Research Lines of the Faculty of Mechanical Engineering of the National University of Engineering and its Link with the Private Company

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***Abstract*– The present work consists of the compilation of information and subsequent evaluation, to verify the existence or not of a significant relationship that must exist between the lines of Scientific-Technological Research of the Faculty of Mechanical Engineering of the National University of Engineering with the Linkage University-Company. In this sense, a questionnaire validated by expert judgment was applied for subsequent analysis and statistical evaluation.**

***Keywords*– Research Lines, University, Company, Faculty of Mechanical Engineering.**

I. Introduction

There is a need and an implicit obligation that universities have to train, specialize and update their students and graduates, so that they can additionally carry out research work, in order to insert themselves into the social dynamics required in these times. In general, there is no adequate research policy and neither is there proper training of human resources, which is how the majority of projects that are executed do not adequately satisfy the needs required by companies; therefore, not the requirement of an effective and permanent link.

In addition, the problem is becoming more acute, due to the decreasing economic support of the State to all public universities in Peru. Having a low level of remuneration for its teachers, which does not facilitate scientific and technological research, this makes it urgent for us to link with the business community with dynamic interaction mechanisms aimed at collecting the experience and knowledge that is produced outside the faculty and extend its action to the service of the country.

II. Implementation of the Research

A. Limitations.

The limitations in an investigation can refer to limitations of time, space or territory and resources, among others, in this case we have considered the following [1]:

Time limitations: The evaluation condition regarding a topic may change temporarily. In the subject of study, the problem analyzed is chronic and comes from long ago, and unfortunately it is still valid. In addition, this is exacerbated in these times of pandemic.

Limitations of space or territory: It was carried out in the Faculty of Mechanical Engineering (FIM), within the scope of the National University of Engineering (UNI). We must also mention that this University is the most representative of Peru, where people from all over the country come.

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Resource limitations: This research work, due to existing administrative obstacles and cumbersome procedures, was fully self-financed.

B. Hypothesis.

General hypothesis: The lines of scientific-technological research of the Faculty of Mechanical Engineering of the National University of Engineering are significantly related to the University-Company link.

Specific hypotheses:

- The lines of scientific-technological research with their indicators: research management, dissemination and appropriation of knowledge and generation and transformation of knowledge are significantly related to the University-Company link.
- The lines of scientific-technological research are significantly related to the University-Business linkage indicator: degree and level of knowledge of the needs of the environment.
- The lines of scientific-technological research are significantly related to the University-Company link indicator. Link established between the professional institution and the company.
- The lines of scientific-technological research are significantly related to the indicator of the University-Company link. Adequacy of the technological offer with the demand of the environment.

C. Method.

Type of research: Depending on the degree of depth and scope that is intended with the research is Applied, because it solves a problem, they turn theoretical knowledge into practical and useful knowledge [2].

According to the emphasis on the nature of the data handled, it is *Quantitative*, because the preponderance of the study of the data is based on their quantification and calculations.

According to its extension in time, it is *Transversal* or *Synchronous*, since the study is limited to a specific moment, a segment of time during the year in order to measure or characterize the situation at that specific time.

Research level: It was Descriptive and Correlational level, because the variables are described: Scientific-Technological research lines and University-Company linkage and the degree of correlation that exists between both variables is measured.

Research design: This research corresponds to the non-experimental-transactional-correlational design. It is Non-Experimental (also known as post facto), since its study is

based on the observation of the facts in the middle of the event, without altering in the least neither the environment nor the phenomenon studied.

Population and Sample:

Population: The study population was made up of those people directly linked to the research institute of the Faculty of Mechanical Engineering of the National University of Engineering, made up of 20 people, including project managers, research engineers, director and past directors of the institute of research.

Sample: The sample is representative and was made up of: Research Engineers (8), Director and past Directors of the Research Institute (4) and Project Managers (8). Which constituted 100% of the population; that is 20 people.

"The size of the population and of the sample, which may seem small in absolute terms, actually does express the opinion and certainty of the responses of the respondents due to two fundamental considerations, firstly, the fact that the authors are part of the system, and second, people closely linked to the subject under study were chosen…".

Inclusion and exclusion criteria: Engineers who had a relationship with the Research Institute of the Faculty of Mechanical Engineering of the UNI were included.
Engineers who were not related to the Research Institute of the Faculty of Mechanical Engineering of UNI and all engineers who did not collaborate in the study were excluded.

D. Conceptual framework.

Type of Research: By depth and scope, the research is applied because it solves a problem, quantitative because the study of data is based on quantification and calculations, transversal or synchronous because the study is limited in time.

Research level: Descriptive and correlational [3], due to the description of variables, where the degree of correlation between both variables is measured.

Research design: Due to the strategy to test a formulated hypothesis, it corresponds to the non-experimental-transactional-correlational design. Based on observation of facts, without altering the phenomenon studied.

Population and Sample: The population was made up of *people directly linked to the Research Institute* (INIFIM) of the FIM-UNI. Project managers, research engineers, *Director and past Directors* of INIFIM. The Sample is representative and was made up of 8 research engineers, 4 people between Director and past Directors of INIFIM and 8 project managers.

E. Variable Operationalization

In table I, the variables that were taken into account for the present research work are defined, in addition, their operationality is defined there, both for inputs and outputs.

TABLE I. DEFINITION OF DE VARIABLES

Variable: X: Management of Scientific-Technological Research Lines
Operational definition: Open academic organization with a horizontal structure where a team of participating teachers, professionals, graduates and students systematically interact based on a disciplinary area of science and technology with the final objective of transmitting, generating new applications and producing knowledge around of this area.
Dimensions: X1: Scientific Management X2: Technological diffusion X3: Generation of knowledge
Indicators: Research management Dissemination and appropriation of knowledge Generation and transformation of knowledge
Variable: Y: University-Company Link
Operational definition: It implies thinking about projects whose team is mixed; that is, researchers linked to the academy and businessmen with specific needs.
Dimensiones: Y1: Institutional distance Y2: Interconnection Y3: Delay Y4: Demand - Supply Gap I+D
Indicators: Degree and level of knowledge of the needs of the environment Link established between the professional institution and the company Administrative delay Adequacy of the technological offer with the demand

F. Data collection instruments

Survey: Questionnaire taking into account the variables and indicators.

Analysis tests: Validity and reliability of instruments.

Validation of the instruments: "The validity of an instrument depends on its effectiveness in obtaining the results of the capacity, behavior or aspect that it claims to measure" [4]. Here the coefficient of validity was used.

Validity coefficient: There is no perfect measurement, as it is practically impossible to faithfully represent the various variables. "Validity is the term we use to refer to the extent to which our measures correspond to the concepts they reflect" [5], and for others: "Validity refers to the degree to which an instrument measures the variable it purports to measure. " [6].

The survey questionnaire has been used as an instrument. Taking as reference the *Content Validity Coefficient*, subject to the criterion of "expert judgment".

Reliability Coefficient: Reliability refers to the degree to which repeated application to the same subject or object produces the same results. For example, if a test is applied today to a group of students and gives certain values, but is applied a month later and gives different values, such a test would not be reliable [7][8].

G. Procedures and Data Analysis

Questions validated by expert judgment were used, then the data obtained were processed using the SPSS program, and subsequently the necessary information was collected for its evaluation. The statistics used were the following: *Arithmetic mean, Variance, Chi-square, Cronbach's Alpha* [9].

III. COLLECTION OF DATA FROM SURVEYS

To show the results obtained from the surveys, the abbreviations that appear in table II were used, in order to optimize the space in this article.

TABLE II. ABBREVIATIONS USED IN THE TABLES

Group	Description	Table
Ask	nth question	**Pi**
Information	Frequency	**F**
	Percentage	**P**
	Accumulated percentage	**PA**

Options	Strongly disagree	**TD**
	In disagreement	**D**
	Neither agree nor disagree	**AD**
	Agree	**A**
	Totally agree	**TA**
Total	Cumulative total	**T**

Table III defines a total of 9 questions aimed at obtaining information regarding the lines of research and the management of the research developed at UNI-FIM.

TABLE III. QUESTIONS ABOUT LINES OF RESEARCH

VARIABLE X: DIMENSION: LINES OF SCIENTIFIC-TECHNOLOGICAL RESEARCH	
P1	The lines of research respond to the institutional objectives
P2	The lines of research guide the institutional policies for the fulfillment of the academic function of the institution
VARIABLE X: RESEARCH MANAGEMENT	
P3	Develops strategic programs for the fulfillment of the academic research function
P4	The current lines of research adapt the regulations and manual of internal rules for the development of research
P5	The investigative activity is organizationally coordinated
P6	The lines of research seek scientific and technological innovation through research
P7	Through the lines of research, the joint participation of research groups in local and national development projects is encouraged
P8	The development of works whose proposals are applied to the social environment is promoted
P9	The investigative activity must have financing strategies

Table IV shows the data obtained in the application of the surveys, showing for each question, the frequency and the percentages corresponding to each of the proposed alternatives. As mentioned before, the terminology used is shown in detail in table II.

TABLE IV. RESULTS OBTAINED WITH RESPECT TO TABLE III

	P01			**P02**			**P03**		
	F	***P***	***PA***	***F***	***P***	***PA***	***F***	***P***	***PA***
TD	2	10	10				2	10	10
D	8	40	50	10	50	50	8	40	50
AD	8	40	90	4	20	70	4	20	70
A							4	20	90
TA	2	10	100	6	30	100	2	10	100
T	20	100		20	100		20	100	
	P04			**P05**			**P06**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10	2	10	10
D	10	50	60	8	40	50	8	40	50
AD	4	20	80	6	30	80	6	30	80
A	2	10	90	2	10	90	2	10	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	
	P07			**P08**			**P09**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD				2	10	10	2	10	10
D	14	70	70	4	20	30	6	30	40
AD	2	10	80	8	40	70	4	20	60
A	2	10	90	4	20	90	6	30	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	

In table V, questions are raised regarding the considerations of the variable X of dissemination and appropriation of knowledge, as well as; to the perspective of the generation and transformation of knowledge.

TABLE V. QUESTIONS ON DISSEMINATION OF KNOWLEDGE

VARIABLE X: DIMENSION: DISSEMINATION AND APPROPRIATION OF KNOWLEDGE	
P10	The lines of research incorporate representatives of the productive sector in the development of academic activities linked to research
P11	Promotes the transfer of knowledge through special degree projects for teachers
P12	Through the lines of research, it responds to the requirements of the local and regional productive sector
P13	The lines of research guide the teacher in the needs of the environment
VARIABLE X: DIMENSION: GENERATION AND TRANSFORMATION OF KNOWLEDGE	
P14	The degree projects and work practice are linked to the lines of research
P15	The lines of research guarantee the disciplinary orientation in the degree works
P16	They assume organizational strategies for the training-updating of teaching and research staff
P17	Academic activity is linked, improving the academic curriculum
P18	They relate the research activity with the academic functions of teaching and extension
P19	It articulates the investigative activity with the professional practice of the teacher
P20	Links degree work with problems and work practice
P21	Curriculum updating is encouraged through research activity related to the company

The results obtained with respect to the questions in table V are shown in table VI, which range from question 10 to question 21.

TABLE VI. RESULTS OBTAINED WITH RESPECT TO TABLE V

	P10			**P11**			**P12**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10			
D	8	40	50	2	10	20	12	60	60
AD	4	20	70	6	30	50	2	10	70
A	4	20	90	8	40	90	4	20	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	
	P13			**P14**			**P15**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10				2	10	10
D	10	50	60	2	10	10	4	20	30
AD	4	20	80	8	40	50	6	30	60
A	2	10	90	8	40	90	6	30	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	
	P16			**P17**			**P18**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10			
D	2	10	20	14	70	80	10	50	50
AD	10	50	70	2	10	90	6	30	80
A	4	20	90				2	10	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	
	P19			**P20**			**P21**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10				4	20	20
D	10	50	60	14	70	70	10	50	70
AD	2	10	70	2	10	80			
A	4	20	90	2	10	90	2	10	80
TA	2	10	100	2	10	100	4	20	100
T	20	100		20	100		20	100	

Another important factor that was evaluated in the present work is the distance that exists between the University and the Company-Society, from the point of view of the conception of needs that the University must satisfy, both with the postgraduate students in the stage of study, as well

as; when they have completed their master's degree. This information, which was later processed, showed very important results in this regard.

TABLE VII. QUESTIONS ABOUT INSTITUTIONAL DISTANCE

VARIABLE Y: DIMENSION: INSTITUTIONAL DISTANCE DEGREE AND LEVEL OF KNOWLEDGE OF THE NEEDS OF THE ENVIRONMENT	
P22	Guarantees the disciplinary orientation in the degree works
P23	The policies and action strategies are oriented towards the dissemination of research
P24	Guides the diagnosis of needs of the environment

VARIABLE Y: DIMENSION 5: LINKS ESTABLISHED BETWEEN THE PROFESSIONAL INSTITUTION AND THE COMPANY	
P25	Understand the environment through research
P26	Articulates investigative activity with professional practice
P27	Incorporates the contributions of the productive sector in the design of lines of research
P28	Promotes the transfer of knowledge through research work
P29	Responds to the requirements of the local and regional productive sector
P30	Incorporates representatives of the productive sector in the development of academic activities linked to research

Table VIII shows the results obtained by the respondents, compared to the questions raised in according to table VII. This block of questions focused on the lack of knowledge that the University has of the needs of the environment, and the different actions that must be taken and are important to establish the expected link.

TABLE VIII. RESULTS OBTAINED WITH RESPECT TO TABLE VII

	P22			P23			P24		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10	2	10	10
D	2	10	20	8	40	50	10	50	60
AD	2	10	30	4	20	70	4	20	80
A	12	60	90	4	20	90	2	10	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	
	P25			**P26**			**P27**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10	2	10	10
D	10	50	60	10	50	60	12	60	70
AD	2	10	70	6	30	90			
A	4	20	90				4	20	90
TA	2	10	100	2	10	100	2	10	100
T		100		20	100		20	100	
	P28			**P29**			**P30**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10	2	10	10
D	12	60	70	4	20	30	12	60	70
AD	2	10	80	2	10	40	2	10	80
A	2	10	90	10	50	90	2	10	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	

It was also evaluated as preponderant factors within the problem raised, the factor corresponding to the delay in the part of procedures and administrative management, whose questions are shown in table IX.

TABLE IX. QUESTIONS ABOUT ADMINISTRATIVE DELAY

VARIABLE Y: DIMENSION: ADMINISTRATIVE DELAY	
P31	Responds to institutional objectives
P32	Guides institutional policies for the fulfillment of the academic research function
P33	Develops strategic programs for fulfilling the function
P34	Adapts the regulations and manual of internal rules for the development of the investigation
P35	Training and updating of teaching and research staff are coordinated
P36	Organizational strategies are important in recruiting and updating teaching and research staff
P37	It relates the research activity with the academic functions of teaching and extension
P38	Produces knowledge from the approach of reality
VARIABLE Y: DIMENSION: INTERCONNECTION ESTABLISHED BETWEEN THE INSTITUTION AND THE COMPANY	
P39	Seeks scientific and technological innovation through research
P40	Stimulates research that responds to new trends and discoveries
P41	Design technologies to improve the social environment
P42	Addresses particular problems that constitute the starting point for the development of new research

The results of the responses obtained, compared to the questions raised about administrative delays in table IX, are shown in table X.

TABLE X. RESULTS OBTAINED WITH RESPECT TO TABLE IX

	P31			P32			P33		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10	2	10	10
D	14	70	80	10	50	60	12	60	70
AD				4	20	80	2	10	80
A	2	10	90	2	10	90			
TA	2	10	100	2	10	100	4	20	100
T	20	100		20	100		20	100	
	P34			**P35**			**P36**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10	2	10	10
D	8	40	5	12	60	70	14	70	80
AD	4	20	70	2	10	80			
A	4	20	90	2	10	90	2	10	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	
	P37			**P38**			**P39**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10	2	10	10
D	10	50	60	14	70	80	12	60	70
AD	4	20	80				2	10	80
A	2	10	90	2	10	90	2	10	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	
	P40			**P41**			**P42**		
	F	**P**	**PA**	**F**	**P**	**PA**	**F**	**P**	**PA**
TD	2	10	10	2	10	10	2	10	10
D	14	70	80	12	60	70	4	20	30
AD	2	10	90	2	10	80	10	50	80
A				2	10	90	2	10	90
TA	2	10	100	2	10	100	2	10	100
T	20	100		20	100		20	100	

IV. RESULTS

Initially, working hypotheses were established for this research. These hypotheses served as a reference to establish the link between the University and the needs of society that the Company should satisfy, and in turn establish a direct link with the University.

Ha: The scientific-technological research lines of the FIM-UNI are significantly related to the University-Company link.

Ho: FIM-UNI's lines of technological scientific research are not significantly related to the University-Company link.

Tables XI and XII show the results obtained from the evaluation of management, dissemination and generation indicators, established to evaluate the expected link.

TABLE XI. CONTINGENCY LEVEL OF VARIABLE X - VARIABLE Y

		Level of variable Y		Total
		Under	*High*	
Level of variable X:	***Under***	14	0	14
	Medium	2	0	2
	High	0	4	4
Total		16	4	20

Since p = 0.0000454 < 0.05, we reject the Ho Hypothesis and conclude that there is a significant relationship.

Table XIII shows the results obtained from the evaluation of management, diffusion and generation indicators, among other factors; established to assess the expected link.

TABLE XII. CHI SQUARE TEST

	Value	Gl	Asymptotic Sig. (bilateral)
Chi Square of Pearson	20,000[a]	2	,0000454
Likelihood ratio	20,016	2	,000
Linear by Linear Association	16,442	1	,000
N of valid cases	20		

Since p = 0.0000454 < 0.05, we reject the Ho Hypothesis and conclude that if there is a significant relationship.

TABLE XIII. INDICATORS OF THE LINES OF SCIENTIFIC-TECHNOLOGICAL RESEARCH AND UNIVERSITY-BUSINESS LINKS AT FIM-UNI

DILICT	Variable Y	
	VE	***SAB***
Management / Research Management	12,879	0,002
Dissemination / Dissemination and appropriation of knowledge	11,986	0,001
Generation / Generation and transformation of knowledge	13,820	0,003

We define:

DILICT = Dimensions and Indicators of scientific-technological research lines
VE = Statistical value
SAB = Asymptotic Sig. (bilateral)

TABLE XIV. SCIENTIFIC-TECHNOLOGICAL RESEARCH LINES

Dimensions / Indicators of the University-Company link	LICT	
	VE	***SAB***
***Institutional distance* / Degree and level of knowledge of the needs of the environment**	11,349	0,002
***Interconnection* / Link established between the professional institution and the company**	11,586	0,002
***Administrative delay* / Administrative delay**	13,720	0,003
***Demand-supply gap* / Adequacy of the technological offer with the demand of the environment**	10,358	0,001

We define:

LICT = Scientific-technological research lines
VE = Statistical value
SAB = Asymptotic Sig. (bilateral)

Analyzing the data shown in table XIII and table XIV, we can interpret the situational characteristics of the problem under analysis. This behavior is broken down into the conclusions and recommendations of the research.

We can conclude then, that from the results of the research work corroborated with the hypothesis test, it can be inferred that the use of the lines of technological scientific research of the Faculty of Mechanical Engineering of the National University of Engineering is significantly related to the University-Company link. This coincides favorably with an aspect of the work carried out by Lidia Colmenárez de Saavedra (2001) on "University-Business Linkage: DAC-UCLA-PYMES postgraduate strategic plan" [10], in which she mentions that historically education has had the arduous task of task of planning and executing development strategies based on the needs that the environment demands as a result of the rapid and turbulent changes that occur within it.

It is inferred that the use of the lines of technological scientific research of the Faculty of Mechanical Engineering of the National University of Engineering is significantly related to institutional distance. These results are related, although in a moderate way, with the results obtained by Yiberín, E. (1993) in his study "Research at the Central University of Venezuela and its Relationship with National Policies in Science and Technology" [11], whose objective was relate the process of scientific and technological research that is carried out at the Central University of Venezuela, with the policies, goals and actions foreseen in the II Science and Technology Plan.

It is inferred that the use of the lines of technological scientific research of the Faculty of Mechanical Engineering of the National University of Engineering is significantly related to the link established between the professional institution and the company, this coincides favorably with an aspect of the work carried out. by Milagro Puertas de García, entitled "Design of Research Lines in University Institutions", prepared as support for the definition of research lines at the Law School of the Fermín Toro University in Venezuela, where it presents different concepts on lines of research.

Regarding the use of the lines of technological scientific research of the Faculty of Mechanical Engineering of the National University of Engineering, it is significantly related to the administrative delay, this coincides favorably with an aspect of the work carried out by López, A. (1991) in their research entitled "Instructional Strategies in Research Methodologies and their Influence in the Preparation of the Degree Project" [12], whose objective was to determine the Instructional Strategies in Research Methodology and their Influence in the preparation of the Project of Degree. Degree, concluding that the methodological preparation should be sufficient for the participants to successfully prepare their degree work projects, which corroborates the results proposed in this study.

CONCLUSIONS

1) The lines of scientific-technological research are significantly related to the University-Company relationship with a p = 0.0000454 < 0.05.

2) In relation to the lines of research and their indicators of research management, dissemination and appropriation of knowledge, generation and transformation of knowledge; a significant relationship was established with p = 0.002, 0.003 and 0.001 respectively.

3) The lines of research are significantly related, with p= 0.002 for the indicator of the University-Company link, the degree and level of knowledge of the needs of the environment is observed, where a high level of disagreement was obtained, by 50%.

4) The lines of research are significantly related, with p=0.002 for the linkage indicator, showing unacceptable linkage. Most of the participants disagreed, at 60%.

5) The lines of scientific-technological research are significantly related (p=0.003) with the indicator of the

University-Company link, here they indicate with respect to the administrative delay, that a large group of the participants disagreed, by 40%.

6) The lines of research are significantly related, by means of a p=0.001 in the linkage indicator, with respect to the adequacy of the technological offer with the demand of the environment. A majority disagreement was obtained from the participants, 60%.

7) Also, from the information reviewed during this research work, we were able to observe that the problem that led us to carry out this work at the National University of Engineering, is a recurring problem in many Universities in the interior of Peru, as well as; in other Universities within Latin American territory.

RECOMENDATIONS

1) Take into account the relationship between the lines of scientific-technological research of the FIM-UNI with the University-Company link to manage, establish and define the lines of research; as well as carry out coordination strategies, agreements and strategic alliances with the business sector.

2) Consider the lines of scientific-technological research with their indicators: research management, dissemination and appropriation of knowledge and generation and transformation of knowledge as policies, standards and procedures for the promotion and conduct of research as an essential and mandatory activity at the University and must be contemplated in its Institutional Strategic Plan.

3) Take into account the indicator, degree and level of knowledge of the needs of the environment to know the needs of the environment; In addition, adequate policies and strategies must be applied for the dissemination of scientific-technological research.

4) Consider the indicator, link established between the professional institution and the company in order to articulate the professional practice and the company, incorporating the contributions of the productive sector in the design of scientific-technological research.

5) Regarding the indicator, administrative delay, it is necessary to have greater efficiency in carrying out the activities, so that it responds to the institutional objectives and also guide these policies for the fulfillment of the academic investigative function, the regulations and the manual of internal norms; which, in turn, must be improved.

6) Regarding the indicator, adequacy of the technological offer with the demand of the environment, scientific-technological innovation must be promoted in accordance with the needs of the national, regional and local environment.

7) Looking at the results of the investigation, we observe that the problem is common within the Latin American sphere, so it would be convenient to carry out joint work between different universities in the area, in order to evaluate joint solutions.

8) It would be interesting to take this problem to international organizations at the Latin American level, to generate joint solution lines that involve the Universities of the sector.

9) As these are common problems in our countries, mobility programs for postgraduate students and visits by university authorities to countries where this problem is less could be proposed, so that postgraduate students can observe different positive realities and be able to replicate them in our country.

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