower secondary is ensured and each child should have the opportunity for nine years of basic education that can enable him/her to cope with life. The policy aimed at achieving the following targets by 2015 (MINEDUC, 2008):

a. Reduce the repetition rate at primary school from 19% in 2004 to 6% in 2015

b. Reduce the dropout rate at primary school from 14% in 2004 to 5% in 2015

c. Pupil-teacher ratio at primary school should be reduced from 67 in 2004 to 45 in 2015

d. Class sizes at primary schools should be reduced from 51 in 2004 to 45 in 2015

e. The gross enrolment rate at lower secondary should increase from 20% to 62% by 2015

f. The transition rate to lower secondary will reach 75% by 2015

g. Reductions in the % of students boarding at lower secondary from 58% to 8% by 2015

The 9YBE program could not be sped up because it requires means and resources that the country could not afford. The government of Rwanda introduced the 9YBE reforms in order to increase the number of student enrolment in lower secondary. This was possible with the commitment and hard work of Rwandans who supported the classroom construction and extension of basic education (MINEDUC, 2012). The following highlights are major components of the policy and their impact:

a. Construction projects using homegrown solutions known as umuganda, where the Rwandan community managed to construct primary and secondary schools at a lower cost in a shorter period of time with labor and local materials. These unconventional methods resulted in saving an estimated 49 million USD (MINEDUC, 2012) The massive construction of schools since 2000 in particular for the 9YBE program has provided schools closer to where many students live as compared to the previous period.

b. The integration of primary and secondary school levels into one campus and under the same administration has also reduced distances for students progressing from primary to secondary school.

c. Teacher recruitment, training, and deployment increased in order to staff new schools while attempting to keep the pupil-qualified teacher ratio within an acceptable range.

d. The pupil-qualified teacher ratio has remained at a high level due mainly to increasing numbers of children enrolling and continuing through basic education. This will require improvements in recruitment, deployment, and the professionalization of teaching as a career choice for many young people.

e. The introduction of an interim double-shift system in primary schools to reduce pupil-class ratios, thus encouraging improvements in teaching and learning.

f. Teacher specialization whereby teachers would teach two subjects, with the expectation that they would have greater content knowledge, thereby providing improved instruction.

g. The reduction of courses from nine to four for lower primary based on the following core courses: English, Kinyarwanda, mathematics and general studies. From P4 to P6 reduction courses were reduced from 12 to six (English, Kinyarwanda, French, mathematics, social studies, science and technology)

At the secondary level, it was decided to increase the number of secondary schools by establishing lower secondary classes at schools selected in each district. In addition to the 242 existing schools, 529 new schools were established during the introduction of 9YBE countrywide (MINEDUC, 2010). In this way, the basic education policy was designed to make secondary level education affordable and accessible to communities, particularly children from poor households who might have otherwise had to discontinue their studies after primary school.

The introduction of 9YBE and later 12YBE has faced a number of challenges including the following: lack of qualified teachers especially in rural areas, lack of basic scholastic materials like textbooks, delays of funds and capitation grants for public and government-aided schools, very high pupil-teacher ratios, some students remaining home for no serious reasons despite the program being free, the non-availability of schools in accordance with the choice of the learners and, a negative perception of the public towards the quality of education in Nine Year Basic Education schools.

2.4.3. The ESSP 2013/2014-2017/2018

The purpose of the ESSP was to provide a planning framework that enables the education sector to improve the provision of education including skills development in order to better meet the requirements of a diverse labor market. It was informed by national aspirations and internationals goals embedded in policy declarations and plans such as Rwanda's Vision 2020, Seven Year Government Program (7YGP) for 2010-2017, MDGs, and EFA goals.

This ESSP was built on progress made in previous years to improve access to education and to extend and scale up the coverage and the quality of 12 YBE as well as school readiness programs. Three goals were identified to support the MINEDUC in achieving its mission to facilitate the development of human capital for the socioeconomic development of Rwanda, namely: (i) promoting access to education at all levels, (ii) improving the quality of education and training and, (iii) strengthening the relevance of education and training.

According to available data, ESSP targets for primary education are as follow: reducing the repetition rate to 8.7%, reducing the dropout rate to 6.6%, a GER of 100%, a NER of 100%, a transition rate 88.4%, two pupils per desk, a student class ratio of 41:1, and a pupil-textbook ratio of 2:1. The ESSP also had targets for lower secondary as follow: a student-classroom ratio reaching 35:1; a repetition rate of 2.9%; and a dropout rate of 11.7%.

2.4.4. The ESSP 2018/9-2023/4

The current ESSP corresponds with the National Strategy for Transformation (NST-1) (Republic of Rwanda, 2017) covering the period 2017 to 2024. It also aligns with Agenda 2063 (African Union, 2015), a strategic framework for the socioeconomic transformation of Africa over the next 50 years through existing initiatives for growth and sustainable development on the continent. The ESSP for 2018/2024 gives priority to increasing completion rates and learning outcomes in basic education. The ESSP is structured around nine strategic priorities:

(i) Enhanced quality of learning outcomes that are relevant to Rwanda's social and economic development

(ii) Strengthened continuous professional development and management of teachers across all levels of education in Rwanda

(iii) Strengthened Science, Technology, Engineering, and Mathematics (STEM) across all levels of education in Rwanda to increase the relevance of education for urban and rural markets

(iv) Enhanced use of Information and Communication Technology (ICT) to transform teaching and learning, and support the improvement of quality across all levels of education in Rwanda

(v) Increased access to education program, especially at nursery (pre-primary), primary, secondary, TVET, and higher education levels in Rwanda

(vi) Strengthened modern school infrastructure and facilities across all levels of education in Rwanda

(vii) Equitable opportunities for all Rwandan children and young people at all levels of education

(viii) More innovative and responsive research and development in relation to communities

The plan aims to achieve outcomes by (i) ensuring that children start school at the right age, acquire literacy and numeracy skills, and complete their schooling, (ii) expanding and modernizing school infrastructure, facilities, and related resources, and (iii) widening access to school readiness programs.

The ESSP is guided by the SDGs, especially SDG4 which states, "Ensure inclusive and equitable quality education and promote lifelong opportunities for all." The ESSP also refers directly or indirectly to many other SDGs, for example: (i) Education and skills for a health environment (SDGs 4, 12, and 13), (ii) Education and skills for healthy lives (SDGs 3, 4, and 5), (iii) Skills for employability (SDGs 4 and 8), (iv) Education for global citizenship (SDG4 and 12).

2.4.5. The Girls' Education Policy 2008

The Girls' Education policy 2008 aimed to increase girls' access to and participation in secondary and higher education (MINEDUC, 2008). In 2006, there were 74,669 girls compared to 81,630 boys enrolled in secondary education. The dropout rate (12.3%) was higher for girls compared to 8.6% for boys. The policy proposes strategies and affirmative action policies for ensuring that girls' participation in education improves.

2.4.6. The Competence-Based Curriculum (CBC)

In a bid to develop a knowledge-based society and the growth of regional and global competition in the jobs market, Rwanda embarked on curriculum reform to improve its quality (REB, 2015). The competence-based curriculum (CBC) was launched in April 2015 and its implementation kicked off at the opening of the school year 2016. This new curriculum was introduced in order to enable Rwandan school leavers and graduates to use what they learn to solve practical problems of life with the aim of developing students' independent, lifelong learning habits; appropriate skills and knowledge; and applications to real life situations. The competence-based curriculum focuses on what learners can do rather than just what they know. It has two categories of competences: basic competences and generic competences. Basic competences are related to different subjects taught while generic competences include critical and problem-solving skills; creativity and innovation; research; communication in official languages; cooperation, interpersonal management, and life skills; and lifelong learning (REB, 2015). The new competence-based curriculum matches global trends and is in line with the 2013 Harmonized Curriculum Framework for the East African Community, in which partner states agreed to put in place a curriculum framework with a set of policies, regulations, and guidelines central to curriculum development and implementation within the East African Community (REB, 2015).

In the CBC, generic competences are developed including lifelong learning, critical thinking, creativity and innovation, research and problem solving, communication skills, and cooperation. Within this new CBC, cross-cutting issues are also integrated such as health and hygiene, environment and sustainability, gender equality, HIV/AIDS, and Rwandan culture and heritage are also promoted to maintain a strong sense of national unity.

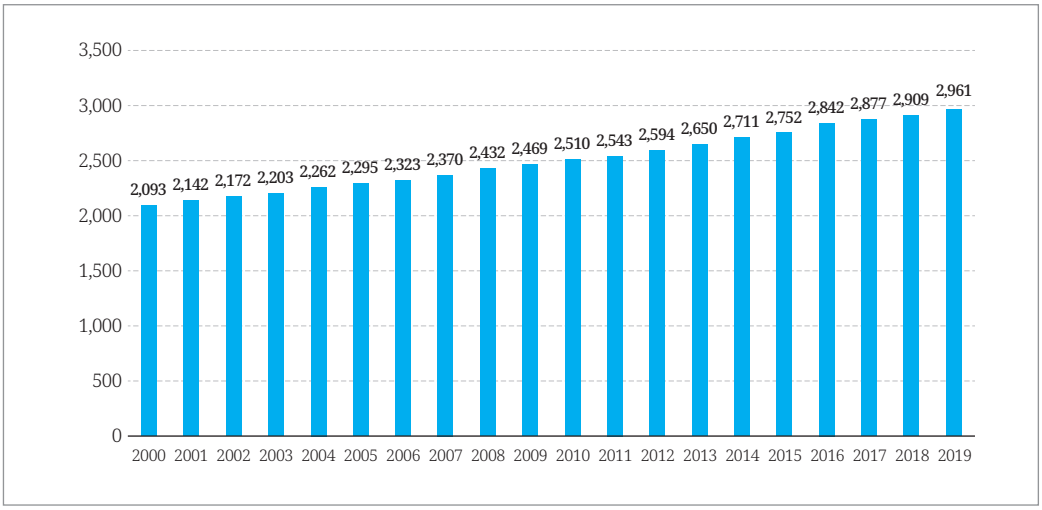
3. Status of Schooling in Rwanda

3.1. Status of Primary Schools

The constitution of the Republic of Rwanda of 2003 as revised in 2015 in Article 20 stipulates that primary education is compulsory and free in public schools and one of Rwanda's education policy objectives is to ensure that education is available and accessible to all Rwandan people (MINEDUC, 2003). In line with this ambitious objective, the government has put forward initiatives to achieve universal access to primary and lower secondary education (9YBE). Such initiatives include the construction of new schools and classrooms and the introduction of fee-free education. The indicators regarding primary and lower secondary education are discussed below.

From 2000 to 2019 the number of schools increased by 40% (from 2,093 to 2,961 schools) as shown in [Figure 4-8]. The increase in the number of schools is a result of the unconventional construction methodology instituted through the Nine Years Basic Education program and fee-free education.

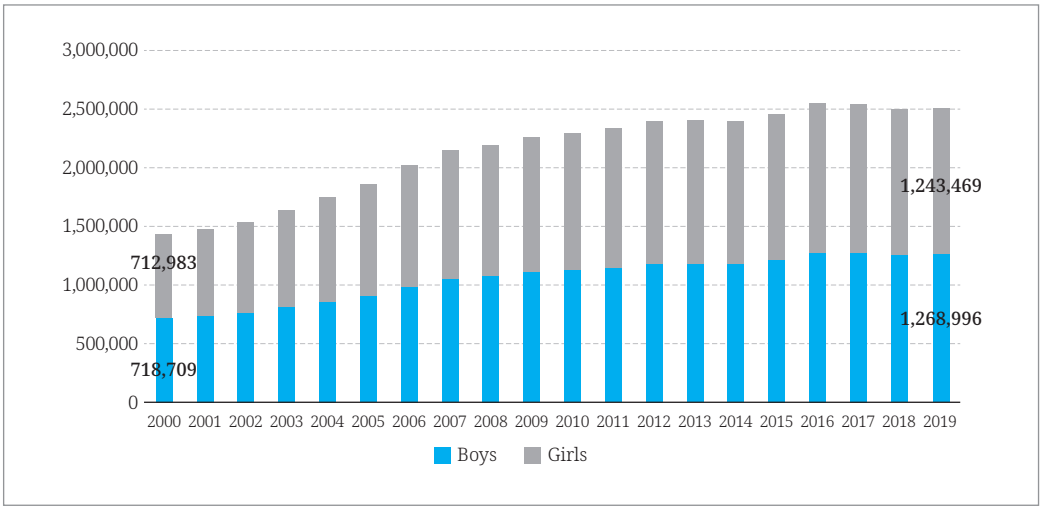
[Figure 4-8] Number of Primary Schools from 2000 to 2019



Source: MINEDUC (2014), MINEDUC (2015), and MINEDUC (2019).

The number of schools for primary education has increased from 2,093 schools in 2000 to 2,961 schools in 2019. The increase in the number of schools automatically implies an increase in the number of children enrolled for education as illustrated in [Figure 4-9] below.

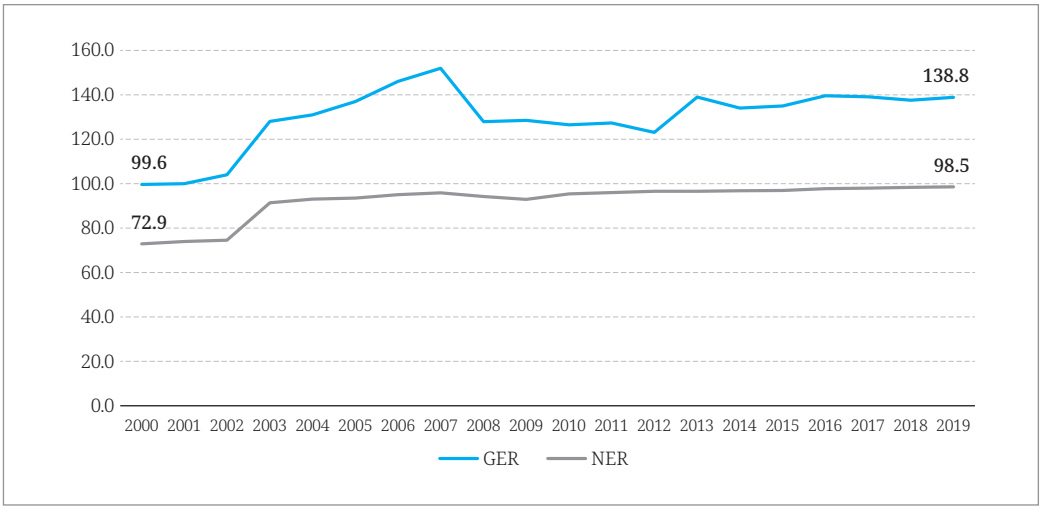
[Figure 4-9] Primary School Enrolment from 2000 to 2019



Source: UNESCO (2015), MINEDUC (2019).

Additional classrooms coupled with the abolition of school fees in 2003 resulted in major increases in primary school enrolment (MINEDUC, 2015). Accordingly, total primary enrolment increased by 75% from 1,431,692 (in 2000) to 2,512,465 (in 2019). Gross enrolment and net enrolment rates are presented in [Figure 4-10] below.

[Figure 4-10] Primary Gross Primary Enrolment Rate and Net Primary Enrolment Trend from 2011 to 2019

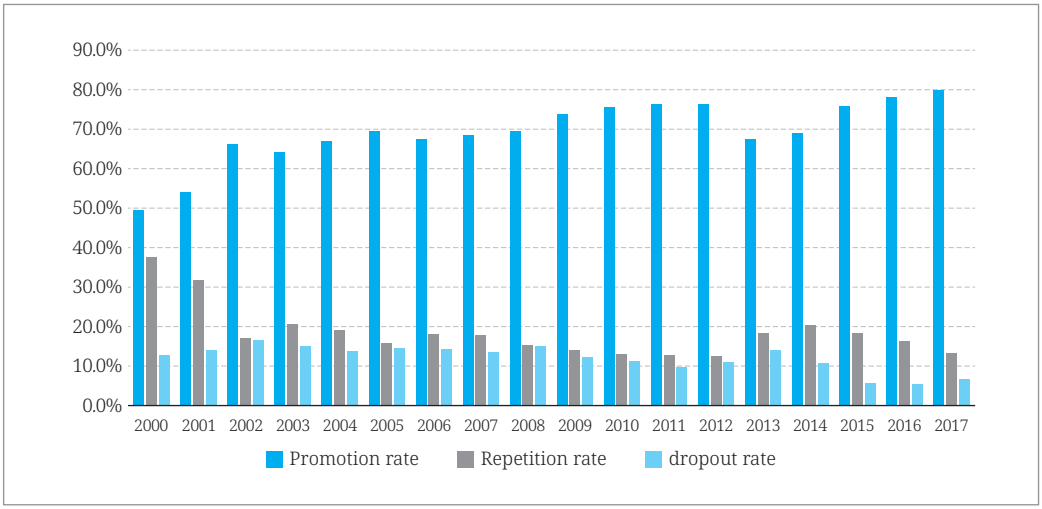


Source: UNESCO (2015), MINEDUC (2019).

Following the increases in the number of schools, gross enrolment rates (GER) have also increased during the period from 99.6% in 2000 to 138.8% in 2019. At the same time, net enrolment rates (NER) increased from 72.9% in 2000 to 98.5% in 2019 as illustrated in [Figure 4-10] above. GER is still a concern as the repetition rate is still considerably high and presence of over-aged students and even previously dropped out students who go back to resume their studies. For the net enrolment rate (NER) the highest improvement was achieved in 2003 where it increased from 74.5% over the previous year (2002) to 91.3%. For the years 2004 to 2019, the NER was relatively stable and approaching 100%. The net enrolment (98.5% in 2019) exceeded the ESSP target of 98.1%.

Statistics in Rwanda show that key indicators identified by internal efficiency analysis reflect some challenges including high repetition rates and low retention as illustrated in [Figure 4-11] below.

[Figure 4-11] Primary Promotion, Repetition, and Dropout Rates from 2000 to 2017

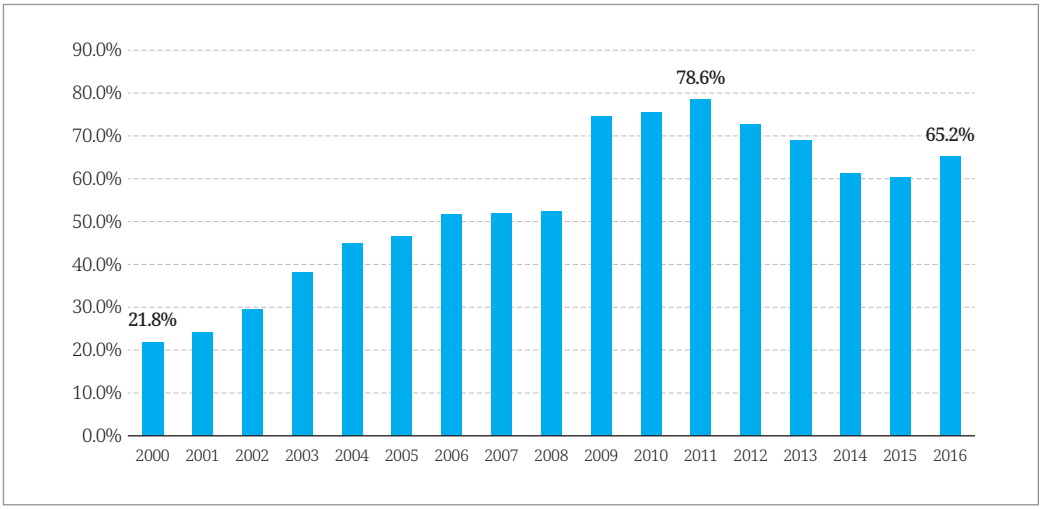


Source: UNESCO (2015), MINEDUC (2018).

The promotion rate drastically improved from 49.6% in 2000 to 80% in 2017. The repetition rate declined but appeared to fluctuate over years (37.6% in 2000, 12.7% in 2011, 20.3% in 2014, and 13.4% in 2017). Dropout rates remained reasonably constant from 2000 (12.8%) to 10.7% in 2014, after which a further reduction in dropouts was noted in 2015 (5.7%), 2016 (5.6%), and 2017 (6.6%). More effort is needed to reduce dropouts since the ESSP target was 5% in 2018 (MINEDUC, 2018).

The primary school completion rates improved from 21.8% in 2000 to 78.6% in 2011, but fell to 65.2% in 2016. This trend can be explained by the change in the language of instruction from French to English from P4 that was adopted in 2008. As the recent research (Moulton, 2016) pointed out, high repetition and dropout rates in P4 and P5 are likely to have a direct relationship with the change in the medium of instruction, including the very high dropout rate at the end of P5.

[Figure 4-12] Primary Completion Rate from 2000 to 2016

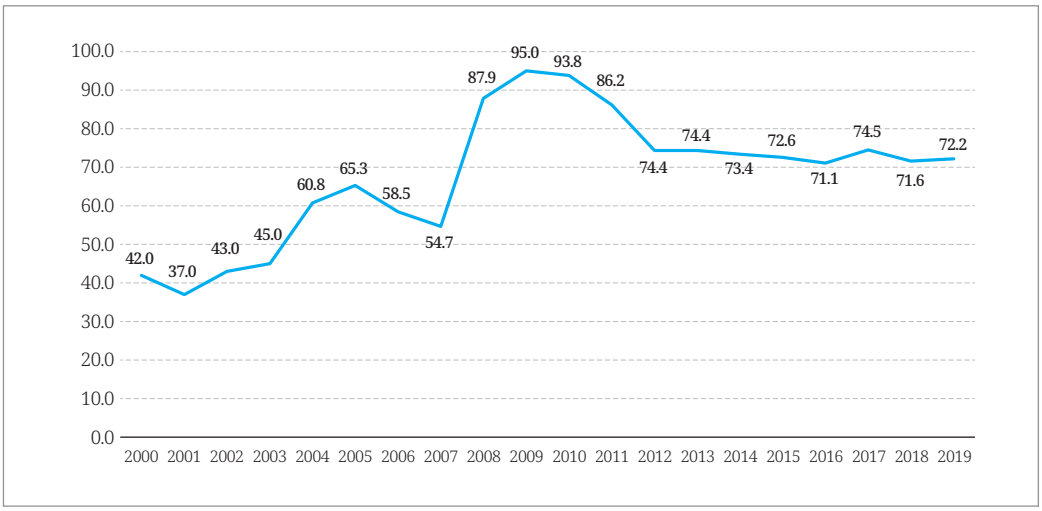


Source: UNESCO (2015), MINEDUC (2018).

The transition rates to lower secondary school greatly improved from 42% in 2000 to 95% in 2009. Since then, the transition rates have declined as illustrated in [Figure 4-13] below.

[Figure 4-13] Transition Rates to Secondary School from 2000 to 2019

(Unit: %)



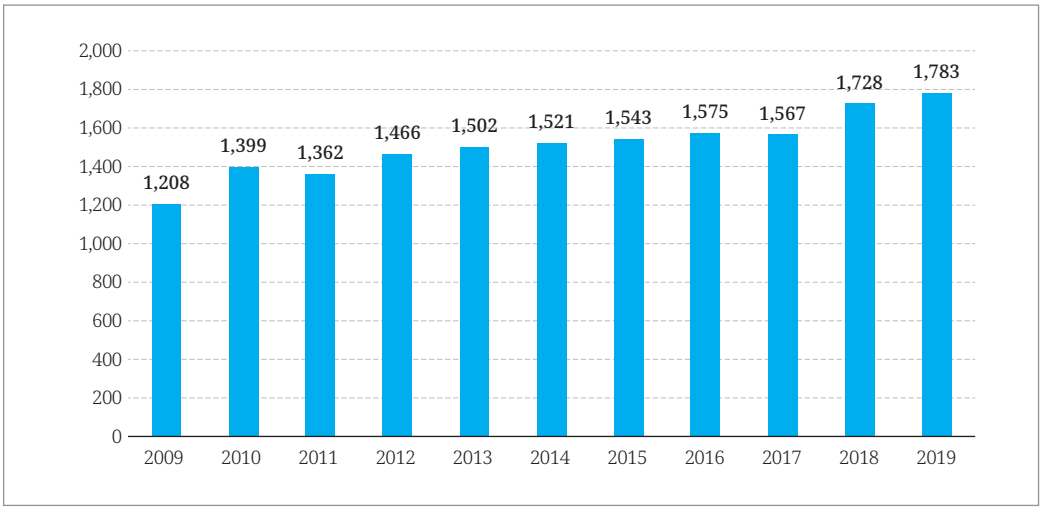
Source: UNESCO (2015), MINEDUC (2019).

The transition rate from primary education to lower secondary rose tremendously from 42% in 2000 to 72.2% in 2019. The transition rate reached its highest peak in 2009 (95.0%) mainly due to the implementation of the 9YBE program.

3.2. Status of Secondary Schools

The number of secondary schools and students are increasing, however, the GER and NER were still low at 47.7% and 27.2% respectively in 2019. From 2009 to 2019, the number of schools increased from 1,208 to 1,783 schools as shown in [Figure 4-14]. As noted in previous section, the increase in the number of schools is a result of a 'homegrown' school construction methodology.

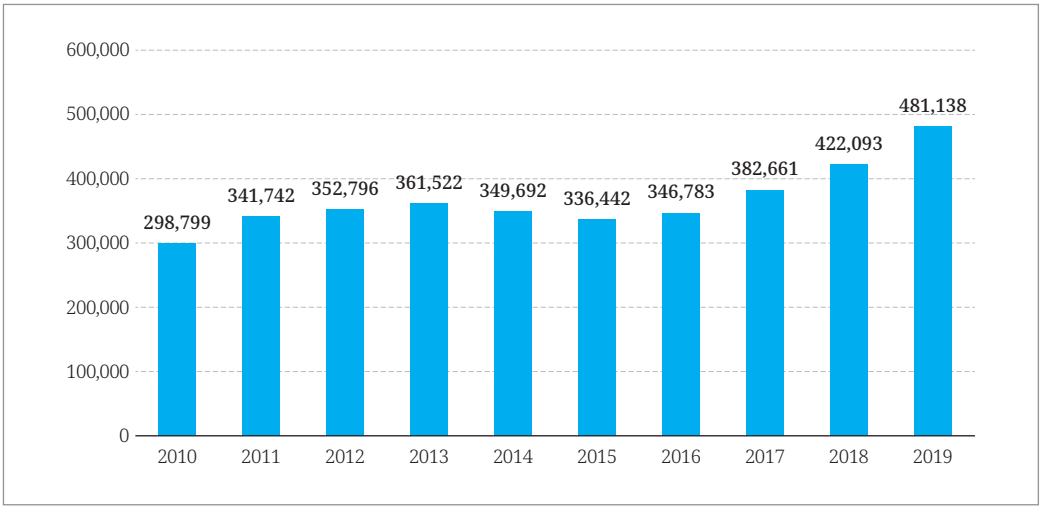
[Figure 4-14] Number of Secondary Schools from 2009 to 2019



Source: MINEDUC (2011) and MINEDUC (2019).

The increase in the number of schools led to an increase in enrolment in the lower secondary schools as shown in [Figure 4-15].

[Figure 4-15] Enrolment in Lower Secondary Schools

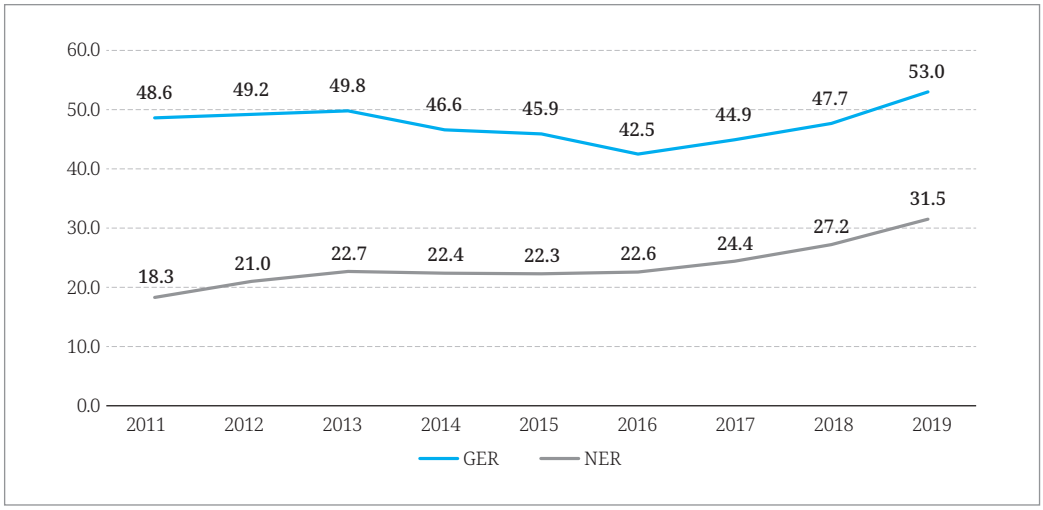


Source: MINEDUC (2011) and MINEDUC (2019).

Secondary schools and classroom construction have been key demographics for students' enrolments at the lower secondary level with an increase from 298,799 students in 2010 to 481,138 students in 2019 (an increase of 71%). Like in primary education, the increased enrolment in secondary education has resulted from additional schools and classrooms constructed together with the adoption of fee-free schooling (MINEDUC, 2015).

[Figure 4-16] illustrates the trends of gross enrolment and net enrolment rates for secondary schools from 2010 to 2019. Gross enrolment rates increased from 48.6% in 2011 to 53.0% in 2019, and the NER also increased from 18.3% in 2011 to 31.5% in 2019. Even though NER increased at the lower secondary level, it is still low because in 2018 only 27.2% of the population aged between 13-15 was attending lower secondary schools and the remaining 72.8% of that population that was expected to be in lower secondary was not enrolled. Some of them might still be in primary while others might have joined VTCs (VOCATIONAL TRAINING COURSES) or prematurely joined the workforce.

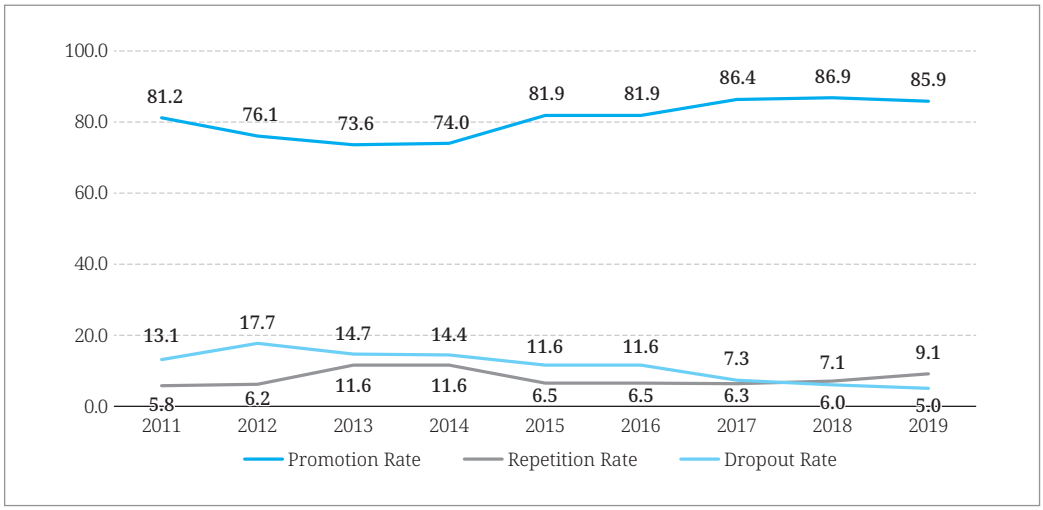
[Figure 4-16] Lower Secondary Education Gross Enrolment and Net Enrolment Rates from 2011 to 2019



Source: MINEDUC (2011) and MINEDUC (2019).

[Figure 4-17] below presents data related to internal efficiency in Rwandan lower secondary education in reference to promotion, repetition, and dropout rates

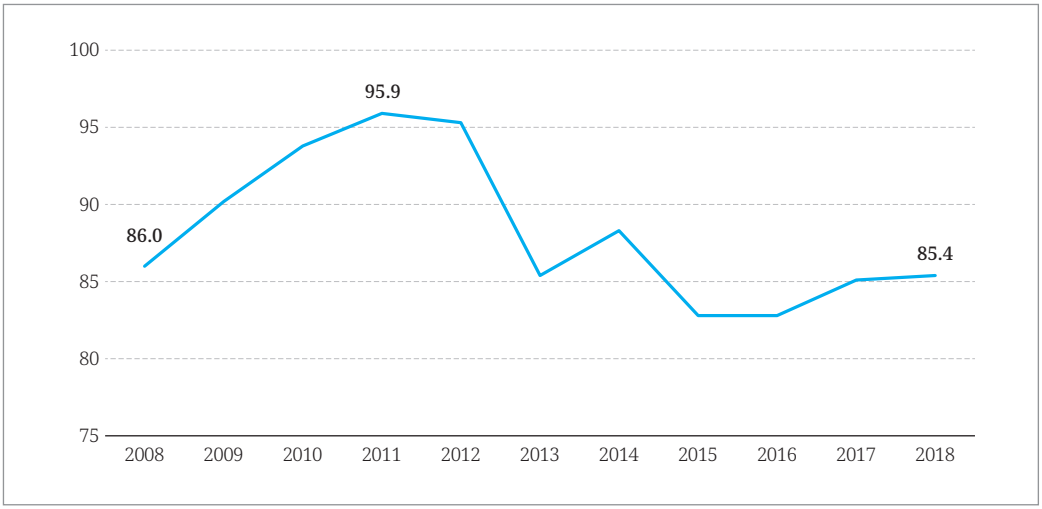
[Figure 4-17] Promotion, Repetition, and Dropout in Lower Secondary from 2011 to 2019



Source: MINEDUC (2014) and MINEDUC (2019).

The figure above shows that the promotion rate from 2011 to 2019 increased from 81.2% to 85.9%. The repetition rate remained almost constant (5.8% in 2011 and 9.1% in 2019) and the ESSP target for repetition (7% in 2019) was achieved. The dropout rate for lower secondary improved from 13.1% in 2011 to 9.1% in 2019. The ESSP dropout target of 6% in 2019 has not yet been met.

[Figure 4-18] Transition from Lower Secondary to Upper Secondary 2008 to 2018



Source: MINEDUC (2018).

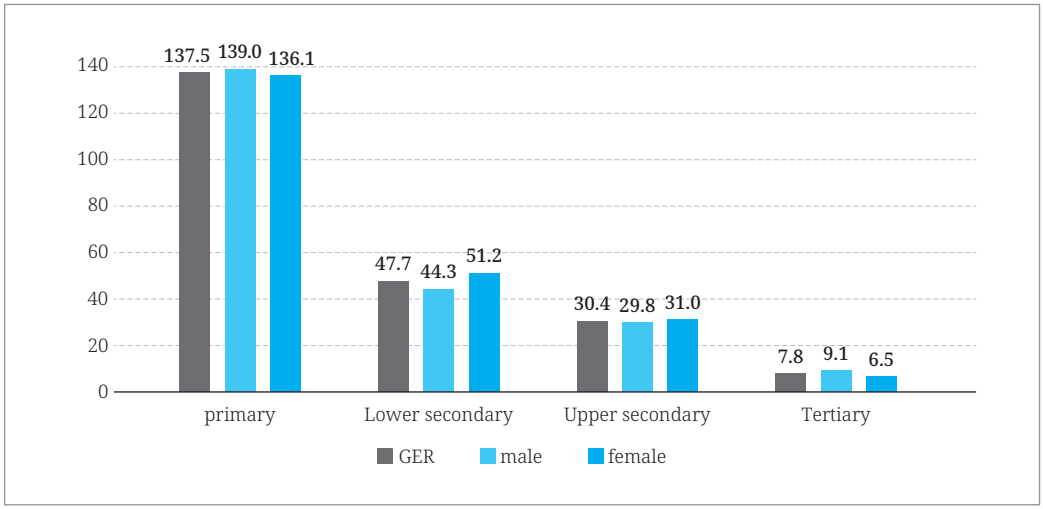
The figure above indicates that the transition rate from lower to upper secondary improved from 86% in 2008 to 95.9% in 2011. After this period, the transition rate declined and fluctuated until it reached 85.4% in 2018. The ESSP 2013/4-2017/8 target of 87% has not been achieved.

3.3. Issues and Challenges

3.3.1. Low Enrolment Rates for Secondary Education

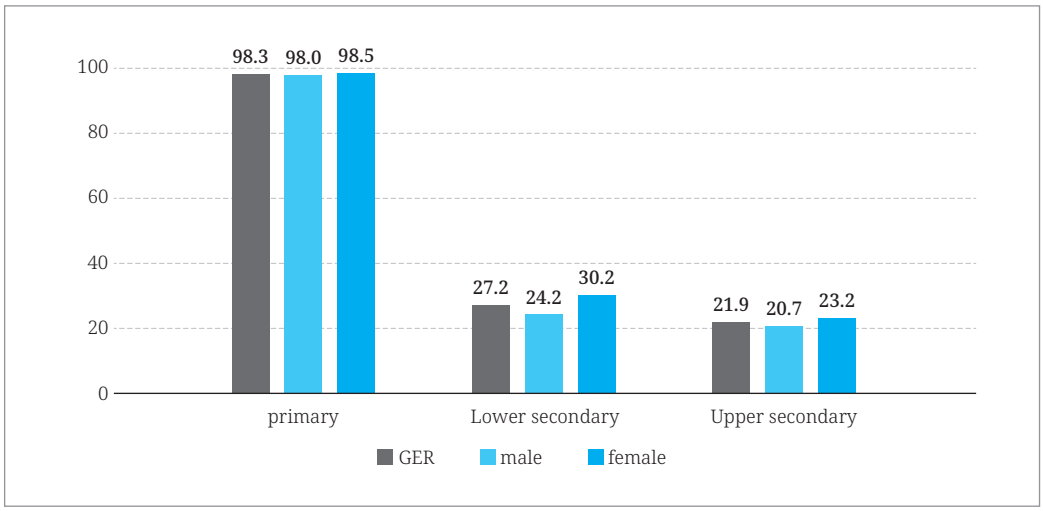
Despite the enrolment rate of primary education being almost 100%, the enrolment rate of lower secondary education dropped sharply. Interestingly, the NER of lower secondary education for girls was higher at 30.2% than boys at 24.2% (MINEDUC, 2018). According to the recent educational statistics (MINEDUC, 2018), the gross enrolment rate (GER) for primary education was 137.5%, the GER for lower secondary education was 47.7%, and the GER for upper secondary was 30.4% in 2018 (See Figure 4-19). In 2018, the net enrolment rate (NER) for primary education was also almost 100%, but the NER for lower secondary education remained low at 27.2% and the NER for upper secondary education was 21.9% (Figure 4-20). Although 12YBE is free and compulsory in Rwanda, the NER for lower secondary education is very low compared to that of primary education, and also lower than the average of world (65.5%) and Sub-Saharan Africa (28.7%).

[Figure 4-19] GER for Primary, Secondary, and Tertiary Education in 2018



Source: http://mineduc.gov.rw/resource/statistics/statistical-year-books/.

[Figure 4-20] NER for Primary and Secondary Education in 2018



Source: http://mineduc.gov.rw/resource/statistics/statistical-year-books/.

Over the past two decades, Rwanda has made progress towards its goal of becoming a middle-income, knowledge-based economy. The government emphasizes strengthening human capital formation, particularly through education, and emphasizes the formation of human capital through the educational service delivery of two key components: access and quality. In terms of access, Rwanda has achieved universal access to primary education, however, it is still endeavoring to ensure the right to access to 12YBE.

There are four key challenges for primary school graduates associated with this low transition rate (MINEDUC and UNICEF, 2017). First, many children do not have the required numeracy and literacy skills, in English in particular, to make the transition successfully. Second, the cost of secondary school education for poor households, which evidence shows is significantly higher than primary education despite the successful implementation of the 12YBE policy. Third, there is a growing opportunity cost for children and households. Finally, there is a supply-side problem, with too few teaching resources in secondary schools to accommodate the very large population of children currently enrolled in primary school and gradually making its way to the transition point.

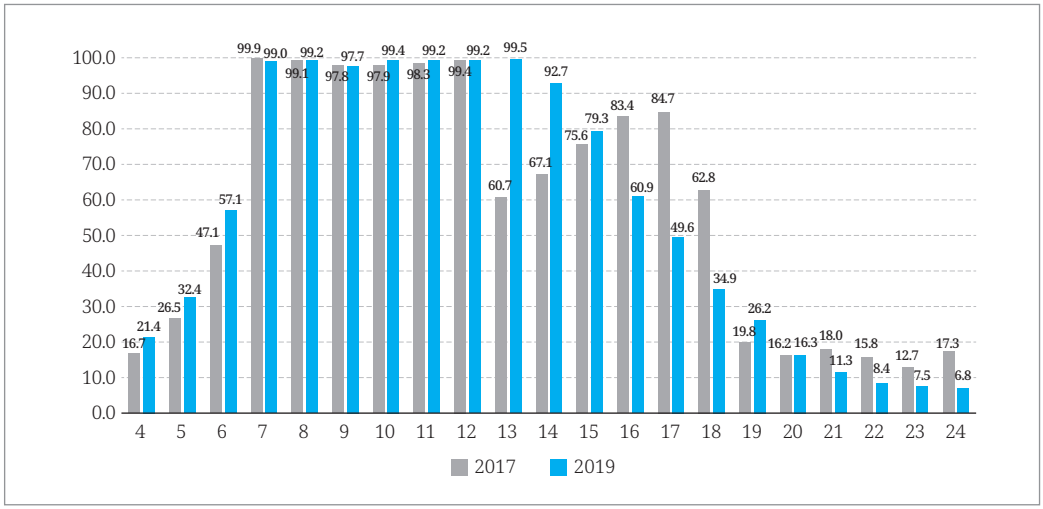
In addition to these challenges, there is a systematic constraint preventing children from transitioning. Although the nine years of basic education is compulsory, students should take a national examination that grants the Primary Leaving Certificate at the end of P6 in order to proceed to lower secondary education (Nuffic, 2015). At the end of their lower secondary education, students take a national examination providing the certificate of ordinary level ('O' Level) in order to be admitted to the senior secondary level. It is one of the obstacles that make it difficult for children to progress from the primary to the lower secondary schools.

3.3.2. Repetitions and Dropouts

In regard to internal efficiency which is seen to have high correlation with educational inputs, the processes and outputs of the system (Yang, 2014) can be indicated by calculating the promotion, repetition, and dropout rates at various grade levels. It also includes cycle completion and survival rates at certain grade levels and cycle-to-cycle transition rates. According to the 2013/4 Global Monitoring Report, Rwanda is ranked as one of the top three performers in the last five years by reducing the out-of-school population by at least 85 percent. While progress in terms of providing access to basic education services is an achievement, more effort is needed to reduce dropouts since the ESSP target was 5% in 2018 (MINEDUC, 2018).

When GER increases and NER decreases, it means that the number of students enrolled is increasing but when focusing on the official schooling age there are children who are not enrolled in school, which is the case in lower secondary education in Rwanda. A deeper survey is needed to explore this issue further. Statistics about GER and NER concur with data about participation as illustrated in [Figure 4-21].

[Figure 4-21] Participation in Education in 2017 and 2019



Source: MINEDUC (2019).

[Figure 4-21] shows that the majority of the participants in education in Rwanda are between 7 and 12 years of age. This is because the period in which education (primary) in Rwanda is compulsory and free. The figure also shows that from age 12 participation rates fall, and at the age of 16 participation in education was at 65.3% in 2018 (MINEDUC, 2018). There is a need to improve the participation rate before and after the primary schooling age.

3.3.3. Enrolment Gaps among Vulnerable Social Groups

Access to education is also indicated by the attendance rates of students who may be affected by family income, as shown by the EICV5 (The Fifth Integrated Household Living Conditions Survey, or Enquête Intégrale sur les Conditions de Vie des ménages in French) survey results (NISR, 2018). The survey revealed that students in the highest income quintile are more likely to have access to primary school compared to those in the lowest income quintile (79.3% for boys and 82.0% for girls in quintile 1 compared to 92.9% for boys and 92.7% for girls in quintile 5).

A study by MINEDUC (2013) indicated that students leave early or fail to return to school for such reasons as possible repetition of one or more years, household costs beyond the family's ability to pay, students' domestic responsibilities, parental attitudes towards the value of education, low achievement as national examinations approach, long-term illness, employment pull, little or no interest, teacher attitudes and behaviors, and pregnancy. The study found that fewer than 5% of girls in rural areas from poor families completed lower secondary school, due in part to their family's inability to spend a higher proportion of their income on their daughter's education (MINEDUC, 2013).

4. Status of Learning Outcomes in Rwanda

4.1. Assessment System in Rwanda

In Rwanda, national examinations have been used for transitioning students to higher levels of education. There are concerns about whether test scores can actually be used to define intended learning outcomes to meet curriculum objectives. It was in 2011 that the Ministry of Education with the support of education stakeholders began a system of learning assessments in primary education, in particular, to generate valuable data on children's learning progress. This data enables the national, sub-national, and school levels to better recognize student learning needs and take appropriate measures to address them (UNESCO, 2015).

Recently, the cabinet meeting of 28th January, 2019 issued a resolution establishing a comprehensive assessment for all basic levels of education in Rwanda. The resolution aimed to improve the quality of both teaching and learning as a way of advancing Rwanda's agenda of becoming a knowledge-based economy. This comprehensive assessment model has three levels: classroom assessment (conducted by teachers at the end of a lesson and at the end of a unit), end of term assessment (conducted by schools with the technical assistance of trained staff at the district level) and end of year assessments (prepared at the national level by Rwanda Education Board experts). The new assessment model introduces measures that seem to be significantly altering the current status-quo. It intends to assess the learners and use their performance to gauge whether they attained the desired competence or not, and to inform remedial action.

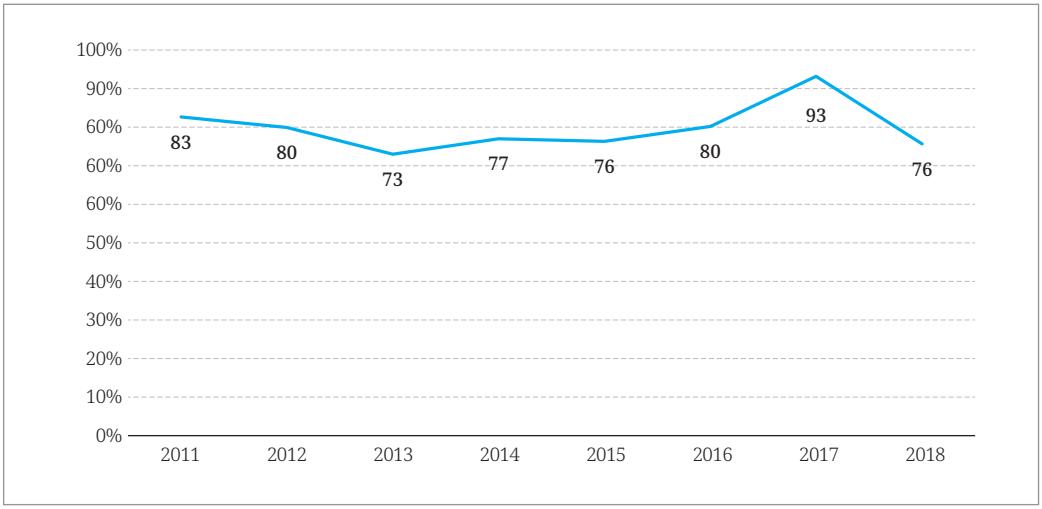
4.1.1. National Examinations

In Rwanda, there are a series of national examinations taken by all students when they reach the end of each level of schooling (Primary Six, Senior 3 and 6, as well as Year-3 for teacher training colleges and Level 5 for TVETs) (REB, 2015). The Rwanda Education Board (REB) has held the responsibility for national examinations since 2011. It oversees the development, administration, and marking of the tests as well as the publication of the test results. For the sake of this study, our analysis will be confined to the primary and lower secondary national examinations.

For the national examinations at the end of primary school, students sit for five examinations, namely: Mathematics, Kinyarwanda, English, Social Studies, and Science and Elementary Technology. The national results are categorized in aggregates. For each

subject a student gets a mark between 1 (the best) and 9 (the worst), then the aggregate is calculated. This runs from 5 (all subjects scored 1) to 45 (all subjects scored 9). According to their aggregated marks student are classified in five categories (Lackamp, 2016). Students categorized in division one, division two, division three, and division four are considered to have passed and so they are admitted to lower secondary the following figure presents the primary pass rates from 2011 to 2018.

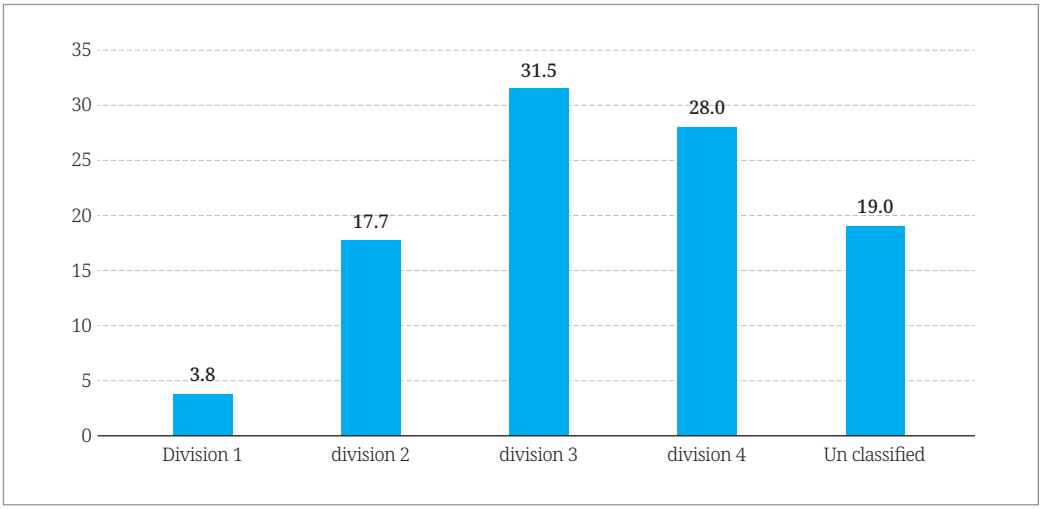
[Figure 4-22] Pass Rates of P6 National Exams from 2011 to 2018



Source: MINEDUC (2018).

The primary pass rate for national exams in 2011 (83%) was better than the pass rates of the following years until 2017 when there was an improvement to 93%. The pass rate in 2018 dropped by 17%. It was in 2018 that national examinations on CBC were held for the first time. National examinations at both the primary and secondary level are a key aspect of Rwanda's education system. Overall, the results of the primary school leaving examination in Rwanda are considered to be good. The question remains to be the relationship between the pass rates and the performance rates. In most cases, the potential of these exams to form the basis of the school accountability system, and so improve performance, has not been fully exploited. By considering the pass rates per division as presented in [Figure 4-22], more focused observations can be made in reference to results of students on the 2019 national examinations. The year 2019 is the second cohort of candidates sitting for the national exams under the Competency-Based Curriculum, which came into effect in 2015. The best score in a subject is 1 and the lowest score is 9. A very small proportion of learners score in the first division, for example in the academic year 2019 results of primary six are categorized as indicated in [Figure 4-23] below.

[Figure 4-23] Primary Six Pass Rates by Division in National Exams in 2019

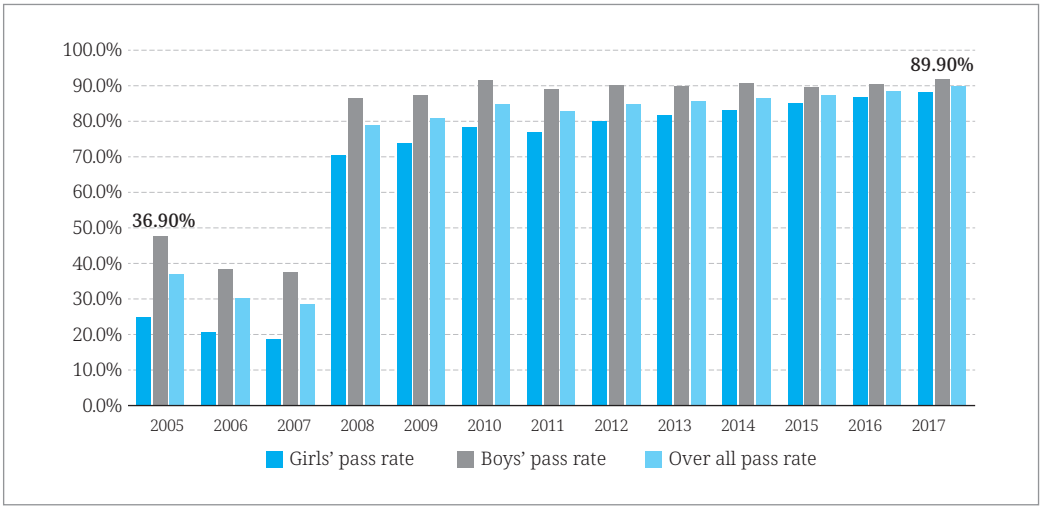


Source: Igihe.com.

According to the results of national examinations for primary released by MINEDUC on the 30th December, 2019, only 3.8% of the students who took the primary leaving examination scored in the first division. The majority (59.5%) of the students scored in division three and four in which scores are relatively lower. The proportion of students who failed (those in the unclassified category) were 19%, almost equal to the proportion that passed in divisions 1 and 2 together (21.5%). It appears that students' achievement during the course of learning was low.

At the end of the lower secondary level, nine subjects (English, Kinyarwanda, Chemistry, Biology, History, Physics, Geography, Entrepreneurship, and Mathematics) are tested. Exam results determine the next level of education. The figure below indicates the trend of students' pass rates from 2005 to 2017.

[Figure 4-24] Pass Rates on Lower Secondary National Exams from 2005 to 2017



Source: MINEDUC (2018).

The pass rates on national exams for lower secondary as illustrated in [Figure 4-24] above greatly improved from 36.9% in 2005 to 89.9% in 2017. The pass rates for boys for all the years from 2005 to 2017 were higher than the girls' pass rates.

4.1.2. Learning Assessment of Rwandan Schools (LARS)

Rwanda has not yet participated in the learning assessments organized at regional or international levels. At the national level, in 2011, Rwanda recognized the importance of quality standards and assurance programs and introduced the Learning Assessment of Rwandan Schools (LARS).

The assessment was designed to evaluate and improve the quality of education and policies for the education system in line with EFA goals, MDGs, Vision 2020, EDPRS 2008-12, the Mission Statement of MINEDUC, and now the SDGs. LARS consists of assessing the learners' skills at a given grade or age (P2 and P5 in selected schools) and is expected to be conducted at least every two years (REB, 2015). In practice, LARS has been conducted in the academic years of 2011(for P2 only), 2014 (for P3 and P5), 2017 (for P6 and S3), and 2018 (for P3). LARS was prepared, piloted, and administered by the REB technical working group composed of experts in different subjects and is subject to moderation by international consultants for international benchmarking.

The main purpose is to measure the level of achievement in literacy and numeracy at the national level in order to determine factors associated with student achievement and thus

to monitor this achievement over time. In fact, children who do not learn basic competences such as numeracy, literacy, and life skills at an early primary age never learn them (MINEDUC, 2012).

LARS revealed a broad distribution of reading literacy scores in which the majority of students either met (55%) or exceeded (8%) curricular expectations. This finding is encouraging, while also indicating that 37% of students did not meet the expectations for P3. The proportion of students failing to meet expectations rose with age for over-aged students, further highlighting the challenges for over-aged children and their classroom teachers. Average reading literacy scores were found to be reasonably high; the majority of P4 students met (71%) or exceeded (9%) curricular expectations in reading for P3. Average numeracy scores were reasonably positive as the majority of P4 students met (27%) or exceeded (27%) P3 curricular expectations in numeracy.

As a monitoring tool, LARS provides MINEDUC with a reliable database on learning achievement as a basis for recommendation to policymakers and other stakeholders for future improvement. The literacy component of LARS focuses on writing skills while the numeracy component captures skills in numeration and operations, the metric system, and geometric figures in conformity with guidelines from the national curriculum. Some key findings from LARS reveal that:

(i) A significant percentage of students fail to meet curricular expectations (only about 30% of P4 students were tested and less than 50% of P6 students could read with comprehension at a P2 level fully, 66% of P6 students could not answer a single comprehension question in English).

(ii) Students in rural areas are disadvantaged in meeting curricula standards compared to their counterparts in urban areas

(iii) Performance is hampered by classroom management with rapidly growing enrolment rates and teacher competences in language (Kinyarwanda and English) and mathematics

The findings should be used to stimulate appropriate actions from policymakers, donors, researchers, teachers, and parents.

4.1.3. Early Grade Reading Assessment (EGRA)

The Early Grade Reading Assessment (EGRA) was developed by USAID to assess children's basic skills for developing countries and provided appropriate information for

improving their learning outcomes. In Rwanda, it was administered to individual students in Kinyarwanda and consisted of six sub-tests: (1) Letter Recognition, (2) Syllable Recognition, (3) Familiar Word Reading, (4) Oral Comprehension, (5) Fluency (reading connected text), and (6) Reading Comprehension. Students in Rwanda are expected to learn to read, and must understand and express basic mathematics concepts in English and Kinyarwanda. Therefore, assessing learning outcomes means to assess whether schools have created environments that enable learning (REB, 2018).

These timed sub-tests assess whether students are achieving the desired level of automaticity in these skill areas. Data from desk reviews indicate that in September/October 2017 EGRA was administered to a random sample of 5,457 P1 students in 304 Treatment and Control schools throughout Rwanda. EGRA was intended to improve the quality of early literacy instruction and strengthen the capacity of the education system in Rwanda (MINEDUC, 2018). National assessments in Rwanda have documented the generally poor reading skills of primary school students. According to a national EGRA conducted in 2012, 13% of students in P4 could not read a single word of a P2/3 level text in Kinyarwanda. Another 13% were reading fewer than 15 correct words per minute, far below what is necessary for comprehension. Similarly, a 2014 reading assessment conducted via the USAID funded Literacy, Language, and Learning (L3) activity found that 60% of P1 students, 33% of P2 students, and 21% of P3 students were unable to read a single word of their grade level text.

Conclusively, many students were not learning to read well enough in either language (Kinyarwanda and English) to fully comprehend a text, and did not receive adequate instruction in the important skills needed to successfully decode and read unfamiliar words and interpret the meaning. Once they have acquired sufficient knowledge of and working vocabularies in English (P4+), students will then need good instruction in the basic phonetics of the English language so that they can learn to easily decode words.

They require abundant practice reading increasingly challenging English texts so that they can build fluency and comprehension (USAID, 2012).

4.1.4. Early Grade Mathematics Assessment (EGMA)

The Early Grade Mathematics Assessment (EGMA) is an assessment tool for children's basic numeracy skills, similar to EGRA. In March 2007, for the first time in Rwanda, a research team evaluated the skills of students with the EGMA instrument adapted to Rwanda's curriculum and context. Primary 4 and 6 students' basic skills in math areas

such as number identification, quantity discrimination, missing numbers, word problems, addition, subtraction, multiplication, geometry, and written exercises were evaluated.

According to EGMA, some students demonstrated automaticity by the beginning of P6. However, their mastery of basic addition and subtraction needs to be more automatic if students are to perform more complicated calculations. Approximately half of the students who were tested read the entire problem aloud before providing the answer. Students performed better on quantity discrimination and word problems than they did on missing number and multiplication. None of the students' results represented a mastery of basic math skills. With regard to geometry, only 50% of P4 students were able to indicate the correct shape when given its attributes.

Conclusively, mathematics skills appear to have been better taught than reading, although students were not learning to automatically perform the basic calculations that underpin further work in mathematics and sciences. Some important number concepts seem to not have been fully developed. This study suggests some classroom practices needed to support improved acquisition of basic skills in mathematics and reading in Rwandan primary schools.

Teachers need to be trained in classroom practices to support the development of their students' skills in reading and mathematics. An emphasis needs to be put on using teaching and learning time as productively as possible. Teachers should learn the importance of giving daily practices in math and reading. All in all, the quality of instruction depends not only on teachers' qualifications and behavior but also on the availability of books to read, time to read, the physical condition of the school, the home environment, and the family's socioeconomic status.

4.2. Issues and Challenges

4.2.1. The Function of a National Examination

As much as access to education has tremendously improved at both the primary and lower secondary levels (enrolment in lower secondary almost doubled from 235,527 in 2009 to 422,093 in 2018), it is important to focus on quality so as to identify gaps and suggest strategies to improve student learning achievement. A World Bank (2011) points out that quality education ensures that all children leaving school are equipped with knowledge, skills, and attitudes for Rwandan economic and social development. As stipulated in an EFA review 2015 report, the quality of education proves to be much more difficult to define and

assess. Indicators typically used to identify quality may include the number of qualified teachers, pupil-teacher ratios, pupils per computer, number of students passing national examinations, etc. These indicators are adequate measures of the intended outcomes of a quality education such as equipping young people to enter the world of work or improving their employability throughout their careers.

Education quality should be seen as a way to improve how young graduates respond to changing labor market needs, adopt new training technologies, expand the outreach of their training, and improve the quality of their services including in the areas of governance, financing, teacher education, and industry partnerships or even to travel far and wide with the necessary confidence and social and language skills. An important challenge for the sector is balancing the expanding access with the needed quality. The current situation calls for consolidating, advancing, and accelerating quality improvements in the monitoring of learning achievement.

It appears that the core purpose of the end of cycle examination is placement into the next cycle of education instead of improving student learning achievement. Some assessments aim to have a direct impact on stimulating changes to policy and teaching. However, in all cases, these three steps are necessary for an assessment to have an impact on learning outcomes. The Curriculum and Assessment Policy issued in 2014 outlines the principles for both informal and formal assessment, in classrooms and national examinations, and for different purposes (REB, 2015). Rwanda refers to examination results as indicators of success of her education system (UNESCO, 2015). Therefore, it is necessary to review the function of national examinations and to improve them for the quality of education.

4.2.2. Low Levels of English Proficiency

In 2008, a policy to use English as the medium of instruction throughout the education system was adopted (MINEDUC, 2010). It was decided to replace French as medium of instruction with English in all public schools. With Rwanda's membership in the East African Community (EAC) and the Commonwealth, and the increasing development of international partnerships, the use of English has become more prominent and the need for literacy in English greater. Since then, there have been changes in the language of instruction from French to English from P4.

According to ESSP 2013-2018, the language of instruction in lower primary schools (P1-P3) became Kinyarwanda, while English and French were to be taught as subjects in all

public and private schools. The decision that Kinyarwanda helps students have sustainable knowledge and know foreign languages was supported by the RALC (Rwanda Academy of Language and Culture). According to the World Bank, the literacy rate of youth (aged 15-24) was 85.1% in 2014, and the literacy rate for adults over 15 years old was 70.8% in 2014 (World Bank, 2019). Teachers in P1-P3 classes should use Kinyarwanda as the mother-tongue language of instruction to help students learn to read while transitioning in P4 from Kinyarwanda to English. However, as most teachers were educated in French and did not master English, this challenged the education system dramatically (Reddick, 2015; Sibomana, 2014; Tolon, 2014). Teachers are instructing in a language with which they have limited fluency, while students struggle across subjects due to a lack of basic fluency in the new medium of instruction.

It is still the most important issue to improve both teachers' and students' levels of English proficiency. The need for capacity building in the English language has been a crucial issue, especially in primary and secondary schools. MINEDUC, in collaboration with stakeholders, has initiated teachers' trainings in English since 2008 but the results are not satisfactory yet. Therefore, efforts are still required in order to upgrade the level of English proficiency among teachers and this contributes to improvement in students' learning.

4.2.3. Teacher Professional Development

Learning conditions include factors within the environment that contribute to the improvement of learning outcomes. These include teacher professional development, pupil-teacher ratio, pupil-qualified teacher ratio, pupil-class ratio, school leadership and management, pupil-classroom ratio, learning and teaching materials, and ICT in education (UNESCO, 2015).

Regardless of how good pre-service training for teachers is, it is important to bear in mind that teachers cannot be prepared for all the challenges they will face throughout their careers (OECD, 2009). Therefore, there is a need to provide teachers with in-service professional development opportunities in order to maintain a high standard of teaching. Statistics from MINEDUC indicate that in 2017 98.2% of primary teachers and 79.5% of secondary teachers were qualified. However, this is not translating into effective learning by students as evidenced by the 2014 LARS results (REB, 2016). To mitigate this challenge, MINEDUC plans a comprehensive school-based CPD for all categories of teachers.

How prepared teachers are to teach is a critical indicator of education quality. Once teachers are equipped with subject mastery, effective teaching practices, technological

awareness, and the ability to collaborate with stakeholders, they are ready to effectively deal with the challenges of the changing world (UNESCO, 2015). In 2016, UNESCO, together with the REB department named the Teacher Development and Management and Career Guidance and Counselling (TDMCGC), organized a consultative meeting with concerned stakeholders that sought to assess the needs for further effective implementation of inclusive education and the use of new methodologies and materials for teaching and learning in the context of the new curriculum (competence-based curriculum). The need for teacher CPD was also expressed in ESSP2017/8-2023/4 as 'insufficient teacher competencies in subject content, pedagogy and languages of instruction (English) that threaten to jeopardise curriculum delivery and inclusion, and ultimately negatively impact student learning outcomes' (MINEDUC,2018). The Ministry of Education and REB have worked with development partners for a number of years to improve teacher competences especially in literacy and numeracy, learner centered pedagogy (LCP), the practice of continuous assessment, and English language proficiency. These partners include VSO, UNICEF, VVOB, JICA, soma umenye, EDT, and UR-CE. For teacher professional development to be effective, the following challenges should be addressed: poor teacher working conditions; teachers' belief; inadequate opportunities; insufficient time, funding, and technology; and unsupportive institutional management (Nzabalirwa & Nkiliye, 2012).

The quotation in box indicates that CPD has been initiated to bring about professional development of teachers and head teachers. However, in-service CPD is not sufficient in itself if it is not built on strong pre-service training. This is why colleges of education are being empowered to effectively train pre-service teachers as mentioned by key informants interviewed from UR-CE. The University of Rwanda College of Education is also partnering with Mastercard Foundation to implement a five-year project on Leaders in Teaching initiatives to strengthen teacher training on Rwanda's Competence Based Curriculum and provide quality practicum opportunities to help student teachers put theory into practice.

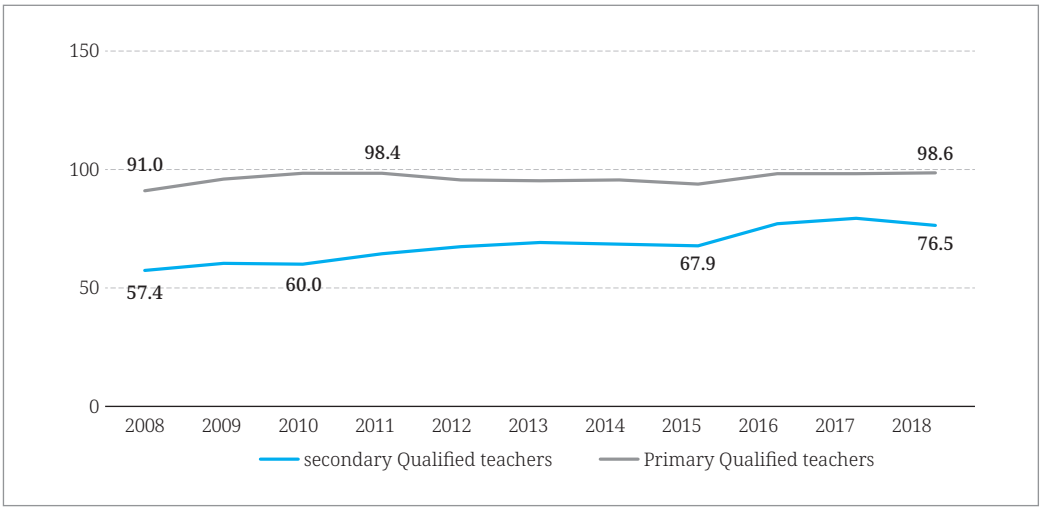
Teacher professional development includes both pre-service and in-service training (MINEDUC, 2013). It guarantees a sufficient number of teachers with appropriate competences as illustrated in subsequent figures.

4.2.4. Lack of Qualified Teachers

[Figure 4-25] shows that the proportion of qualified teachers in primary education increased from 91% in 2008 to 98.6% in 2018 while in secondary the proportion of qualified teachers increased from 57.4% in 2008 to 76.5% in 2018. Unlike in other developing countries where large proportions of primary teachers lack adequate academic qualifications,

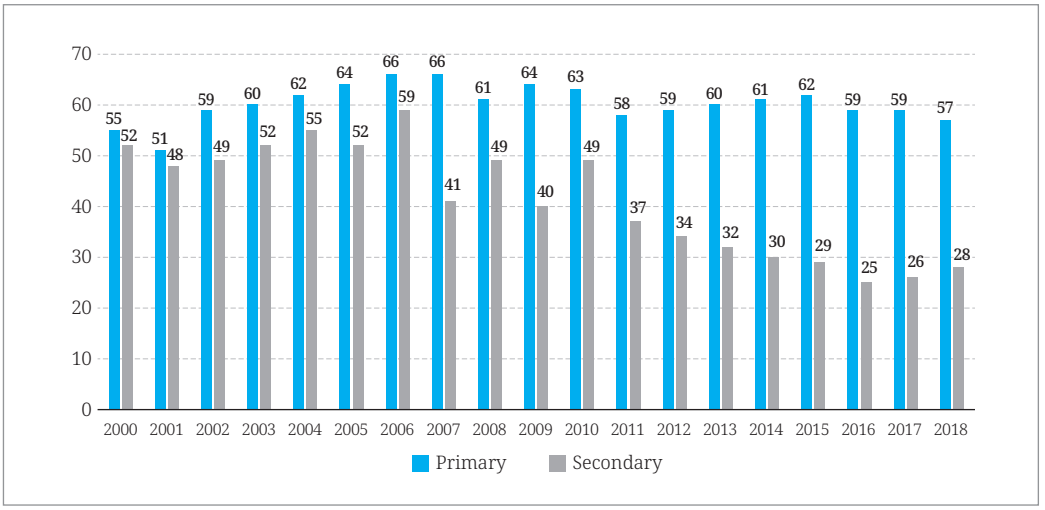
training, and content knowledge (UNESCO, 2005), in Rwanda the majority of teachers, 98.6% (primary education in 2018) and 76.5% (secondary education in 2018), are qualified. The major challenge as noted in the ESSP for 2018-2024 is adequate teacher competence (MINEDUC, 2017). Insufficient teacher competencies are mentioned in regard to subject content, pedagogy, and languages of instruction and threaten to jeopardise effective curriculum implementation.

[Figure 4-25] Proportion of Qualified Teachers in Primary and Secondary from 2008 to 2018



Source: MINEDUC (2018).

[Figure 4-26] Pupil-Qualified Teacher Ratios in Primary and Secondary from 2009 to 2018



Source: UNESCO (2015), MINEDUC (2018).

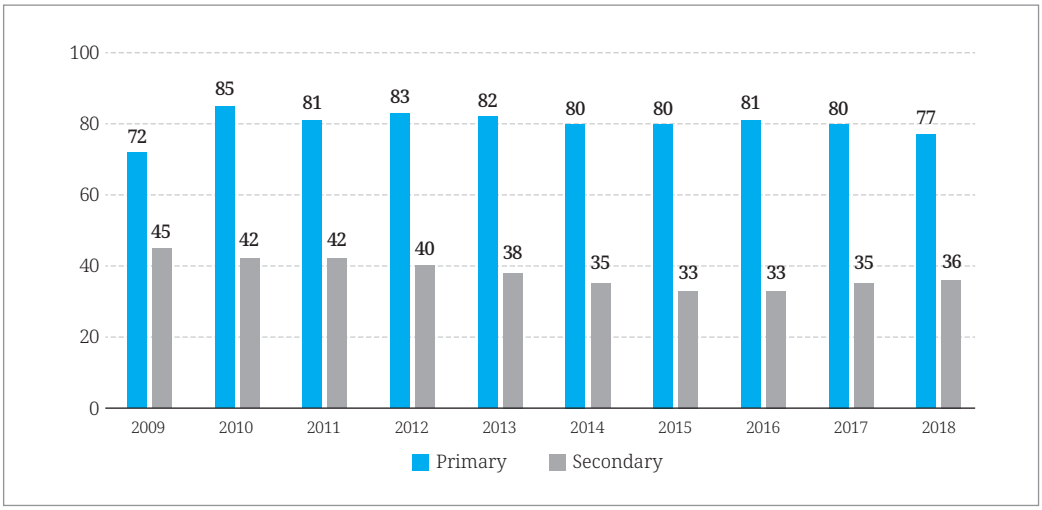
[Figure 4-26] shows student-qualified teacher ratios in both primary and lower secondary education. For primary education there have been slight variations in the pupil-qualified teacher ratio over the years (from 55:1 in 2000 to 57:1 in 2018) despite the fact that the percentage of qualified teachers increased from 53.3% in 2000 to 98.2% in 2018 as shown in [Figure 4-26]. The increase in the number of qualified teachers was counteracted by a tremendous increase (75%) in student enrolment (from 1,431,692 in 2000 to 2,503,705 in 2018) that resulted from government's abolition of school fees, as well as school construction and rehabilitation. To improve the level of instruction and learning amidst the increased enrolment, a double-shift system and teacher specialization were implemented as interventions to reduce class sizes in primary schools. Primary level data points out the continuing need to address class sizes.

For secondary education since 2000, the highest pupil-qualified teacher ratio was 59:1 in 2006 and the lowest was 25:1 in 2016. Secondary classes appear to be within a more acceptable range due to school expansion, increased numbers of qualified secondary teachers, lower NER, and improved promotion.

4.2.5. Pupil-Class Ratios in Primary and Secondary Education

The implementation of 'education for all' through the abolition of school fees and the introduction of 9YBE led to increased student enrolment and consequently high pupil-classroom ratios. [Figure 4-27] indicates pupil-class ratios in both primary and secondary schools from 2009 to 2018.

[Figure 4-27] Pupil-Classroom Ratios in Primary and Secondary Education from 2009 to 2018



Source: UNESCO (2015), MINEDUC (2018).

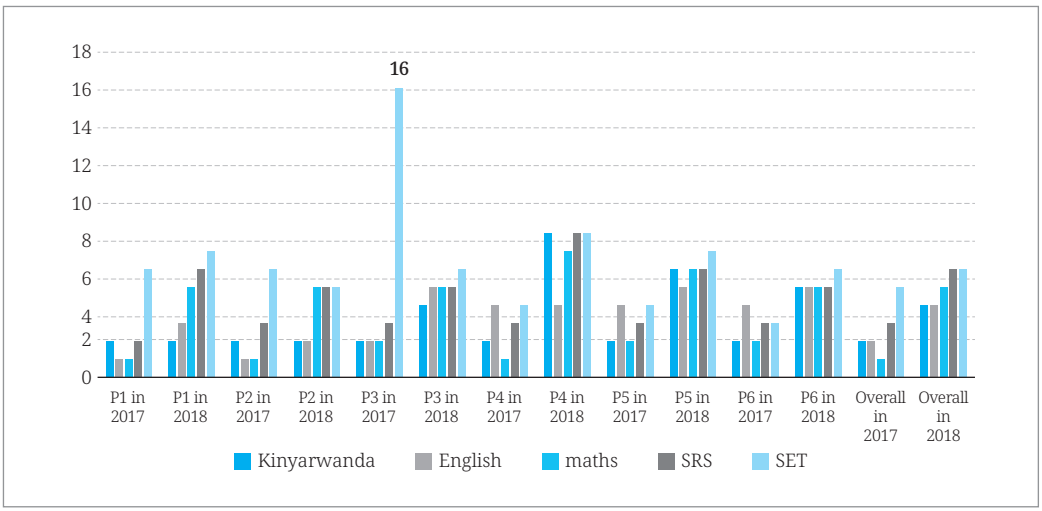
As [Figure 4-27] shows, pupil-classroom ratios are higher in primary (between 72 and 85) compared to secondary (between 33 and 45). In primary, the pupils-classroom ratio by far exceeded the standard classroom capacity, which is 46 students according to MINEDUC (2009). This has implications on student learning and achievement. There are also disparities among schools, for example the average pupil per classroom in public schools is 85, 80 in government-aided schools, and 32 in private schools (MINEDUC, 2018).

In order to respond to this, double shifting was introduced to lower the pupil-classroom ratio in 2009. The double-shift system contributed to reducing the number of students, however, it was a challenge for teachers who teach morning and afternoon shifts with very limited time to prepare for and reflect on lessons. And it was also a burden on parents because they had to find a way to look after their children. However, MINEDUC phased out the double-shift system in primary schools in 2018 and allowed students to spend eight hours at school instead of six.

4.2.6. Lack of Learning Materials

The availability of textbook resources including teacher guides, reference books, and visual teaching aids contributes to improved student learning and performance. In Rwanda, the government target for pupil-textbook ratio is 1.7:1 at the primary level and 1:1 at the secondary level (MINEDUC, 2018). [Figure 4-28] below indicates pupil-textbook ratios in primary schools for 2017 and 2018.

[Figure 4-28] Pupil-Textbook Ratios in Primary Schools in 2017 and 2018



Source: MINEDUC (2017), MINEDUC (2018).

Current data indicates that textbook distribution and presence in schools has improved. Comparing pupil-textbook ratios in 2017 with those in 2018, it appears that the ratios were better in 2017 with the exception of SET textbooks for P3 where there was one book per 16 pupils. However, unlike the statistics for 2018, the textbook statistics for 2017 are not indicative of whether the textbooks were aligned with CBC. All in all, the targets of (1.7:1 and 1:1 for primary and secondary respectively) are yet to be achieved.

5. Successful Primary School Case Study

5.1. Outline of the Case Study

This study attempted to understand characteristics that make schools more effective in terms of academic achievement in Rwanda. For this purpose, I was recommended one successful primary school (Kibenga Primary School) that showed high performance on the P6 national examination in a rural area and one secondary school in Kigali by the Rwanda Education Board. I visited the primary school and conducted interviews with two teachers and a principal in December 2019. I conducted a one-on-one interview with the principal and a group interview with the teachers.

Kibenga Primary School is a government-aided school located in Mayange sector, Bugesera district, Eastern province of Rwanda. The school is found in a rural area forty kilometers off Kigali-Nyamata-Gashora tarmac road. The school has a student population of 835, 13 classrooms, and 23 teachers (of whom 11 teachers are on the government payroll). The school is under the joint leadership and management of African New Life Ministry, a Faith-Based Organization (FBO) and MINEDUC.

Kibenga Primary School has been among the best-performing schools in Rwanda for the last two academic years (2018 and 2019). According to the principal, every graduate has graduated with grade 1 or grade 2 in every subject, and the dropout rate has been at 0% since 2014. Due to these achievements, it is popular to transfer to this school from the nearby urban areas. Below are some summaries of the characteristics that explain the school's best performance below.

5.2. Lessons from the Kibenga Primary School

5.2.1. The Principal's Leadership

The school principal has tried to improve students' learning outcomes. He requires all teachers to prepare and submit lesson plans for five subjects (mathematics, science, social studies, English, and Kinyarwanda) every day, and all documents must be written on a computer. In addition, the principal often visits other well performing schools in Kigali city, and secures lesson plans or examination papers and shares them with teachers for use in their classes. And he also tries to benchmark those schools. "I take my time to go to Kigali to look for test exams. I work with the best schools like Remera Academy and Kigali Harvest. We organize debates and compete with the private schools," explained the principal of Kibenga Primary School.

The principal manages the students with a strong religious base and also makes an effort to improve their non-cognitive skills and develops their national values. This strong school discipline is one of the reasons why at Kibenga Primary School there are no cases of drug abuse, pregnancies, or dropouts. The principal sets the expectations for behaviors and outcomes, and he also tries to share this principle and expectation with teachers and parents. The principal also communicates with parents regularly. He said, "I ask all parents to come to school every two months and SGAC every month. We share all of the school life and we try to find ways to address any student concerns." Because school teachers and parents communicate regularly, parents could be more interested in their children's school life as well as studying. As research has pointed out, the school climate can affect students' academic achievement and success in addition to positive social and emotional development efforts (Zullig, et. al., 2010). School leadership will be needed to bring along necessary changes. This school case illustrates that a school climate managed by the principal's leadership could make the school more effective, even if it is located in a rural area.

5.2.2. Teachers' Efforts and Incentives

Although classrooms are overcrowded (60 students in P6 classroom) in the school, teachers are encouraged to apply active teaching and learning methods to ensure that every student is engaged in the learning process. "We teach from concrete to abstract. We give many diversified examples and give chance to learners for practice. We also use BLF toolkits and we always consult our colleagues within departments for any help we may need," one teacher asserted. Teachers in this school should prepare lesson plans for five subjects and submit them to the principal every day. They are also required to make all documents

necessary for class be written on a computer, and provide supplementary learning materials and reading programs with students. Teachers should share lesson plans for each subject with other teachers to improve them and participate in their own professional development training in Kinyarwanda, English, and math. One teacher who come from Uganda and is fluent in English helps the other teachers prepare lesson plans and make teaching materials. This kind of teacher's effort contributes to the improvement of students' achievement.

What makes teachers put more effort into their work? One of the reason is that the NGO provides incentives to teachers in the form of an allowance (about 50 USD per a month) to top up their salaries. The NGO also employs 12 additional teachers and provides breakfast, lunch, and a snack for all teachers during their work in the school. Research shows (Darling-Hammond, 2000) that effective teachers are one of the most important factors effecting students' achievement. The government and many development partners have also recognized the effects of teachers and attempted to improve the quality of their teachers. These policies have mainly focused on providing teacher training programs for the improvement of teaching. When many teachers do not understand the implications of a new policy or change in the curriculum, they need to be trained on how to use it to improve their professionalism. However, this school's case implies that it is important to provide not only professional development programs but also incentive for teachers.

5.2.3. Maximizing Student Learning Time

Because the Kibenga Primary School is operated on a single shift and provides supplementary classes for every student as well as general classes from 7 am to 4 pm, students spend more time on their learning compared to other ordinary schools. They are required to come to school early every day and read English books according to the reading plan arranged by the teacher before classes begin. After classes, they also take an additional class for improving their learning outcomes or join in club activities such as English debate and football. For these additional activities, the school provides all students with lunch and learning materials.

Student learning time is the most valuable resource in the educational process for improving achievement. On average in the OECD, students in PISA 2012 reported spending 4.9 hours per week on homework or other study set by teachers (Gromada, & Shewbridge, 2016). Student are usually supposed to study eight hours for their regular classes in Rwanda but some of them study only six hours at schools due to the double-shift system. However, at Kibenga Primary School, students spend at least one more hour on their learning or other educational activities in addition to regular classes. They are also required to study

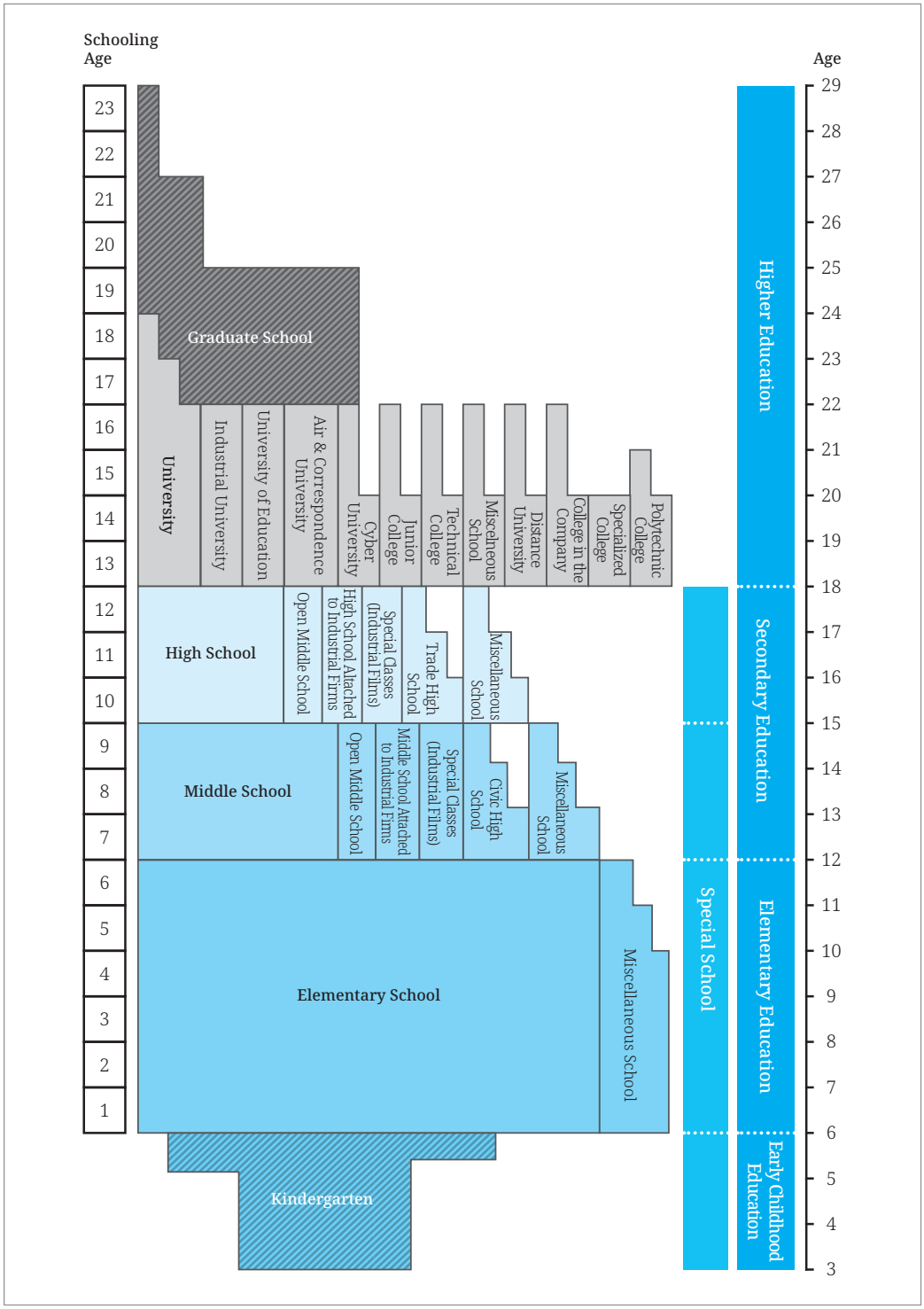
more at home to complete homework arranged by their teachers. It was possible to increase students' learning time because the school provides materials and a positive environment for learning. This school's case shows that the more time a school makes students spend on learning, the higher performance they can achieve.

6. Korean Case Analysis

6.1. Overview of the Education System in Korea

The current Korean education system consists of nine years of compulsory education (six years of primary school and three years of lower secondary school), three years of upper secondary education, and higher education (Park, 2015). Upper secondary schools (the High school) are classified as general, special-purposed, specialized, and autonomous high schools. There are significant differences among the four types of upper secondary schools in terms of purpose, curriculum, reputation, and academic competition; however, graduates who want to advance to higher education can apply to any type of higher education institution regardless of their high school type. Higher education is provided by universities, universities of education, industrial universities, air and correspondence university, technical universities, technical colleges, distance universities, and cyber universities. The length of higher education is generally four years but varies depending on the institutional type. Most junior colleges offer two years of the associate degree programs providing training in practical and occupational skills. Universities normally last four years and grant a bachelor's degree upon graduation.

[Figure 4-29] School System in Korea



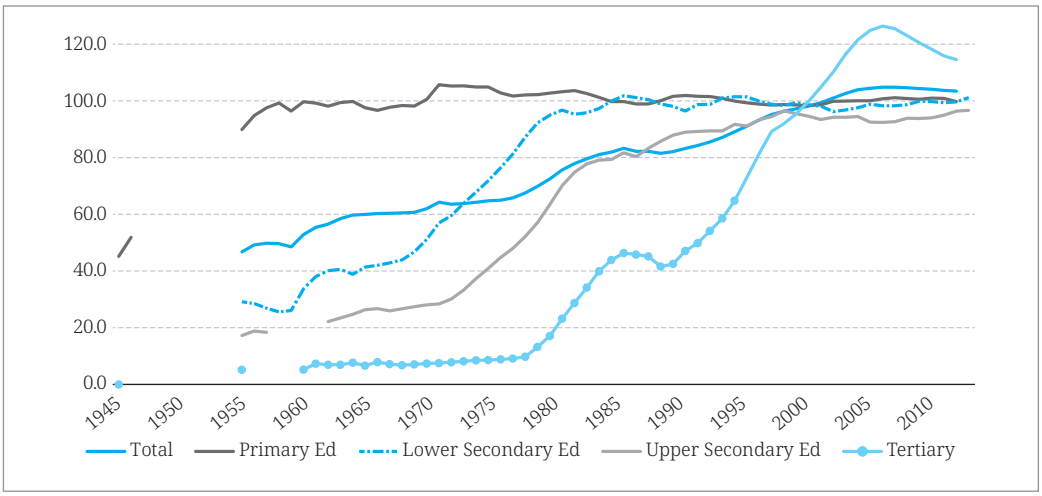
Source: KEDI (2019), Brief statistics on Korean education, p.63.

6.2. Expanding Educational Opportunities for All

The single and open 6-3-3-4 system that was established in 1951 was a one of the core factors causing the expansion of education in Korea. Right after independence from Japanese colonial rule on 15 August, 1945, Korean education policy focused on expanding educational opportunities that were suppressed during the colonial period and establishing an institutional framework so that anyone could receive equitable educational opportunities without discrimination. In the Japanese colonial period, even primary education was not compulsory for Koreans, and secondary and higher education were very limited under the dual education system. Therefore, ensuring equitable access to education for all without discrimination was the most important and urgent task for the Korean government. In this context, there were significant efforts such as the 'Education Tax Act' and 'Compulsory Education Subsidy Act' to support the six years of compulsory education, and a standardized national curriculum that ensured the same level and content of education was established in the mid-1950s (Park et, al., 2016). These efforts contributed to expanding enrolment in primary education rapidly and eliminate disparities between classes.

Student enrolment is the beginning of government efforts for accumulating human capital and it is closely related with educational investment (Hong et. al., 2018). Korea has been praised as a good example of how to expand educational opportunities for all groups of people. [Figure 4-30] shows the trends of gross enrolment rate by level of school from 1945 to 2018. The GER for primary education increased rapidly from 45.2% in 1945 to 98.8% in 2015, and the GER for secondary and tertiary education also increased rapidly during this period.

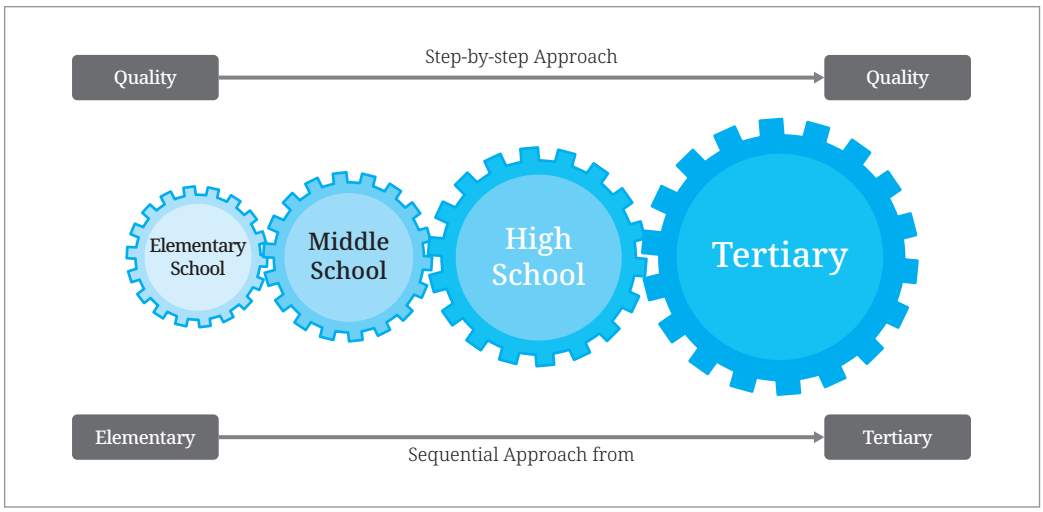
[Figure 4-30] GER by Level of Education from 1945 to 2015 in Korea



Source: KEDI and MOE (each year), *Education Statistics Yearbook.*

The development of Korean education was focused on achieving quantitative expansion, then by taking a step-by-step and sequential approach for the short term (KEDI, 2010). This policy direction was consistently maintained from primary and secondary education to higher education. Through this step-by-step approach, Korea experienced a rapid expansion of education from primary to higher education over the last 70 decades. In many countries, educational opportunities expanded sequentially from primary, secondary, and to higher education. Korea also experienced sequential expansion, but it is characterized by rapid expansion in a short period of time. Korea responded to the demand for the next level of education from graduates by providing more opportunities and sacrificing the quality at each level of education. This approach has led to simultaneous universalization from primary, to secondary, and to higher education within a short amount of time.

[Figure 4-31] Development of Korean Education



Source: KEDI (2013), *Education for the Future.*

Primary education opportunities expanded, but secondary and higher education opportunities were still limited in the 1950s-1960s. In this context, the government tried to control the enrolment in secondary and higher education with the entrance examination system, while at the same time increasing educational opportunities through the private school promotion policy (Kimura & Park, 2015). Unlike primary education that pursued the government-led opportunity expansion policy, the expanding secondary and higher education opportunities depended on the private sector for the cost of establishing and managing schools.

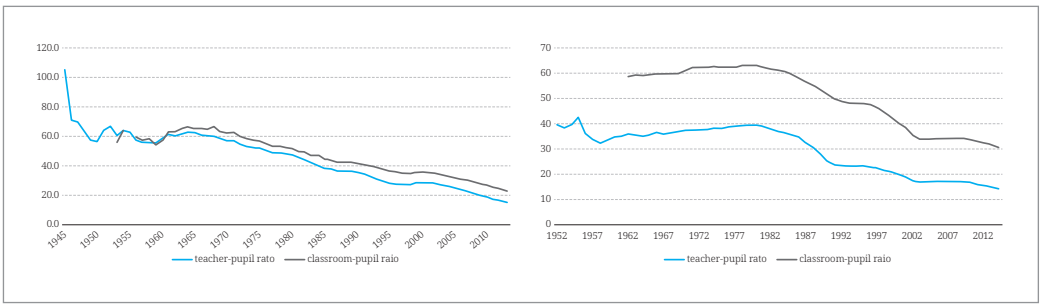
While universal basic education eliminated disparities between classes, competition became very fierce due to restricted entry into secondary and higher education. Therefore,

the government tried to expand educational opportunities by sequentially abolishing or reforming the entrance examination at each level of education when the demand for advancement to next level of education became a social problem and it was no longer possible to control it. As a result, the social selection function of the entrance examination gradually transited from the level of lower secondary to upper secondary and then higher education.

Korea abolished the entrance examination to lower secondary education in 1969 and this led to the rapid expansion of educational opportunities. The rapid expansion of lower secondary education caused by the abolishment of the entrance examination directly resulted in excessive competition on entrance examinations and brought about an extreme bottleneck phenomenon for upper secondary education. In order to resolve related educational problems, the Korean government decided to abolish the entrance examination for upper secondary schools gradually from 1974, and it became the turning point for expanding educational opportunities.

The rapid expansion of education resulted in the deterioration of educational environments. With financial constraints, the policymakers set up priorities and strategies to expand educational opportunities by balancing quality and quantity. Korea took a low-cost approach, which tried to maximize the number of students accepted by operating large number of classes and a double-shift system for achieving quantitative expansion and sacrificing quality at all levels of education (Lee et. al, 2010). [Figure 4-32] show the trends of teacher-pupil ratio and classroom-pupil ratio for primary and secondary education during the expansion period of educational opportunities. The teacher-pupil ratio for primary education decreased from over 60 in 1950 to 15.3 in 2018, while Rwanda's is still over 40.

[Figure 4-32] Trends in the Teacher-Pupil Ratio for Primary and Secondary Education from 1945 to 2018



Source: KEDI and MOE (each year), *Education Statistics Yearbook.*

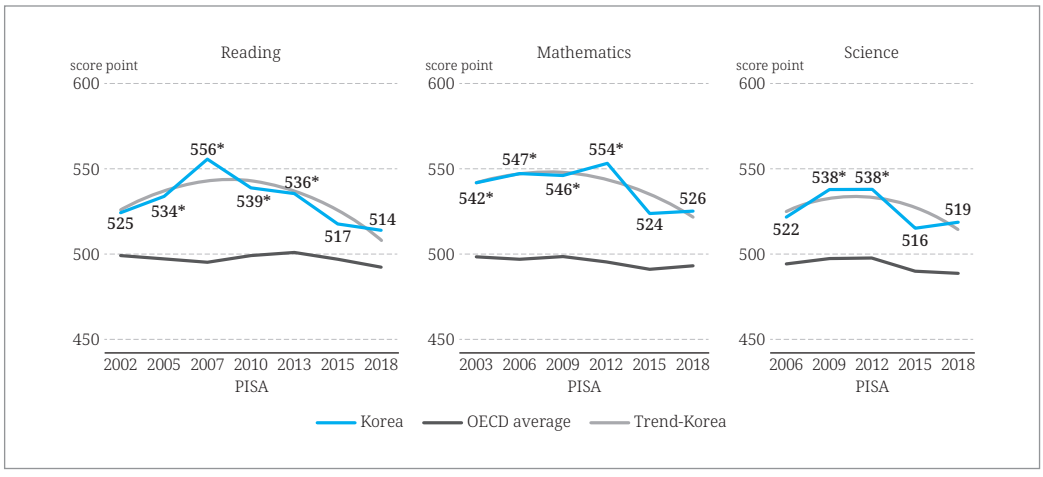
Although Korea has made great strides in terms of the quantity of education, the government sacrificed the quality of education such as teacher-student ratio and student-

classroom ratio to provide more educational opportunities at each level of education. With a limited budget, it can be said that a type of trade-off between quantitative growth in education and qualitative improvement was inevitable. When educational opportunities expanded to a certain extent, the Korean government prioritized quality and gradually focused on the improvement the educational conditions.

6.3. Improving Students' Learning Outcomes

Korea also has a top-quality school system when measured by student performance on standardized tests. Korea has been very active in establishing and implementing evidence-based educational policies by participating in various international-level academic achievement assessments such as OECD PISA (Program for International Student Assessment), IEA TIMSS (Trends in International Mathematics and Science Study), and ICILS (International Computer and Information Literacy Study). Starting with the participation in OECD PISA in 2000, Korea has gained international attention for performing highly in subjects such as reading, mathematics, and science (Kim et. al., 2016). As [Figure 4-33] shows, Korea consistently ranks among the best-performing countries in the OECD's PISA, but has declined recently. The mean scores in reading, mathematics, and science are some of the highest and the percentage of low performers is one of the lowest among PISA-participating countries.

[Figure 4-33] Trends in the Results of the PISA Test



Source: OECD (2019). Programme for international student assessment (PISA) results from PISA 2018: Country note. Pairs: OECD.

Although the recent results on the PISA show a decline in the average reading, mathematics and science scores, Korea still ranks in the top tier. Multiple factors have contributed to Korea's exceptional achievements in education, including maintaining the

quality of the academic curriculum on a national level and setting the nation's educational policy by conducting the National Assessment of Education Achievement (NAEA) every year since 1998 (Kim et. al., 2016). The NAEA has evaluated academic achievement for secondary school students every year with four main purposes. First, the NAEA aims to diagnose the educational achievements of secondary school students and the trends of the achievements systematically and scientifically. Second, the NAEA provides data for supporting educational policies that ensure students' basic achievement and the enhancement of the curriculum. Third, the NAEA provides information for enhancing the accountability of schools and supports school education. Fourth, the NAEA supports the schools and teachers to help improve school-level standards-based achievement assessment and classroom assessment implementation methods.

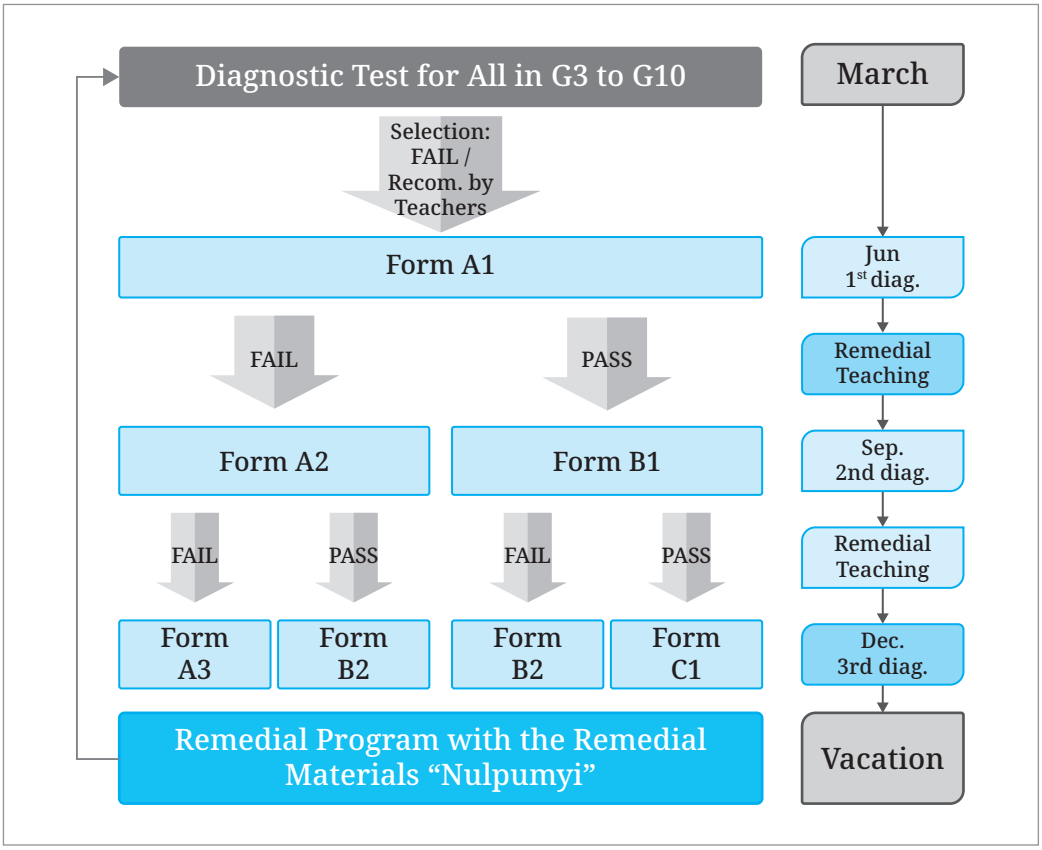
The Korean government conducts the NAEA annually through the Korea Institute for Curriculum and Evaluation (KICE), one of the government-funded research institutes, and also conducts the survey to understand students' school lives and non-cognitive characteristics such as self-efficacy, motivation, and attitudes toward their subjects. The NAEA results are divided into four level: the best level, the normal level, the basic level, and the below basic level, and only the percentage of students at each level is reported. The government also reports the analytic research results using the NAEA and survey data, and uses them to improve the curriculum and develop educational policies. The government also conducts research, and develops and implements the NAEA and other international assessment such as PISA, TIMSS, and ICLIS through KICE.

According to the recent results of the national assessment in 2019 (Korean Ministry of Education, 2019), proportions of the below level students in the Korean language subject decreased from 4.4% in 2018 to 4.1% in 2019 in lower secondary schools and the proportion of below level students in the English language subject decreased from 5.3% in 2018 to 3.3% in 2019 in lower secondary schools. However, the proportion of below level students in math increased from 11.1% in 2018 to 11.9% in 2019 in lower secondary schools. The NAEA results also showed an achievement gap between the urban (10.3%) and rural (15.2%) areas in math. Many Korean students are struggling to study math, and often give up on their learning. Based on these results, the Korean government is developing and implementing educational policies for improving students' learning outcomes. Regarding ways to improve learning outcomes, the government is focusing on supporting the below basic level students and schools are using ICT technology. For example, the "Keep-Up, Catch-Up (KU-CU)" website is for helping students "Keep-Up" with the formal curricula and supporting underachieving students who need to "Catch-Up" with their studies. The "Do-Dream School Project" provides students with counselling and other support programs for improving their academic

achievement and preventing dropouts.

Although the NAEA has assessed student achievement every year, there were also several limitations. First of all, the NAEA does not provide information about each school or individual student, because it aims to understand the trends of the students' achievement. It is also difficult to exactly diagnose the below basic level students from all grades from primary to lower secondary schools, because the NAEA assesses only S3 and S5 students via a sampling method (3% of the student population). Another limitation is that instructional materials developed based on NAEA results are appropriate for the above basic students, so it is hard to pinpoint the below basic level students and provide systematic remedial programs for them. In order to overcome these limitations, the government developed the 'Diagnostic tests and remedial system of basic skills', and supports the regional offices of education to operate it. This online-based system developed and operated by Chungnam National University aims to identify the below basic level students and diagnose their current levels of achievement (Ban, 2018). This system provides instructional materials appropriate for the below basic level students as well as diagnostic tests for students from P3 to S4. Especially, regional offices of education support diagnostic tests based on the needs of each school, and test scores are reported only to each school and the below basic level students for improving students' learning outcomes. The regional governments also provide teachers and schools with instructional materials appropriate for the below basic level students.

[Figure 4-34] The Concept of Diagnostic Tests & Remedial System of Basic Skills (DTBS)



Source: Ban (2018).

Another approach to ensure learning for all and improve students' learning outcomes focuses on providing intensive support for children from vulnerable social groups such as the poor, immigrants, and North Korean defectors. Intensive support for these groups is provided in consideration of the collective characteristics of each vulnerable group and categorized into direct support for individual students and institutional support for schools.

In the case of direct support for students from immigrant families and North Korean defectors, the government provides specialized programs focusing on improving language skills. The children from these groups have difficulty learning the Korean language and they cannot receive any support from their family. Especially, because language skills are the most fundamental for learning throughout the schooling period, low language skills affect their academic achievement in other subjects as well as the Korean language subject. Students from low-income families are provided learning materials and scholarships to continue to study. The government provides various learning programs for the English and math subjects through the Educational Broadcasting System (EBS), and provides financial

support for university students helping them as a private tutor at home. The regional offices of education support the establishment of learning centers in community and hiring tutors, so that students can study and do their homework after school. The government also provides mentoring and counselling program to motivate their learning and prevent dropouts. Recently, the Korean government has provided additional support for the below basic level students in the lower grades of primary school. This approach is based on the perception that learning deficits accumulate from the lower grades and influence low motivation or a poor interest in learning, and eventually lead to low academic achievement.

The government also provides indirect support for students from vulnerable social groups by supporting schools. For example, the government provides financial support for after-school programs, and each school implements them autonomously according to the needs of the students. The government has also designated the schools where the proportion of below basic level students is over 10% as "Do-Dream School" since 2018, and provided various support programs including after-school programs, learning clinics for students, counselling, etc. Another related policy is to support villages or communities, including the schools. The 'Education Welfare Priority Zone Project' and 'Innovative Education Zone Project' have attempted to develop partnerships with families, schools, and communities to help ensure quality education.

6.4. Efforts to Develop Evidence-Based Educational Policies

Korea has been very active in developing and implementing evidence-based educational policies by establishing an education statistical survey system that covers the National Center for Education Statistics, regional offices of education, and each school. This system has advanced considerably over the past seven decades in terms of survey scale, method, and analysis of the results (Park & Kim, 2008). In particular, survey, analysis, and service systems are closely interconnected through information communication technology.

The main statistical office in Korea, the Bureau of Statistics at the Government Information Agency, was established in 1948 and has since been enlarged and renamed the National Statistical Office (NSO) in December 1990. However, many statistics, labeled as designated or general statistics, have also been produced by government agencies under the permission of the NSO. In the same vein, the education statistics survey has been conducted by the Ministry of Education with authorization from the NSO since 1963. The survey results have been published in the annual "Statistical Yearbook of Education." From the 1960s to 1990s, the education statistics survey aimed at collecting data for the yearbook, rather than conduct a professional survey and analysis to improve national education. However, since

the Korean Educational Development Institute (KEDI), a one of the government funded-research institutes, commissioned the education statistics survey, the function of the education statistics survey has changed to collect, analyze, and provide a various data for the purpose of developing and improving education policies.

The national statistics system can be largely classified into centralized and decentralized types (Park & Kim, 2008). The centralized statistical system is a system by which an exclusive institute is responsible for producing all the basic statistics necessary for the country, and Rwanda has this system. On the other hand, the decentralized type means that each ministry or government organization collects data and produces statistics for their needs, and Korea has this system. Because each system has both of advantages and disadvantages, each country's system varies depending on its context. Korea's experience illustrates that the decentralized system could produce education statistics swiftly based on demand. Especially in this process, educational institutes played an important role.

The Korean government took a sequential and low-cost approach in order to develop the education statistics system (Kim et., al., 2017). Statistics generally require data collection, data analysis, and data services, and the Korean government has focused on educational data collection in the early stages but later on it expanded its scope of interest to data analysis and services. With regard to the data collection method, it initially used administrative statistics but gradually expanded to include survey statistics. Another approach was to keep the cost low by utilizing quality human resources. Despite the importance of educational statistics, it was difficult to secure sufficient financial resources for statistics due to limitations in the government budget. Similar to the approach of expanding educational opportunities, the government had no choice but to rely on quality human resources. With the establishment of an online system using ICT, the cost of data collection has been able to decrease.

In addition to educational statistics, the Korean government also continues to strive to provide various survey data to contribute to policy decision-making through its educational research institutes. The Korea Educational Development Institute (KEDI) founded in 1972 is a one of the government-funded research institutes and it is in charge of collecting education statistics. KEDI has performed a pivotal role as a think tank for enhancing the quality of education by collecting and analyzing various survey data. Other educational research institutes that play a key role in Korean education sector such as the Korea Institute for Curriculum and Evaluation (KICE), the Korea Research Institute for Vocational Education and Training (KRIVET), the Korea Education Research Information Service (KERIS), and the National Institute for Lifelong Education (NILE) have become detached from KEDI. These educational research institutes have conducted various policy research projects and

longitudinal surveys on student achievement, studying not only cognitive but also non-cognitive skills. Based on their research, they provide the policy recommendation required to improve Korean education in their specialized areas.

7. Implications for Enhancing HCI in Rwanda

7.1. Lessons from Korean Experiences

Korea has experienced the rapid expansion of its education system from primary to higher education over the last 70 decades. In many countries, educational opportunities expand sequentially from primary to secondary and then to higher education. Korea also experienced sequential expansion, but it is characterized by rapid expansion in a short period of time. The Korean government could not control or catch up to the size and speed of the educational expansion. The government responded to graduates' demands for the next level of education by providing more opportunities without additional financial support. It was the only option after the government abolished the entrance examination for lower and upper secondary school to increase accessibility. Strategies such as the 'No Test Middle School Entrance System' or 'the High School Equalization Policy' led to the simultaneous universalization of primary to secondary and then to higher education within a short period of time. It is clear that these changes contributed to the expansion and equity of educational opportunities, and become a foundation for the nine years of compulsory education. However, it caused a decline in the quality of secondary education and arguments about equality.

The Korean government sacrificed the quality of education such as teacher-student ratios and student-classroom ratios to provide more educational opportunities at each level of education. Because it tried to maximize the number of school-aged children, almost 40% of schools were operated with double or triple shifts in urban areas, and class sizes also exceeded 100 students per classroom (Kim, 2000). Moreover, the government minimized construction and expenses from facilities, maintenance, and management by maintaining schools in as large a scale as possible. With a limited budget, a type of trade-off between education's quantitative growth and qualitative improvement was inevitable in Korea. When educational opportunities expanded to a certain extent, the Korean government gradually focused on improving the quality of education.

The reason that a low-cost approach succeeded was that qualified teachers with relatively strong educational backgrounds were secured and thoroughly utilized. In Korea,

the teaching profession is traditionally respected, and its social status and compensation are also relatively high. Due to the influence of the Confucius tradition, teachers were highly regarded as professionals and the authority was identified with that of the king. After the Korean War, with career opportunities not as diverse as today, the profession of teaching was one of the relatively well-paid jobs and naturally attracted a lot of young people. The Korean government has tried to recruit and retain high-quality teachers (Kim, 2009). For example, public school teachers are entitled to compensation consisting of a basic salary and various allowances in accordance with the public official compensation regulations. In addition, the Korean government enacted 'The Public Educational Officials Act' in April 1953 to provide better treatment for public educational officials than other civil servants. As a result of these efforts, compensation for teacher in comparison with per capital GDP as of 1965 was about three times higher for new teachers and as much as nine times higher for teachers who served for 40 years (Kim, 2009).

In this context, the government could control the quantitative increase of teachers along with the sequential expansion of primary and secondary education (Chun, 2017). However, in the process of expanding educational opportunities, teachers struggled to teach in overcrowded classroom and they utilized strong disciplinary methods to control the students. Ironically, socialization functions of school education that internalize uniformity, collectivism, adaptation, and obligation in large overcrowded classes had effectively been put into effect during the early industrialization stage (Lee et. al., 2010).

Although Korea has made great accomplishments in terms of the quantity and quality of education, challenges remain regarding the human capital accumulation of the next generations and educational inequalities. Ensuring educational opportunities for all students, including those from disadvantaged backgrounds and the improvement of below basic level students are still especially critical issues these days. Against this backdrop, the Korean government established a support system and implemented educational policies for improving the achievement of below basic level students.

7.2. Policy Recommendations for Enhancing HCI in Rwanda

7.2.1. Supporting Lower Secondary Education

Although the Rwandan education system ensures educational opportunities from primary to upper secondary school for all, in reality, the government pay more attention to primary education and secondary education is considered a kind of selective education. In order to promote 'education for all' with a limited budget, the double-shift program in public primary schools was implemented in 2009. This initiative contributed to increasing

the number of students enrolled in primary schools. Unlike primary education, there were not specific educational policies or initiatives for increasing the number of students in lower secondary schools except establishing new schools. Instead, the Rwandan government limits the number of students per classroom to 45 for better quality of education, even though lower secondary schools are a part of basic education.

Since the government prioritized the expansion of primary education, limiting the number of secondary school students could be an effective way to control both the quality and quantity of secondary education. This approach can be positively assessed in that it aimed at ensuring a minimum standard of quality for secondary education. However, the policy goal of expanding educational opportunities for lower secondary schools could not be achieved because there was not sufficient financial support such as the building new schools and classrooms, hiring trained teachers, etc.

With a limited budget, a type of trade-off between quantitative growth and qualitative improvement in education is inevitable. In this situation, the Rwandan government has selected quality rather than quantity for lower secondary education. The Rwandan government recently decided to provide financial support for building new schools and classrooms for implementing a single shift and improving the learning environment in primary schools. This means that the focus of the policy has shifted from expanding educational opportunities to improving the quality of primary education, but the government still emphasizes primary education. If the Rwandan government aims to enhance the HCI index in the short term, it should focus on lower secondary education and consider ways to increase the number of students, even if the quality of educational conditions (e.g. teacher-pupil ratio) is declined temporarily in the lower secondary school. For example, in urban area where access to school is relatively easy, the number of students per classroom can be set 45-50. In rural areas, it could be considered to use primary school classroom for the lower secondary education temporally.

In addition to this system improvement, intensive support for secondary school teachers is needed to achieve real results. Since the increase in the number of students per classroom may inevitably burden teachers and result in a decrease in the quality of education, it is necessary to support teachers to maintain the quality of teaching and learning in these crowded classrooms. For the improvement of teaching capacity and classroom management skills, the government provides secondary school teachers with a variety of professional development programs. In addition, teacher motivation and a sense of professional responsibility are crucial factors contributing to students' learning and their achievement (UNESCO, 2019). Therefore, it is also important to motivate teachers by supporting them with

financial or nonfinancial incentives as well as the provision of professional development programs to improve teaching or classroom management skills.

7.2.2. Abolishment of the Grade 6 National Examination

In order to extend the years of schooling, it is suggested to improve the transition system that ensures all primary school graduates who want to advance to a lower secondary school can be admitted regardless of their test score. As Rwanda makes progress improving student learning and continuation rates in the primary cycle, abolishing the grade 6 national examination could also be considered as a way to allow more primary school graduates to continue with their schooling for three more years. The national examination at P6 has the function of selecting the candidates for lower secondary school as well as assessing students' academic achievement levels. Despite the 12 years of compulsory basic education and various curriculum reform policies, the P6 national examination still prevents graduates from continuing to study at the next cycle of basic education. This examination is considered high stakes and requires instructional time to be devoted to preparing for the test instead of regular teaching and learning (WB, 2018). Therefore, the abolishment of the selecting function of P6 national examination should be considered in order to ensure the opportunity of basic education for all and expand the years of schooling.

Korea's experiences such as the No Test Middle School Entrance System or the High School Equalization Policy illustrate the benefits of abolishing the entrance examination for secondary education. Korea abolished the entrance examination for lower and upper secondary schools sequentially in the process of expanding educational opportunities. The abolishment of the entrance examination ensured that primary schools could be used for their original function, and contributed to reducing individual and social costs for preparing for the test. Other Sub-Saharan African countries such as Botswana and Mauritius also abolished their primary school leaving examinations to ensure nine years of basic education. The abolishment of the P6 national examination means having Rwanda consolidate primary and lower secondary into a single basic education cycle of nine years of schooling. This change could contribute to improving transition rates from primary and lower secondary schools in the short term, however, the establishment of new schools and hiring qualified teachers will also be needed for the success of this change. The government also needs to adopt an alternative assessment system to assess student achievement in various ways and support their learning.

7.2.3. Establishing a Diagnostic and Remedial System for 'Below Basic Level Students' Using ICT

Rwanda should try to increase the average academic achievement level through intensive support for below basic level students for improving learning outcomes in primary and secondary education. For this, above all, it is necessary to establish a system to diagnose and support below basic level students. Rwanda has conducted Learning Assessment of Rwandan Schools (LARS) to assess students' academic achievement at national level since 2011 and it was revealed that a significant percentage of students fail to meet curricular expectations. Primary schools also have several types of exams in Rwanda. At the school level, exams are conducted on a monthly and semester basis, and the end of year exams are administered annually by local and national education boards. It is important to assess students' achievement regularly, however, these exam results are only used as basic data to regulate the access or placement of students into the next grade or level of education, and there is a lack of support for improving achievement based on the assessment data in Rwanda. Therefore, it is important to find ways to use the exam results for improving students' achievement.

Korea's experience could be a one exemplar in terms of using assessment results for improving students' achievement in basic education. The Korean central government and Ministry of Education conduct a national assessment at S3 and S5 via a sampling method annually to understand subject-based achievement and support educational policies. The purpose of this national assessment is similar to that of LARS in Rwanda, however, it differs in that the Korean government provides an online-based system with ICT technology to diagnose the level of achievement and to support the improvement of students' achievement. For example, the "Keep-Up, Catch-Up (KU-CU)" website for helping students to "Keep-Up" with the formal curricula and supports underachieving students who need to "Catch-Up" with their studies. The "Do-Dream School Project" provides parents and students with counselling and other support for improving their academic performance.

In addition to this national assessment and online supporting system, regional offices of education also establish and operate the online-based 'Diagnostic Tests and Remedial System of Basic Skills' developed by Chungnam National University to support below basic level students. Through this system, each school can identify below basic level students and diagnose their current level of achievement from P3 to S4, and students can take advantage of systematic remedial programs including online-based supplementary learning materials. Regional governments also provide teachers and schools with instructional materials appropriate for below basic level students. Especially, regional offices of education support

diagnose examinations based on the needs of each school, and test scores are reported only to each school and the below basic level students for improving learning outcomes. There is no need to compare assessment results between schools or students for selection except understanding differences.

7.2.4. Establishing an Educational Policy Research Institute as a Knowledge Hub

Rwanda should consider establishing an educational policy research institute to collect and analyze data to develop educational policies. In order for the Rwandan government to continuously enhance its human capital competitiveness, it is essential to develop and implement evidence-based education policies that are suitable for Rwanda's contexts. Therefore, it is necessary to establish an educational policy research institute that has the competency to produce appropriate knowledge and information on educational policies, and continue to conduct a variety of research projects. This research institute could provide necessary advice for policymakers as a think tank, and could also serve as a platform for linking education policies and practice.

Korea established the foundation for the development of evidence-based education policy through the establishment of the Korea Educational Development Institute (KEDI) in 1972. KEDI has performed a pivotal role as a think tank for enhancing the quality of education by collecting and analyzing various survey data, and also acts as a platform connecting the Ministry of Education, regional offices of education, and schools in the era of educational decentralization. Other educational research institutes also have conducted various policy research projects using statistics and survey data. Based on this research, they provide the policy recommendations required to improve Korean education in their specialized areas. Therefore, the establishment of an educational research institute will become an important cornerstone of educational innovation in Rwanda.

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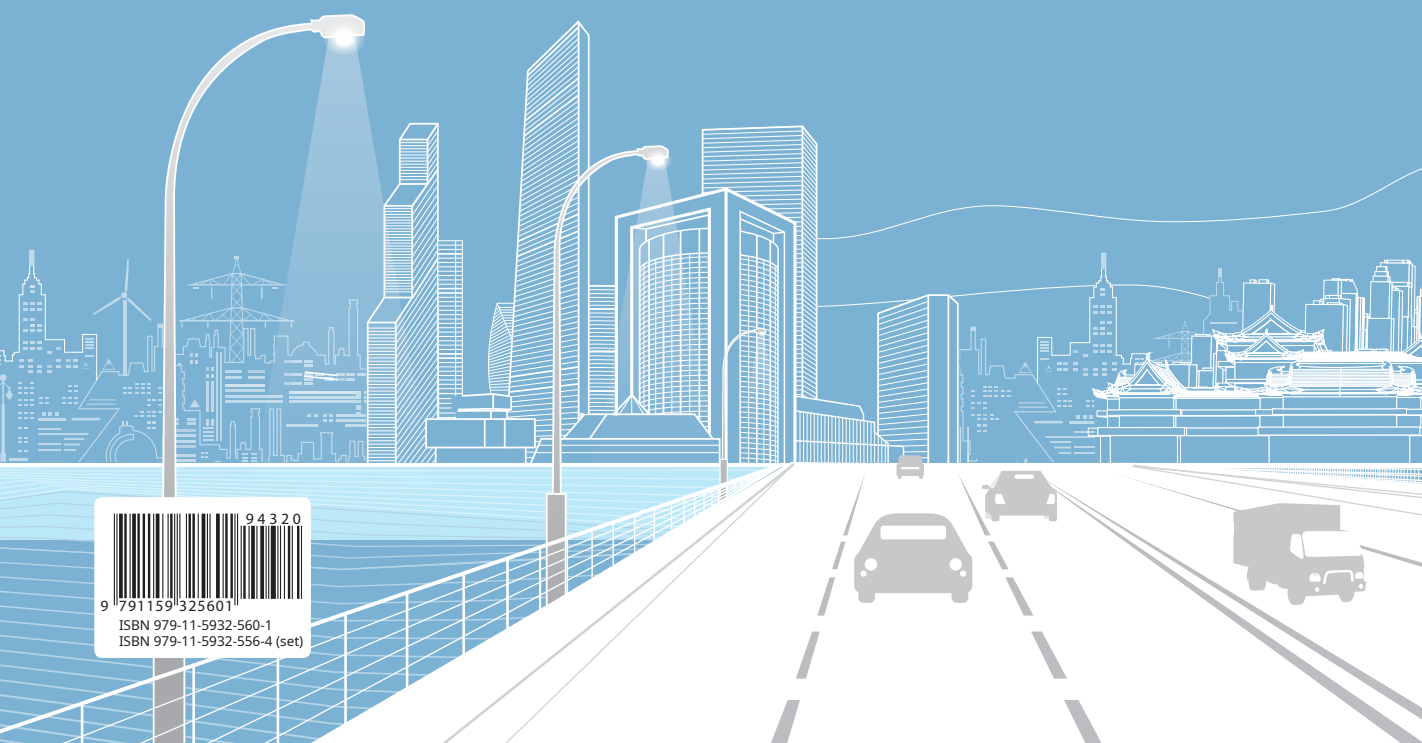

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