# Practices, Opportunities and Challenges of University-Industry Linkage in Selected Amhara Region Public Universities

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**Abstract**

Although universities in Ethiopia have already started industry linkage and expected to contribute for the development of the country through different ways including producing quality graduates, research and development works and technology transfer, universities are now a days working mainly on producing large amount of educated man power and little emphasis is given for technology transfer through strong university-industry linkage. Therefore, the main aim of this study is to assess thepractices, challenges and opportunities of university-industry linkage in Amhara region. Primary data was used for the current study. Primary data was collected through interview, focus group discussionand questionnaire. The target population of the study includes: university and industry employees as well as ministry of education higher officials. A total of 322usable questionnaires were collected and analyzed. Stratified and purposive sampling techniques were used to select the required sample size. A descriptive data analysis technique wasused as a data analysis tool. The findings of the study revealed that there is poor university-industry linkage practice across the universities in the study area.Internship and externship are among the major university-industry practices in the study area.Lack of confidence on domestic innovation, lack of attention by the industry owner, lack of research fund from industries perspective, low performance of university researches convertibility in to project etc are among the major challenges of university-industry linkage. Universities provision of top priority for university-industry linkage, the expansion of universities and industries across the country are among the opportunities of university-industry linkage. Finally, in order to improve the current

poor university-industry practice; industries, universities and the government should consider university-industry linkage as their priority agenda.

**Key words:** *Challenges, opportunities, practices, industries, linkage.*

## 1. Introduction

Across the globe, universities are recognized as sources of knowledge creation, innovation and technological advances and they are being positioned as strategic assets in innovation and economic competitiveness, and as problem-solvers for socio-economic issues affecting their countries. Universities play a crucial role in the socioeconomic transformation and development of the country in addition to their primary function of producing qualified and competent graduates. This includes developing new technologies, upgrading existing low-level technology to medium or high technology, developing better or new and effective management techniques, and formulating and suggesting economic and other relevant policies through research (Creso, 2015 and Abraham, 2016 and Abebe, 2020).Research actually shows that University research plays a great role in contributing to a country's economic growth and there is a positive correlation between academic research and economic growth (Salter and Martin, 2001 as cited in Awuor, 2015). This can be maximized when there is strong partnership between universities and industries. The cooperation between higher education institutions (HEIs) and industry can play a critical role in securing and leveraging additional resources for higher education, promoting innovation and technology transfer, and ensuring that graduates have the skills and knowledge required to effectively contribute to the workforce (John, Teralynn and Margaux, 2012 and Yang, 2017). Their collaborations deliver far reaching and enduring socio-economic impact that cannot be achieved by working in isolation.

Over the last forty years, governments around the world have stimulated linkages between higher education institutions and industry. There has been a sizeable increase of the literature on the topic, while policymakers, are continuously updating their policies seeking to maximize the effectiveness of interactions between firms and public research institutions at the regional and national level. The popularity of this trend has increased recently (Robert and Roland, 2019).Across all continents,

policymakers work to encourage universities to foster an entrepreneurial culture and increase their involvement in the productive sector. To respond to this desire for relevance, higher education institutions should be encouraged to establish more connections with the business world. These connections are especially important in Africa, where the bulk of universities were established with the goal of advancing national development. Higher education institutions are now expected to contribute to national economic development through research and innovation (Creso, 2015). National governments and international organizations are becoming more aware of the critical role that industry-university collaboration can play in the development of Africa (Atuahene, 2011).

Even though empirical studies show that many African universities are or have recently started taking steps to strengthen their connections with industry and the productive sector, the practice of university-industry linkages and the advantages associated with such links are still in their infancy stage in Africa (John et al., 2012; Creso, 2015; Lem et al., 2019 and Archibugi, 2018).Relatively only few African universities manage technology incubators or science parks at their institutions (John et al., 2012 and Philisiwe and Lawrence, 2019). University-industry partnerships in Africa suffer from a number of factors, among which is what some actors identified as there is a lack of confidence of the population in general and industry in particular, in the ability for African university to contribute to economic development. Thisis mainly due to weak investments in research infrastructures, and the prevalence of poor governance practices in African universities. Firm size, characteristics of the university partner, firm location, lack of strong leadership on the side of university administrators and limited financial capacity of industries to partner with universities are also the factors that constrained the development of university – industry partnership in Africa (Johnston et al., 2015 and Creso, 2015).

As one of the fast economically emerging nation in the world, Ethiopia is undergoing various transformation works. One of the key components of the transformation efforts has been the expansion of the number and capacity of universities.However, although universities in Ethiopia have already started industry linkage and expected to contribute for the development of the country through different ways including producing quality graduates,

research and development works and technology transfer, these universities are now a days working mainly on producing large amount of educated man power and little emphasis is given for technology transfer through strong university-industry linkage.Provision of consultancy and technical services, joint venture of R&D, licensing, spin-offs, and science parks / innovation center/ or technology park are among the major advanced means of university-industry linkage practices (Esham, 2008). However, the common industry linkage works in many of the universities in Ethiopia are limited to the conventional university-industry linkage practices such as student internship, consultancy service and training (Ayenew, Teklay and Habtamu, 2015 and Abraham and Ranganathan, 2018). The attention given by the government to promote university-industry linkage by designing various policies, strategies and guidelines, the expansion of universities across the country and the expansion of industries are considered as promising opportunity to strengthen the linkages in Ethiopia (Misganu, 2018).

Both industries and Universities have never been able to exist separately; an intellectual asset of the University has either to address the problems of industries or has to largely contribute for the growth and development of various industries. Likewise, the advancement of knowledge and technology in higher education institutions/Universities can only happen with the pertinent need and support of the industry. Thus, creating a reliable partnership between University and industry has a paramount contribution for generating mutual benefits between them and for the betterment of the society and the world at large (Universities of Amhara Region UIL guideline, 2018). Even though, the contribution of university-industry interaction to overall socio-economic development of the society is rapidly growing across developed nations and having opportunities in developing countries in general and Ethiopia in particular, the current scenario is different in Ethiopia, neither universities nor public research institutes have any significant role as a source of policy formulation or technology transfer which is not exceptional to the study area (Abraham, 2016).

Although conducting research and developing technology transfer mechanisms are two of the main duties of Ethiopian universities, and despite the existence of a national policy framework to encourage university-industry linkage, this practice is

still in its infancy. Even the contribution of the largest and oldest university in the country, Addis Ababa University, has made little progress in fostering collaboration with industries and accelerating the nation's economic growth through research and innovation (Mulu, 2017).The linkage particularly in terms of university research with industry is in an infant stage. For example a study conducted by Hiwot (2014) and Abraham and Ranganathan (2018) indicated that creating linkage with university doesn't get priority attention by the industry owner because the industry owner did not give priority for local technology and expertise rather they are interested for imported technology and profit maximization. As a result, the university leadership focuses on other routine activities and bureaucratic issues and hence the status of the linkage between the two entities is very low.

In addition, lack of universities innovation improvement center / laboratories, lack of sufficient research fund both in industries and universities, the low quality and applicability of researches conducted by universities to improve industries performance or low performance of university researches convertibility in to project and low capacity of industries to absorb and apply graduate research results, lack of mutual trust between universities and industry, insufficient publicity and bureaucracy, inadequate infrastructures (such as communication and transport), time constraint due to heavy teaching load of university instructors, lack of strong university-industry linkage offices,weak exchange of researchers between industry and universities, weak dissemination of research out puts, lack of fiscal incentives for joint research and development, huge number of students and poor orientation of the industry sector on research and development and lack of awareness about the importance of university- industry linkage on the side of industry practitioner are the factors that hinder the successful linkage between industries and universities in Ethiopia(Ayenew, Teklay and Habtamu, 2015). In addition, lack of commitment and support from the leaders' side of universities and industries, low level of industrializationand the reluctance of the local industries to work with the universities are the main challenges for building strong partnerships with industries (Misganu, 2018 and Mulu, 2017).However, to the best of the researcher's knowledge, whether the challenges mentioned above are a factor responsible for the low linkage between

universities and industries in the study area is not well investigated and documented, therefore this research is intended to fill this gap through empirical investigation.

The findings of the study will provide information regarding the practices, challenges and opportunities of university-industry linkage and thereby help todesign a means to strengthen their cooperation. It will also be used as an input for policy makers and as a literature for future researchers'. Thus, the objective of the study is to assess the practices, opportunities and challenges of university-industry linkage in selected public universities in Amhara region.

## 2. Research Methodology

### 2.1. Research Design

In this study since both quantitative and qualitative data were collected through questionnaire, interview and FGD, the type of research approach used was mixed approach(Creswell, 2012).

### 2.2. Population and Sampling

The study population is defined as employees of selected public universities in Amhara Region, higher officials from Ministry of Education (MOE) and selected industries managers. Stratified and purposive sampling technique was used to select the target population for this study. Based on their generation of establishment, from ten universities in Amhara region classified in four generations, one university was selected from each generation. Accordingly, Bahir Dar University from first generation, DebreMarkos University from second generation, and Debre Tabor University from third generation were selected. However; due to their recent establishment sample was not considered from fourth generation universities. Then, sample respondents were taken from each university. Purposive sampling technique was used to select the required sample respondents from each stratum. Accordingly, only respondents who can able to deliver the required information were included and selected as a target sample respondent. Therefore, based on this premises lower level, middle level and top level management body of each university, university-industry linkage office employees, research and community service directors in each university as well as coordinators in each college, senior academic staffs from different colleges in each university and selected top officials or managers of selected industries in the study area were used as a target respondent. In addition, higher officials from Ministry of

Education (MOE) were also used as a target respondent.

### 2.3. Sample size Determination

From the purposively selected target groups, a total of 420 samples for questionnaire, 27 respondents for interviewand 6 focus group discussion each having 8 members (UIL directors, college research and community service coordinators, industry managers and experts) were used because Coromina (2014) and Joseph et al. (2010) also suggested that a sample sizes in the 200-500 ranges are usually enough for data analysis.

### 2.4. Sources of Data and Method of Collection

For this study primary data was gathered and used. Primary data was collected from target respondents using well-structured questionnaire, interview and FGD. Questionnaire was distributed to department heads, senior academic staffs, college deans as well as vice deans. Interview and FGD was used to collect data from universities - industry linkage directors, MOE higher officials and selected industries in the study area as well as from research and community service directors and coordinators in each college. .

### 2.5. Development and Measurement of the Data Collection Survey Instrument

This research was used the survey method to collect the required cross-sectional primary data. A self-administered questionnaire was developed based on literature review. The questions included in the questionnaire were measured by using a five-point Likert scales. To ensure content validity, items selected to measure each variable were mainly adopted from prior studies with significant modifications.

### 2.6. Method of Data Analysis

In this study, the objective is to assess the current practices, opportunities and challenges of university-industry linkage in the study area. Therefore, to achieve this objective, once the data is collected, coded, entered and cleaned; it goes through descriptive statistics such as tables, frequencies, and percentages.

## 3. Results and Discussion

### 3.1. Introduction

This chapter presents the analysis, discussion and inferences made on the basis of the responses obtained. All the data obtained were coded and entered in to SPSS version 21.0 and inferences were made based on the result. A fairly representative sample was obtained by employing the use of stratified and purposive sampling

technique. Accordingly; among a total four hundred twenty questionnaires distributed, a total of 322 useable copies of the questionnaire were returned. The percentage of the useable copies of the questionnaire was 76.67 percent. In addition, a total of 22 interviews (among 27) and 4 FGD (among 6) were conducted with university and industry leaders to triangulate the data obtained through questionnaire.

### 3.2. Data Analysis and Discussion

**Table 1: Status of University-Industry Linkage**

| S.No | Question Statement | Response category | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Does your university / college / department or academic program have linkage with any industries? | Yes | 207 | 64.3 |
| | | No | 115 | 35.7 |
| 2 | Whom do you thinkmore benefited from the linkage between universities and industries? | University | 27 | 8.4 |
| | | Industry | 24 | 7.5 |
| 3 | | Both | 271 | 84.2 |
| 4 | What do you think is the current status of university-industry linkage in your university? | Good | 30 | 9.3 |
| | | Intermediate | 107 | 33.2 |
| | | Poor | 185 | 57.5 |
| 5 | What do you think is the current status of university-industry linkage in your college / institute or school? | Good | 39 | 12.1 |
| | | Intermediate | 99 | 30.7 |
| | | Poor | 184 | 57.1 |
| 6 | What do you think is the current status of university-industry linkage in your department / academic program? | Good | 28 | 8.7 |
| | | Intermediate | 98 | 30.4 |
| | | Poor | 196 | 60.9 |

Source: Survey data, 2022

As indicated above in table 1, 64.3% of the respondents replied that there is university industry linkage practice in their university/college/department where as 35.7% replied that there is no linkage between universities and the industries. Majority of the respondents (84.2%) believe that both universities and industries will be benefited if there is strong linkage between the two parties. More than half (57.5%, 57.1% and 60.9%) of the respondents replied that the current status of university-industry linkage practice is poor in their university, college and department respectively.

The interview and FGD response from industry and university leaders also confirmed that the existing university-industry practice is in an infant stage. Student placements / internship, externship, health care services in hospitals, delivering tutorial for high school students, law or court service for the poor, and demand driven training (community service) are the

common conventional university-industry linkage practices across the study area. However; collaboration or linkage in the area of curriculum development, commercialization of research and development results, establishment of common science and technology park or technology and business incubation center, arranging direct employment opportunities for graduates and conducting joint research projects (including budget sharing) are in an infant stage. Even the interview response from Ministry of Education (MOE) higher official (UIL and Technology transfer director) also confirmed that even though the MOE tries to strengthen university industry linkage as a national level through the national research council and trying to develop, revise and approved the guideline as a proclamation, designing mechanisms for hosting companies to get direct benefit from the service they delivered to the universities and delivered training to industry experts; the linkage is not as expected or it is poor.

Consistent with the current study previous studies also prove that the university-industry linkage practice and the benefits derived from such linkage is in an infant stage in Africa in general and in Ethiopia in particular (John et al., 2012; Creso, 2015 and Mulu, 2017). Even the contribution of the oldest and largest university (Addis Ababa University) in strengthening partnership with the industry and enhancing the economic growth of the country through research and innovation is minimal. The common industry linkage works in many of the universities in Ethiopia are limited to the conventional university-industry linkage practices such as student internship, consultancy service and training (Ayenew et al., 2015 and Abraham and Ranganathan, 2018).

**Table 2: Challenges of University-Industry Linkage**

| NO | Challenges | Mean | Standard Deviation |
|---|---|---|---|
| 1 | Work culture difference between academia and industries | 3.81 | 1.059 |
| 2 | Geographical proximity of universities and industries | 3.37 | 1.121 |
| 3 | Lack of confidence on domestic innovation | 3.52 | 1.024 |
| 4 | Creating linkage with university doesn't get priority attention by the industry owner. | 3.86 | 0.994 |
| 5 | lack of universities innovation improvement center / laboratories | 3.80 | 1.045 |

| | | | |
|---|---|---|---|
| 6 | lack of sufficient research fund both in industries and universities | 4.02 | 0.960 |
| 7 | The low quality and applicability of researches conducted by universities to improve industries performance or low performance of university researches convertibility in to project. | 3.76 | 1.050 |
| 8 | lack of mutual trust between universities and industry | 3.73 | 1.050 |
| 9 | Complex bureaucracy to interact with the industry | 3.98 | 0.965 |
| 10 | Inadequate infrastructures (such as communication and transport) | 3.62 | 1.159 |
| 11 | Lack of incentives for joint research and development | 3.93 | 1.008 |
| 12 | Poor orientation or awareness of the industry sector on research and development | 3.80 | 1.122 |
| 13 | Lack of commitment and support from the leaders' side of universities and industries | 3.90 | 1.027 |
| 14 | Lack of integration between industry and university in curriculum development. | 4.03 | 0.948 |
| 15 | Industries lack of confidence on students / instructors ability and knowledge | 3.62 | 1.068 |
| 16 | Lack of interest of the university to work with the industries | 3.24 | 1.134 |
| 17 | Lack of interest of the industries to work with the universities | 3.63 | 1.078 |

Note: Very High =5; High= 4; Average =3; Low =2; and Very low=1

Source: Survey data, 2022

The data presented in table 2 indicates the major challenges that hinder the establishment of strong University-Industry Linkage from the academician and leaders of the selected universities perspectives. As shown in the table above, the major challenges that hinder the practice of strong university-industry linkage includes: lack of integration between industry and university in curriculum development, lack of sufficient research fund both in industries and universities, complex bureaucracy to interact with the industry, lack of incentives for joint research and development (for academic staff), lack of commitment and support from the leaders' side of universities and industries with a mean values of 4.03, 4.02, 3.98, 3.93 and 3.90 respectively.

The structured interview and FGD conducted with selected university and industry leaders also confirmed that lack of interest of industries to have linkage with the university (for example in budget sharing for joint research and project works), lack of prior UIL experience, poor communication platform / networking between the two parties, overload (busy) on their teaching-learning tasks and lack commitment of academicians to engaged in

university-industry interaction, usually industries raise problems which are out of the university scope or capacity (for example, power, water, dollar etc), inadequate infrastructure, lack of mutual understanding about the objective of university-industry linkage, shortage of specialization on some professions for specific activity requirements from industries side, usually universities need industries only for internship, lack of enforcing guideline or policy for industries to work with universities, usually industries request the university to perform routine or their own annually planned activities, bureaucratic procedure, lack of trust on local innovation and lack of nationally harmonized UIL implementation strategy or guideline are the university-industry linkage impediments in the study area .

Similarly, the structured interview response from Ministry of Education (MOE) higher officials also proves that awareness problem (on both sides), lack of law enforcement, low level of industrialization and lack of linkage grant and incentive mechanism are among the major obstacles that hinder the promotion of university-industry linkage in Ethiopia.

In consistent with the current study findings previous studies also proves that lack of universities innovation improvement center / laboratories, lack of sufficient research fund both in industries and universities, the low quality and applicability of researches conducted by universities to improve industries performance or low performance of university researches convertibility in to project and low capacity of industries to absorb and apply graduate research results, lack of mutual trust between universities and industry, insufficient publicity and bureaucracy, inadequate infrastructures (such as communication and transport), time constraint due to heavy teaching load of university instructors, lack of strong university-industry linkage offices, weak exchange of researchers between industry and universities, weak dissemination of research out puts, luck of fiscal incentives for joint research and development, theory based curriculum, huge number of students and poor orientation of the industry sector on research and development, the reluctance of the local industries to work with the universities (usually they demand different services from universities but they don’t want to deliver service / share budget), low level of industrialization, lack of leadership commitment and lack of awareness about

the importance of university- industry linkage on the side of industry practitioner are the main challenges that hinder the establishment of strong university-industry partnerships in Ethiopia (Ayenewet al., 2015; Misganu, 2018; Mulu, 2017; Hiwot, 2014 and Estifanos and Melaku, 2018).

The linkage particularly in terms of research with industries is in an infant stage. Lack of confidence 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, 2015). The relatively young ages of most universities coupled with challenges in finance and basic infrastructures also explains why majority have remained teaching university rather than research and technology outreach centers in Africa in which Ethiopia is not exceptional (Mpehongwa, 2013).

**Table 3: Opportunities of University-Industry linkage**

| NO | Opportunities | Mean | Standard Deviation |
|---|---|---|---|
| 1 | There is a better platform for UIL (clear structure, Policy, etc.)at the national level | 2.98 | 1.275 |
| 2 | There is adequate and clear incentive structure for innovations, patent rights | 2.83 | 1.233 |
| 3 | Regular training is given to promote UIL (by Universities, government and industries) | 2.57 | 1.214 |
| 4 | The attention given by the government to promote university-industry linkage by designing various policies, strategies and guidelines. | 2.90 | 1.221 |
| 5 | The expansion of universities across the country | 3.15 | 1.243 |
| 6 | The expansion of industries across the country | 3.18 | 1.318 |

Note: Strongly Agree=5; Agree-4; Undecided=3; Disagree =2; strongly disagree=1
Source: Survey data, 2022

Unfortunately regarding opportunities of university-industry linkage, the result shows that the perceived mentioned opportunities were not as such considered as opportunities by the respondents. Respondents are almost disagree on majority of the mentioned opportunities as shown above. However; universities provisions of top priority for UIL, the expansion of universities and industries across the country with mean value of above three (3) are considered as among the opportunities of university-industry linkage in the study area (table 3).

The interview and FGD result also revealed that the very dynamic nature of the economy / market by itself, the existence of strong desire or interest mainly from universities side to work together and availability of young qualified staff having good research experience are among the opportunities for having strong university-industry linkage practice in the future. This finding is consistent previous studies (World Bank 2013; Creso, 2015; and Universities of Amhara Region UIL guideline, 2018). Similarly an empirical study conducted by Misganu (2018) also revealed that the attention given by the government to promote university-industry linkage by designing various policies, strategies and guidelines, the expansion of universities across the country and the expansion of industries are considered as promising opportunity to strengthen the linkages in Ethiopia.

## 4. Conclusion and Recommendation

### 4.1. Conclusion

The main conclusions drawn from the data analysis result are summarized below.

There is poor university-industry linkage practice across the different universities / colleges and departments in the study area.The university-industry linkage practices in selected universities are mainly limited to the conventional university-industry linkage practices such as internship, externship, and demand driven training. However; collaboration or linkage in the area of curriculum development, commercialization of research and development results, establishment of common science and technology park or technology and business incubation center, and conducting joint research projects (including budget sharing) are in an infant stage or almost nil.lack of integration between industry and university in curriculum development, insufficient research fund both in industries and universities, complex bureaucracy to interact with the industry, lack of incentives for joint research and development (for academic staff), poor commitment and support from the leaders' side of universities and industries are among the major challenges of university-industry linkage in the study area.Universities provisions of top priority for UIL and the expansion of universities and industries across the country are considered as among the opportunities of university-industry linkage in the study area.

### 4.2. Recommendation

The findings of this study have important practical implications for universities as well as for the industries. Thus, in order to take advantage of the linkage between universities and industries; the government should encourage those industries participating in university-industry linkage through awareness creation and incentive (like tax reduction), industries representatives should participate as university board members, research and project proposal ideas should be initiated from real industry problems rather than developing ideal research proposals, there should be enforcing policy or framework for industries to engage in UIL activities,universities should allocate adequate budget and therebyencourage and motivate their academic staff to participate on UIL activities through different incentive and reward mechanisms, the leaders of both parties should be committed for university-industry linkage activities and industries should have their own research and development center supported with adequate budget.

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