

Volume 3, No. 1 January 2024 (1860-1874)

p-ISSN 2980-4868 | e-ISSN 2980-4841

<https://ajesh.ph/index.php/gp>



Assessment of the Status and Challenges of The Linkage Between Universities and Industries in Ethiopia: The Case of Two Universities and Six Industries

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ABSTRACT

University and Industry Linkages (UIL) are becoming common practices many countries worldwide. The relationship between universities and industries is highly important for promoting the economic development of a nation. This study aimed to assess the current university-industry linkage works, identify the main challenge in the process of creating good linkages and propose ways to promote collaboration between universities and industries by considering two universities and six industries within the chemical and construction inputs manufacturing industry UIL sub zonal forum in Ethiopia. A mixed research approach was used to collect and analyze the data. Accordingly, a sample survey of 246 respondents from universities and industries was conducted using a questionnaire. Moreover, interviews were conducted with UIL and Technology Transfer Directorate, Industry Manager, Ministry of Science and Technology, and Ministry of Industry and Chemical and Construction Inputs Industry Development Institute. The study reveals that university-industry linkages are at an infant stage and that long distances are expected to help people realize strategic partnerships compared to international experience. The study revealed that university-industry linkages were limited to the most known type of university-industry collaboration, which consists of student internship programs, consultancy services, and short-term training programs.

Keywords: University, Industry, Linkage/Partnership, University-Industry linkage, Research and development

INTRODUCTION

In today's world, the sustainable development of a country depends strongly on its capacity to produce and apply knowledge (Brimble and Doner 2007; Mansell and Wehn 1998;

Plewa et al. 2013). Knowledge and the know-how to use existing expertise have become vital for a country's existence in a dynamic and competitive global environment (Adelowo, Siyanbola, and Ibrahim 2023; Amarathunga, Khatibi, and Talib 2023). Universities have long been recognized as important sources of essential knowledge and skilled manpower across many countries (O'Dwyer, Filieri, and O'Malley 2023; Yin et al. 2023). The increasing recognition of universities as critical drivers of socioeconomic development has reshaped and transformed their traditional missions of teaching and collaborating with industries to enhance the goal of economic development (Borah, Massini, and Malik 2023; Delgado-Verde and Díez-Vial 2023; Ursić et al. 2022). Higher education institutions are places for knowledge and skills and are the basis for the right attitude (Fernández Díaz, Carballo Santaolalla, and Galán González 2010; Krishnakumar and Rajesh 2011; Ramayah, Yeap, and Ignatius 2013). They perform their activities in three significant aspects: teaching, research, and consultancy. Furthermore, as their primary responsibility, higher-level institutions are expected to perform specific tasks, such as curriculum preparation, course development, counseling and guidance, and working with industries in capacity building. In a technical sense, academic institutions are expected to contribute more to the economic development of a country (Corsi et al. 2023; Dias and Selan 2023).

According to the International Institute for Education Planning (2000) findings, "Modern universities combining teaching and research were developed in the early nineteenth century; it has evolved from being largely institutions of higher education and basic research, universities have increasingly assumed social functions and the third pillar of the university mission to the societal service has gradually emerged and consolidated" (Abebe Assefa 2016). Knowledge accumulation and transfer have increasingly become recognized as critical sources of economic growth and a firm's competitiveness. With this trend, university-industry connections have become a central issue subject to different views and contending perspectives on appropriate collaborations between universities and industries (Eun, Lee, and Wu 2006).

The beginning of the Industrial Revolution in England and Germany influenced American industrial development, especially regarding the British textile sector, which "introduced the factory system into the United States early in the nineteenth century" (Sanford 1958). This marked the beginning of a critical stage in the industrial development of the U.S. However, it took the US almost another 50 years to introduce applied science into advanced industrial technologies, which were considered relatively new during the early decades of the nineteenth century (Mansfield 1968). In effect, since the eighteenth century, the principal forms of support for productive activities that emerged from universities were directed toward agriculture, which later constituted a strategic tool, especially in critical periods such as the Civil War, the First World War, the Depression era, and World War II. Even after the 1950s, agriculture remained privileged in the American political landscape (Mowery and Rosenberg 1989). As of

1850, the agricultural sector suffered a vital transformation due to the application of new technologies, which paved the way for agro-industry development. Instead of adding more manpower, farmers used mass-produced farm machinery, new types of fertilizer, and new strains of crops and cattle. This allowed them to widely increase the production levels of their fields (Chandler, 1977; Rostow, 1960)

This research is driven by the overarching goal of comprehensively examining the changing role of universities in fostering socioeconomic development, mainly through their interactions with industries. In the current global landscape, the pivotal role of knowledge in a country's sustainable development necessitates a profound transformation of universities from traditional teaching institutions into vital sources of knowledge and skilled manpower. This study seeks to unravel the multifaceted responsibilities of higher education institutions, encompassing teaching, research, and consultancy, while emphasizing their crucial contributions to curriculum development, course design, counseling, and collaborative efforts with industries for capacity building. Acknowledging the evolving societal functions of universities, this research delves into the historical development of university-industry collaborations, emphasizing the emergence of the third pillar of the university mission: societal service. By tracing the historical trajectory of these collaborations, from the influence of the Industrial Revolution on American industrial development to the integration of applied science into advanced technologies, this study aims to provide insights into the dynamic relationships between universities and industries. This exploration is crucial for understanding their contemporary roles and formulating strategies that enhance their collective contribution to economic development.

RESEARCH METHODS

This section addresses the research methodology and provides insight into the research design, research approach/type, data type and source, methods of data collection, methods of sampling, population, sampling unit, sampling frame, sampling procedure, sampling size, methods of data analysis and conclusion. According to Chih-Pei and Chang (2017) study, research design is the general plan of how the researcher intends to undertake the project in practice, and it describes how, when and where the data are collected and analyzed. (Kothari 2004) noted that a descriptive research design is important for obtaining a picture of a situation as it naturally happens. To ensure the validity and reliability of the primary data collected in this study, important measures were taken. With regard to this, before the questionnaire was distributed and the interview questions were conducted with respect to the sample population of the study, a pilot test of twelve respondents was performed to ensure that the right questions were asked and that the instruments used for collecting the data were reliable and valid, as determined by using Cronbach's alpha.

Table 1. Reliability statistics

Cronbach`s alpha	Number of items
0.72	12

The alpha coefficient for the twelve items is 0.72, suggesting that the items have relatively high consistency. Since a reliability coefficient of .70 or higher is considered acceptable, the instrument used in this study has good reliability. Creswell and Tashakkori (2007) suggested that a mixed research method is important for balancing the weaknesses of both qualitative and quantitative research methods. A quantitative approach is important for quantifying the data on the subject under study and providing statistical information about the problem. In addition, the quantitative research design is cross-sectional because the data were collected once and once, and this approach is significant. This study used both probability and nonprobability sampling. According to (Singh and Masuku 2014), the probability sample enables each member of the population to have an equal chance of being selected. On the other hand, nonprobability sampling was used as a technique, and industry sampling units were selected according to the researcher’s purpose and judgment that best met the purposes of the study.

In this study, a total population of 502 people were included; of those 472 people were from two universities, 271 were from the AASTU, and 201 were from the DBU. On the other hand, 30 respondents were selected purposively from the six industries. Therefore, the researcher took 216 respondents from the two universities proportionally; based on this, the respondents from each department were chosen by using a simple random sampling method, and the 30 respondents from the six industries were selected through a purposive sampling method. Therefore, the study has a sample size of 246 respondents.

Table 2. Sample size distribution

No	Name of Institutions	of Target Population	% (proportion)	Proposed samples	Sampling Technique
1	AASTU	271	$271/472*100 = 57.4\%$	$216*57.4 = 124$	Simple random sampling
2	DBU	201	$201/472*100 = 42.6\%$	$216*42.6 = 92$	
Total		472	100	216	

Along the N.B. from the industry side, 30 respondents (five respondents from each industry) were selected by the researcher by using purposive sampling because those respondents are familiar and engaged in the area of UIL. Therefore, the total sample size for this study was $216+30=246$.

RESULTS AND DISCUSSION

Assessment of the Status and Challenges of The Linkage Between Universities and Industries in Ethiopia: The Case of Two Universities and Six Industries

This chapter presents the data findings and analysis. The first section addresses the respondents’ background information, and the second section addresses the results of the data analysis on the status of the link between university and industry, the national policy framework and its enforcement in place that direct the link between university and industry. The second section identifies the factors that influence the link between university and industry and recommends ways to better strengthen the link between university and industry. This finding implies that the response rate is 93.08%. Of these, 87.7% of the respondents were university instructors. On the other hand, approximately 12.3% of respondents were from industries. Furthermore, of the 216 university respondents, 61.2% had teaching experience ranging from 6-10 years. Approximately 60.7% of industry staff have more than five years of experience in industry. The detailed response rates of the respondents are summarized below.

Table 3. Response Rate of Respondents

Name of Institution	Respondents	Method Data collection	Proposed	Distributed	Returned	Percent
AASTU	Instructors	Questionnaire	124	124	113	91
	Students	FGD	2		2	100
	UIL Officials	Interview	2		2	100
DBU	Instructors	Questionnaire	92	92	88	95.7
	Students	FGD	2		2	100
	UIL Officials	Interview	2		2	100
Six Industries	UIL & TT Managers and Experts	Questionnaire	30	30	28	93
	UIL officials	Interview	1		1	100
Total			246		229	93.08

Source: Authors’ own construction, 2023

Table 4. Background Information of the Two University Respondents

Variable	Respondents Characteristics		
	Frequency	Percent (%)	
Sex of the two university respondents	Male	150	74.6
	Female	51	25.4
	Total	201	100.0
Age of the two university respondents	< 25 years	38	18.9
	26-35 Years	119	59.2
	36-50	41	20.4
	>50	3	1.5
	Total	201	100.0
Work Position of	College dean	4	2.0

respondents	Department head	31	15.4
	Senior instructor	94	46.8
	Instructor	68	33.8
	Post graduate student	4	2.0
	Total	201	100.0

Source: Research“ field survey, 2023

As shown in Table 4, the majority of the respondents (approximately 150; 74.6%) were male, approximately 119 (59.2%) had an age range of 26-35 years, and approximately 94 (46.8%) and 68 (33.8%) had academicians who were senior instructors and instructors, respectively.

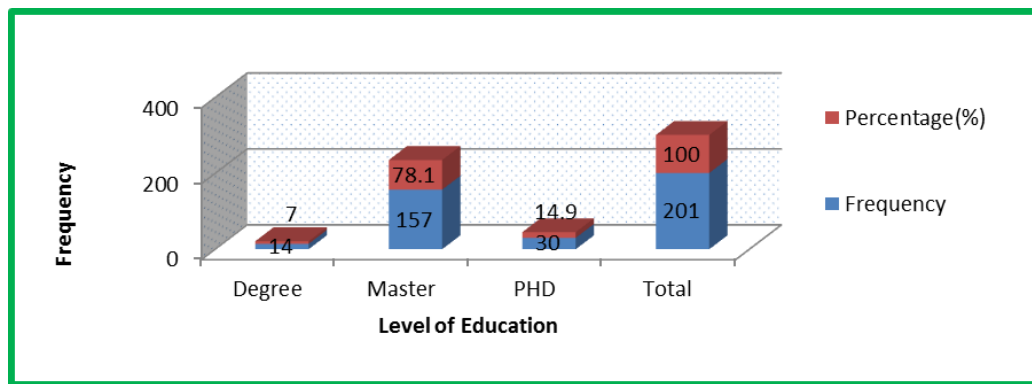


Figure 1. Educational level of the two university respondents
Source: Research“ field survey, 2023

As shown in Figure 1, the majority of the respondents (157; 78.1%) from the university side had a second/master’s degree, approximately 30 (14.9%) had a third degree (Ph.D.) and only a few (7%) had a first-degree degree. From these findings, we can understand that all the respondents were above the first-degree level, which helps us to better understand the questionnaire and the objective of the study. The university data obtained through interviews with UIL showed that the existence of few academicians with third-degree education contributed to the low performance of the research and technology output supplied to the industry.

Assessment of the Status and Challenges of The Linkage Between Universities and Industries in Ethiopia: The Case of Two Universities and Six Industries

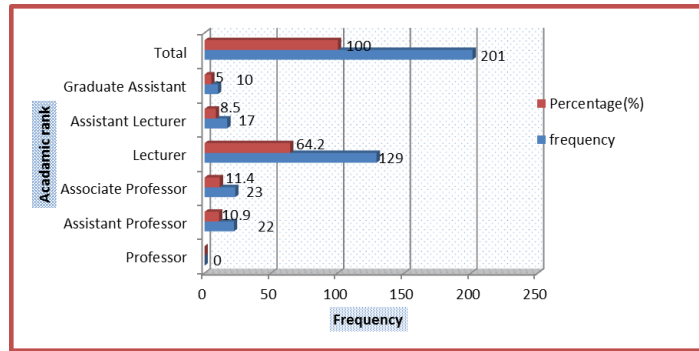


Figure 2. Academic rank of the two university respondents
Source: Research“ field survey, 2023

Figure 2 shows the academic rank of the university respondents involved in this study. The majority (129, 64.2%) of the respondents were lecturers; 23 (11.4%), 22 (10.9%), 17 (8.5%) and 10 (5%) of the respondents were associate professors, assistant professors, assistant lecturers and graduate assistants, respectively.

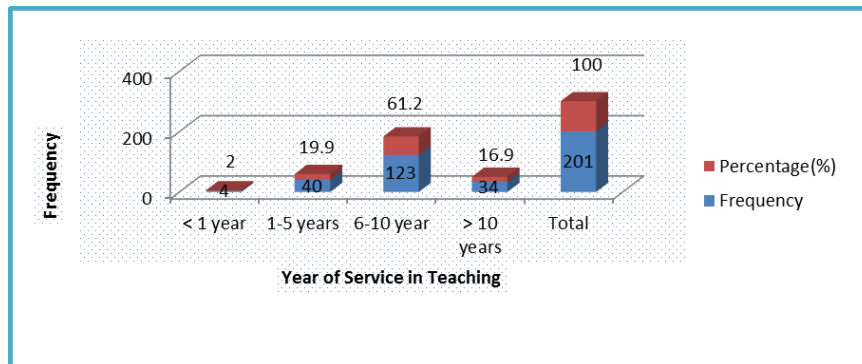


Figure 3: Teaching experience of the two university respondents
Source: Research“ field survey, 2023

Figure 3 reflects the university respondent year of service in teaching. With respect to this topic, the majority of the respondents (123 [61.2%]) had experience teaching from 6-10 years, approximately 40 (19.9%) had 1-5 years of experience, and approximately 34 (16.9%) and 4 (2%) had less than one year of experience, respectively.

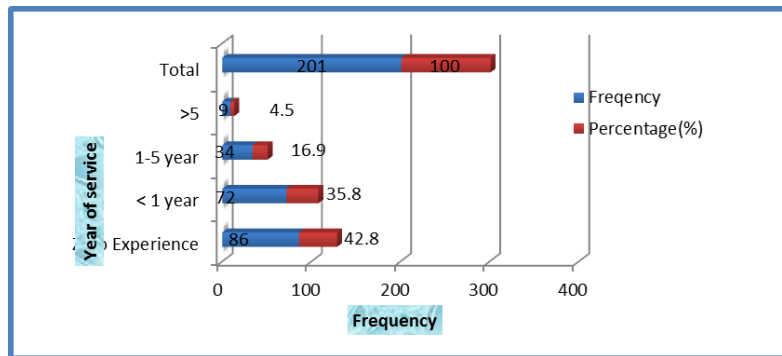


Figure 4. Work experience in industry of the two university respondents

Source: Research“ field survey, 2023

Figure 4 illustrates the work experience of university respondents in industry. Accordingly, approximately 86 (42.8%) respondents had no work experience in industry, approximately 72 (35.8%) had less than one year of work experience, 34 (16.9%) had work experience of 1-5 years, and 9 (4.5%) had work experience greater than five years.

Current status of university-industry linkage

The following table shows the university participants’ responses to the current status of the link between university and industry.

Table 5. Current status of university-industry linkage

Question	Number of respondents										Total	
	Vp		P		G		Vg		Ex		F	%
	F	%	F	%	F	%	F	%	F	%		
The existing willingness and inspiration academicians to work on UIL	4	21.	47	23.	7	35.	30	14.9	8	4.0	201	100
Adequacy of time and autonomy of academicians to work with industry	4	20.	94	46.	4	24.	11	5.5	6	3.0	201	100
commitment level of University leadership	4	19.	11	58.	1	8.5	15	7.5	1	6.0	201	100
	0	9	7	2	7				2			

Assessment of the Status and Challenges of The Linkage Between Universities and Industries in Ethiopia: The Case of Two Universities and Six Industries

Research policy and availability of matching fund	6	31.8	82	40.8	4	2	20.9	10	5.0	3	1.5	201	100
Infrastructure and testing facilities for R&D	3	17.9	11	55.7	2	10	27	13.4	6	3.0	201	100	

Source: Research field survey, 2023

As shown in Table 5, most of the respondents (72 [35.8%]) replied that the existing willingness and inspiration of the university staff to work collaboratively with industry is rated as good; regarding the autonomy and available time for academicians to work with industry within the framework of UIL, the majority of the respondents (94 [46.8%]) replied that it is poor. On the other hand, approximately 40 (19.9%) and 117 (58.2%) respondents believed that the existing commitment level of leaders to achieving UIL missions was rated very poor and poor, respectively. In relation to innovation policy and the existence of matching funds for research activity, approximately 64 (31.8%) and 82 (40.8%) university respondents perceived that universities have research policies; however, the funds allocated for R&D activity are very poor and poor, respectively. Regarding the existing infrastructure and testing facilities, the majority of the respondents (112; 55.7%) were rated as poor; this problem is widely reported by Debre Berhan University respondents. According to the respondents, this happened because the university was newly established and became a 3rd generation university. In addition, approximately 36 (17.9%) and 27 (13.4%) of the respondents believed that the existing infrastructure testing facilities for conducting R&D activities are good or very good, as reported by the AASTU respondents.

In sum, the majority of the university respondents agreed that the existing level of university trust in working with industry is poor. Due to being at a poor level, respondents mentioned that some industries became reluctant to permit internships for students or allocations of matching funds for R&D activities, and they highly depended on foreign technologies and experts rather than working with local experts and using locally produced technologies.

Table 6. University willingness to work with Industries and their linkage

Question	Category	Frequency	Percent
Based on size, which type of industries do you think more interested to work with universities?	Small & Medium	8	4.0
	Medium & Large	89	44.3
	Small, medium and large	104	51.7
	Total	201	100.0
What services does your university/department offer to industry?	Short term training	145	72.1
	Consultancy service	42	20.9
	Staff Exchange	8	4.0
	Research & Technology transfer	6	3.0
	Total	201	100.0

Source: Research“ field survey, 2023

As indicated in Table 5 most of the respondents (194; 96.5%) replied that they needed to work in partnership with industries. On the other hand, the majority of the respondents (190 [95.5%] reported that they currently have linkages with industries in different areas of support.

Table 7. Types of industry and areas of the university-industry linkage

Question	Number of respondents							
	Yes		No		Do not Know		Total	
	F	%	F	%	F	%	F	%
Do you have an interest to work in partnership with industry?	194	96.5	7	3.5	-	-	201	100
Does your university have a linkage with industry?	190	95.5	11	5.5	-	-	201	100

Source: Research“ field survey, 2023

Table 6 shows the industries in which universities work in partnership with universities and the type of service provided by the university to industries. Based on this, the majority of the respondents (104; 51.7%) replied that currently, they work in small, medium and large industries. Regarding the type of service that universities provide to industries, the majority (145 [72.1%]; 42 [20.9%]; 8 [4%]; and 6 [2%]; of respondents said that they are currently providing services to industries in the areas of short-term training, consultancy services, staff exchange and research and technology transfer, respectively.

Table 8 Awareness of the legal and policy environment Perspective

Question	Number of respondents							
	Yes		No		Do not Know		Total	
	F	%	F	%	F	%	F	%
Is there any national policy/strategy framework that enhances the link between university and industry?	3	1.5	189	94.0	-	-	201	100
Does the UIL policy/Strategy have an incentive system?	17	8.5	172	85.6	12	6.0	201	100

Table 9. Ordinal regression model goodness of fit

Assessment of the Status and Challenges of The Linkage Between Universities and Industries in Ethiopia: The Case of Two Universities and Six Industries

	Chi-Square	Df	Sig.
Pearson	66.119	9	0.79
Deviance	96.182	9	1.000

Link function: Logit.

Source: Researcher's SPSS Output, 2023

As shown in Table 9 above, the P value is 0.79, which is greater than the 5% level of significance. As a result, we observe in the table above that the p value is 0.79, which is greater than the level of significance of 0.05; thus, the model has good fit. Therefore, we fail to reject the null hypothesis because of differences in the observed data.

Table 10. Results of the ordinal logistic regression model for the University

Factors	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
National Policy framework and its enforcement	19.814	.708	783.747	1	.000*	18.427	21.201
Lack of mutual trust between U&I	-1.670	.543	9.467	1	.002*	-2.734	-.606
Lack of incentives for academicians working on UIL	-1.790	.839	4.548	1	.033*	-3.435	-.145
Practical skill of academicians to undertake R&D	1.048	.433	5.857	1	.016*	.199	1.897
Lack of communication between U&I	-1.623	.773	4.407	1	.036*	-3.138	-.108
Lack of matching fund for R&D	-1.009	.457	4.870	1	.027*	-1.906	-.113
Infrastructure and testing Facilities	2.600	.743	12.233	1	.000*	1.143	4.057
Leadership commitment	19.536	.666	859.776	1	.000*	18.230	20.842
Intellectual property right	-.111	1.564	.005	1	.943	-3.176	2.953

NB. * Indicates that the independent variable is significant

The dependent variable is the status of the university-industry linkage. Source: Researcher's SPSS Output, 2023

Intellectual property rights at the national level

As the table above indicates, the variable intellectual property rights did not significantly influence university industry linkages. The significance value of firm size was greater than the confidence level of 0.05 ($0.943 > 0.05$). From these findings, we can infer that intellectual property rights are not a critical problem in the study area. According to (Belete 2014), the link between universities and industries might result in the creation of knowledge that needs commercial value and some form of patent. Without the existence of a legal framework, intellectual property rights could be a source of conflict between actors. Despite this fact, the

findings show that intellectual property rights were not a problem and did not have a significant effect on the study area.

Table 11. Background Information of the Six Industrial Respondents

Variable		Respondents' characteristics	
		Frequency	Percent (%)
Sex	Male	19	67.9
	Female	9	32.1
	Total	28	100.0
Industry Work Experience	<1 year	1	3.6
	Year	10	35.7
	>5 years	17	60.7
	Total	28	100.0

Source: Researcher's field survey, 2023

As shown in Table 11, above the majority of the respondents, 19 (67.9%) were males and 9 (32.1%) were female. With respect to industry work experience, approximately 17 (60.7%) respondents had more than five years of work experience, and 10 (35.7%) respondents had one to five years of experience.

As the above table shows, commitment to achieve UIL has a significant mathematical effect ($P=0.000<0.05$), and its influence on UIL status is positive. This reflects that, holding other factors constant, the existence of committed leadership in UIL increases the probability of excellent UIL by 12.747. A study by Imboden (2023) revealed that, in an exemplary partnership, effective leadership requires identification of the demand for proper balance between power sharing and control, between processes and outcomes, between interpersonal trust and confidence and between stability and adjustment. Therefore, well-organized, enthusiastic, committed leadership is the principal factor that promotes UIL to the expected status. With respect to this issue, respondents were asked to judge the commitment of leaders to realizing the UIL strategy. Accordingly, the majority of the industry respondents (18 [64.3%] and 5 [17.9%]); believe that the existing commitment of leaders to attaining the UIL mission was poor and very poor, respectively. Although the existence of committed leadership is key for proper UIL implementation, the study showed that leadership commitment in the study area is low and that this commitment is ineffective and inefficient.

CONCLUSION

Assessment of the Status and Challenges of The Linkage Between Universities and Industries in Ethiopia: The Case of Two Universities and Six Industries

Based on the findings of the study, the following conclusions were drawn. Knowledge-producing institutions are considered important sources of information for industry innovation. Likewise, university-industry linkages serve as engines in facilitating the economic development of many developed countries; they contribute more to solving real technological problems and modernizing the practices and systems of industries. Even though the link between university and industry is expected to achieve meaningful results in the areas of internship, externship, training and development, consultancy, R&D and business incubation, the study conducted on AASTU, DBU and six industries in Ethiopia reveals that the practice of working jointly is at a low stage, that the link is not fully functional beyond the signing memorandum of understanding (MoU), and that generally, the result expected from the strategic university-industry partnership is not realized. Furthermore, creating a link between universities and industry does not receive priority attention from either university leaders or academicians or industry owners or managers due to attitudinal problems and a lack of awareness of the significance that can be derived from the link, a lack of commitment by university and industry leaders, a high focus of leaders on routine tasks and bureaucratic issues, a lack of incentive and encouragement for academics and industrialists working on university-industry linkages, a lack of binding policy frameworks, a lack of practical skill by university academicians working on solving industry problems, a lack of continuous control and monitoring of the progress of university industry linkages by government institutions who are responsible for this assignment, industry owners' dependency on foreign technology and expertise rather than giving value to local technology and expertise, and a high focus of academics on school teaching and theoretical knowledge. Therefore, this study has shown that the overall status of UIL is at an infant stage and that additional efforts must be made to strengthen the link and to drive what is expected from partnerships between universities and industry.

BIBLIOGRAPHY

- AbebeAssefa, Abraham. 2016. "University-Industry Linkage Practices, Determinants and Challenges Theoretical and Empirical Article Review: Lessons for Effective and Successful Collaboration." *International Journal of Research in Management, Economics and Commerce* 6(03).
- Adelowo, Caleb Muiyiwa, Willie Owolabi Siyanbola, and Dan-Azumi Mohammed Ibrahim. 2023. "Managing Technology Transfer and University-Industry Linkage in a Developing Country: Empirical Evidence from Nigeria." *International Journal of Technology, Policy and Management* 23(2):170–86.
- Amarathunga, Buddhini, Ali Khatibi, and Zunirah Mohd Talib. 2023. "University–Industry Linkages and Agendas for Future Studies: A Systematic Literature Review and Bibliometric Analysis." *Asian Education and Development Studies*.

- Belete, Wondwossen. 2014. "Towards University–Industry Innovation Linkages in Ethiopia." *Innovation and Intellectual Property: Collaborative Dynamics in Africa* 316–34.
- Borah, Dhruba, Silvia Massini, and Khaleel Malik. 2023. "Teaching Benefits of Multi-Helix University-Industry Research Collaborations: Towards a Holistic Framework." *Research Policy* 52(8):104843.
- Brimble, Peter, and Richard F. Doner. 2007. "University–Industry Linkages and Economic Development: The Case of Thailand." *World Development* 35(6):1021–36.
- Chih-Pei, HU, and Yan-Yi Chang. 2017. "John W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches." *Journal of Social and Administrative Sciences* 4(2):205–7.
- Corsi, Simone, Feranita Feranita, Mat Hughes, and Alex Wilson. 2023. "Universities as Internationalization Catalysts: Reversing Roles in University–Industry Collaboration." *British Journal of Management* 34(4):1992–2014.
- Creswell, John W., and Abbas Tashakkori. 2007. "Differing Perspectives on Mixed Methods Research." *Journal of Mixed Methods Research* 1(4):303–8.
- Delgado-Verde, Miriam, and Isabel Díez-Vial. 2023. "New Product Development and Supplier Involvement: The Role of R&D Collaboration with Supporting Organisations." *The Journal of Technology Transfer* 1–24.
- Dias, Alexandre, and Beatriz Selan. 2023. "How Does University-Industry Collaboration Relate to Research Resources and Technical-Scientific Activities? An Analysis at the Laboratory Level." *The Journal of Technology Transfer* 48(1):392–415.
- Eun, Jong-Hak, Keun Lee, and Guisheng Wu. 2006. "Explaining the 'University-Run Enterprises' in China: A Theoretical Framework for University–Industry Relationship in Developing Countries and Its Application to China." *Research Policy* 35(9):1329–46.
- Fernández Díaz, María José, Rafael Carballo Santaolalla, and Arturo Galán González. 2010. "Faculty Attitudes and Training Needs to Respond the New European Higher Education Challenges." *Higher Education* 60(1):101–18.
- Imboden, Serge. 2023. "Effective and Efficient Leadership." Pp. 905–17 in *Food Safety Management*. Elsevier.
- Kothari, Chakravanti Rajagopalachari. 2004. *Research Methodology: Methods and Techniques*. New Age International.
- Krishnakumar, R., and KM Rajesh. 2011. "Attitude of Teachers' of Higher Education towards E-Learning." *Journal of Education and Practice* 2(4).
- Mansell, Robin, and Uta Wehn. 1998. *Knowledge Societies: Information Technology for Sustainable Development*. Oxford University Press.
- Mansfield, Edwin. 1968. "Industrial Research and Technological Innovation: An Econometric Analysis." (No Title).

Assessment of the Status and Challenges of The Linkage Between Universities and Industries in Ethiopia: The Case of Two Universities and Six Industries

- Mowery, David C., and Nathan Rosenberg. 1989. "New Developments in US Technology Policy: Implications for Competitiveness and International Trade Policy." *California Management Review* 32(1):107–24.
- O'Dwyer, Michele, Raffaele Filieri, and Lisa O'Malley. 2023. "Establishing Successful University–Industry Collaborations: Barriers and Enablers Deconstructed." *The Journal of Technology Transfer* 48(3):900–931.
- Plewa, Carolin, Nisha Korff, Thomas Baaken, and Greg Macpherson. 2013. "University–Industry Linkage Evolution: An Empirical Investigation of Relational Success Factors." *R&D Management* 43(4):365–80.
- Ramayah, TYJA, Jasmine AL Yeap, and Joshua Ignatius. 2013. "An Empirical Inquiry on Knowledge Sharing among Academicians in Higher Learning Institutions." *Minerva* 51:131–54.
- Sanford, Charles L. 1958. "The Intellectual Origins and New-Worldliness of American Industry." *The Journal of Economic History* 18(1):1–16.
- Singh, Ajay S., and Micah B. Masuku. 2014. "Sampling Techniques & Determination of Sample Size in Applied Statistics Research: An Overview." *International Journal of Economics, Commerce and Management* 2(11):1–22.
- Ursić, Luka, Godfrey Baldacchino, Željana Bašić, Ana Belén Sainz, Ivan Buljan, Miriam Hampel, Ivana Kružić, Mia Majić, Ana Marušić, and Franck Thetiot. 2022. "Factors Influencing Interdisciplinary Research and Industry-Academia Collaborations at Six European Universities: A Qualitative Study." *Sustainability* 14(15):9306.
- Yin, Ximing, Fei Li, Jin Chen, and Yuedi Zhai. 2023. "Innovating from University–Industry Collaboration: The Mediating Role of Intellectual Capital." *Journal of Intellectual Capital* 24(6):1550–77.

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First publication right:

Asian Journal of Engineering, Social and Health (AJESH)

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