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The Influence of Organizational Culture on University-Industry Linkage: *Focus on Innovation and Technology Transfer in Ethiopia*

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ABSTRACT

The current business environment is demanding organizations to enter into a paradigm shift in their business operations so that they can adopt a strategy of competing through collaboration. University-industry linkage (UIL) is a kind of collaboration that brings together universities and industries to a platform that facilitates conditions for the exchange of knowledge and skills, hence promote business innovation and technology transfer. This study was thus conducted to investigate the influence of organizational culture on the implementation of UIL and its contribution to innovation and technology transfer taking selected science and technology universities and manufacturing firms in Ethiopia. Primary data through survey questionnaire and semi-structured interview were collected and analyzed using both descriptive and inferential analyses. A total sample of 365 (250 from university and 115 from industry) participated in the survey questionnaires upon which the data analysis was based. The study revealed that the organization culturein universities affected the implementation of UIL and its associated results of innovation and technology transfer. However, the effect of culture was not clearly visible for industries. It was found that there was no significant difference in the perceptions of universities and industries towards the effect of culture on UIL.

1. Introduction

Globalization and advancement in the information technology have driven a business environment to become more dynamic and competitive than ever before. Organizations, whether they are business or non-business type, need to update themselves on a regular basis in order to ensure their survival and sustainable growth in such an environment. Innovation and technology transfer is one of the approaches through which business organizations thrive to survive the rapidly changing and competitive nature of today's marketplace (Mitasiunas, 2013; IKED, 2006). Thus, the very essence of innovation and technology transfer dictates that organizations, be they from the same domain or different context should forge an integration that will help the exchange of ideas, people and materials for the mutual benefits of all the players.

The collaboration between higher education institutions (universities) and industries can be taken as a vital strategy for promoting and exploiting innovation and technology transfer. There is also wider understanding that the knowledge and information generated through continuous and systematic development of theories and principles in HEIs are not supposed to remain with them, as it was the case during the period of universities as "ivory tower." Thus, universities and business firms in the industrialized and emerging economies have already gone long distance since they have made a paradigm shift in favor of creating linkages and contributing to their economies (Guimon, 2013).

2. Review of Literature

2.1 University-Industry Linkage: Theoretical and Empirical review

Business firms often enter into collaboration with universities to get the overall benefits such as employment of competent graduates, acquiring access to emerging technologies and enhancing their knowledge base rather than desiring to develop specific commercializable innovations (Perkman & Walsh, 2007). Terms and concepts such as collaboration, cooperation, partnership, interaction, etc. are frequently used to mean UIL which refers to interdependence between universities and industries for mutual economic benefits. The recently developed triple helix, a conceptual model for innovationwith the university as a key player, is the great paradigm shift of the late 20thand early 21stcentury. It represents a transformation from the conventional development model that has segregated the three institutional spheres-higher education, industry and government and has consistently left out universities from development strategies and policies (Etzkowitz & Dzisah, 2007).

Universities and other higher education institutions are expected to make crucial contributionsto the process of enhancing production and productivity of firms in addition to their traditional activities of knowledge creation and human capital development. Mowery and Sampat (2004) as quoted in Costa & Teixeira (2005) described universities as instruments of knowledge-based economic development and change. According to Spencer (2001) as cited in Costa & Teixeira (2005) most member countries of OECD support interactions between universities and industry with the belief that such relationship would augment the rate of innovation in the economy.

University-industry linkages and their merits have now spread virtually all over the world as a result of high development in technology and globalization (Schiller, 2006). At present, such practice of interdependence also becomes familiar to low income and newly emerging economies such as in Asia, Africa and Latin America. To capitalize on the potential of universities in this aspect, governments and institutions are actively crafting strategies and guidelines to upgrade collaboration between their universities and industries (and other productive sectors as well) through research and other forms of partnerships (Ssebuwufu, Ludwick & Beland, 2012). Ethiopia has also responded to such pressing needs of the environment through its Ministry of Science and Technology (MoST) which has been authorized for the planning and implementation of science, technology and innovation policy. According to MoST (2013) UIL is defined as "a co-ordinated system of work among education and training, research institutions and industries to engage in a collaborative manner."

2.1.1 Innovation and Technology Transfer

A well-implemented UIL program can have several benefits to the parties involved as well as the society at large. Among the major outputs of UIL activities are innovation and technology transfer. There has been high recognition of innovation as critical precondition for business success because it promotes and ensures growth, sustainability and competitiveness (Tomlinson, Zorlu &Langley, 2008). Innovation is a very broad concept that involves several various stakeholders ranging from governments and scientists to business executives, marketing specialists and consumers. Different authors have conceptualized innovation from various perspectives. According to Freeman, an inventioncanbe just an idea, a sketch or model for a new or improved device, product, process or system; however, an innovationhas an economic meaning that is realized only with the first commercial exchange that involves the new product, process, system or device. Thus, from the economic value-added point of view, innovationcan be defined as the application of new ideas to the products, processes, or other aspects of the activities of a firm that lead to increased value. Galanakis (2006) also defines innovation as "*the creation of new products, processes, knowledge or services by using new or existing scientific or technological knowledge, which provides a degree of novelty either to the developer, the industrial sector, the nation or the world and succeeds in the marketplace*." Therefore, innovation can be understood as an approach that combines knowledge, skills and technology into a value addition process with an objective of delivering new or significantly improved products, processes or systems with a potential of commercial transaction.

The other important and possible result of UIL which is highly related to innovation is technology transfer. Looking at the face value of technology transfer implies that there are at least two parties involved in the process one of which can be considered technology developer and supplier and the other receiver of technology. Literatures show that there are two major components of innovation process: knowledge and successful handover of that knowledge with new products or services being offered to customers. The second component is what can be denoted as technology transfer which is responsible to distribute the outputs of innovation to organizations that can deliver those products to the market (Rombach & Achatz, 2007). Hence, the following comprehensive definition of technology transfer has been used as cited in (Mitasiunas, 2013):

> *"Technology transfer can be defined as the process of sharing of or acquiring/providing/licensing skills, knowledge, technologies, intellectual property, technology development personnel or entire teams, methods of manufacturing between companies, research institutions and other organizations to enable the accessibility of scientific and technological developments to a wider range of users who can then further develop and exploit the technology into new products, processes, applications, materials or services (*http://en.wikipedia.org/wiki/Technology_transfer*).*

For the purpose of this research innovation and technology transfer have been treated as a package of UIL results in order to simplify the data analysis and draw a comprehensive conclusions relating to the context of the samples of the study. Therefore, the influence of organizational culture on UIL implementation both in universities and industries has been examined to see how cultureaffects the contribution of UIL to innovation and technology transfer.

2.1.2 Organizational Culture

In many discussions about culture, it is common to think of people who share something, whether that sharing reflects the norms or customsdictating how to decide and act in some particular ways (Alvesson & Sveningsson, 2008). The concept of culture has recently been widely used in the context of organizations, hence organizational culture. The concepts of organizational culture have their roots in the popular definition given below by Schein (1990) as cited in Lim (1995):

> *"a pattern of basic assumptions that a group has invented, discovered or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."*

The definition of organizational culture given above elucidates that an organization creates its distinguishing assumptions and values that can be taught to new employees, get familiar with and survive the external challenges, forge and capitalize on relationships with other organizations and develop ways of overcoming difficulties faced in the due course of its operations (Hartnell, Ou& Kinicki, 2011). Culture resides within an organization and serves to balance the needs of external world with the policies and strategies of the organization. When culture succeeds in meeting the right fit between these two possibly competing needs, the consequence will be committed employees who can leverage their organization a hard win by the rivals (Daft, 2008).

3. Problem Statement

In Ethiopia, it's a recent phenomenon since the concepts of innovation and technology have come to the attention of industries, universities and government. Over the past two decades, the incumbent government has taken some practical steps to develop and implement the science, technology and innovation policy (The Ethiopian Science and Technology Agency, 2006). According to the initial policy of science, technology and innovation (STI) of the country, one of the underpinning objectives was to create national capability that could result in the utilization of indigenous knowledge and exploiting the opportunities of the global advancement in scientific knowledge and technology. In fact, Ethiopia has revised its previous STI policy with a broader scope of the linkage whereby government, universities, public research institutes, TVET and industries are to constitute the major key players of the system (NSTI, 2012).

The very recent experiences of Ethiopian universities, particularly those which rely on the government budget, reveal that they have begun to design systems and structures for creating partnerships with local industries by setting various objectives, including innovation and technology transfer among others. Interestingly, majority of those collaborations between universities and industries are formal, i.e., they are backed up by memorandums of understanding (MoUs). Nevertheless, only few or none of those partnership agreements have succeeded to materialize compared to the intended objectives.

The most common university-industry linkage that many Ethiopian universities are more often engaged in is a short term student attachment to industry (commonly known as internship program) as part of their curricula which even proves to be ineffective and unsatisfactory due to various constraints, such as lack of stakeholder commitment and limited budget among others. Other possible reasons for weak university-industry linkages from innovation and technology transfer point of view maybe lack of strong culture that promotes internal integration that forms a suitable basis for external relationships, such as UIL from both sides. The partnerships so formed between universities and industries are less inclusive, hence not widely shared. Agreements for the linkages are usually made by very few representatives (mainly the top managements) of both sides leaving the units and employees concerned with little or no information about the why and how of the collaborations.

As far as the researcher's knowledge is concerned no empirical studies with a special reference to the effect of organizational culture on UIL that focuses on innovation and technology transfer have been conducted in Ethiopian context. Therefore, the researcher has been motivated to undertake this study which may narrow the existing information gap in research context as well as contribute to the literature regarding Ethiopian reality.

4. Research Questions

The main question this study would attempt to answer is:

- How does organizational culture affect the contribution of UIL to business innovation and technology transferto firms under study?

This question was asked to both universities and industries under investigation to see whether or not their respective cultures support the practice of UIL and its desired outputs.

5. Objectives of The Study

The main purpose of this study is to investigate the effect of organizational culture on the UIL practice and its contribution to innovation and technology transfer. The following are specific objectives that this study attempts to realize:

- To examine the influence of university culture on the implementation of UIL and its results,
- To analyze the influence of industry culture on the implementation of UIL and its results,
- To compare university and industry cultures in terms of their effects on UIL practice and associated outputs.

6. Hypotheses

The following hypotheses have been formulated in line with the research question and specific objectives stated above:

H_{01}: There is no significant influence of culture on UIL practice and outputs for the sample universities.

H_{02}: There is no significant influence of culture on UIL practice and outputs for the sample industries.

H_{03}: There is no significant difference between universities and industries regarding the influence of culture on theUIL practice and its outputs.

7. Research Methodology

While recognizing the existence of several types of research design (Kothari, 2004; Cooper, *et al*., 2012; Zikumund, et al., 2009) this particular study is a non-experimental research type whereby a combination of descriptive and explanatory approaches have been employed for the data collection, analysis and interpretation. This is because the nature of the study indicates the existence of dependent and independent variables whose relationship is to be described and explained. Organizational culture was taken as an independent variable causing changes in the UIL practice (dependent variable) and its outputs, such as innovation and technology transfer. The research question and objectives presented in the previous section also indicate that cultures of the sample organizations are expected to influence the UIL practice and its desired results expressed as innovation and technology transfer.

7.1 Type of Data

Data are the most critical requirements for answering the research question(s) and/or testing hypotheses. For the purpose of this study both primary and secondary data were utilized with primary data predominantly relied on. Self-administered survey questionnaire and semi-structured interview were utilized for collecting primary data while both published and unpublished documents were used for accessing secondary data. Based on the nature of data, this study has employed the mixed methods type of research wherein, both quantitative and qualitative data are

incorporated. In the course of applying this approach, quantitative data were predominantly utilized because the required data were gathered more through the use of survey instruments.

7.2 Population and Sampling

The survey data required for the study have been gathered from the academic staff of the target universities and industry officers. The university academic staff population has been defined based on their academic rank criterion so that those faculties with the rank of lecturer and above were included in the sampling frame. The university sampling frame also entailed all teaching officers who were eligible as per the criterion mentioned above. The industry population was framed to comprise those individuals who assumed managerial positions in the respective companies during the data collection period.

For gathering relevant data from the sample universities, the sample frame was determined to constitute academic staff or faculties with academic ranks of lecturer and above as well as teaching officers such as, heads of departments, associate deans, college deans and directors who assumed various management positions. Also, the faculties identified for sampling purpose were those who had a master's degree and above. For the industry population, the sampling frame set for the survey data was purposively limited to individuals in the managerial levels of the target firms.

For the university population, sample size was fixed using the formula presented below (Yemane, 1967). The total number of academic staff in all the three institutions who met the criterion of the sampling frame was 893 (i.e., 320 from ASTU, 365 from AASTU and 208 from AAiT). The number of respondents taken from this population size has been set as follows:

$$n = \frac{N}{1 + Ne^2}$$ **, Where: n = sample size, N = population size, e = error term (level of precision. At 95% level of confidence**

Therefore, the number of research participants from university population is:

$$n = 893/ (1+893*0.05^2) = 276$$

However, in order for improving the response rate of the data, 24 additional respondents were taken that added up the university sample size to 300 research participants to whom the questionnaires were distributed. For industry population, 50 firms that met the specific research criteria were identified first and then three individuals in the managerial positions of each sample were purposively selected to participate resulting in a sample size of 150 respondents.

Applying the proportionate stratified sampling technique, the sample size from each institution is computed as shown in the following table:

Table- 1
Sample size determination of university population

Institution	Population size of institution	Population proportion	Sample size of institution
AAiT	208	23%	69
AASTU	365	41%	123
ASTU	320	36%	108
Total	**893**	**100%**	**300**

Source: Researcher's own survey data 2017/18

8. Data Analysis and Interpretation

Data analysis and presentations were undertaken using both descriptive and inferential statistics. The descriptive analysis has been executed first for both university and industry and then followed by inferential analysis accordingly. Out of 300 questionnaires distributed to university respondents, 260 were collected of which 240 have been correctly filled out and found eligiblefor the data analysis. From the collected questionnaires 10 of them were significantly incomplete and excluded from the analysis, whereas the rest 10 had some minor errors and used in the analysis after adjustments have been done to them. Therefore, though the overall response rate is 86.7% (i.e. 260/300), the actual response rate based on the number of questionnaires used in the analysis is 83.3% (i.e. 250/300).

On the other hand, from the total number of questionnaires (i.e., 150) dispatched to the industry respondents, 130 were returned back of which 110 were correctly completed, 5 completed with minor errors and 15 were returned back with major flaws and left out from further use in the research. Thus, by making careful editing and necessary adjustments to the few errors committed in the five questionnaires, a total of 115 completed questionnaires have been used in the industry data analysis. The overall response rate based on the number of returned questionnaires is 86.7% (130/150) but the actual response rate based on the accurately completed number of questionnaires is 76.7% (115/150) which was significant enough to be utilized for the data analysis.

9. Descriptive Results on the Influence of Culture on UIL Implementation

In this section the responses to the items on the effect of organizational culture on the UIL implementation based on five point Likert's scales have been summarized and discussed. First the mean, standard deviation and percentages to each item have been computed, and then the overall average values of these parameters have been worked out and used in the discussion of both university and industry data. The five point Likert's have been condensed into three categories to simplify the analysis.

Table- 2:
University Responses on the influence of culture on UIL Implementation

Items	N	Mean	SD	Agree %	Neutral %	Disagree %
Visionary and change oriented leadership	250	2.86	1.01	24.4	44.4	31.2
Mission promotes innovation culture	250	3.57	0.95	66.8	18.0	15.2
Flexibility towards new thinking	250	2.87	1.03	32.8	30.4	36.8
UIL is aligned with innovation need	250	2.86	0.95	24.0	42.4	33.6
Proactive measures on UIL activities	250	2.81	1.09	29.2	30.4	40.4
Psychological supports to creativity	250	3.00	1.05	37.2	32.8	30.0
Financial supports to creativity	250	2.93	1.06	40.0	23.6	36.4
Leaders share their vision with faculties	250	3.12	0.95	40.0	34.0	26.0
Special focus to ideas from outside	250	2.93	1.07	34.0	33.2	32.8
Training programs innovation oriented	250	2.94	0.98	34.8	32.4	32.8
Competition for research grants	250	2.94	1.02	33.6	30.4	36.0
Effort to develop a learning culture	250	3.34	0.93	53.2	29.6	17.2
Benchmarking as source of innovation	250	3.04	0.98	31.2	41.6	27.2
Aggregated values		**3.02**	**1.01**	**37.0**	**32.1**	**30.4**

Source: *Researcher's own SPSS analysis of survey data 2017/18*

Table- 2 above has presented the data analyzed to elicit the opinions of university respondents regarding the effect of organizational culture on UIL implementation and associated results in terms of innovation and technology transfer. However, whether a culture has positive contribution or otherwise on the performance of an organization depends on how it has been built and nurtured by the leadership under consideration. According to the data summarized in Table No.2, a fairly large number of respondents expressed their consensus with the statements that describe the favorable influence of culture on UIL practice of their universities. Having a look at the aggregate values in the last row of the table, one can observe an overall mean of 3.02 and an overall 37% of agreement to the items. But when we consider the opinions of respondents to some individual items, most of their means are below 3.0 which imply a need for closer examination to identify possible gaps and make the necessary improvement to the existing culture.

Table- 3
Industry Responses on the effect of Culture on UIL Implementation

Items	Mean	SD	Agree %	Neutral %	Disagree %
Visionary and champions of change leadership	3.23	1.28	53.9	16.5	29.6
Vision/mission promotes innovation	3.62	1.74	72.2	8.7	19.2
Flexibility towards new thinking	3.46	1.23	58.3	12.2	29.5
Innovation considered during review of plans	2.98	1.06	39.2	25.2	35.7
Financial support to creativity	3.30	1.21	47.8	20.9	31.3
Psychological supports to creativity	3.32	1.32	59.1	11.3	29.6
Leaders share their business vision	3.34	1.20	60.8	13.6	25.2
Special focus to ideas of outside stakeholders	3.23	1.23	55.7	13.0	31.3
training programs fit collaborative innovation	2.69	1.12	32.1	18.3	49.6
Efforts to develop a learning culture	3.25	1.13	51.3	19.1	29.6
High personal motivation to participate in UIL	3.67	1.20	71.3	7.8	20.8
Benchmarking as a high source of innovation	3.28	1.13	46.0	31.3	22.6
Aggregated Average values	**3.28**	**1.24**	**54**	**16.5**	**29.5**

Source: Researcher's own SPSS analysis of survey data 2017/18

In the Table-3 above industry data pertaining to organizational culture and its relationship with UIL and associated outputs have been presented. Organizational culture is one of the most crucial factors that visualize the big picture of the entity under consideration. According to the descriptive data analyzed and reported in Table No. 3, culture has been found to have positive contribution to UIL and its anticipated outcomes. This is supported by the aggregated mean value of *X* = 3.28 (*SD* = 1.24) and 54% of respondents' agreement which are well above the average values. Particularly, as we can see from the same table the missions of sample firms promote their innovation culture as indicated by mean value of *X* = 3.62(SD = 1.74) which was supported by 72.2% of the respondents' agreement.

10. CORRELATION AND REGRESSION ANALYSES

10.1 Correlation Analysis: University

Correlation is a measure of association that shows the relationship between two variables. By using this technique, we can examine whether or not two variables vary together and also determine the strength of their relationship. Table No. 4 below presents the associations between the overall means of the items describing the influence of culture on UIL and those describing UIL results that can be thought of as innovation and technology transfer.

As we can see in Table No.4, the organizational culture and the UIL results in university have strong positive relationship with a correlation coefficient of 0.746. This correlation result indicates that as universities make efforts to create conducive working atmosphere, there will be increased chance for better implementation of UIL, and hence realization of the desired results as manifested in innovation and technology transfer.

Table- 4
Correlation between Organizational Culture and UIL Results: University

		Org. Culture	UIL Results
Org. Culture		1	.746**
UIL Results		.746**	1

**. Correlation is significant at the 0.01 level (2-tailed).
Source: *SPSS University Data Analysis 2018*

10.2 Correlation Analysis: Industry

The following table portrays the correlation analysis that examines the relationship between organizational culture and UIL results for industry data.

Table- 5
Correlation between Organizational Culture and UIL Results: Industry

	Culture	UIL Results
Culture	1	.561**
UIL Results	.561**	1

**. Correlation is significant at the 0.01 level (2-tailed)
Source: *SPSS University Data Analysis 2018*

Thecorrelation result in Table- 5indicates a moderate positive relationship exists between organizational culture and UIL results in industry context. We can say that as industry cooperative culture gets improved there will be a possibility for UIL results to increase and vice versa. The positive correlation between culture and expected results of UIL also imply the chance for innovation and technology transfer from industry point of view.

10.3 Regression Analysis: University

Regression analysis measures the dependence linear relationship between dependent and independent variables. The following simple regression analysis was conducted to measure the extent to which organizational culture predicts the changes in UIL results based on opinions of university respondents summarized using five Likert scales point. Table No. 6 below presents the regression analysis results.

Table- 6
Simple regression analysis for university

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.102	.111		9.957	.000
	Culture	.627	.036	.746	17.615	.000

Dependent Variable: Results
Source: *SPSS University Data Analysis 2018*

As we can observe from Table-6 the organizational culture at university significantly predicts the variation in in UIL results. The unstandardized beta coefficients show that a one unit increase in organizational culture will lead to a 0.627 unit upward variation in UIL results. This can also be stated using the following simple regression equation.

$$\hat{y} = 1.102 + 0.627x$$

10.4 Regression for Industry

The table below portrays the simple regression analysis for the relationship between organizational culture and UIL results from industry perspective.

Table -7:
Simple Regression Results for Industry

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.813	.180		10.088	.000
	Culture	.380	.053	.561	7.200	.000

Dependent Variable: Results

As indicated in the Table 7, unstandardized coefficient of the independent variable indicates that a one unit increase in organizational culture will result in a 0.38 increment in the UIL outputs expressed as innovation and technology transfer as shown in the equation below:

$$\hat{y} = 1.813 + 0.38x_i$$

Where: ŷ = dependent variable (UIL results) and x_i = independent variable (Culture)

11. Hypothesis Testing

The study was concerned with analyzing the influence of organizational culture on UIL implementation and its envisaged outcomes (innovation and technology transfer). The hypotheses developed in this regard have been tested as follows:

H_{01}: There is no statistically significant influence of culture on UIL practice and outputs for universities.

Referring back to the simple regression run for university and reported in Table- 6, we can notice that the t-test result was significant at $p < 0.01$. This result revealed that the effect of organizational culture on UIL results for universities was statistically significant. As a result the null hypothesis stating the absence of significant effect of culture on UIL results is not supported

H_{02}: There is no significant influence of culture on UIL practice and outputs for the sample industries.

The simple regression results reported in Table- 7 showed that the t test value obtained was significant at $p < 0.01$ leading us to declare that there was a statistically significant influence of organizational culture on the UIL results as measured from industry point of view. Therefore, the null hypothesis formulated in favor of the argument that no significant effect of culture on UIL results has been found unsupported.

The third hypothesis was set to compare the universities and industries in terms of their perceptions toward the effect of organization on UIL results. The null hypothesis developed was:

H_{03}: Universities and industries are not significantly different with respect to the influence of their cultures on UIL implementation and its results.

Table- 8
Independent Samples t-testfor the effect of culture on UIL results

		Levene's Test for Equality of Variances		t-test for Equality of Means				
Mean of culture	**Equal variance assumption**	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
	Equal variances assumed	8.885	0.003	-2.898	363	0.004	-0.26443	.09125
	Equal variances not assumed			-2.721	191.339	0.007	-0.26443	.09717

Source: *SPSS University Data Analysis 2018*

The examination of independent samples t-test presented in Table- 8 reveals that the value of F,df (1, 363) = 8.89 is significant at $p < 0.05$. This result of the Levene's test shows that the assumption of equal variance between the two groups does not hold. The two groups have been found to have significant variance and this does not allow us to decide on the null hypothesis using the t-test results across the F value row. Therefore we have to use the values in the lower row for judging the null hypothesis under consideration. Accordingly, since the value of t at df (191) = -2.72 is significant at $p < 0.05$, we can say that the null hypothesis is not supported meaning that there is statistically significant difference between universities and industries with regard to the influence of organizational culture on the UIL implementation and its results.

12. Analysis of Qualitative Data

The opinions collected from both university and industry participants revealed that their cultures were not in a position to promote UIL, and hence innovation and technology transfer. The respondents were strongly attributing the reasons for weak culture to lack of commitment from top management to UIL activities, and hence innovation and technology transfer. According to the respondents, the people in the top managerial levels were not well-qualified for the positions they assumed because they complained that the assignment was not merit

based. It was found out that leaders could not create a culture that promotes change, and hence poor orientation toward creativity and entrepreneurship.

The interviews made with industry respondents uncovered that they were not sure whether or not their culture could promote UIL that could lead to business innovation and technology transfer. However, they reported that there was some good beginning to introduce change oriented culture which could help companies to adopt innovation and new technologies. For instance, the attempts to introduce and implement modern management tools, such as business process re-engineering (BPR), balanced scorecard (BSC), and Kaizen were what these interviewees appreciated as good indicators of changes in culture.

13. Summary of the Major Findings, Conclusions and Suggestions

This study has intended toanalyze the influence of organizational culture on the implementation of UIL and its desired results (innovation and technology transfer) in the context of selected universities and industries in Ethiopia. With regard to the target population, science and technology universities and institutes, and manufacturing industry were considered for data collection. The data have been analyzed using both descriptive and inferential statistics

13.1 Summary of the Major Findings

- The aggregate mean value of $\bar{B}$ = 3.02(*SD* = 1.01) and the combined agreement of 37% respondents in the descriptive results of university data showed an overall positive perceptions of respondents regarding the effect of culture on UIL implementation. Similarly, the descriptive results obtained from industry data indicated that an overall mean of *X* = 3.28 (SD = 1.24) and an aggregate 54% of respondents who reported their agreements to the positive items about their culture. This means that organizational culture had positive influence on the UIL implementation and its outputs.

- The correlation analysis revealed that organizational culture and the UIL results have strong positive relationship (**r = 0.746**) for university and a moderate positive relationship (**r = 0.561**) for industries. From these results we see that organizational culture was more positively correlated with UIL results in universities than it was in industries. Nevertheless, the positive correlations in both cases pinpoint that the two variables go in the same direction which if properly exploited would drive both organizations to benefit from their collaboration.

- The simple regression analyses for universities and industries have also produced positive results. The result for university has shown that organizational culture positively explained the variation in the UIL results with a regression coefficient of0.627 holding the effects of other variables unchanged. Parallel analysis run for the industry also resulted in positive prediction of UIL results by organizational culture with a regression coefficient of 0.38 keeping all other factors constant. Therefore, we can say that organizational culture, when regressed alone, affects the UIL results positively both in universities and industries with the degree of explanation being stronger in the former case.

- The hypothesis testing conducted using the independent samples t-test revealed the t-value of -2.72 at (df = 191) was statistically significant at $p < 0.05$ leading us to a decision that the null hypothesis was not supported. The degrees of freedom for the t-test was based on the assumption that equal variances not assumed because the results of Levene's test for equality of variances showed that F (1, 363) = 8.89 was significant at $p < 0.05$ and directed us to the use of the second option of the t-values reported in the same test. Therefore, the statistical hypothesis which claims the absence of difference between universities and industries was not supported.

- The last, but equally crucial findings were those obtained from the qualitative data gathered through interviews and open-ended items. These findings indicated that organizational culture was found to affect the UIL implementation and its desired outputs. However, according to the opinions collected, the participants believed that their cultures were not in a position to promote UILto the level of their expectations, particularly in terms of innovation and technology transfer results. The respondents complained that their leaders did not have the capacity to create or adopt a culture that would promote change, and as such poor orientation toward creativity and entrepreneurship was what they perceived as the limitation of their cultures. However, some respondents, particularly from university witnessed efforts being made to introduce cultural change. But, they also disclosed that changes in their universities were more often used as a response to external push, like requests from government.

13.2 Conclusions

Based on the above findings the following conclusions have been drawn:

- From the descriptive results it has been observed that organizational culture had positive contribution to the UIL implementation both in universities and industries investigated. Majority of the research participants tended to have positive attitude toward their respective cultures which implies that well planned and implemented activities could lead to improved culture so that ensure the success and sustainability of UIL activities.

- The positive relationships between organizational culture and UIL results evidenced by correlation analyses show that there was ample potential to exploit from building and exercising strong culture in

line with UIL activities. The positive relationship results also implied additional efforts are required to enhance the role of organizational culture in such a manner that more outcomes could be harvested from effective execution of UIL. Similar results and implications have also been drawn from the simple regression analyses undertaken for both samples independently. Industries need to carry out much more tasks to enhance their culture as targeted to improving their relationships with universities, and hence better innovation and technology transfer.

- Universities and industries were found to be different in their perceptions toward the influence of organizational culture on UIL implementation. Universities were found to have relatively better positionto realize the contribution of culture to the effectiveness of their UIL activities as compared to their partner industries. However, there were visible limitations from both sides to recognize and capitalize on their cultures for the purpose of promoting innovation and technology transfer activities.

- Last, but not least, it can be said that organizational cultures of both universities and industries were not so strong to the level expected to promote their UIL activities.

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