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The Federal Democratic Republic of Ethiopia
Ministry of Education

Higher Education, Technical and Vocational Training,
Research Institutions and Industry Linkage
(HETRIL)

Training Manual for Higher Education Institutions

June 2024

Addis Ababa, Ethiopia



Federal Democratic Republic of Ethiopia
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Research Institutions and Industry Linkage
(HETRIIL)**

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Acronyms

AAU – Addis Ababa University

AAiT – Addis Ababa Institute of Technology

CIE - Centre for Innovation and Entrepreneurship

CT - Cooperative Training

ERCs - Engineering Research Centers

HEIs - Higher Education Institutions

HETRIIL - Higher Education Training, Research Institutions and Industry Linkage

IP - Intellectual Property

IPR - Intellectual Property Rights

ITT - Innovation and Technology Transfer

JAR - Joint Applied Research

MinT - Ministry of Innovation and Technology

Mol - Ministry of Industry

MRC - Medical Research Council

NSERC - Natural Science and Engineering Research Council

NSF - National Science Foundation

NUST - Norwegian University of Science and Technology

REF - Research Excellence Framework

RIs - Research Institutions

SSHRC - Social Sciences and Humanities Research Council

STI – Science Technology and Innovation

TBF - Technology Bridge Foundation

TFILU - Technology Faculty – Industry Linkage Unit

TVT – Technical and Vocational Training

TVET - Technical and Vocational, Education and Training

UICP – University-Industry Cooperation Program

UIL - University-Industry Linkage

UIRCs - University-Industry Research Centers



Forward

The Ministry of Education has implemented various reforms to improve the overall quality of education, particularly within the higher education sector. One of the key focuses is to align the curriculum with practical industry experience for all programs and strengthen the partnership between academia and industry stakeholders.

This training manual is a collaborative effort between the Ministry of Education and various stakeholders, demonstrating a united dedication to enhancing Ethiopia's higher education and its relationship with the industry. It emphasizes the crucial integration of higher education, technical and vocational training, research institutions, and industry to support national development.

The training aims to advance technology and research, benefiting both academia and industry. It enables academia to address industry needs and better prepare students for employment by closely collaborating with the industry. Academia-industry partnerships are vital for the country's development, but there are challenges, such as differing focuses, with academia emphasizing theoretical research and industry demanding on practical skills. Bridging this gap requires effective communication and understanding of the academia-industry partnership, following HETRIIL proclamation's six pillars among linkage actors.

This manual provides guidance on training linkage actors on the concept of HETRIIL and the six pillars, such as joint applied research, internships, externships, cooperative training, consultancy services, and technology transfer activities among higher education, technical and vocational training, research institutions, and industry. It also outlines the role and responsibilities of linkage actors within the national HETRIIL organizational structure. The manual can effectively aid higher education institutions, linkage actors, and academia-industry partnerships by serving as a guide and implementing the HETRIIL proclamation activities, raising awareness and transferring knowledge about the linkage system. The training manual is also aligned with Ethiopia's policies and strategies, bridging the gap between academia and industry while fostering innovation and practical skills.

We extend our gratitude to all contributors, including government bodies, educators, and industry professionals, for enriching this manual with their insights and expertise.

H.E. Kora Tushune Godana
State Minister, Ministry of Education

FDRE Ethiopia

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Definition of Key Terms

For this manual, the following operational definitions of terms are given:

Academic staff: is an individual who is working within a department, school, or center of HEIs responsible to deliver one or more academic program(s).

Applied research: is a type of research design that seeks to solve a specific problem or provide innovative solutions to issues affecting an individual, group or society. It is often referred to as a scientific method of inquiry or contractual research because it involves the practical application of scientific methods to daily problems.

Collaborative body: is any entity or organization who shares resources, and platforms for common goals.

Commercialization: is a process of transforming research/innovation outputs from prototypes, creative ideas, and artwork that are transformed into marketable products, capital gains, income from licenses, and/or revenue from the sale of the new product.

Consultancy: is a professional work carried out on behalf of a third party utilizing the knowledge and expertise of a member(s) of university staff and, in some cases, the equipment and facilities of the university.

Cooperative Training: is an education and training system that is designed to develop knowledge, skills and attitudes of trainees by harmonizing basic trainings by training institutions with practical training which takes place at industry work floors.

Council: is a link between national higher education and training, research institutes and industry.

Externship: is a program/arrangement in which academic staff members of an academic unit spend a predefined period of time (usually short) in an industry relevant to their field of study to get practical exposure and better understand the challenges to serve the industry.

Higher Education and Training Institute: is any public or private institution established by law to provide tertiary education, conduct research, and carryout community service activities. It also includes technical and vocational education and training.

Higher education and training, research institutes, and industry linkages: is a forum for collaboration between higher education and training, research institutes and the industry in accordance with the directions and principles of the linkage policy.

Incubation Center: is a unit that systematizes the process of assisting the growth of successful new ideas by providing them with a comprehensive and integrated range of technologies and services. Additionally, this unit serves as a bridge to license and commercialize technologies and research findings.

Industry: is an entity involved in the manufacturing, agro-processing, construction, services and mining sectors.



Industry-sponsored research agreement: is a written agreement used when a company or an organization provides funds to HEIs or any of its academic Units Faculties/s Schools/Institutes, etc. for an organized research project.

Innovation: is a process by which a domain, a product, or a service is renewed and brought up to date by applying new processes, introducing new techniques, or establishing successful ideas to create new value.

Intellectual Property (IP): is any proprietary right which arises under, or is capable of being obtained under, legislation relating to copyright, patents, utility models, industrial designs, trademarks, or plant varieties. It also includes know-how, trade secrets and confidential information.

Internship: is a program in academic learning whereby students spend a predefined period in an industry that enables them to practice their technical knowledge and get hands-on experience on challenges in practical working situations.

Linkage: is any recognized collaboration between two or more actors and stakeholders to achieve a common goal.

Practical training: is an activity in which the teacher/student or trainer/trainees participate in networking activities, which includes internships, externships, collaborative training and has a significant positive impact on the quality and relevance of education and training.

Research Institute: is an entity established mainly for conducting research.

Science: is the systematic study of the structure and behavior of the physical and natural world through observation, experimentation and the testing of theories against the evidence obtained.

Stakeholder: is an individual or a group that has an interest in any decision or activity of an organization. It also refers to a private, governmental, and/or non-governmental organization and industry which has concern and relation with the HEIs and research institutes.

Technology: is a system of knowledge, skills, experience and organization that is used to produce and utilize goods and services. It includes: the knowledge of product and process design, and the managerial systems for efficient operation of production facilities. In short, technology is a combination of knowledge and equipment.

Technology transfer: is the process of conveying results or practices created or developed locally or internationally to disseminate in the recipients economy through capital and technology along with associated skills, procedures and business information. The transmission process involves the direct use, recording and adaptation of technology.

Training: is any form of professional or technical capacity enhancement service rendered through the appropriate university channel (Institute, College, Unit, Department, Center, or School) to any organizations, individuals, or groups.



University-Industry Linkage (UIL): is an interaction between firms and universities/public research centers to develop the curricula to meet the skills need of the industry, solve technical problems and work in Research and Development (R&D) innovation projects for mutual benefits.



Unit 1: General Overview of HETRIIL

1.1. Introduction

Higher Education Institutions (HEIs) play a fundamental role within societies through educating and creating knowledge (Rabii and Belhacen, 2020). In addition, they have taken action in building relationships with knowledge users for the sake of transfer and dissemination (Etzkowitz and Leydesdorff, 2000). The growing role of knowledge in economic development implies that HEIs and industry have no choice to interact in order to create and exploit knowledge. University-Industry Linkages help HEIs to improve the quality and relevance of academic agenda by getting access to relevant resources for research activities like financial support, research facilities and support for students, as well as learning opportunities in field-testing (Lee, 2000), while firms get help to obtain a competitive advantage to face globalization. It is a win-win situation gained through various forms and practices of linkages such as academic knowledge commercialization, joint research projects, joint curricula and employees' training. The outcomes of such linkages are broader than the predefined goals of each partner, and manifest on a greater level impacting the knowledge environment and innovation system as well as the economic development (Etzkowitz and Leydesdorff, 2000).

Technological developments and their institutional environments grow mutually and bring progressive changes in knowledge structure. HEI policies and practices in a country are largely shaped by the historical development, and institutional behavior and cooperation patterns between HEIs, firms and other actors (Bartholomew, 1997). Consequently, drivers of interaction between organizations such as HEIs, firms and others can be radically different from one context to another. Since the economy is increasingly becoming knowledge-based, the ability to produce and exploit knowledge for industrial purposes is a major issue. However, the synergy generated through relationships between different stakeholders namely government, industry and HEIs, is a key driver to face different challenges in the area of knowledge-based economy. Such synergy seems not to exist in African economies and the reasons behind this lack might vary depending on each actor involved in the knowledge environment started by the HEIs.

Global experiences show that both industries and HEIs have never been able to exist separately; an intellectual asset of the HEI has either to address the problems of industries or to contribute to the growth and development of various industries. Likewise, the advancement of knowledge and technology in HEIs can only happen with the pertinent need and support of the industry.

However, at the circumstances of HEIs and industries collaboration in Africa might not be as elaborate as in developed economies for several reasons. For the most part, HEIs in developing countries function independently and the industry mainly depends on foreign knowledge sources to sustain production and meet competitive challenges (Adeoti, 2009).

There is no difference in the Ethiopian scenario. The expansion of Higher Education Institutions (HEIs) and industries in different parts of the country and the attention of the government by designing different policies, strategies, directives and conferences were taken as opportunities to



be tapped to promote Higher Education Institutions and Industry Linkage. However, UIL in Ethiopia is not properly managed; therefore, it does not contribute to the overall development of the country as expected (Misganu and Steyn, 2018).

Many scholars agree that the linkage is in the very infant stage and the university-industry interactions were limited to conventional types as student internship program, consultancies and training programs. Furthermore, there exists a mismatch between the curricula at HEIs and the skill needs of the industries. Consequently, many manufacturing industries in the country are operating at a very low capacity and an alarmingly low productivity in this unprecedented global competitive world.

Thus, avoiding those barriers and creating reliable partnerships among Higher Education, TVT, Research Institutions and the industry (HETRIIL) linkage has a paramount importance for creating mutual benefits among them for the betterment of the society and the world at large.

This training manual is designed to create a shared understanding about the role of HETRIIL and its effective implementation which is the foundation for achieving the desired strategic benefits of the linkage.

1.2. Scope of the training

This training manual is delimited to explaining the nature, benefits, expected outcomes, and procedures of and roles and responsibilities in linkages among HE, TVT, Research Institutions and the industry to provide opportunities for trainees, trainers and practitioners to look at the various creative, innovative and collaborative ways of managing HETRIIL.

1.3. Target groups

The target groups of the training include relevant government offices, public and private HEIs, industries, TVTs, research institutes, civic societies, industry associations, media, and other relevant actors.

1.4. Objectives

1.4.1 General objective

The general objective of the training is to create a common understanding on the purpose, benefits and management of HETRIIL among the concerned stakeholders.

1.4.2 Specific objectives

The module has the following specific objectives.

- ✓ To create and enhance the awareness and understanding about the role of HETRIIL among stakeholders;
- ✓ To enhance the management and implementation of HETRIIL; and
- ✓ To guide how to optimize the benefits of HETRIIL.

1.5. Expected outcomes

At the end of the training program, trainees are expected to have:

- ✓ a clear picture of the current practice of HETRIIL in Ethiopia;
- ✓ a thorough understanding of the concept of the six pillars of HETRIIL;
- ✓ enhanced knowhow, motivation and management commitment to devise mitigation mechanisms to minimize the dragging forces for effective implementation of HETRIIL.

Unit 2: Delivery Modalities

The training targets HETRIIL stakeholders at different institutions and positions; hence, the methodology will vary with the respective target groups.

2.1. Training approach

This training manual is designed to facilitate active learning, which is trainee-centered to encourage the active participation of the trainees. The experience and ideas of the trainees should be recognized as a valuable resource that builds up on what the participants already know. The methodology should promote a two-way exchange of ideas, knowledge, skills and attitude between the trainer and the trainees. Group work and other activities will be applied to ensure practical learning.

2.2. Training Techniques

This training manual uses innovative training techniques such as brainstorming, question and answer, pair/group work and presentation, case studies, and experience sharing as needed.

Group	Target group	Training technique	Materials Needed	Training duration
Group I	Higher officials*	Lecture and discussion Experience sharing	flip chart, name tag, marker, videos, standardized power point, policies, and directive and training manual	One day
	National and Regional HETRIIL Council members	Lecture and discussion, Experience Sharing	flip chart, name tag, marker, videos, standardized power point, policies, and directive, and training manual	One day
Group II	Officers from sectorial associations and civil societies	Lecture, brainstorming, Q&A, case studies, experience sharing	flip chart, name tag, marker, videos, standardized power point, policies and directive and training manual	Three days
Group III	Industry professionals and focal persons	Lecture, brainstorming, Q&A, group work and presentation, case studies, home take assignments,	flip chart; sticky note, name tag, marker, videos, standardized power point, policies, and directive and training manual	Three days

Group IV	Zonal and sub-zonal clusters	Lecture, brainstorming, Q&A, group work and presentation, case studies, experience sharing	flip chart; sticky note, name tag, marker, videos, standardized power point, policies, and directive and training manual	One day
	Coordinators (academia, RIs and industry) and Trainers	Lecture, brainstorming, Q&A, group work and presentation, case studies, experience sharing	flip chart; sticky note, name tag, marker, videos, standardized power point, policies, and directive and training manual	Four days
Group V	Instructors and researchers	Lecture, discussion, case studies	standardized power point, policies and directives, and training manual	One day

*higher officials include top management from HEIs, industries, sectorial associations

2.3. Processes of the training

2.3.1 Self and team introduction

The training begins with the trainers introducing themselves and providing background information about their qualifications and experiences. Then, an overview, objectives, outline, and schedule of the training should be presented. The trainer explains how the participants are expected to take part in the training such as group discussions, activities, case studies, and other interactive methodologies. The trainer then invites the trainees to introduce themselves as indicated in the activities.

Activity 1:

Groups I and II: The trainer/s invites the participants of the training to briefly introduce themselves, their institutions, professions, experience, and positions.

Groups III and IV: The trainer asks the participants to move around for five minutes and have pair introduction to as many participants as possible. Then, the participants are asked to introduce the names of five other trainees to the whole team.

2.3.2 Training Expectation

Training expectations shall be collected from the participant in different ways. For groups I and II, the trainers shall inquire the participants to forward their expectations within five minutes whereas for groups III and IV, the trainer provides the necessary materials such as flip charts, markers, and boards for the trainees, and encourages them to write down their expectation from this training. Then, the trainer collects expectations of the trainees and reflects on them to come to a common understanding.

2.3.3 Setting norms and ground rules

Setting ground rules and norms is essential for creating productive learning environment. These rules will be generated collectively by the participants and then displayed on the wall throughout the training period. The trainer can refer to the rules as needed to remind the participants of the commitment they made to the training sessions.

The trainer asks what rules trainees would like to establish and abide by as a group throughout the training period. Then agreed ideas from the participants are put on the flip chart. If they are not mentioned by the participants, the trainer puts the following notes on the flip chart.

- Starting and ending times,
- Putting phones on silent/flight mode,
- Not interrupting other participants
- Listening and speaking without judgment

2.3.4 Assessment Tools (Pre- and Post - assessment)

The effectiveness of the training can be measured by conducting pre- and post-assessments using questionnaires. A pre-assessment is administered before the training begins to examine the baseline understanding of the participants about HETRIIL. This baseline can be used to compare against the post-assessment results which are made after the training is delivered. The post-assessment measures the change in understanding HETRIIL that may have resulted in because of the training. The trainer and responsible bodies can determine the effectiveness of the training by comparing the pre-and post-assessment results and adjusting the training as needed. These assessments are applied to only Groups III and IV. For Groups I, II, and V, some key thought-provoking and experience-sharing questions may be raised as an introduction to the training.

The questionnaires are attached as an appendix.

Unit 3: Concepts and Practices of HETRIIL

3.1 Introduction

The linkage experience across the world indicates different forms. University-Industry linkage (UIL) was practiced in many parts of the world since the 1980s and 1990s. During these periods, the UIL activities mainly focused on research consortia, research parks, industrial liaison programs, the growing share of industry funding in university income and an increasing number of university researchers engaged in academic entrepreneurship. Gradually the focus of UIL has been more diversified; these include training and curriculum development, internship programs for students, contract & collaborative research, consultancy services, enterprise support and development, technology transfer, and commercialization of intellectual property (IP).

To get a good picture of the benefits of proper execution of UIL, the experiences, and achievements of various developed and developing nations from different parts of the world are summarized and discussed in the following paragraphs.

3.2 International Experiences

In developed countries, for instance, in UK research-intensive universities are “enterprising” in the sense that they commercialize research, license and transfer technology, and engage with the industry in diverse ways. To these effects, they use Research Excellence Framework (REF) and the university funding system. The industry contributes significantly to the R & D. The exchange of knowledge and skills is bi-directional: from the university to the industry and vice versa (Medhat, et al. 2014). The focus areas of UIL are diverse and range from informal contacts to non-exclusive licensing of university-held patents. Other UIL areas include innovation-related expenditure spent on universities, exclusive licensing of university-held patents, internships, joint research and development projects, problem-solving/consulting by university staff, recruitment at post-doctoral level, testing and standards, conferences, publications, and recruitment at first-degree, or Master’s levels (Medhat, et al. 2014).

The government of Canada has also employed several strategies to improve the implementation of UIL. Such strategies include institutions receiving incentives to engage in joint initiatives. The tax incentive is given to the industry to encourage them to invest more in research and development projects in collaboration with the university. The UIL in Canada uses classifications that are made based on the comparative advantages of each region. By and large, Canada’s case shows that focus areas are driven by the local industrial base, which is influenced by local natural resources, market forces, government incentives and the local infrastructure. Universities shifted their focus to new, high-tech forces of production where information and other new technologies emerge from university research labs and respond to private production and marketing demands (Buchbinder and Newson, 1990).

Federal tax duties are transferred to provincial governments specifically for providing health and educational services to Canadians and the federal government's policy-making and funding control over the major research councils, which support academic research in universities. This is done through the different councils put in place – The Natural Science and Engineering Research Council (NSERC); The Social Sciences and Humanities Research Council (SSHRC); and the Medical Research Council (MRC); which make distribution of research funding to academics. There are also policies that guide their funding priorities and indirectly affect the shape of academic work as it is carried out in universities (Buchbinder and Newson, 1990).

In Germany, science and industry work together in the support of research through the provision of the Research Campus – Public-Private Partnership for Innovation funding initiative. They have also other initiatives such as Enterprise champions, Innovation Networks, Campus Companies, Enterprise training, Student placements, Patenting/licensing, and Adjunct professors. UIL in Germany pays due attention to the involvement of different stakeholders. In this regard, private industrial firms, business development organizations, universities, the Centre for Innovation and Entrepreneurship (CIE), government research laboratories, the government finance organization, Technology Bridge Foundation (TBF), and science parks (ISI, 2014).

The US has a foundation called The National Science Foundation (NSF) which comprises engineering research centers (ERCs) that work toward enhanced university–industry partnerships. The introduction of the Bayh Dole Act in 1980 resulted in a significant increase in the number of patents granted to US universities from 300 in 1980 to 3,661 in 1999. In the US support mechanisms are classified into four. These include: Providing financial support and consulting to individual researchers; Engaging a university in one-time projects where some could be government cost-shared, such as those funded by the Advanced Technology Program of the National Institute for Standards and Technology; Availing big laboratories funded by industry consortia; and Putting in place partially government-funded Quasi-permanent University-Industry Research Centers (UIRCs) and Engineering Research Centers. Besides, the issuance of the enactment of the Bayh-Dole Act in 1980 by the U.S. Congress, which gave the right to universities and small businesses to own patents on federally sponsored research, played a key role in terms of revolutionizing UIL (Hall, 2004).

The concept of University-industry linkage in Japan dates back to the establishment of the Imperial College of Engineering in 1873, which was later, named the College of Engineering of Imperial University (now the University of Tokyo) whose graduates worked in the industry, government, and academia. RIKEN which was established in 1917 had exercised joint appointment in the institute as well as the industry thus implying the practice of UIL. Japan's universities, however, were not active in the 1960s and 1970s due to political movements. In response to the need for facilitating UIL, the government of Japan put in place joint research in 1983 and supported to establish Collaborative Research Centers in national universities beginning in 1987. Japan introduced the Japanese version of the Bayh-Dole Act in 1999 and initiated research grants to encourage university-industry joint research. The years 2001 and 2002 saw the launchings of 'The Industrial Cluster Plan' and 'Knowledge Cluster Initiative', respectively (Masayuki, 2011).

University–industry linkage was considered a key success factor for these initiatives. The conversion of national universities to independent entities as “national university agencies” in 2004 was another measure taken to encourage the UIL. This new status leveraged the institutions to pass independent decisions, manage their employees and enter into agreements with any legal person. In order to become entrepreneurial and enhance economic growth, the government targeted designing policies aimed at raising the quality of Public Research and Education Organizations (PREOs) research and training programs and fostering science–industry interactions, and developing high technology. In addition, the government helped to establish Collaborative Research Centers in national universities beginning in 1987. In 1999, the government began to provide research grants to encourage university-industry joint research (Masayuki, 2011).

Before the 1997 Asian Financial Crisis, the South Korean government promoted university-industry collaboration through industrial policy. The government led the role of cooperation by channeling credit to targeted industries and universities and to prevent coordination failure. The collaboration was based on the development goal of the government such as promoting heavy and chemical industries in the late 1980s. In South Korea, government policy is the main determinant that drives Korean universities to play the role of knowledge provider for industrial innovation. The policy program for joint university–industry R&D was first initiated by the SMBA (The Small and Medium Business Administration) of Korea in 2007. It aims at solving technological problems and at developing new products of small and medium sized firms by utilizing the excellent research work force of universities and government research institutions.

Since large firms have their own R&D labs and technological capability to solve their technological problems and to develop new products and services, universities and PRIs (Power Reactor Information System) are relevant resources to support SMEs. This policy program can be classified into three types: university–industry R&D cooperation (type A), university–research institute R&D cooperation (type B), and others including international cooperation and linkage (type C). Type A and B can be divided into two sub-types: leading cooperation and general cooperation. The former sub-type is concerned with the development of sophisticated technologies to provide greater support than general cooperation which is concerned with ordinary technologies requiring fewer resources to develop.

Policy program was designed for international R&D cooperation between domestic institutes or firms and foreign institutes or firms. It includes a ‘Linkage Program’ which intends to promote the fusion of diverse technological knowledge by strengthening linkage among domestic R&D agents (Burton, R.C. 2001, Sohn, et.al, 2009).

Developing countries also give high emphasis on UIL. For example, Russia developed a science and innovation policy with a view to linking science and industry in the early 1990s, the government gave priority to “preserving science and creating technical infrastructure, such as technology parks and incubators”. After the first Government Fund supporting R&D at small innovative enterprises was created in 1994, several new “institutes for development” were established in the mid-2000s. Following the government’s decision in 2010 that required large government-controlled companies to engage in research and development, companies had to

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develop long-term innovative programs. The government introduced technology platforms, programs for the innovative development of large state companies, and matching grants for industry-university research cooperation in 2010. The technology platforms connected the industry, research institutes, and universities. The government provided subsidies on a competitive basis to the industry to fund complex high-tech projects carried out together with universities (Rodionov, and Velichenkova, 2020).

Universities and colleges in China work closely with the industrial sector in science and technology activities. This can be traced back to the reform in the 1980s, when the new Chinese national innovation system began to take shape. In 2004, the industrial sector was the second largest source of science and technology funding for universities, providing nearly 38 percent of total funding to universities. The main pull factor that initiated interaction between universities and industries was the lack of industrial R&D capability, which forced the industrial sector to go around in search of technical guidance from universities and research institutes. China's R&D expenditure has been growing steadily in the last decade despite their yet strong use of imported technologies. China has empowered its R&D institutes, research funding and academia-industry linkages through profound policy-based administration in 1985's science and technology reform (Cha Jianzhong, 2005).

Regarding the African experience in UIL practice, only little information is available. So far, empirical studies of university-industry linkages have mainly focused on technologically developed countries. Current studies on university-partnerships in Africa mostly consist of grey literature in the form of reports and conference publications of various national, regional and international organizations like UNESCO; and the World Bank. Only limited information is available since most African countries do not believe that these partnerships can contribute to a globally competitive knowledge production and innovation. Lack of reliance on domestic innovation in Africa creates a context where actors are oriented towards imported technology and do not consider local universities as primary sources of input into the innovation process (Creso M. Sá, 2015).

A study in Eastern and Southern Africa showed that Governments do not provide adequate incentives for university-industry linkages, and universities lack the mandate, organizational structures, human resources management policies, modalities for promoting the protection of intellectual property rights generated by research and innovation activities, and the necessary incentive schemes to nurture, capture, and reward talent and innovation (Paschal, 2013).

A recent report on the state of university-industry linkages in Africa revealed that (AAU & AUCC 2012):

University research output is limited by the low percentage of academic staff with PhD training and qualifications, and brain drain of qualified scientists;

Many African universities have attempted to foster linkages with firms through the creation of offices and staff positions in charge of such affairs. However, such offices lack the material resources and expertise to handle industry partnerships and technology transfer effectively. There

is a low number of science parks and technology incubators in academic institutions. Only a small percentage of universities is involved in managing science parks and engaging in technology transfer.

3.3 Ethiopian Scenario

Close to four decades back, efforts were made at the highest political level to establish a University-Industry cooperation program. It culminated in the formation of the Addis Ababa University-Ministry of Industry Cooperation Program (UICP) in February 1986 through a formal agreement between the Addis Ababa University (AAU) and the Ministry of Industry (MoI) (Daniel and Tarekegn, 2004).

The overall objective of UICP was to bring together AAU and the MoI so that they could accomplish their respective goals. On the part of the industry, the aims included solving technical and managerial problems; injecting new processes, technologies; maintaining and improving productivity and efficiency; and facilitating further training of existing staff, etc. On the other hand, the aims of AAU included practical training of students; making R&D relevant while maintaining independence of staff; augmenting its R&D resources with those from UICP; obtaining feedback on the direction of R&D, curricula, teaching approaches and consultancy services, etc, (Daniel and Tarekegn 2004).

Until the change of government in 1991, funding was of two types: the regular budget for administration and office expenses was funded equally by MoI and AAU; the operational budget was funded partly by the two institutions¹ and partly by "voluntary" contributions from the corporations of the Ministry of Industry. However, as a result of the new governmental structure the then corporations were dissolved, and consequently the UICP activities were totally halted until 2000.

In 2000, the university established a Technology Faculty – Industry Linkage Unit (TFILU) on its Technology Faculty premises. The main objective of this unit was to pave the way for the establishment of the University-Industry Resource Integration Centre (UIRIC). It had the responsibility of conducting a need and capability assessment of the Technology Faculty and the industrial sector at large so as to form a strong foundation for a reliable linkage. The Unit examined the activities carried out by the Addis Ababa University – Ministry of Industry (AAU-MOI) co-operation program to learn from the successes and shortcomings of their experiences (Daniel and Tarekegn, 2004).

The Unit began its operation in July 2000, soon after the grant had been obtained from the Ethiopian Science and Technology Commission (ESTC)². The first few months have been devoted to organizing the office. The executive committee of the Unit, which had five members, was formed from various departments of the Faculty. Sub-committees for Training, Research and

¹ Each budget was approximately Birr 50,000 (US\$25,000) per year.

² The grant was given by ESTC, Commissioner Asrat Bulbula, 200,000.00 Sek which was close to Birr 200,000.00
Ministry of Education, June, 2024

Consultancy, Industry Job-Core, Workshops and Seminars, and Information Technology were formed maintaining the departments' mix of the Faculty (Daniel and Tarekegn, 2004). The activities to be carried out by the Unit towards meeting its objectives include:

i. Training

TFILU planned to conduct training in summer 2001 for industries. Training modules were prepared in collaboration with all the departments of the Faculty.

ii. Research and Consultancy

The Unit compiled and published a document on the Research and Development Program of the Faculty of Technology in May 2001.

The Unit also prepared a project profile for the Assessment of the Needs and Capabilities of Ethiopian Industries and the Faculty of Technology. The other initiatives were the Unit contacted the Norwegian University of Science and Technology (NUST) to carry out joint research on Ethiopian Pozzolan materials and in August 2003 about 150 students of the Faculty got training through the support of the Massachusetts Institute of Technology - Africa Internet Technology Initiative (AITI).

iii. Industry Job-core

In May 2002, the Faculty signed a memorandum of understanding with MIDROC-Ethiopia for joint collaboration in the areas of research, training, sharing of industrial experience, vacation jobs, sponsorship programs, and the like.

iv. Workshops and Seminars

The Unit organized and conducted a workshop in January 2001 at the Graduate School auditorium on "The Need for University–Industry Linkage", which proved to be quite successful. One of the important outcomes of the workshop was the formation of the National Advisory Body for the Unit.

3.4 Current UIL practice

Despite the fact that the UIL practice in Ethiopia started close to four decades ago but the collaboration is still in its infant stage and it is mainly focused on the student internship program. Therefore, the collaboration has not yet had a meaningful contribution to the overall development of the country as expected (Misganu and Steyn, 2018).

The UIL practice has been challenged by several factors such as institutional bottlenecks, policy practice gaps, contextual variation, and information gaps, finance and awareness-related caveats, work overload, and facility-related hurdles. Moreover, the lack of trust and commitment between the universities & industry, the lack of commitment and support from the leadership of both universities and industries, and the reluctance of the local industries to work with the universities remained a big rift to UIL (Misganu and Steyn 2018).

However, within all those barriers few local higher institutes such as AAU-AAiT stretch its effort to bring a meaningful effect in the economy through UIL activities. As a local case study, typical examples of industry-sponsored graduate programs in AAU, AAiT is presented in the table below (Kassu, et. al., 2022).

Name of the sponsored graduate programs	Name of the school/department that launched the programs
MSc in Sugar Engineering	The School of Mechanical and Industrial Engineering and School of Electrical and Computer Engineering
Industrial Systems Engineering	School of Mechanical and Industrial Engineering
Logistics and Supply Chain Engineering	School of Civil and Environmental Engineering
Road Safety	School of Civil and Environmental Engineering
EEP tailored graduate program	School of Electrical and Computer Engineering
EBC curriculum tailored program	School of Electrical and Computer Engineering
Food Engineering	School of Chemical and Bio Engineering
Leather Technology	School of Chemical and Bio Engineering
Mineral Engineering	School of Chemical and Bio Engineering
Petroleum and Petrochemical Engineering	School of Chemical and Bio Engineering

While the aforementioned UIL experiences show the case of Addis Ababa University, which has remained Ethiopia’s flagship for more than seven decades now, there have been different level attempts to promote linkages among the academia and the industry to help the injection of well trained and skilled graduates of higher education and TVET to the world of work. Recognizing the role of linkage among higher education, TVT, and research institutions and the industry, the need for expanding such linkages and diversifying the forms of linkages, and ensuring a well thought-out and consolidated coordination of linkages, the Ethiopian government took different measures.

Ethiopia had its Science and Technology Policy in 1993. Unfortunately, this policy did not pay attention to linkages and there existed no meaningful endeavour in activities related to linkages until the second decade of 2000. The Science, Innovation and Technology Policy issued in 2012 identified linkage among universities, research, and TVET Institutions and industry as one of the eleven strategic directions of Ethiopia. Focusing on technology transfer as a critical development agendum and reiterating Ethiopia’s poor experiences in technology transfer, the Policy indicated that the establishment and maintenance of linkage among the institutions’ listed above is hoped to “support and facilitate the search, selection, importation, adaptation and utilization of effective

foreign technologies”. An STI Strategy which aimed at implementing the STI Policy was put in place in 2014. An annual conference, which brought University-Industry Linkage Directors of higher education institutions and company representatives together to deliberate on issues related to practices and challenges of linkages, was held at different universities. GIZ used to support this conference.

The Ethiopian Higher Education Proclamation 2019 demands higher education institutions to partner the industry to enjoy mutual benefits. With a view to diversify the nature and forms of linkages and strengthen the collaboration among the different parties, a “Directive on Research, Technology Transfer, University-Industry Linkage, and Community Services for Higher Education” was issued by the then Ministry of Science and Higher Education now Ministry of Education later in 2019. A national HETRIIL Strategy which aspired “to share resources; to manage & facilitate technology transfer and innovation development, to coordinate community service between stakeholders and partners, and to solve operational, legal and organizational problems that hinder the integration” was developed in 2021.

Efforts have also been made by individual higher education and research institutions and industry to establish and maintain collaboration with one another although these efforts have remained way below expectation. UNCTAD Science, Technology, and Innovation Policy Reviews (STIP Reviews) (2020) stated that in Ethiopia, research institutes and the industry were engaged in collaborative endeavors. Each public university has established an office responsible for leading and managing linkages between universities and the industry. This has created opportunities for the universities to engage in several collaboration efforts. However, the linkage is still entangled with multi-faceted challenges slowing down the realization of the linkage aspirations of achieving the desired linkage strategic goals.

Unit 4. Managing HETRIIL Pillars

4.1. Introduction

This part of the manual focuses on training modules on the HETRIIL pillars identified as key success factors for bringing different potential partners together toward the achievement of Ethiopia's strategic goals and aspirations. The subsequent section of this module presents the different aspects, including module description, learning objectives, and module contents. The introductory part of the section introduces HETRIIL in brief and the latter provides the concepts and implementation requirements of the training modules.

4.2. Overview of HETRIIL pillars

HETRIIL is an acronym for partnerships between academia, TVET/TVT, research institutions, business and industry, civil society, and media to collaborate on knowledge generation, innovation, and problem-solving activities. To achieve these HETRIIL pillars, a strong, strategic, and operational partnership is required. Such a strategic collaboration not only result in the achievement of the strategic goals and aspirations but also brings enormous benefits to all parties involved in a linkage. HETRIIL partnership requires well thought-out strategic and operational level partnership, joint planning, decision-making, management, and sharing of resources to make it successful.

Engaging in mutually beneficial linkages allows academia to have access to real practices, additional financial resources, up-to-date equipment, and opportunities for staff and students to familiarize themselves with contemporary industrial science and technology, and management systems. Equally, such linkages provide a wide range of advantages to research institutions and the industry.

Experiences of different countries have shown a broad range of linkages including teaching and curriculum development, research and development, consultancy, mutual visits, jointly organized meetings, conferences and seminars, joint publications, joint participation in exhibitions and fairs, industrial support to individual students or their associations, and industrial representation on the governing boards of higher education establishments. Teaching, which takes the largest share of higher education institutions, takes different forms, including sandwich courses, jointly developed degree courses, and continuing education courses. Engaging in these various forms of linkages, the parties can enjoy remarkable achievements beneficial to each.

Cognizant of the benefits that HETRIIL can bring to the diverse sectors and individuals, Ethiopia has identified six pillars. These are Joint Applied Research, Internship, Externship, Cooperative Training, Innovation and Technology Transfer, and Consultancy. Successful implementation of these pillars helps institutions develop and adapt need-based technology-oriented programs for employers and create employment prospects for students. To this end, the government has recently introduced HETRIIL Proclamation, which intends to promote linkages among relevant

stakeholders, address the challenges, and outline the incentives for companies participating in these programs.

This section presents detailed information about the six training modules including their descriptions, contents, and modes of delivery. Each module consists of one pillar. The training modules include:

- ✓ **Module One:** Joint Applied Research (JAR)
- ✓ **Module Two:** Innovation and Technology Transfer (ITT)
- ✓ **Module Three:** Consultancy
- ✓ **Module Four:** Cooperative Training (CT)
- ✓ **Module Five:** Internship
- ✓ **Module Six:** Externship

Understanding the relevance, contributions, and benefits of these pillars facilitates the proper implementation of each training module and creates opportunities for key actors to benefit from one another's strengths, potential, and resource-sharing schemes. Each training module is discussed in detail below.

4.3. Module One: Joint Applied Research (JAR)

4.3.1 Module Description

This module aims to provide higher education officers, government officials and industry practitioners with an understanding of JAR management. Participants will be familiar with the basics of JAR and the roles and responsibilities of HETRIIL partners in the implementation and management of JAR activities. Through interactive sessions and case studies, participants will develop practical skills to help them effectively lead, coordinate, and manage JAR projects.

The module will begin with an introduction to JAR and its importance in addressing HETRIIL matters and barriers related to HETRIIL implementation. Participants will then discuss the different aspects of JAR management and implementation. The training module will also cover the roles and responsibilities of each partner in the research process, from joint planning, funding and resource allocation to data sharing and dissemination.

Participants will gain practical knowledge on the best practices for joint applied research, including effective collaboration and communication strategies, ethical considerations, and project management techniques. They will also seek ways to solicit potential funding sources and navigate the regulatory landscape surrounding joint applied research.

At the end of the training, participants will be equipped with the skills and knowledge necessary to develop and manage successful joint applied research projects through HETRIIL in advancing research and development towards application in real-world contexts.

4.3.2 Learning Objectives

At the end of this training module, participants will be able to:

- ✓ Identify the various aspects of JAR implementation and management,
- ✓ Discuss the roles and responsibilities of HETRIIL partners in JAR activities,
- ✓ Develop practical skills in leading, coordinating, and managing JAR activities,
- ✓ Advocate the relevance of JAR activities, and
- ✓ Apply ethical and legal issues related to JAR activities.

4.3.3 Module Contents

Understanding Joint Applied Research

Before discussing the details of Joint Applied Research, it looks sound to briefly review the basic differences between basic and applied research. Classifying research as applied and basic, Cooper and Schindler (2011, p. 15) defined applied research as a study carried out to find “answers to specific questions related to action, performance, or policy needs” and basic research as a study done to “solve perplexing questions or obtain new knowledge of an experimental or theoretical nature that has a little direct or immediate impact on action, performance, or policy decisions”.

Boncz (2015, p. 13) states that basic research intends to produce “fundamental and theoretical knowledge” in which “data gathering normally aims at answering theoretical questions and researchers carry out empirical observations to that end” while applied research is done to “answer practical questions”. Boncz further confirms that the solutions provided to practical problems are relatively directly applicable. Applied research, therefore, refers to finding solutions to down-to-earth problems and applying the knowledge gained through basic research to solve problems. The below table clearly indicates the difference between basic and applied research.

Table 1. Prevailing Characteristics of Basic vs. Applied Research¹⁰

	Basic /foundational/academic Research	Applied Research
Purpose	To advance human understanding and knowledge of the universe. To uncover universal laws, e.g. pertaining to space, matter, energy, society, living and nonliving systems, etc.	To help client (e.g. policy makers or organizational leaders) to make a decision about a particular situation, problem, or opportunity.
Initiative	Researcher initiates based on their own expertise, research skills, and interest.	Client initiates based on their need for information in response to a particular situation, problem, or opportunity.
Funding	Funding is usually available from government, universities, and private foundations in the form of research grants.	The client pays for a consultant or employs an in-house member of staff. Funding is usually much less than needed for a thorough research.
Who does research	A solo researcher, usually from one discipline Team projects are less common	In-house member of staff or consultant(s). (Ideally it should be a research team consisting of experts from relevant and complementary disciplines)
Time frame	Usually longer timeframes compared to applied research	Tied to the client’s timeframes: Significantly shorter deadlines than researcher would ideally need.
Research setting	Research can be autonomous from its environment	Research is embedded in, and inseparable from, its real world context
Research methods	Usually uses fewer varieties of data sources and data collection methods. Data collection and analysis methods usually build on the researcher’s unique strengths.	Trends to use a combination of multiple methods of data collection from different sources and a mix of qualitative and quantitative data analysis methods.
Evaluation and outlet	Presented in scientific conferences and published in journals subject to peer review process.	Presentation and report submitted only to the client who is the sole evaluator of the work. The client decides whether and how to use the information and whether to make it public.

Source: Baimyrzaeva (2018, p. 9)
Ministry of Education, June, 2024

JAR is a collaborative scientific investigation, among different institutions (government and non-government) to address national or institutional problems through collaboration. JAR seeks to tackle a particular issue and provide creative solutions to the identified problem through collaborative work among institutions.

JAR is done to produce “radical innovations” that can positively influence the economic advancement of a nation. There is no doubt that such innovations require heavy investment in Research and Development (R&D) which anticipates the industry’s willingness, determination and commitment to take risks and the higher education and its faculties to commit whatever they have toward the success of joint studies.

According to Boncz (2015, p. 13), JAR is classified into three categories. These are evaluation research, research and development and action (operational) research. Evaluation research mainly focuses on examining existing data about a problem to demonstrate the results and come up with evidence-based alternative solutions. Evaluation research determines “the value or quality of an object or process”. Action research aims to solve practical problems.

Benefits of Joint Applied Research

Resources are limited. Using these limited resources requires joining hands and employing effective and efficient strategies. One of the key strategies which can play an instrumental role in helping institutions use limited resources effectively and efficiently is JAR. JAR brings enormous benefits to the collaborating institutions. These include, among others, access to resources, schemes to make efficient use of available resources, staff and student exchange, knowledge and skill transfer, and the creation of innovative solutions to practical problems. Furthermore, JAR facilitates knowledge co-creation as different parties with various perspectives, experiences, knowledge, and skills work together on specific problems. This maximizes innovation and creativity.

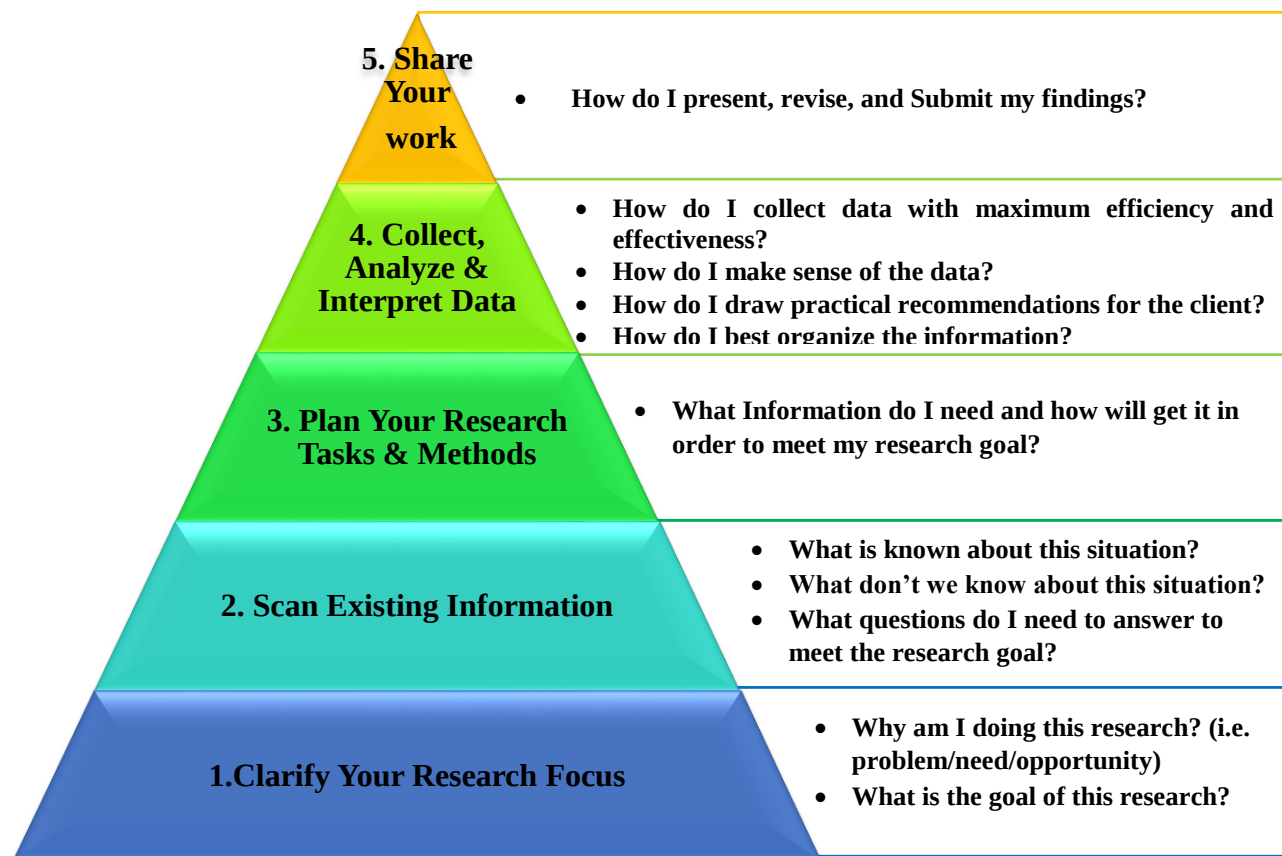
Management of Joint Applied Research

Applied research involves several steps. It begins by clarifying the focus of research which is the basis for meeting the objectives of the research. Then scanning existing information, which is an essential second step, takes place. This helps plan appropriate research tools and methods. Using these tools and methods, the collection, analysis, and interpretation of data are done. The last step in applied research is sharing the output. This implies that institutions collaborating to engage in joint applied research should be abreast of these steps.

Graph 1 below shows the steps in implementing JAR.

Beginners' Guide for Applied Research Process: What Is It, and Why and How to Do It?

Graph #1: Five-Step Framework for Applied Research Process



Step 1: Clarify Your Research Focus

Source: *Baimyrzaeva (2018, p. 18)*

Core tasks of Joint Applied Research

There are a number of core tasks that ensure effective implementation of JAR. The tasks range from joint planning to the execution and evaluation of JAR activities. Institutions engaging in JAR discharge these core tasks by assuming different roles and responsibilities which need to be clearly laid out before the start of the detailed works of JAR.

Implementation of Joint Applied Research

Implementation of JAR toward achieving its intended goals heavily depends on its key potential key actors' positive attitude and commitment. The following discussion defines key actors of JAR and their specific roles and responsibilities.

Key actors and their responsibilities

Planning, implementation, monitoring, and evaluation of HETRIIL are performed at different levels which require different parties to take on diverse roles and responsibilities. The key role players of HETRIIL include all relevant stakeholders who share common interests and benefits. These included government institutions (different ministries and public institutions), academia, research institutions, industries, civil societies, and the media.

As a lead institution, the government is responsible for designing legal frameworks, setting directions, soliciting, allocating, and approving budgets, instituting incentive schemes, putting in place and overseeing joint planning, implementation, M&E mechanisms, and providing support to HETRIIL actors.

Partner institutions have shared responsibilities that include designating representatives who can serve as a liaison among each respective institution, leading, assigning required resources, soliciting, computing, and utilizing HETRIIL funds/grants, encouraging staff members towards HETRIIL success, and working on intellectual property (IP) policy.

Resources

JAR is a resource-intensive activity. Since resources are limited, tapping resources elsewhere and sharing available resources maximizes achievement and avoids wastage. Institutions should think outside the box to seek resources for joint applied research. Limiting oneself to the resources of one's institution may not be sufficient to carry out research that has wider implications. As the saying goes "Money follows winning ideas", securing funds through joint grant writing and matching fund schemes are among the good strategies to carry out impactful JAR. A study by Ssebuwufu, Ludwick and Béland (2012) confirmed that institutions can generate funding internally, solicit private funds from other institutions, or secure capacity-building funds from donors and other external partners. Ssebuwufu, Ludwick, and Béland (2012) quoted NACI (2002) that South Africa had funding for 58% of its higher education research from private sector research contracts. This same study indicated that institutions with high reputations in research were able to attract better income while those with low performance did not.

Enabling environment and incentive schemes

Creating an enabling environment is one of the key requirements to effectively run and implement JAR activities. Enabling environment refers to capacitating institutions with needed infrastructure and facilities. Where infrastructure and facilities are not available, institutions should join hands to acquire and use them for mutual benefits through a transparent platform.

Incentive schemes are key motivating factors that can drive actors to the intended common goals. Hence, institutions should put in place incentive schemes (benefit packages) that can motivate and encourage staff working in their respective institutions. To this effect, there should be agreed upon guidelines that clearly indicate the purpose, roles, responsibilities, and benefits that are commensurate with actors' contributions.

With a view to promoting linkages, European Union (2020) recommends the d creation of centers of competence, intermediary organizations, web platforms to map collaboration, regional competition, schemes to attract international researchers, and pre-commercial procurement. Centers of competence, often based in academia and working with regional businesses, aimed at addressing issues of regional strategic sectors. The centers strengthen collaborations by bringing the private sector on board in the management and governance structures, dedicating services to the private sector, gearing the work of the academia toward mutual benefits, and facilitating inter-regional linkages and healthy competitions for awards (European Union 2020).

Collaboration and communication strategies

Collaboration and communication strategies play a critical role in ensuring the successful implementation of JAR. HETRIL partner institutions can make the best out of JAR if they use the following strategies that can help facilitate effective collaboration and communication.

Establish clear objectives: Before beginning any joint research project, it is important to establish clear objectives that all parties involved agree upon. This will help ensure that everyone is working towards a common goal and will prevent misunderstandings later on.

Foster open communication: It is important to establish an open and transparent communication channel among the collaborating partners. This can be achieved through regular meetings, phone calls, emails, and other means of communication. Setting up clear communication protocols and guidelines at the outset of the project can also be helpful.

Clarify roles and responsibilities: Each partner should have clearly defined roles and responsibilities within the project. This will help ensure that everyone knows what they need to do and that there is no duplication of efforts.

Share resources: Collaborating partners should share resources such as data, equipment, and personnel whenever possible. This will help maximize efficiency and reduce costs.

Build trust: Building trust between collaborating partners is crucial for effective collaboration. Trust can be built through transparency, honesty, and mutual respect. It is important to address any conflicts or issues that arise in a timely and respectful manner.

Regularly review progress: Regularly reviewing progress and milestones can help identify any potential problems early on. It's important to discuss any issues openly and work together to find solutions.

By following these collaboration and communication strategies, collaborating partners can increase the likelihood of successful joint applied research projects.

Ethics and legal issues

Ethics is key in joint applied research. Researchers must ensure that they obtain informed consent from their study participants, protect their privacy and confidentiality, and avoid any harm or undue stress to participants. It should, therefore, receive the highest level of attention in the

management of JAR. Partner institutions should follow well-established and agreed-upon ethical procedures.

In addition to ethical considerations, there are also legal issues that researchers must consider when conducting applied research. For example, they must comply with laws and regulations related to data collection, handling, and storage, as well as intellectual property rights and patent law if applicable. Partner institutions have the responsibility to ensure such laws are maintained in accordance with Ethiopia's laws.

Another legal issue that partner institutions should pay attention to is the use of copyrighted materials. They must be careful not to infringe on the copyright of others when using materials such as images, text, videos, or music in their research.

It is essential for institutions to stay up to date with current ethical and legal guidelines for conducting joint applied research to ensure that they are protecting their participants' rights and adhering to all relevant laws and regulations.

Legal issues related to intellectual property and confidentiality should be handled by the legal framework (HETRIIL proclamation) and relevant national regulatory frameworks.

Principles

JAR is governed by mutual understanding, benefits, support, and resource sharing. Institutions involved in JAR can enjoy mutual benefits if they jointly prioritize research themes based on their respective needs and practical applicability. JAR creates a window of opportunity for knowledge and skill transfer among the actors. Institutions are required to maintain transparency and abide by research ethics principles and intellectual property rights. In addition, institutions engaging in JAR should work toward sustaining, learning, and developing to strengthen their collaboration.

Effectiveness and efficiency are among the key principles in JAR. The former refers to ensuring the extent to which a study meets its anticipated goals while the latter is about using the minimum amount of time, resources, and effort to meet research goals and objectives (Baimyrzaeva 2018, p. 14).

Evaluation and impact assessment

Monitoring and Evaluation (M&E) frameworks and tools are important for joint applied research. Partner institutions working together in the implementation of JAR activities should consider the following steps when designing an M&E framework for joint applied research.

- ✓ Identifying the key objectives
- ✓ Determining the expected outputs
- ✓ Defining the expected outcomes
- ✓ Identifying specific indicators that will help you measure progress towards achieving the objectives and expected outcomes
- ✓ Planning appropriate data collection methods
- ✓ Developing methods for analyzing the data

- ✓ Preparing regular reports and share with stakeholders

Similarly, measuring impacts is an essential component of joint applied research. These may include pre-and post- implementation surveys. To that effect, methods such as interviews, observations, case studies, and metrics can be applied institutions should also measure the impacts of JAR. These methods can be used individually or in combination to provide a comprehensive understanding of the impact of the JAR. It is important to select methods that align with the JAR's objectives and expected outcomes.

4.3.4 Modes of delivery

This module will be delivered through either virtual and face-to-face sessions including lectures, case studies, group discussions and hands on exercises. The choice of the modality depends on the target groups. Participants will also have access to online resources including reading materials, videos and discussion forums.

4.3.5 Duration

The module will be delivered over a period of half a day to five days, depending on the specific target groups, their needs and availability.



Learning Resources: Pictures Flipchart, Handouts, Publications of research output

The learning resources vary based on the target groups nature and needs.



Activities

Learning Assessment: Question and Answer: Oral questions and classwork questions will be given to participants. The types of learning assessment tools depend on the target group.

Presentation: Trainees from each group are expected to present their work regarding the concept of research.



Essential Readings

HETRIIL Proclamation

Directives

Guidelines and other relevant legal and institutional frameworks

4.4. Module Two: Innovation and Technology Transfer (ITT)

4.4.1 Module Description

This module aims to equip participants with knowledge about the fundamental principles and effective strategies for handling innovation and technology transfer projects. Participants will be introduced to various stages involved in planning, implementing, and monitoring such projects and gain insights into some common hurdles encountered in securing funding, safeguarding intellectual property rights, and motivating research personnel.

4.4.2. Learning Objectives

By the end of this module, participants will be able to:

- ✓ Appreciate the key principles of innovation management and technology transfer,
- ✓ Plan and manage innovation and technology transfer projects successfully,
- ✓ Develop strategies for mitigating funding, intellectual property protection, and incentive challenges, and
- ✓ Monitor and evaluate the success of innovation and technology transfer projects.

4.4.3 Module Contents

Understanding Innovation and Technology Transfer

Innovation is a key driver of economic growth and development. It refers to the process of developing and implementing new ideas, products, or processes that bring about positive change. Innovations can help organizations increase their competitive advantage, improve efficiency, and create new growth opportunities.

Technology transfer is an essential component of innovation. It involves the movement of knowledge, technology, and intellectual property from one organization or individual to another for commercial development. Technology transfer is important because it enables organizations to leverage their research and development efforts and bring new technologies to market more quickly.

Innovation is a technical solution that improves the technology created, introduces a new raw material or new market to an existing technology, adds to existing technology, improves or streamlines the technology, reduces production and service time and costs, or expands the market. Technology transfer refers to the process of transferring technology from the person or organization that owns or holds it to another person or organization with the purpose of sharing skills, knowledge, methods of manufacturing, and facilities to ensure that scientific and technological developments are accessible to a wider range of users. The ITT mainly focuses on the creation, adaptation, adoption, transferring of appropriate technologies to users to revitalize the nation's economy.

To make innovation and technology transfer successful, a strong link must be created to enable the industry to benefit from the basic research that can be done by HEIs and research institutions which serve as raw materials for the industry to translate the research output into technology and commercialization. Jointly filed patents, student and researcher start-ups, graduate mobility, knowledge co-creation, and academic spin-off activities are among the joint initiatives which contribute to innovation (OECD, 2019).

Overall, understanding innovation and technology transfer is essential for anyone who wants to be successful in today's economy. By leveraging new ideas, products, and processes, we can create greater value for ourselves and society. By working together with other organizations and sharing ideas and resources, we can accelerate the development and commercialization of new technologies and drive economic growth and development.

Benefits

Innovation and technology transfer in university-industry linkages bring numerous benefits to both academia and the industry. These include:

- exchanging knowledge, expertise, and resources;
- commercialization of academic research by transferring technology from the lab to the industry;
- transforming innovations and inventions into marketable products, services, or processes;
- generating revenue through licensing agreements, patents, and spin-off companies;
- driving economic growth by fostering innovation and entrepreneurship;
- adopting cutting-edge technologies, improving productivity, and developing new market opportunities;
- gain practical skills, industry insights, and hands-on experiences that enhance their employability.

Principles

The ITT becomes effective if properly guided by the principles of understanding national priority, pooling resources from collaborating institutions, joint planning on agreed needs, creation of national capacity adaptation of solutions to practical problems, and flexible and innovative approaches towards continuous improvements. This implies that the academia and the industry abide by mutual points on the bases of which the partners do tasks with consensus and share benefits fairly equally. The following table summarizes some of the basic principles.

Financial Instruments	Regulatory Instruments	Soft Instruments
R&D innovation subsidies/grants for industry-science research	IP regulations publicly-funded research	Outreach activities to raise awareness of science-industry opportunities
Tax incentives for companies purchasing research from universities	Regulation of spin-offs founded by researchers & students	Training programs on knowledge collaboration
Grants for IP applications from universities	Sabbaticals & mobility schemes for researchers to work in industry	Collective industry-science roadmapping & foresight
Financial support to academic spin-offs	Career rewards for researchers engaging in knowledge collaboration	Guidelines, standards, & codes of conduct for science-industry collaboration
Financial support to firms to recruit PhDs & post-docs	Open access & open data provisions for publicly-funded research	Networking support to build science-industry linkages
Financial support for universities to host industry researchers		
Public procurement of university research		
Innovation vouchers for R&D services from universities		
Performance-based funding systems for university linkages with industry		
Public-private partnerships creating joint research laboratories		
Funding of infrastructures & intermediaries for collaboration		

Table 1. List of the 21 policy instruments. Source: [OECD, 2019](#).

There are emerging policy approaches to promote university-industry collaboration knowledge

Source: European Union (2020, p. 6)

Intellectual property (IP) protection

Since innovation and creativity deserve protection, IP is one of the core aspects of ITT that needs special attention to encourage innovators, creators, and adaptors. Hence, collaborating institutions are required to protect IP through developing appropriate policies or directives. Such regulatory frameworks should be put in place and easily accessible to all concerned staff.

Key Actors and their roles and responsibilities

There are many different types of research institutions, government agencies, and companies that play a role in technology transfer. Research institutions, such as universities and research centers, are often the birthplace of new technologies. These organizations conduct cutting-edge research and develop new ideas and technologies that have the potential to create value for society.

Government agencies also play a critical role in technology transfer. They provide funding for research and development, and they support the commercialization of new technologies through various programs and initiatives.

Companies are also important players in technology transfer. They often partner with research institutions and government agencies to commercialize new technologies and bring them to market. Companies have the resources and expertise needed to bring new products to market, and they can help researchers and inventors navigate the complex process of commercializing new technology.

Implementation of Innovation and Technology Transfer

Technology transfer is among the key pillars identified by the Ethiopian government. In this technology era, economic advancement heavily depends on the capacity to use technology extensively and effectively. For this to happen, strategic implementation is needed.

Experiences in the US show that professors of top university scientists observe how industries do their jobs, conduct assessments of problems faced by industries, and try to solve their problems through scientific and technological approaches (Prager and Omenn, 1980). Hi-tech companies are good examples in this regard (Ibid). The National Science Foundation provides financial assistance to HE-Industry-community innovation and technology transfer (Ibid) and this support has shown increment over time. This close interaction paves the way for joining hands to complement one another's resources and enhance the practice of innovation and technology transfer.

Planning and Executing Innovation and Technology Transfer Projects

Planning and executing technology transfer projects can be complex processes that require careful consideration of various factors. Here are some key steps to follow when planning and executing technology transfer projects:

Identify the Technology for Transfer: The first step in planning a technology transfer project is identifying the technology that needs to be transferred. This may be a new product, process, or method that has been developed internally or licensed from an external source.

Assess the Technology: After identifying the technology for transfer, it's important to assess its readiness for transfer. This includes evaluating whether the technology is protected by patents or other intellectual property rights, assessing the technical feasibility and commercial potential of the technology, and identifying any regulatory approvals or certifications required.

Define the Scope of the Project: Once the technology has been assessed, the next step is to define the scope of the project. This includes setting goals, defining the project timeline, and determining what resources will be needed to successfully transfer the technology.

Develop a Technology Transfer Plan: With the project scope defined, the next step is to develop a technology transfer plan. This should include a detailed project schedule, budget, and resource plan, as well as a risk management plan that identifies potential risks and mitigation strategies.

Establish a Cross-functional Team: Successful technology transfer projects typically involve collaboration across multiple functional areas, including research and development, manufacturing, legal, regulatory affairs, and marketing. It's important to establish a cross-functional team to facilitate communication and ensure all stakeholders are aligned on project goals and timelines.

Execute the Plan: With the technology transfer plan in place and the cross-functional team established, the next step is to execute the plan. This involves coordinating all activities involved in the transfer process, tracking progress against the project plan, and making any necessary adjustments along the way.

Monitor and Evaluate Performance: Throughout the technology transfer project, it's important to monitor and evaluate performance against established goals and milestones. This allows for early identification of potential issues or roadblocks, enabling the project team to take corrective action before they become major problems.

Celebrate Success: Finally, when the technology transfer project is completed, it's important to celebrate the success with the entire team and recognize individual contributions. This helps build momentum for future projects and reinforces the importance of effective technology transfer processes.

By following these steps, organizations can effectively plan and execute technology transfer projects, successfully transferring new technologies from the laboratory to commercial applications.

Monitoring and Evaluation of Technology Transfer Projects

Monitoring and evaluation of technology transfer projects are critical to ensuring the successful transfer of technology from the laboratory to commercial applications. Here are some key steps that organizations can take to monitor and evaluate their technology transfer projects:

Develop a Monitoring and Evaluation Plan: The first step in monitoring and evaluating technology transfer projects is developing a plan that outlines the objectives, metrics, and methods that will be used to measure progress and outcomes. This plan should be developed early in the project and should be reviewed and updated regularly.

Track Progress Against Objectives: Once the monitoring and evaluation plan is in place, it's important to track progress against established objectives. This involves regularly collecting data on project activities and outputs, such as the number of patents filed, the number of partnerships established, and the number of products or services launched.

Evaluate Outcomes and Impact: In addition to tracking progress against objectives, it's also important to evaluate the outcomes and impact of technology transfer projects. This includes assessing the economic and social impact of the transferred technology, the level of adoption by end-users, and any new insights or knowledge generated by the project.

Identify Areas for Improvement: Based on the results of the monitoring and evaluation, it may be necessary to identify areas for improvement in the technology transfer process. This could involve adjusting project timelines, reallocating resources, or changing project objectives.

Use Lessons Learned to Improve Future Projects: Finally, it's important to use the lessons learned from technology transfer projects to improve future projects. This may involve developing new

best practices for technology transfer, training staff on effective transfer strategies, or sharing knowledge and insights with other organizations and stakeholders.

By following these steps, organizations can effectively monitor and evaluate their technology transfer projects, identify areas for improvement, and ultimately increase the chances of successfully transferring new technologies from the laboratory to commercial applications.

Financing of ITT

Finance is a critical element for the implementation of ITT. Partner institutions are required to have clear budget plans to run and implement ITT effectively. The budget plan should indicate resources required and the respective contributions of partner institutions before the implementation of the ITT program. Doing so helps institutions achieve the purpose of ITT and ensures its sustainability.

Challenges and mitigating strategies

Implementation of innovation and technology transfer is challenged by several factors. Funding, intellectual property protection, and incentives are critical factors in facilitating technology transfer projects. However, these areas can also pose significant challenges that need to be addressed to ensure a successful transfer. Here are some steps that organizations can take to mitigate these challenges:

Securing Funding: One of the main challenges in technology transfer is securing sufficient funding to support the project. To mitigate this challenge, organizations should consider seeking funding from multiple sources, such as government grants, venture capital firms, and angel investors. It's also important to develop a detailed budget and cost projection for the project, which can help demonstrate the potential return on investment.

Protecting Intellectual Property: Another key challenge in technology transfer is protecting intellectual property (IP) rights. To mitigate this challenge, organizations should work with legal experts who are knowledgeable in IP law to develop appropriate strategies for protecting their patents, trademarks, and copyrights. This may involve filing for patent protection, creating non-disclosure agreements, or licensing IP to third parties.

Providing Incentives: Incentives can play a crucial role in encouraging technology transfer and collaboration between researchers, entrepreneurs, and industry partners. To mitigate this challenge, governments and organizations can provide tax breaks, grants, and other financial incentives for companies that successfully transfer technology. They can also establish programs that recognize and reward individuals or teams for their contributions to technology transfer projects.

Facilitating Collaboration: Finally, a collaboration between researchers, entrepreneurs, and industry partners is essential for successful technology transfer. To facilitate collaboration, organizations can establish formal partnerships and networks that bring together different stakeholders with complementary skills and expertise. They can also create online platforms and other tools that make it easier for collaborators to share information, resources, and ideas.

In summary, by taking proactive steps to address funding, IP protection, incentives, and collaboration, organizations can mitigate some of the challenges associated with technology transfer and improve their chances of success.

4.4.4 Modes of Delivery

This module will be delivered through either virtual or face-to-face sessions including lectures, case studies, group discussions, and hands-on exercises. The choice of the modality depends on the target groups. Participants will also have access to online resources including reading materials, videos, and discussion forums.

4.4.5. Duration

The module will be delivered over a period of half a day to five days, depending on the specific target groups, their needs, and availability.



Learning Resources: Pictures Flipchart, Handouts, Publications of research output

The learning resources vary based on the target group's nature and needs.



Activities

Learning Assessment: Question and Answer: Oral questions and classwork questions will be given to participants. The types of learning assessment tools depend on the target group.

Presentation: Trainees from each group are expected to present their work regarding the concept of research.



Essential Readings

HETRIIL Proclamation

Directives

Guidelines and other relevant legal and institutional frameworks

4.5. Module Three: Consultancy

4.5.1 Module Description

This module on the planning, execution, and management of consultancy services for industry aims at equipping heads of public and private TVET and higher education institutions, heads of research institutions, government agency supervisors, and company executives with the knowledge and skills to effectively deliver consultancy services to the industry. Through interactive activities, case studies, and group discussions, participants will learn how to identify industry needs, define scope and objectives, allocate resources, manage incentives, ensure professional ethics and legal compliance, and address project-related issues.

This training module provides a comprehensive overview of consultancy services and their importance for the industry and offers strategies for delivering high-quality services that meet industry needs and demands. Participants will gain an understanding of the challenges related to intellectual property rights, managing incentives for participating institutions and staff, professional ethics, and legal procedures, and how to mitigate these challenges.

4.5.2 Learning Objectives

Upon completion of the module, participants will be able to:

- ✓ Understand the concept and types of consultancy services offered by TVET, higher education, and research institutions to the industry;
- ✓ Define project scope and objectives, allocate resources effectively, and develop project proposals and agreements;
- ✓ Understand the mechanisms to mitigate challenges related to intellectual property rights and managing incentives for participating institutions and staff, professional ethics, and legal procedures;
- ✓ Understand compliance with ethical and legal requirements in the delivery of consultancy services;
- ✓ Develop the understanding to manage projects effectively, ensuring timely completion of projects;
- ✓ Develop the understanding to monitor and evaluate project outcomes, and address issues and challenges as needed.

4.5.3 Module Content

Understanding Consultancy Services

Consultancy is the provision of expert advice or professional work carried out on behalf of a third party utilizing the knowledge and expertise of a member(s) of higher education institution staff and, in some cases, the equipment and facilities of the academic institution. It creates the

participation of academic institutions' staff in consultancy work and offers opportunities and benefits to institutions, their employees, and students.

Nature of consultancy

Consultancy services are professional services provided by experts in a particular field to individuals or organizations who require expert advice, guidance, or support. These services can be delivered to address specific issues or problems, to improve performance, or to facilitate change. Consultancy services can cover various areas, including business strategy, operations management, project management, marketing, human resources, and information technology.

Consultancy services play a vital role in the industry by providing expert advice and guidance to organizations facing complex issues or challenges. They help organizations identify opportunities for improvement, develop effective strategies, and implement changes that lead to improved performance and increased profitability. Consultancy services also provide a fresh perspective and insights into industry trends and best practices, helping organizations to stay competitive and relevant.

Higher education, TVET, and research institutions have a significant role to play in delivering consultancy services to the industry. These institutions possess a wealth of knowledge and expertise that can be leveraged to deliver high-quality services that meet the needs and demands of the industry. By providing consultancy services, institutions can make a positive contribution to the development of the industry, support economic growth, and enhance their reputation and visibility in their respective fields.

There are different types of consultancy services such as contract (teaching, document development, research, serving as a committee member, etc), consulting, and company directorship. The academia should make maximum effort to ensure the provision of consultancy services that are of a high standard and respond to the needs of the recipients. Consultancy services can be offered to different sectors including, industries, service sectors, government institutions, and other national and international organizations to transfer focused knowledge and expertise skills to promote higher education institution, industry, and other institutions interaction.

The different types of consultancy services include:

Management consulting: This type of consultancy service focuses on improving an organization's overall performance by identifying opportunities for improvement and developing strategies to achieve them.

Financial consulting: This type of consultancy service provides advice on financial matters, such as investment decisions, financial planning, and risk management.

Human resources consulting: This type of consultancy service guides managing employee-related issues, such as recruitment, training, and performance management.

IT consulting: This type of consultancy service provides expertise in information technology, including software development, network infrastructure, and cybersecurity.

Marketing consulting: This type of consultancy service guides marketing strategies, market research, and brand management.

Implementation of consultancy services

Consultancy services involve providing expert advice and guidance to individuals or organizations in a particular field. The implementation of consultancy services typically involves the following steps:

- ✓ Identifying the needs jointly
- ✓ Conducting joint research
- ✓ Formulating joint recommendations
- ✓ Implementing recommendations
- ✓ Evaluating results together.

The process of implementing consultancy services may vary depending on the specific industry or field, as well as the scope of the project. However, these general steps provide a framework for how consultants typically work with clients to achieve their goals and address their business challenges.

Requirements

Consultancy service provision should meet certain requirements to be successful. Partnering institutions should carry out the planning and approval of consultancy works through well-established guiding principles and transparent criteria. The following are among the few requirements which HETRIIL partners should abide by.

Eligibility: To offer consultancy services, the academic staff should satisfy some eligibility criteria. These, among others, include he/she should be employed and entitled to offer to teach, conduct independent research, and manage and run higher education institutions' equipment and facilities.

Participation approval: Staff of higher education institutions who will be engaged in consultancy services must get permission from the appropriate authorities before he/she will enter into any agreement with the potential external client.

Consultancy contracts: Contract whether it is made with private or institutional consultancy, it should be done based on a signed contractual agreement between the staff or the university and the external client. For effective implementation, the contract processes can be facilitated by the appropriate consultancy coordination office of the higher education institution.

Share of benefits: - Higher education institution staff should be remunerated for the consultancy services they delivered. The share of the payment paid for the staff involved in institutional consultancy work and private consultancies will be determined and governed by the policy or directive put in place by the higher education institution. In addition, the policy or directive will also assist to handle any grievances or complaints that may arise between the consultant and the client.

Planning Consultancy Services

Planning is a critical stage in delivering successful consultancy services. Effective planning enables institutions to identify the needs and expectations of the industry, define the scope and objectives of the consultancy services, allocate resources and budget effectively, establish project timelines and milestones, and develop project proposals and agreements.

The following are key steps involved in planning consultancy services:

Identify Industry Needs and Demands: Institutions must conduct market research and analysis to gain an understanding of the current and future trends in the industry. This involves engaging with industry stakeholders and clients to obtain their feedback and insights on their needs and expectations.

Define Scope and Objectives: Based on the identified industry needs and demands, institutions must define the specific tasks and activities that will be carried out during the consultancy process and the desired outcomes or results that the consultancy services aim to achieve.

Allocate Resources and Budget: Institutions must allocate sufficient resources, such as personnel, equipment, and facilities, to ensure that the consultancy services are delivered effectively. Budgeting involves estimating the costs associated with delivering the consultancy services, including personnel and administrative costs, and allocating them appropriately.

Establish Project Timelines and Milestones: Institutions must establish clear project timelines and milestones to ensure the timely delivery of consultancy services. A project timeline outlines the key activities and tasks involved in the consultancy process and their respective deadlines. Milestones mark significant achievements or progress in the project.

Develop Project Proposals and Agreements: Institutions must develop clear and comprehensive project proposals and agreements to formalize their consultancy services. A project proposal outlines the scope, objectives, methodology, timelines, milestones, and resources required for the consultancy services. A project agreement defines the legal and contractual obligations of both parties, including the rights and responsibilities of the institution and the client.

By following these steps, institutions can plan and deliver high-quality consultancy services that meet the needs and expectations of the industry. Effective planning ensures that consultancy services are delivered efficiently, effectively, and in compliance with ethical and legal requirements. The planning should be joint.

Execution and Management of Consultancy Services

Consultancy services are an essential part of modern business operations. Companies often seek the help of consultants to provide expert advice and guidance on a wide range of issues, from strategy and business planning to marketing and financial management. However, the execution and management of consultancy services can be challenging, requiring careful planning, coordination, and communication.

Here are some key considerations for executing and managing consultancy services effectively:

Define project goals: Before starting any consultancy project, it is essential to define clear and specific goals that the project aims to achieve. This will help ensure that everyone involved in the project understands what they need to do, and why.

Select the right team: The success of a consultancy project depends largely on the quality of the consulting team. Make sure to select consultants who have relevant expertise and experience, and who will work well together.

Establish clear roles and responsibilities: Each member of the consulting team should have a clearly defined role and responsibility. This includes the project manager, who should be responsible for coordinating the work of the team and ensuring that the project stays on track.

Communicate regularly: Regular communication is essential for keeping everyone on the same page and ensuring that the project is progressing as planned. Establish regular meetings, status updates, and progress reports to keep everyone informed.

Monitor and measure progress: It is important to monitor and measure progress throughout the project to ensure that it is meeting its goals. Establish metrics and key performance indicators (KPIs) to track progress, and use these to identify areas where adjustments may be needed.

Manage risks: Consultancy projects can be complex and involve many different variables. It is important to identify potential risks early on and establish strategies for mitigating them.

Ensure quality control: Finally, it is important to maintain high standards of quality throughout the project. Establish quality control procedures to ensure that deliverables meet the required standards, and use feedback from clients to improve future projects.

In conclusion, executing and managing consultancy services requires careful planning, coordination, and communication. By following these key considerations, you can ensure that your consultancy project is successful and achieves its goals.

Intellectual Property Rights (IPR)

Intellectual property rights (IPR) refer to the legal rights that protect the creations of the human mind. These creations can include inventions, literary and artistic works, symbols, names, images, and designs used in commerce. IPR is essential for fostering innovation and creativity by providing incentives and rewards for individuals and organizations who create and develop new ideas, products, and services.

There are several types of IPR that institutions need to consider when delivering consultancy services. The most common types of IPR include:

Patents: Patents protect inventions and discoveries, such as processes, machines, or products.

Trademarks: Trademarks protect distinctive signs, such as logos, symbols, or brand names, that identify and distinguish goods or services from those of other companies.

Copyrights: Copyrights protect original literary, artistic, and creative works, such as books, music, films, and software.

Trade Secrets: Trade secrets protect confidential business information, such as formulas, manufacturing processes, or customer lists.

Industrial Designs: Industrial designs protect the visual appearance of a product, such as its shape or pattern.

Institutions must consider IPR when delivering consultancy services to the industry. Protecting IPR is essential for maintaining the ownership, control, and commercial value of the knowledge and expertise developed during the consultancy process. Institutions must ensure that their consultancy services do not infringe upon the IPR of others while safeguarding their own

To protect IPR, institutions must take several measures, including:

- ✓ **Conducting IP due diligence:** Institutions must conduct thorough research and analysis to identify potential IPR issues and risks associated with the consultancy services.
- ✓ **Developing IPR policies and procedures:** Institutions must develop clear and comprehensive policies and procedures for managing IPR during the consultancy process.
- ✓ **Drafting contracts and agreements:** Institutions must draft contracts and agreements that address the ownership, control, and use of IPR during and after the consultancy process.
- ✓ **Educating staff and clients on IPR:** Institutions must educate their staff and clients on the importance of IPR and the potential risks associated with infringing upon the IPR of others.

By protecting IPR during consultancy services, institutions can ensure that their knowledge and expertise are valued and recognized by the industry while mitigating legal and reputational risks associated with IPR infringement.

Managing Incentives

Effective management of incentives is crucial for successful consultancy services. Institutions must ensure that their staff and participating institutions are incentivized appropriately to maintain their commitment and motivation while delivering consultancy services. Managing incentives involves balancing the interests and needs of all stakeholders involved in the consultancy process.

The following are key strategies for managing incentives:

Aligning incentives with organizational goals: The incentives offered to staff and participating institutions should align with the organizational goals of the institution. This ensures that the consultancy services delivered are aligned with the strategic objectives of the organization.

Offering financial and non-financial incentives: Incentives can include both financial rewards, such as bonuses or commissions, and non-financial rewards, such as recognition, career development opportunities, or work-life balance benefits.

Providing clear performance metrics: Clear and realistic performance metrics must be established to measure the progress and success of the consultancy services. These metrics help staff and

participating institutions understand what they are expected to achieve and how their achievements will be rewarded.

Creating a fair and transparent incentive system: The incentive system must be fair and transparent to all stakeholders involved in the consultancy process. Institutions must ensure that the criteria used to determine incentives are objective, measurable, and communicated clearly to all stakeholders.

Monitoring and evaluating the effectiveness of incentives: Institutions must continuously monitor and evaluate the effectiveness of the incentive system to identify areas for improvement and ensure that incentives remain relevant, motivating, and aligned with the organizational goals.

By managing incentives effectively, institutions can maintain the commitment and motivation of their staff and participating institutions, leading to better quality consultancy services and improved outcomes for the industry. Effective management of incentives also helps institutions to mitigate risks associated with conflicts of interest and ethical violations that may arise from inappropriate incentives.

Professional Ethics and Legal Compliance

Professional ethics and legal compliance are essential aspects of any successful business or organization. Professional ethics refers to the set of moral principles that guide the behavior of professionals in each field, while legal compliance refers to the adherence to laws and regulations governing business operations.

To maintain high levels of professionalism and ensure legal compliance, businesses and organizations must establish clear policies and procedures that outline expected ethical behavior and legal requirements. These policies should be communicated clearly to all employees, and regular training should be provided to ensure that everyone understands their responsibilities and obligations.

Some common areas where professional ethics and legal compliance come into play include:

Financial reporting: Ensuring accurate financial reporting is critical for both ethical and legal reasons. Companies must comply with accounting standards and government regulations to avoid legal penalties, and also to maintain the trust of stakeholders and customers.

Data privacy: In today's digital age, protecting personal information is more important than ever. Businesses must adhere to strict data privacy laws to ensure that sensitive information is not misused or mishandled.

Workplace safety: Ethical and legal obligations to provide a safe working environment for employees are paramount. Employees have a right to work in a safe environment, and employers must provide one.

Environmental responsibility: Many industries have a significant impact on the environment, and companies must take steps to minimize their ecological footprint. Ethical considerations and legal requirements often go hand-in-hand when it comes to environmental responsibility.

In conclusion, maintaining a strong commitment to professional ethics and legal compliance is critical for any successful business or organization. By establishing clear policies and procedures and providing regular training to employees, organizations can ensure that they are meeting their ethical and legal obligations.

4.5.4 Modes of Delivery

This module will be delivered through either virtual or face-to-face sessions including lectures, case studies, group discussions, and hands on exercises. The choice of the modality depends on the target groups. Participants will also have access to online resources including reading materials, videos, and discussion forums.

4.5.5 Duration

The module will be delivered over a period of half a day to five days, depending on the specific target groups, their needs, and availability.



Learning Resources: Pictures Flipchart, Handouts, Publications of research output

The learning resources vary based on the target group's nature and needs.



Activities

Learning Assessment: Question and Answer: Oral questions and classwork questions will be given to participants. The types of learning assessment tools depend on the target group.

Presentation: Trainees from each group are expected to present their work regarding the concept of research.



Essential Readings

- ✓ HETRIIL Proclamation
- ✓ Directives
- ✓ Guidelines and other relevant legal and institutional frameworks

4.6 Module Four: Cooperative Training (CT)

4.6.1 Module Description

This training module provides participants with a comprehensive understanding of cooperative training programs, equipping them with the necessary knowledge and skills to plan, execute, and monitor successful programs that address specific organizational needs. Participants will learn how to recognize common challenges and develop strategies to mitigate them effectively, ensuring maximum impact and success. By applying the knowledge gained from this module, participants will be able to design and implement effective cooperative training programs tailored to their respective workplaces.

4.6.2 Learning Objectives

By the end of this training module, participants will be able to:

- ✓ Understand the key components of cooperative training programs and their importance in the workplace.
- ✓ Plan and execute effective cooperative training programs that address specific organizational needs.
- ✓ Jointly monitor and evaluate cooperative training programs to ensure their success.
- ✓ Recognize common challenges that can arise when implementing cooperative training programs and develop strategies to mitigate them.
- ✓ Apply the knowledge gained from this module to design and implement successful cooperative training programs in their respective workplaces.

4.6.3 Module Contents

Understanding Cooperative Training

Cooperative training is an education and training system designed to develop the knowledge, skills, and attitudes of trainees by harmonizing basic training by training institutions with practical training, which takes place at industry work floors. It emphasizes strengthening linkages between training and research institutions and the industry to improve the quality and relevance of skills development training. Cooperative training is experiential learning; it is “not an add-on to the curriculum, but an integral part of the educational process” (Cates and Jones 1999). It combines classroom learning with practical work experience thus providing students with the opportunity to gain hands-on experience in their field of study while also earning academic credit.

The primary goal of cooperative training is to prepare students for successful careers by providing them with relevant skills and experience. This allows them to develop a better understanding of what is required in their chosen profession and also helps them to build a network of contacts within the industry.

Overall, cooperative training plays an important role in preparing students for successful careers and helping employers to build a skilled workforce.

Benefits

Cooperative training offers numerous benefits to both students and employers. For students, it provides an opportunity to gain valuable work experience, earn academic credit, and potentially secure a job offer upon graduation. For employers, it allows them to identify and train potential employees, while also benefiting from the fresh perspectives and innovative ideas that students can bring to their organization.

Principles

The following principles uplift the success of cooperative training.

Active stakeholders' involvement: the starting point for cooperative training is an active engagement of stakeholders - academic and the industry. They all need to plan together and work in a partnership, feeling toward common goals.

Believe in the benefits of cooperative training: Partnering institutions, especially the industry should have sound and deep trust in the contribution of cooperative training.

Trust and commitment: Cooperative training is fully dependent on partners' trust in each other and commitment to the set objectives. Providing open access to learning through experiential learning is key to cooperative training. The industry should trust the academia that equips trainees with the requisite knowledge.

Joint planning: Cooperative training should be designed based on joint planning. The academia and the industry should plant together, implement together and monitor and evaluate together to enable cooperative training to meet its strategic objectives.

Length of cooperative training

The total duration required to complete cooperative training depends on the level and the complexity of the occupations. Most of the training hours should be offered in the industry to provide an opportunity for the trainees to expose to practical skills and experience relevant to the industry. Cooperative training programs could be led either by higher education institutions or industry.

Management of Cooperative Training

The management of cooperative training takes different forms in different contexts. Three models were recommended by Wilson (1997) that three models (Stanley, ND). These are the centralized, the decentralized, and the integrated models. Standly stated that in the case of the centralized model, all operations are handled by a single structure which gives no room for faculties. In the case of the decentralized model, faculties, getting little or no central support structure, do all cooperative training activities (the management, marketing, placement and academic control of Experiential Learning). The third model which is “integrated model” decentralizes the academic administration and instructional matters to faculties and has a department in charge of doing the administrative aspects of CT. As each model has its own merits and demerits, it is important to consider the model that fits the specific context. No one jacket fits all size.

Managing cooperative training through collaboration involves working together with the participants and stakeholders involved in the training program to ensure its success. This requires clear steps which include the following.

Establish clear communication channels: Ensure that all participants, trainers, and stakeholders have access to clear and concise communication channels. This could include regular meetings, email updates, or an online forum.

Set clear goals and objectives: Clearly define the goals and objectives of the training program and ensure that everyone involved is aware of them. This will help to keep everyone focused on the same outcomes and allow for better collaboration between participants.

Encourage feedback and input: Create an environment where feedback and input from all participants are encouraged and valued. This will foster a culture of collaboration and help to identify potential issues early in the training program.

Assign roles and responsibilities: Clearly define the roles and responsibilities of each participant and stakeholder involved in the training program. This will help to ensure that everyone knows what is expected of them and will increase accountability throughout the program.

Evaluate progress regularly: Regularly evaluate the progress of the training program and adjust as necessary. This will help to ensure that the program is meeting its goals and objectives and will allow for better collaboration between participants.

The aforementioned procedures allow effective management of cooperative training through collaboration, ensuring that all participants are engaged, motivated, and working towards a common goal.

Implementation of cooperative training

Cooperative training is a form of training that consists of both technical and vocational education and training. Its implementation combines work-based learning with institutional training. The training curricula consist of two kinds of modules namely, the basic training module and the practical training module. The basic training module contains industry-initiated courses (e.g., entrepreneurship). On the other hand, the practical training module contains learning guides and manuals that help trainees to plan their learning objectives and mentors to plan their supervision tasks. The learning guides and manuals are prepared by the industry in consultation with collaborating institutions.

The implementation of Cooperative Training requires the active engagement and dedication of training institutions and employers. To help cooperative training move in the right direction, the industry should be of the opinion that committing time and required resources for cooperative training is valuable to bring benefits to only trainees and training institutions but it also has tremendous advantages to the industry. On the other hand, there should be a scheme that encourages institutions that commit their resources to the realization of cooperative training. Governments in developed countries provide different incentives such as tax holidays and/or exemptions, infrastructure, facilities, etc.

The modes of delivery of CT can be institution-led or industry-led. Institution-led CT takes dual involvement of both the training institutions and industries whereas delivery of the industry-led schemes are linked with employment contracts under a fully regulated structure. CT, whether institution or industry-led, is an integration of an academic learning component and an experiential learning component. Trainees attend classroom teaching in lecture rooms, which needs to be supplemented by experimental work in laboratories. To get skilled, trainees get their training in industry, commerce, or the public sector.

Assessment of CT can be done both in formative and summative methods. The formative assessment is more often used in industry-led training whose results determine whether a trainee should be placed in the industry for practical training. On the contrary, the summative assessment is conducted in the industry to gauge the competence of the trainees. A trainee is certified by the industry supervisor only when he/she is competent in the required skills.

In Ethiopia, the Memorandum of Understanding (MoU) is believed to facilitate the conduct of effective cooperative training. Accordingly, the academia and the industry are required by the Ministry of Education to sign a Memorandum of Agreement. As a tool useful to facilitate collaboration, the MoU defines cooperative training and its duration, states the purpose of cooperative training, identifies places for cooperative training, sets start and end dates for cooperative training, lists rights and obligations of the academia and the industry, and sets a performance monitoring and evaluation system.

Planning and Execution of Cooperative Training

Planning and executing a cooperative training program can be an involved process, but it is essential to ensure that both the educational institution and the employer partner are able to achieve their goals. The key steps worth considering when planning and executing a cooperative training program include the following.

Identify potential employer partners: The first step is to identify potential employers who may be interested in partnering with your educational institution for a cooperative training program. Look for companies that operate in fields related to your student's areas of study.

Develop a program structure: Once you have identified potential employer partners, work with them to develop a program structure that meets their needs while also providing valuable experience and academic credit to your students. Consider factors such as the length of the program, the number of hours students will work each week, and the specific tasks they will perform.

Establish guidelines and expectations: It is important to establish clear guidelines and expectations for both students and employer partners before the program begins. This should include information about hours, compensation, and any other relevant policies or procedures.

Recruit and train students: Once the program structure has been established, begin recruiting students who are interested in participating. Provide them with training on workplace etiquette, safety, and any specific skills they will need to succeed in their role.



Monitor progress: Throughout the program, it is important to monitor the progress of both students and employer partners to ensure that everyone is meeting their obligations and that the program is running smoothly. This can involve regular check-ins with students, site visits with employer partners, and ongoing communication with all parties involved.

Evaluate and make adjustments: At the end of the program, evaluate its effectiveness and make any necessary adjustments for future iterations. This could involve soliciting feedback from students, employer partners, and faculty members to identify areas for improvement.

By following these steps, institutions can effectively plan and execute a cooperative training program that provides valuable experience and academic credit to students while also meeting the needs of employer partners.

Joint Monitoring and Evaluation of Cooperative Training Programs

Joint monitoring and evaluation is an essential part of ensuring the success and effectiveness of cooperative training programs. Here are some key considerations for joint monitoring and evaluation:

Establishing common goals: Before the program begins, it is important to establish common goals and objectives that both the educational institution and the employer partner want to achieve through the program. This will help ensure that everyone is working towards the same outcomes.

Defining performance indicators: Develop performance indicators that can be used to measure progress towards achieving these common goals. These indicators should be measurable, realistic, and relevant to the goals of the program. Examples might include student satisfaction with the program, the number of students who are offered employment by the employer partner, or the level of skill development demonstrated by students.

Regular communication: It is important to maintain regular communication between all parties involved in the program. This may involve regular check-ins with students and employer partners, site visits to observe the program in action, and ongoing feedback from all stakeholders.

Collecting data: Collect data on the performance indicators established at the start of the program. This may involve surveys, interviews, focus groups, or other methods of data collection.

Analyzing data: Once data has been collected, analyze it to determine how well the program is meeting its goals and objectives. Look for areas where the program is performing well, as well as areas where improvements could be made.

Making adjustments: Based on the data analysis, make adjustments to the program as needed. This might involve changing the structure of the program, adjusting the training provided to students, or modifying the types of tasks assigned to students.

Celebrating successes: Finally, celebrate the successes of the program. Share positive outcomes with students and employer partners, and consider ways to build on these successes in future iterations of the program.

By following these steps for joint monitoring and evaluation, you can ensure that your cooperative training program is meeting the needs of all stakeholders and achieving its goals and objectives.

Financing of cooperative training programs

Finance is a critical element for the implementation of cooperative training programs. Partner institutions are required to have clear budget plans to run and implement cooperative training effectively. The budget plan should clearly indicate the resources required and the respective contributions of key actors prior to the implementation of the externship program. Doing so helps institutions achieve the purpose of externship and ensures its sustainability.

Challenges in Implementing Cooperative Training Programs and Mitigation Strategies

Implementing cooperative training programs can present various challenges that educational institutions and employer partners need to address to ensure the success of the program. Here are some common challenges and potential mitigation strategies:

Finding suitable employer partners: One of the most significant challenges is finding employer partners who are willing and able to participate in the program. To address this, educational institutions can build relationships with potential employer partners early on, identify key decision-makers within those organizations, and clearly articulate the benefits of the program to them.

Aligning program goals: Educational institutions and employer partners may have different goals for the program, which can create misalignment. Effective communication and collaboration between all stakeholders are essential in identifying common goals and objectives and ensuring that they align with the interests of both parties.

Ensuring quality student experiences: Providing students with high-quality experiences that meet their learning objectives can be challenging. Developing a clear structure for the program, providing adequate training and support for students, and regularly monitoring and evaluating the program can help ensure that students have a positive and valuable experience.

Managing logistics: Logistics such as scheduling, transportation, and coordinating student placement can be complex. Developing a detailed plan ahead of time and maintaining open lines of communication between all stakeholders can help mitigate logistical challenges.

Addressing liability concerns: Liability concerns related to workplace safety and workers' compensation can pose challenges. Establishing clear guidelines and expectations, ensuring proper insurance coverage, and providing appropriate training and support for students can help mitigate these concerns.

Funding the program: Funding can be a challenge, particularly for smaller educational institutions or employers. Seeking grants or other sources of funding, partnering with other organizations to share costs, or incorporating cooperative training into existing programs can help address funding challenges.

Evaluating program outcomes: Evaluation can be difficult, particularly if data collection or analysis is not standardized. To ensure meaningful evaluation, it is important to establish clear

performance indicators, collect data consistently and rigorously, and use appropriate tools to analyze and interpret data.

By proactively identifying these challenges and implementing mitigation strategies, educational institutions and employer partners can successfully implement cooperative training programs that benefit students and meet the needs of employers.

4.6.4 Modes of Delivery

Delivery modules will be delivered through either virtual or face-to-face sessions including lectures, case studies, group discussion, and hands-on exercises. The choice of the modality depends on the target groups. Participants will also have access to online resources including reading materials, videos, and discussion forums.

4.6.5 Duration

The module will be delivered over a period of half a day to five days, depending on the specific target groups, their needs and availability.



Learning Resources: Pictures Flipchart, Handouts, Publications of research output

The learning resources vary based on the target groups nature and needs.



Activities

Learning Assessment: Question and Answer: Oral questions and classwork questions will be given to participants. The types of learning assessment tools depend on the target group.

Presentation: Trainees from each group are expected to present their work regarding the concept of research.



Essential Readings

HETRIIL Proclamation

Directives

Guidelines and other relevant legal and institutional frameworks

4.7 Module Five: Internship

4.7.1 Module description

This training module is designed to provide an overview of internship programs, including their objectives, implementation procedures, and challenges related to placement, supervision, and assessment. Additionally, it will highlight the new HETRIIL Proclamation introduced by the government to address some of these challenges and provide incentives for companies participating in internships. The module is tailored towards university student internship managers, government agency supervisors, and company executives who are looking to develop effective and successful student internship programs.

4.7.2 Learning objectives

At the end of this training module, the participant will be able to:

- ✓ Understand the importance of internships for both the intern and the hosting organization,
- ✓ Practice and manage the implementation procedures of internships effectively,
- ✓ Address challenges related to placement, supervision, and assessment of interns,
- ✓ Comprehend the new HETRIIL Proclamation introduced by the government and its implications for companies participating in internships,
- ✓ Utilize incentive packages provided by the government to enhance their participation in internships.

4.7.3 Module Contents

Understanding Internship

Internship is the engagement of students in work-related activities in the industry before they graduate from HEIs. It is intended primarily for the purpose of providing students with hands-on experiences to enhance their understanding of down-to-earth issues relevant to a particular area of study, during which period they are closely supervised by experienced industry supervisors and HEI mentors. Internship provides students with invaluable learning experiences and creates opportunities for students to explore potential career fields. Internship allows students to translate the theory they acquire in the classroom into practice through hands on training. Literature about best practices indicate that internship provides a good opportunity for students to develop soft skills such as business awareness, communication, creativity, initiative, leadership, planning, self-management, teamwork, etc. In sum, internship plays a pivotal role in enhancing the quality of education and training. For employers, internship enables them to gain free services and potential talent and caliber to recruit for their industries.

However, it is important to note that internship is beyond gaining experience; it should rather be considered as an opportunity for students to make meaningful contribution to an organization and the organization should really feel this and facilitate the realization of such contributions by interns.

Benefits of Internship

Internship provides students with an opportunity to apply their academic knowledge to real-world situations, develop professional skills, and make valuable industry connections. Internships benefit companies by allowing them to identify and recruit talented students for future job openings. Interns can bring fresh perspectives and ideas to an organization, provide additional support for projects, and help mentor other employees. Additionally, government agencies can benefit from student internships by providing opportunities for students to learn about public service and encouraging them to consider careers in government.

Objectives of internship

The objectives of internship programs are critical to ensuring that students receive the most benefits from their work experience. These programs serve multiple purposes, ranging from providing practical work experience to promoting career exploration and enhancing academic learning. Some of the key objectives of internship programs are:

- ✓ Providing practical work experience,
- ✓ Improving employability skills,
- ✓ Promoting career exploration, and
- ✓ Enhancing academic learning.

Managing internship

Managing an internship program involves several key steps as stated below.

Defining the goals and objectives of the internship program: Before beginning an internship program, it is important to establish clear goals and objectives that align with the overall mission of the organization. This will help ensure that the program meets the needs of both the interns and the organization.

Develop a job description: A well-written job description will help attract qualified candidates and provide them with a clear understanding of their responsibilities.

Recruit interns: Once the job description is complete, it's time to begin recruiting interns. There are many ways to do this, including posting the job description on relevant job boards, reaching out to universities and colleges, and utilizing social media.

Interview and select candidates: Once you have received applications, it's time to interview candidates. This is an opportunity to assess their skills, experience, and fit for the role.

Provide training and orientation: Once selected, interns should be provided with a thorough orientation and training. This will ensure that they understand their roles and responsibilities, as well as the culture and expectations of the organization.

Provide ongoing support and feedback: Interns should receive ongoing support and feedback throughout their tenure. Regular check-ins and performance reviews can help identify areas for improvement and ensure that the intern is meeting their goals.

Evaluate the program: After the internship program is complete, it's important to evaluate its effectiveness. This can include obtaining feedback from interns and supervisors, assessing the impact of the program on the organization, and identifying areas for improvement.

By following these steps, organizations can successfully manage their internship programs and provide valuable experiences for both interns and the organization.

Implementation Procedures for Internship

The implementation of internship requires careful planning and execution to ensure the success of internship activities. This section will provide an overview of the steps involved in implementing a successful internship program as stated below.

Develop a plan (goals of the internship, the roles and responsibilities of stakeholders, and the timeline for implementation),

Identify potential host organizations such as businesses, government agencies, or non-profit organizations which offer internships that align with the students' area of study,

Establish partnerships that can involve in reaching out to the organization to gauge their interest in hosting interns, establishing formal agreements outlining the terms of the internship, and assigning a point of contact for communication,

Recruit and select interns. This process involves advertising internship opportunities, reviewing resumes/applications, conducting interviews, and selecting candidates based on their qualifications and fit for the internship program,

Prepare interns for the internship. Before the internship begins, interns should be given orientation and training on the organization's policies and procedures, safety protocols, and goals and expectations for the internship experience,

Supervise interns during the internship to ensure they are meeting the goals and expectations outlined in their internship plan, and

Evaluate intern performance

Overall, implementing a student internship program involves developing a plan, identifying potential host organizations, establishing partnerships, recruiting and selecting interns, preparing interns for the internship, supervising interns during the internship, and evaluating intern performance. Proper implementation procedures can lead to a successful program that provides valuable work experience for students while benefiting host organizations.

Types and length of an internship

Internship is classified as qualified (mandatory) and non-qualified. Qualified internship has an academic credit value whereas, a non-qualified internship does not have an academic credit value. The length of the internship depends on the nature of the program (e, g., natural science vs social sciences).

Key actors and their responsibilities

There are several key role players in internships. These include, among others, higher education, TVET, research institutions, industries, civil societies, staff, and students. These parties play vital roles in helping students gain practical experiences and exposure to the work environment.

The roles of the key role players vary based on their authority, structure, and level of engagement (specific duties).

Higher Education Institutions (HEI) and Research Institutions (RIs): are responsible for planning and communicating internship activities to potential internship service providers. However, the internship planning should be done jointly with the providing institutions. In addition, HEIs prepare students, send them to institutions where they can do internships, follow up on the students' progress, and evaluate their performance. Moreover, HEIs are responsible for designing motivational schemes for interns who demonstrate outstanding performance through predefined criteria.

Higher Education and Research Institutions Supervisors: HEIs and RIs have a significant role in realizing the objectives of the internship program. They intensively engage in orienting, coaching, mentoring, guiding, supervising (advising), and evaluating interns. They work closely with industry supervisors.

Industry supervisors (IS): The primary role of the industries and ISs revolves around creating a conducive environment for interns to make the best out of the internship program by assigning interns to places that align with their fields of study, following up their performance on a regular basis, providing the support they might need, mentoring and evaluating interns through in collaboration with HE supervisors. In addition, it is the duty of the industries and ISs to ensure that the required resources, equipment, and facilities that support interns' learning objectives are provided.

Governance

Internships should be governed by the transparent and mutually beneficial directives stipulated by the concerned government body. Key governance issues that require key actors' attention include access to internship placement and eligibility, internship orientation and agreement, internship assignments, withdrawal and termination, duration and timeline, and financing internship.

Principles

Internship requires careful implementation to enable students and the industry to gain the intended benefits. It is critical that all actors are on the same page to ensure its effective implementation. Best experiences in the world show that internship implementation should be guided by the following principles.

Assigning a coordinator: It is wise to put in place a dedicated internship program coordinator(s) to make its implementation successful. In situations where there is a large number of students and

only one full-time coordinator is assigned, hiring a graduate student to facilitate and coordinate the daily operations and liaise between internship actors and interns is an option to consider.

Providing interns with real work assignments: It is imperative that interns are assigned to do work related to their major and the task they are assigned to do is challenging. Interns' should be recognized by the institution (where they do internship) as valuable.

Holding orientations and reviewing interns' progress: All parties (interns, mentors, managers) should be inducted on the goals and expectations of internship and the roles and responsibilities of each party in order to ensure that all involved in the process have a common understanding about what and how to do things. It is also essential to closely follow up on the progress of interns to achieve the intended objectives.

Providing interns with a guide: Providing interns with a clear guide helps clear questions and communicate rules and expectations. This could be done in the form of providing a handbook or putting in place websites dedicated to internships thus allowing interns to get updated on developments and be reminded of their roles, rules, and expectations of the implementers of internship.

Visiting interns on site: It is important that career center staff and faculty make regular visits to interns on-site to observe the types of experiences that students are getting. Such visits also help to build better working relationships with the industry, understand the knowledge or skills gaps, enhance visibility, etc.

Organizing "new hire panels": This refers to sessions where newly hired (up to three years) staff of an organization hold experience-sharing discussions with interns to learn from the new hires' experiences through Q & A. New hire panels provide interns to get insights into what to expect in the world of work and independent lifestyles.

Bringing in speakers with executive ranks: Creating exposure for interns to listen to and interact with accomplished professionals in their field provides career development opportunities and role modeling experience for interns. Talking to CEOs leaves a special impression in the minds of the interns and inspires them to become accomplished professionals in the future.

Creating a platform for interns to showcase: Providing students with the opportunity to showcase their achievements of internship in the form of a formal presentation, a fair or an expo plays an inspirational effect. Interns may get employment opportunities if they perform well during their internship.

Conducting exit interviews: Collecting students' feedback about their experiences is essential to see how much students have learned from the internship programs. This can be done either face-to-face or virtually. It sounds better if the interview is conducted after students fill out exit surveys in order to collect relevant and complete feedback.

Challenges Related to Internship Placements, Supervision, and Assessment

While student internships offer many benefits, they can also pose challenges related to placement, supervision, and assessment. In this section, we will discuss some of the common challenges and strategies for addressing them.

Placement Challenges: One of the primary challenges related to internship placements is finding appropriate opportunities that align with students' areas of study and interests. To overcome placement challenges, internship coordinators can collaborate with industry associations, career services centers, and alumni networks to identify potential host organizations. They can also consider offering incentives such as academic credit, stipends, or professional development opportunities to entice organizations to participate in their program.

Supervision Challenges: Another challenge is ensuring that students are adequately supervised during their internship to ensure their safety and that they are meeting the goals outlined in their internship plan. To address supervision challenges, internship coordinators can provide training and support for supervisors on best practices for mentoring and supervising interns. They can establish clear communication protocols between the intern and supervisor and conduct regular check-ins to ensure that the internship is progressing as expected.

Assessment Challenges: Assessing intern performance and evaluating the effectiveness of the internship program can be challenging, particularly if the goals and objectives of the internship are not well-defined or if assessment criteria are not clearly established. To overcome assessment challenges, internship coordinators can work with supervisors to establish clear goals and objectives for the internship and develop assessment criteria to evaluate intern performance against those goals. Coordinators can also collect feedback from both interns and supervisors to assess the effectiveness of the internship program and identify areas for improvement.

Overall, challenges related to internship placements, supervision, and assessment can be addressed through collaboration with industry associations and career services centers, providing training and support for supervisors, establishing clear communication protocols, developing well-defined goals and objectives, and collecting feedback from interns and supervisors. By addressing these challenges, student internship programs can succeed in providing students with valuable work experience while also benefiting host organizations.

Mitigation strategies

The challenges related to internship management and implementation can be mitigated through joint efforts of partnering organizations. The following are among the key mitigation strategies institutions can adopt to ensure internship programs bear fruit.

Establish clear communication channels between your institution and the partner institution. Ensure that both parties understand their roles and responsibilities, as well as the expectations for the internship program.

Planning and coordination: Develop a detailed plan for the internship program in collaboration with the partner institution. This plan should include the timeline, logistics, and objectives of the program. Coordinate with the partner institution to ensure that everyone is on the same page.

Regular check-ins: Schedule regular check-ins with the partner institution to monitor the progress of the internship program. This will allow you to address any issues that may arise quickly.

Training and orientation: Provide training and orientation sessions for students who will participate in the internship program. This will help them prepare for the workplace and understand the goals of the program.

Evaluation and feedback: Collect feedback from the partner institution, students, and supervisors at the end of the program. Use this feedback to evaluate the effectiveness of the program and identify areas for improvement.

Relationship building: Foster a positive relationship with the partner institution. This can lead to future collaborations and partnerships.

Incentive packages for the industry provided by HETRIIL

HETRIIL has now taken a new shape through a proclamation that institutes binding rules and regulations governing potential partners. The proclamation aims at creating an enabling environment for potential stakeholders to engage in the provision of experiential learning for students and academia through mutually beneficial partnerships. The proclamation introduces different incentive packages that can benefit the industry participating in internship programs. Some of these incentives include:

Duty-Free Privileges: One of the incentives offered by the HETRIIL Proclamation is duty-free privileges when the business and industry imports machinery and equipment related to the internship program. This can help reduce the cost of setting up internship programs and make them more affordable for participating organizations.

Tax Reliefs: Another incentive offered is tax reliefs given to participating companies. Depending on the tax laws, companies may receive tax benefits for providing internships, including deductions and credits. This can help save money and make it easier for companies to support internship programs.

Legal Frameworks: The HETRIIL Proclamation provides a legal framework for implementing internship programs, which can provide clarity and stability to organizations participating in these programs. By establishing legal guidelines for internships, the proclamation can ensure the safety of students and establish clear expectations for organizations offering internships.

In summary, the proclamation and the accompanying incentive packages aim to encourage and support the development of quality internship and externship programs. These incentives can help reduce the costs of implementing internship programs and provide a clear legal framework for participating organizations. Companies can take advantage of these incentives to provide valuable work experience to students while benefiting from the skills and knowledge these interns bring to their organizations.

Financing of Internship

Finance is a critical element for the implementation of an internship. Partner institutions are required to have clear budget plans to run and implement internships effectively. The budget plan should clearly indicate the resources required and the respective contributions of partner institutions prior to the implementation of the externship program. Doing so helps institutions achieve the purpose of internship and ensures its sustainability.

Evaluation and impact assessment

Evaluating the impact of an internship program is important to determine its effectiveness and identify areas for improvement. Partner institutions can use a variety of methods to evaluate and assess the impact of internships, including:

Surveys: Conduct surveys with interns, supervisors, and partner institutions to gather feedback on the program's overall effectiveness, specific components, and achievements. Ask questions that focus on learning outcomes, career development, and skills acquired during the internship.

Performance reviews: Use performance reviews to evaluate interns based on their work during the program. This can provide insights into the effectiveness of the program in terms of developing skills and knowledge.

Case studies: Conduct case studies of individual interns who have completed the program. This can help to identify best practices, lessons learned, and success stories.

Return on Investment (ROI) analysis: Conduct an ROI analysis to determine the economic value of the program, such as cost savings, increased revenue, and improved productivity.

Long-term follow-up: Follow up with interns after they complete the program to assess the long-term impact of the internship. This can involve tracking their professional development over time, including job placements, promotions, and career trajectories.

Comparison groups: Compare the performance of interns who completed the program with those who did not participate in an internship. This can help to identify the impact of the program on the interns' skills, knowledge, and career development.

Evaluating the impact of an internship program requires a comprehensive approach that considers both qualitative and quantitative data. By using these methods, institutions can gain insights into the effectiveness of their program and make improvements where necessary.

4.7.4 Modes of Delivery

This module will be delivered through either virtual or face-to-face sessions including lectures, case studies, group discussions, and hands-on exercises. The choice of the modality depends on the target groups. Participants will also have access to online resources including reading materials, videos and discussion forums.

4.7.5 Duration

The module will be delivered over a period of half a day to five days, depending on the specific target groups, their needs and availability.



Learning Resources: Pictures Flipchart, Handouts, Publications of research output

The learning resources vary based on the target groups nature and needs.



Activities

Learning Assessment: Question and Answer: Oral questions and classwork questions will be given to participants. The types of learning assessment tools depend on the target group.

Presentation: Trainees from each group are expected to present their work regarding the concept of research.



Essential Readings

HETRIIL Proclamation

Directives

Guidelines and other relevant legal and institutional frameworks

4.8 Module Six: Externship

4.8.1 Module Description

This training module is designed to provide an in-depth understanding of externship programs for academic staff in higher education institutions. The training will cover the objectives, implementation procedures, principles, challenges related to placement, supervision, and assessment, as well as strategies for developing effective and successful externship programs.

The training targets university externship managers, government agency staff, and company executives who are interested in establishing and/or improving externship programs for members of the academic staff in public and private higher education institutions. By the end of this training, participants will have gained knowledge on the benefits, best practices, and strategies for creating successful externship programs that meet the needs of their respective institutions and stakeholders.

4.8.2 Learning objectives

Upon completion of this module, participants will be able to:

- ✓ Recognize the purpose, benefits, and principles of externship programs for academic staff in higher education and research institutions,
- ✓ Develop effective and successful externship programs by following implementation procedures,
- ✓ Identify challenges related to placement, supervision, and assessment of academic staff during externships and develop strategies for addressing these challenges,
- ✓ Implement best practices for developing and managing externship programs that meet the needs of academic staff, educational institutions, and industry partners,
- ✓ Explain the newly introduced Higher Education and Research Institutes and Industry Linkage Proclamation and its impact on externship programs,
- ✓ Apply the knowledge gained to develop or improve externship programs for academic staff in their respective institutions.

4.8.3 Module Contents

Understanding externship

The term externship is given different meanings in different contexts and countries including Ethiopia. In some countries across the world, externship is used to mean students' practical training taking place in industries. This is especially so in Law. Undergraduate Law curricula requires students to have practical attachments to bridge the knowledge and skills gap between the classroom and the workplace through what is labeled as externship. Ethiopian Law curriculum is not an exception; it defines students' industry-linked training as externship.

In this document, however, externship refers to academic staff's exposure to and engagement in business & industry activities to get practical skills & contribute to the day-to-day operations of

the business & industry. The program is not only supposed to enable externs to get hands-on experience in their profession, but it also creates chances for them fill gaps between the theory and practice through conduct of problem-solving research and need-based training and counselling/consultancy. It also informs the teaching-learning and assessment modalities.

Industry professionals' involvement in teaching and assessment, too, is externship. Their engagement in the teaching and learning process is believed to provide value-added knowledge and practical experience to students (Ssebuwufu, Ludwick and Béland 2012). It is important that industry professionals are valued as “suitably qualified” professionals for a teaching post in academia (Ibid).

Externship programs are an effective way for academic staff to gain valuable industry-specific knowledge and skills while building relationships with industry partners. In this type of program, academic staff members from higher education institutions work with organizations in their field of study to gain practical experience and learn about the latest trends and practices. The goal of externship programs is to provide a bridge between academia and industry, allowing academic staff members to bring their new knowledge and skills back to their educational institutions and share them with their colleagues and academic staffs.

This training module will provide guidance on how to develop effective academic staff externship programs that meet the needs of all stakeholders involved, while also addressing common challenges associated with these programs.

Benefits

Externship brings so many benefits to all parties involved in it. Externship offers benefits not only to academic staff members but also to educational institutions and industry partners. It provides a unique opportunity for the industry to involve in the community, avail in-kind support of time and expertise, get insight into the demands and challenges of education, find ways to inculcate practical problems of practice into the curriculum through joint project development, network with the academic to engage in a variety of mutually beneficial joint projects, etc. Industry partners also benefit from the fresh perspectives and insights provided by academic staff members, as well as building relationships with potential future employees or research collaborators.

Similarly, academia can enjoy a wide range of benefits from externship. Some of the core benefits educators, researchers and students could gain include familiarizing themselves with contemporary industry issues and problems and adapting responsive deliveries, serving as a venue for the industry professionals to share their practical experiences to the academia.

By providing academic staff members with the opportunity to participate in externship programs, educational institutions can increase their engagement with industry partners and enhance the quality of their academic programs. Whereas the benefits of externship are multi-faceted to the different sectors and individuals, there are also challenges that must be addressed, such as placement, supervision, assessment, and cultural differences. In this regard, its implementation requires mutual understanding and efforts among implementing partners.

Principles

Implementation of externship becomes effective when done in mutually agreed up on principles. Some of the principles are accountability & responsibility, cost effectiveness, inclusiveness, quality, trust and cooperation and sustainability. Each partner institution should adhere to the aforementioned principles.

Time and duration of externship

Externship is practiced differently depending on the nature of the discipline and the specific contexts of the implementing partners. Adequate and most convenient time should be allocated for externship. In fact, there is no doubt that spending more hours in the industry provides the externs better opportunity to learn more and enhance their practical skills. In order to ensure that the extern gains meaningful experience from the externship, the time externship takes place is decided by looking into the various influencing factors and considering the time most convenient for the academia, the industry and the extern. Likewise, the length of externship can be determined through a mutually agreed plan.

Managing Externship Program

Developing an effective externship program involves creating a structured and meaningful experience for academic staff that integrates classroom learning with practical, real-world work experience. This includes identifying appropriate host organizations, defining clear learning objectives, and establishing performance metrics. Additionally, effective programs provide ongoing feedback and support to ensure that academic staff are gaining valuable skills and knowledge. It is also crucial to comply with relevant academic and legal requirements to ensure that the program meets standards and expectations.

Collaboration between academic institutions, employers, and other stakeholders is another key aspect of developing an effective externship program. By working together, these groups can identify and prioritize goals, establish communication protocols, and ensure that the experience benefits all parties involved. Successful programs also provide opportunities for academic staffs to reflect on their experiences and apply what they have learned to their future careers. Ongoing evaluation is essential to monitor the program's effectiveness and make improvements as needed. Ultimately, careful planning, communication, and collaboration are necessary to develop an externship program that meets both academic staff and employer needs while complying with all relevant academic and legal requirements.

Implementation of Externship Programs

There are different phases of externship implementation. These include pre-placement, while (actual) placement and post placement. Pre-placement encompasses identifying relevant industry for externs, planning jointly, orienting externs and mentors. On the other hand, while or actual placement deals with implementation of externship programs as per plan. Post-placement activities include documenting new knowledge and skills learned and sharing the same with colleagues to compliment to their existing knowledge. Externship can be arranged as per agreed schedule for

mutually decided duration of time. In a situation where the period allotted for an extern is found inadequate, it can be extended for additional time based on written consent among the partner institutions. Program termination also take place based on the mutual consensus among the parties as deemed necessary.

Supervision and evaluation is done with the understanding that the externs gets practical experience by way of contributing their experience to the industry. Therefore, supervision and evaluation of externs of externs should be done with utmost caution. The industry staff should use pre-defined and objectively verified assessment tools to evaluate externs. In addition, the externs should familiarize themselves with the evaluation tools (criteria).

To implement successful externship programs, institutions should provide valuable work experiences to academic staff while meeting the needs of host organizations and ensuring compliance with relevant policies and regulations. To this effect, the following key steps should be taken into consideration.

Clearly define program goals and learning objectives: Before beginning an externship program, it is important to clearly define the goals and learning objectives of the program. This will help guide the selection of appropriate host organizations and ensure that staff members gain relevant and meaningful work experience.

Establish clear communication channels: Effective communication is key to the success of any externship program. Institutions should establish clear lines of communication with participating academic staffs, host organizations, and faculty members to ensure that everyone is on the same page and aware of expectations.

Provide ongoing support and feedback to staff: Externship programs can be challenging, particularly for staff who may be working in unfamiliar environments. It is important to provide ongoing support and feedback to staff throughout the program to ensure they are making progress and getting the most out of their experiences.

Develop strong partnerships with host organizations: Building strong partnerships with host organizations is essential to the success of an externship program. Institutions should work closely with host organizations to identify appropriate placements, ensure compliance with relevant policies and regulations, and provide ongoing support to staff members.

Evaluate program outcomes and make adjustments as needed: Continual evaluation of the program is essential to ensure its ongoing success. Institutions should collect feedback from participants, analyze program outcomes, and make adjustments as needed to improve the program and better meet the needs of academic staff and host organizations.

Ensure compliance with relevant policies and regulations: Compliance with relevant academic and legal requirements is crucial to the success of an externship program. Institutions should ensure that all necessary policies and regulations are followed, including those related to safety, liability, and privacy.

Key actors

The effective realization of an internship requires the involvement of several factors. The key actors of externship are the Academia, Research Institutions, industries, civil societies, and the media. These parties take different responsibilities to effectively run and implement externships.

Externship Coordinator: Each key actor is expected to establish a section and assign a coordinator (liaison) who can communicate with the respective institutions to properly execute externship activities. The externship coordinator is the key personnel responsible for the overall planning of the program. This covers such activities as preparing detailed work plans, recruiting and securing institutions and community partners which can host externs, providing orientation and training to all who involve in the externship, and keeping records of externs' progress.

Academia: Externship cannot be materialized without the active engagement of HEIs, TVET, and HIEs. HEIs, TVET, and academia identify relevant staff attachment places, develop schemes of staff development plan, put in place a scheme for linkage goals and objectives, and coordinate, implement, monitor, and evaluate the program.

Externship host: The central roles of the externship are creating a conducive environment for the externship; allocating resources, engaging in joint planning and reporting, ensuring occupational safety services, evaluating performance, and assigning appropriate supervisors. The externship host makes sure that the externship site is prepared in alignment with expectations, assigns a coordinator in charge of managing the externship, provides externs with opportunities to improve their practical skills, maintains a safe and adequate training environment, inducts externs about all applicable rules that externs should apply, and complete an evaluation of the externship program provided.

Extern: has a lot of duties and responsibilities ranging from attending orientation and meetings to spending predefined hours at externship places and sharing practical knowledge and skills gained through externship with colleagues to improve the delivery of the academia. Through externships, externs identify gaps in the industry, use practical skills for the teaching-learning process, and apply the practical skills to solve problems through research endeavors and generate evidence. While doing these, the extern is expected to respect the externship codes, rules, and regulations, develop lesson plans, work with colleagues in a peer review process to strengthen lesson plans and complete an evaluation of the externship experience. It is important that the externs conduct interviews with different unit heads to understand the industry better and inform their delivery in a manner their profession contributes to the improvement of the industry's productivity.

Financing of Externship

Finance is a critical element for the implementation of externship. Partner institutions are required to have clear budget plans to run and implement externships effectively. The budget plan should clearly indicate the resources required and the respective contributions of partner institutions prior to the implementation of the externship program. Doing so helps institutions achieve the purpose of externship and ensures its sustainability.

Challenges in the implementation of Externship Programs

Externship programs offer numerous benefits, including providing academic staff with opportunities to acquire practical skills and gain valuable work experience. However, there are also challenges associated with externship programs that must be addressed to ensure their success. One major challenge is finding appropriate host organizations that can provide relevant and meaningful work experiences for academic staff. This requires collaboration between academic institutions and potential host organizations to identify suitable placements.

Another challenge is defining clear learning objectives and establishing performance metrics to evaluate staff members' progress. It is important to ensure that these metrics align with the goals of the program and provide meaningful feedback to both staff members and employers. Additionally, it can be challenging to provide ongoing support and feedback to staff members while they are on externship, particularly if they are in remote or decentralized locations.

Compliance with relevant academic and legal requirements is another challenge related to externship programs. Institutions must ensure that all necessary policies and regulations are followed, including those related to safety, liability, and privacy. It may also be necessary to secure appropriate insurance coverage and indemnification agreements.

Finally, there is a need to continually evaluate and improve externship programs to ensure that they remain effective and relevant. This may involve collecting feedback from participants, analyzing program outcomes, and adjusting as needed. Overall, while externship programs offer significant benefits, addressing these challenges is essential to ensure their success and maximize their impact.

4.8.4 Modes of Delivery

This module will be delivered through either virtual or face-to-face sessions including lectures, case studies, group discussions, and hands-on exercises. The choice of the modality depends on the target groups. Participants will also have access to online resources including reading materials, videos, and discussion forums.

4.8.5 Duration

The module will be delivered over a period of half a day to two days, depending on the specific target groups, their needs, and availability.



Learning Resources: Pictures Flipchart, Handouts, Publications of research output

The learning resources vary based on the target group's nature and needs.



Activities

Learning Assessment: Question and Answer: Oral questions and classwork questions will be given to participants. The types of learning assessment tools depend on the target group.

Presentation: Trainees from each group are expected to present their work regarding the concept of research.



Essential Readings

HETRIIL Proclamation

Directives

Guidelines and other relevant legal and institutional frameworks

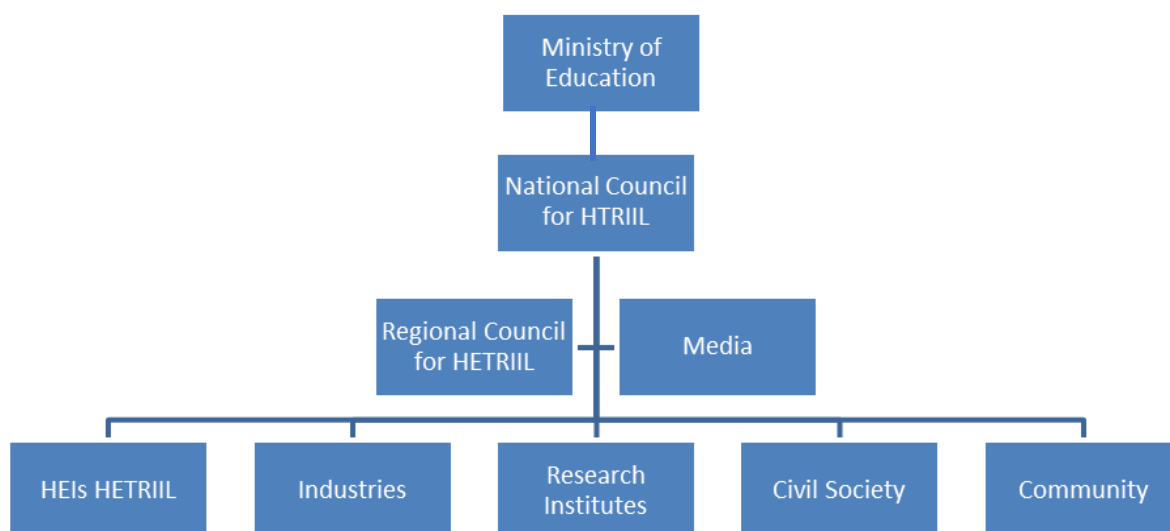
Unit 5. HETRIIL organizational structure and responsibilities

5.1 Organizational Structure

Since different parties are required to join hands toward the success of HETRIIL, there has to be a clear and transparent structure in place that brings the government, HEIs, industry, research institutes, civil societies, and the community together to achieve the common goals. For this to happen, a formalized and well-defined structure is formed by considering key decision-makers and role players of each participating party. This includes the following key role players.

- ✓ Government Economic Sector Organizations
- ✓ Government development organizations
- ✓ Higher Education Institutions
- ✓ Research institutes
- ✓ TVT Institutions
- ✓ Private manufacturing and service industries
- ✓ Federal and regional Chamber of Commerce and Sectoral Associations
- ✓ Local Non-Governmental Organizations
- ✓ Professional Associations and Civil Society

Each actor should assign an officer whose full-time job is to ensure the implementation of HETRIIL and who has decision-making authority in his/her respective institution. The officer to be assigned should be mandated to engage in and influence the linkage. The following diagram summarizes the structure anticipated for the effective implementation of HETRIIL.



5.2 Roles and responsibilities of parties involved in HETRIIL

Government

The government, MoE, is the key body responsible for leading, coordinating, and facilitating linkages and discharging its responsibilities through the National Council. This aligns with Proclamation 1097/2011. Some responsibilities are independent while others are joint with other government Ministries. The tasks that need attention are human resources, finance, infrastructure, and intellectual property which may cause a conflict of interest.

The government makes the environment more conducive for HETRIIL and should sort out the needs of the other actors and design strategies to respond to those needs. These included issuing favorable policies, rules, and regulations, financing R&D, facilitating collaboration between industries and universities, etc. As this is a process, there should be a systematic scheme that works on these areas in consistent and scientific ways. Moreover, the government should be dedicated to promote growth and prosperity in the private sector through sustained provision of the necessary attention and assistance as the private sectors are the key stakeholder in the implementation of HETRIIL.

The Ministry of Education shall be responsible to:

- ✓ Coordinates linkage activities done by collaborating institutions;
- ✓ undertake awareness creation among governmental, non-governmental, and private industries about HETRIIL;
- ✓ facilitate dialogue among key players in government, private sector and non-governmental organizations;
- ✓ facilitate resources mobilization to implement HETRIIL;
- ✓ develop national strategic plan, prepare performance report and submit reports to the National HETRIIL Council;
- ✓ ensure the directive of HETRIIL is properly implemented; and
- ✓ document linkage efforts and make data available for users.

National Council of HETRIIL

The National Council shall steer the coordination of HETRIIL. Membership to the council should be representative of pertinent bodies and allow relevant bodies to join it. It is recommendable that council uses the media to disseminate the core principles and objectives of HETRIIL to the intended stakeholders. The National Council may reach the core actors of HETRIIL in two ways. Where possible, direct line of contact should be made and is encouraged. Where situations don't allow and for specific follow up and reporting, the regional councils may be used as instruments to meet the objectives of HETRIIL. The National Council should have a strong linkage forum for identification of common needs, and sharing experiences and lesson learned. MOE has the

responsibility to organize such a forum that helps the linkage to meet the desired objectives through collaboration and serious engagement of all parties.

The National HETRIIL Council shall be responsible to:

- ✓ put in place the strategic directions of the HETRIIL, follow up and monitor the process and accomplishments;
- ✓ deliberate on the report submitted by HETRIIL actors;
- ✓ put in place subsequent directions following the inspection of reports;
- ✓ make recommendations to the government for budget allocation;
- ✓ chair the other lower level HETRIIL actors;
- ✓ coordinate and monitor the performance of the Regional council; and
- ✓ Organizing best practices learning platforms and ensuring experiences sharing among institutions; and
- ✓ Supporting linkage endeavors.

Regional HETRIIL Council

The Regional HETRIIL Councils shall have the following responsibilities:

- ✓ Translating the decisions of the national HETRIIL council into action;
- ✓ Ensuring the realization of HETRIIL to responds to the needs of the respective region;
- ✓ Making recommendations to the national HETRIIL council; and
- ✓ submit quarter reports to the National HETRIIL council.

HEI and Research Institutions

There should be HETRIIL directorate or coordination body in the HE and Research Institutions. HE and Research Institutions are responsible to:

- ✓ institute a well-defined structure that enables the implementation of HETRIIL;
- ✓ put in place a transparent and effective system for the realization of linkage goals and objectives at local, zonal and national level;
- ✓ prepare the HETRIIL plan every year/semester;
- ✓ identify industries for creating linkage;
- ✓ initiate and sign MoU with the HETRIIL and ensure the implementation of linkages with active participation of partners; and
- ✓ follow up and monitor the HETRIIL activities and submit reports to the respective management of the HEIs.

Industries

The industry is expected to ensure the realization of the six pillars of HETRIIL. Hence industries are responsible to:

- ✓ put in place conducive environment for the implementation of HETRIIL;

- ✓ entertain requests by HETRIIL actors on education, training, research and technology transfer as well as to formulate and request its similar demand;
- ✓ put into practice HETRIIL policy and guideline;
- ✓ allocate defined resources (human, material, financial) for joint HETRIIL activities;
- ✓ propose technology adaptation and transfer priorities to address critical problems;
- ✓ prepare plan and performance report jointly with responsible HETRIIL actors;
- ✓ evaluate the performance of trainee from HEIs during practical training and send the evaluation result in a sealed envelope and the stamp of the industry; and
- ✓ assists the trainee in identification of real industrial gaps and in finding out solutions.

Civil Society

Civil society includes professional and academic societies, labour unions, and NGOs. Thus civil societies are responsible to:

- ✓ contribute their share to the success of HETRIIL through engagement in curriculum designing, teaching, research, assessment and project development; and
- ✓ catalyze implementation of HETRIIL activities through technical and financial support.

Community

Linkage which considers the community will be sustainable since the community considers HETRIIL activities as it's owns. The sharing of information with the community, therefore, fosters a collaborative atmosphere for HETRIIL actors. The community can:

- ✓ play roles in creating a conducive environment for realization of HETRIIL goals;
- ✓ be engaged in planning, implementation and follow up of HETRIIL activities; and
- ✓ be involved in fund raising for HETRIIL activities.

Media

Communication plays pivotal role in linkages as it is a means through which knowledge, skills and technology transfer are disseminated to the target group. Therefore, media can

- ✓ play roles in promoting HETRIIL actors, their duties and responsibilities as well as the importance of linkage in the community;
- ✓ ensure transfer of information amongst HETRIIL actors and beyond;
- ✓ play a role in creating events, association and networking; and
- ✓ be used to disseminate knowledge about benefits and expectations of HETRIIL.

5.3 Recognition and Incentive Schemes

There are different recognition and incentive schemes for HETRIIL actors depending on their nature and contributions.

Private companies

Private companies engaged in HETRIIL activities may receive recognition and incentives based on their contributions to the success of HETRIIL objectives. Such institutions get their expenses spent for HETRIIL activities covered. In addition, private institutions get compensation for any damages caused by HETRIIL related activities from Linkage Funds.

Private Higher Education Institutions

Private Higher Education Institutions involved in HETRIIL get the following incentives. They get compensation for costs incurred by HETRIIL. They receive capacity building support in primary focus areas identified by the government.

HETRIIL participant researcher or patent owner

HETRIIL participant researcher or patent owner get benefit from the income his/her project may generate. A higher education institution teaching staff who is involved in Externship may get promoted based on his/her performance.

For the successful implementation of the HETRIIL on the six pillars, different mechanisms can be put in place such as showcases, competitions, consultancies, and technology transfer activities at different levels. MoE shall facilitate such competitions with other HETRIIL actors. In skill competition, HEIs will undertake competition at their respective place and then present candidates for national competition. Then MOE with relevant stakeholders and collaborators shall undertake the competition and awards the winner. Juries shall be selected from independent industries and institutions that have the required skill and experiences in the area. The competition can be grouped into competition for staff, students, the community under each HEIs mandate area, SMEs, and start-ups.

Likewise, industries can be considered for awards based on their excellence in hosting interns, externs, cooperative learning, conducting collaborative research, innovation, and technology adoption that are generated by HEIs. To this effect, competition criteria shall be prepared, communicated to industries. Industries shall be invited to apply, and finally conduct the competition by employing competent juries. Awards shall be given at the national level by inviting concerned stakeholders, industries, universities, student representatives, and mass media. The event shall be organized by MOE or MOE-appointed HEIs/industry and conducted at least once per year.

The fund shall be granted for collaborative research that will be conducted jointly by HEIs staff/student and industry staff according to standards and criteria agreed upon. Those criteria should be developed and set for the selection of outstanding and promising problem-solving

proposals and be evaluated by relevant professionals in the areas. Grants shall be awarded to outstanding research proposals that will solve the problems of the industry and/or the HEIs. The grant shall be managed jointly by the industry and the university by sharing the fund based on research activities to be undertaken.

Granting research output is also part of the reward system in which relevant and an outstanding research outputs will be financially granted and recognized for commercialization and further scale-up of generated technologies. In this case, research outputs should be promising, innovative research findings that are successfully completed and confirmed by the institution/s where the research has been conducted. Selection criteria for the award can be underlying scientific novelty/creativity, originality, technical feasibility, industrial and environmental adaptability, and stability. Moreover, the economic and societal impact of the research output shall be considered as criteria. Technical committees shall be organized from different disciplines with experiences and capacity to evaluate research outputs that can be further commercialized and scale-up.

5.4 Ownership

To promote the trainees to own the six pillars of HETRIIL, the following activities shall be undertaken.

In the face of changing academic and industrial environment, being competent is a necessity to survive and to be resilient in the regional, national, and international markets. Moreover, the FDRE government set out that HEIs should be competent and self-sustainable. Hence collaboration is a necessity to survive, and implementation of HETRIIL is found to be important to address such challenges. Therefore, each institution is expected to own the program and implement the HETRIIL pillars for the benefit of all parties.

Producing competent and qualified graduates is a mandatory activity for the HEIs to curb the prevailing national poor quality of education. To produce competent graduates, collaboration with industries/institutions plays paramount importance and needs due attention. Therefore, implementing the six pillars of HETRIIL is an opportunity to restore quality education in the country.

Likewise, industries need qualified, competent, and tailor-made employee which need intimate and productive collaboration with HEIs. As a national agenda to transform the industry sector, quality and quantity of human power are inseparable to attain the anticipated industry development. Hence industries should play their role in producing quality and quantity of human power for their benefit as well as for holistic national prosperity through transforming the sector.

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Appendix

Pre-test and Post-test assessment questionnaires

Please rate the items below about the training you will/have received (To be delivered before and after the training to assess the impact of the training)

S. No	Your understanding about	Level of understanding					Remark
		Very low	Low	Medium	High	Very high	
	The overall objective of the training						
	Joint Applied research						
	IP and Technology Transfer						
	Consultancy Services						
	Cooperative training						
	Internship						
	Externship						

To improve the training materials and approach (to be delivered at the end of the training)

What are the strengths of this training?

What are the weaknesses of this training?

Which part of the training needs to be improved?

What should be included in the training?

What should be removed or deleted from the training?

