SCIENTIFIC CULTURE

www.sci-cult.com

SCIENTIFIC CULTURE, Vol. 11, No. 4, (2025), pp. 1267-1277
Open Access. Online & Print

DOI: 10.5281/zenodo.11042598

ROLE OF THE UNIVERSITY IN THE PROCESSES OF KNOWLEDGE TRANSFER FOR COMPANIES IN THE AGRO-INDUSTRIAL SECTOR

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Received: 11/11/2025
Accepted: 20/12/2025

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ABSTRACT

The results of this research are presented, which has the general objective of proposing strategies for knowledge transfer from universities for the strengthening of the agro-industrial sector, through: describing the models of knowledge transfer between universities and the agro-industrial sector; to characterize the necessary components for the processes of knowledge transfer between universities and companies in the agro-industrial sector; Define strategies for the transfer of knowledge between universities and companies in the agro-industrial sector. To this end, a qualitative, explanatory, non-experimental, cross-sectional and field research was carried out, taking a population and sample of twenty experts in the agro-industrial sector of the region, who were interviewed, in order to find common opinions. According to the above, the following results were obtained: a mixture of existing knowledge transfer models should be applied, prioritizing the relationship between university-business-state; The participation of companies in innovation and development processes leads to multiple tax and financing benefits; various strategies are proposed to improve the transfer of knowledge between the university and the agro-industrial sector.

KEYWORDS: Agribusiness, Competitiveness, Innovation, Knowledge Transfer, Value Chain, University.

1. INTRODUCTION

Nowadays, one of the most important assets that any organisation has is information, which provides essential tools when generating innovative processes and provides a fundamental resource for increasing productivity and decision-making. In this sense, universities are responsible, from their research and academic processes, for transferring it to the members of the production chain, as a useful input when it comes to understanding the environment and satisfying specific market demands. Thus, in this paper he intends to propose strategies for the transfer of knowledge from universities, which can contribute to the strengthening of the competitive capacities of companies in the agro-industrial sector.

The above statements suggest that, altho there are some efforts on the part of academia to narrow this open space between both sectors more and more, it can be evidenced that most of the research papers produced are focussed on solving academic problems but not on meeting the needs of companies in their environment. As an example of the aforementioned situation, it is evident that students carry out business and training interneships, a process in which knowledge and information is transferred from the academic environment to the work environment, in which internes become the instrument by which this process of rapprochement between both sectors is carried out.

Likewise, the university has a policy that requires the preparation of a degree project as a requirement to obtain a university degree, altho it is unknown how such projects impact on the productivity of local companies. Within this perspective, the graduate becomes only a product of the university at the time of entering the labour market, but it does not represent a knowledge transfer strategy towards it, since its results depend solely on its performance and performs a job in search of experience or a personal economic benefit, not on behalf of the university.

In addition, there are no feedback methods thru which the business environment can maintain an open communication channel with the university, in order to share experiences or present their needs. In this order of ideas, we should think about the so-called "knowledge society", in which information becomes the main generator of changes in the environment and allows the development of the economy and social transformation. It is at this point, where universities play an important role in the process of knowledge transfer, not only as a provider of human talent to the workplace, but also as a provider of strategies that contribute to reducing knowledge gaps in the agroindustrial sector of the municipality.

2. LITERATURE REVIEW

2.1. Economy and Technology

In the current economic environments, information and communication technologies play a key factor in innovation and the improvement of productive processes, which are determinants in the competitiveness of companies and, therefore, in the economic dynamics of any country. For this reason, companies must have access to the knowledge produced in universities and research centres to incorporate new technologies, knowledge and methods into their productive processes that constitute an increase in their productivity and competitiveness levels, thus achieving a greater link between science and the business environment (Waissbluth, 1994).

In this context, it is important to highlight the concept of knowledge and technology transfer, as a process of creating, storing and retrieving information to transfer it to companies or organisations to support the creation of new products or services, as well as the improvement of their productive processes (Chang et al., 2005). In this process, there must be a high degree of relationship between the sender and the receiver, with universities and scientific institutions being the main knowledge-generating entities, and the business environment, the main information-demanding one (Vázquez González, 2017).

This is how, in developed countries, such as the United States or Switzerland, these processes of knowledge transfer from universities or research centres are strengthened, in order to contribute to increasing the competitiveness of their markets. In turn, competitiveness can be understood as the way in which organisations manage to achieve certain advantages that allow them to obtain a privileged position compared to their competitors, in the environment in which they develop and, in this way, maintain profitability over time and contribute to human development (Ferraz, Kupfer, & Iootty, 2004), which translates into a high degree of economic dynamization and social transformation.

On the other hand, in countries with emerging economies, such as Mexico, despite the efforts of public institutions to promote co-operation relations between academia and the productive sector, it has not been possible to generate effective processes of relationship between both links of the socio-economic engine that allow raising the productivity and competitiveness indices of the nation (Vázquez, 2017).

Similarly, every year, the World Economic Forum measures the factors that allow calculating competitiveness in countries, that is, those that project the greatest opportunities for sustainable growth. According to the results of the Global Competitiveness Report (2017), the countries that lead this list are: Switzerland, Singapore, the United States, the Netherlands and Germany respectively, in this measurement various factors are taken into account such as: quality of their institutions, infrastructure, macroeconomic environment, health or primary education, from which the necessary parameters can be defined to consider a country as competitive.

The report mentions that the countries that obtained the highest scores implemented business support programmes, it also indicates that the development of technology adoption processes, sophistication and innovation plays a fundamental role in this measurement and also contributes to the growth of the economy. The above proposes the following scenario: the economic growth of a country, therefore, the increase in its productivity levels, are directly proportional to its efforts made in terms of technology support processes, innovation and economic growth in emerging companies (World Economic Forum, 2017).

However, according to the Sustainability Report of the Inter—American Development Bank "IDB" (2010), it is highlighted that companies in Latin America and the Caribbean base their innovation decisions more on information from market sources — suppliers, customers and competitors - than on information from scientific institutions, giving a low level of importance to the use of the latter. The IDB study points to the reduced exchange of knowledge between scientific institutions and companies, as a reason that explains the low generation of ideas for innovation, partly due to the low absorption capacity of companies, the waste of scientific discoveries and the irrelevance of research in public institutions to meet business needs, amongst other difficulties.

Faced with this problem, it is sought that universities play a fundamental leadership role in their regional environments, so that in alliance with other social agents they generate competitive innovation strategies (López et al., 2009). This is largely due to the enormous challenges that Colombia faces in the area of research generation. In this sense, it can easily be seen in a region that the productive supply is mostly dominated by primary sector activities, which occupy a place of maximum importance in the local economy. This behaviour can mainly be due to the low existing technological offer and the lack of support programmes from government institutions or universities, towards manufacturing companies, deriving this in the low development of the sector, therefore, in the little use of the productive potential of territorial nuclei of small areas or localities.

Consequently, the companies that are part of the agroindustrial sector of municipalities do not ensure the necessary capacities to lead innovation processes efficiently, they also have a low or almost zero level of relationship with the scientific environment, basing their strategic decisions on internal information, despite the weakness of their research and development infrastructure (Cuello, 2016).

2.2. Models Of Knowledge Transfer

To propose an appropriate strategy of articulation between the business environment and the scientific or academic environment, the existing models that describe the knowledge transfer processes between universities and companies should be taken into account, amongst which are the Linear Model, Triple Helix Model, Spiral Model and Catch Up Model, which are detailed below:

2.2.1. Linear Model

As stated by García et al. (2013), the Linear Model: "It is characterised by defining the transfer, starting from the needs of the market, accompanied by basic research, to then take it to applied research and initiate the process of transferring research results" (García et al., 2013), that is, to achieve an effective process of innovation in products or productive processes, certain stages must be followed, starting with scientific research. Under this premiss, the usefulness of R&D processes as the main means of knowledge and technology transfer to the market is highlighted, responding to their specific needs. In this sense, Smith (1995) proposes the following chain that describes the practical operation of this model and the activities that should be carried out from research to the production and commercialisation of knowledge.

2.2.2. Spiral Model

Understanding knowledge as a competitive advantage that allows any company to have a privileged position with respect to its competitors, Nonaka and Taekuchi (1995) propose that the processes of knowledge creation are similar to a spiral that unites tacit knowledge and explicit knowledge, the first being the one that can be transferred, communicated or shared in the form of data and the second, represents a more complex type

of knowledge, to the extent that it is not expressed in a, but as experiences or skills that start from personal experience (Nonaka and Taekuchi, 1995). Thus, four processes are described thru which knowledge can be created:

- Socialisation: Individuals share knowledge thru common experiences.
- Combination: construction of a new explicit knowledge.
- Outsourcing: turning tacit knowledge into explicit one.
- Internalisation: turning tacit knowledge into learning.

Taking into account the previous postulates, knowledge is created thru the interaction between individuals, who share common experiences and from these new knowledge is generated, which is disseminated and learnt within organisations, turning this process into an information spiral (Nonaka et al., 2001).

2.2.3. Catch Up Model

This model, described by Kim (2000) is based on the imitation and acquisition of knowledge created by a third party, using as a reference the industrialisation processes applied in Korea and Japan, which allowed these nations to move from an economic model totally dependant on agriculture to actively compete in the technology and communication industry in a period of only four decades (Kim, 2000).

In this way, the Catch Up model proposes two stages for the transfer: the first, where the existing knowledge is learnt and absorbed, requiring companies to advance at an accelerated pace, thus increasing their adaptation capacities and originating methods of appropriation. In the second stage, we move from "duplication" to "creative imitation", a process that requires greater academic skills and a higher level of knowledge, this forces the state to invest in R&D processes in universities and companies that allow them to master absorption strategies. In this way, it is possible to move from adaptation to improvement and subsequently to the production of technology with the active participation of the State in the design of programmes that contribute to the increase of skills and investments in R&D.

2.2.4. Triple Helix Model

In this model, the latent need to incorporate science and technology into the productive sector is raised, emphasising the direct relationship that arises between these three components when creating and transferring knowledge. This approach finds significant theoretical support in the sections of Leydesdorff (2010), who point out that: "The state creates public research institutions, universities create companies and these, in turn, create research and development units" (Leydesdorff, 2010).

In this way, the model can be understood as a synergy between universities, companies and the state, which, strengthened and managed in the appropriate way, generates important contributions to the economy, since the projects or ventures generated from universities, supported by the state as a financing entity, give rise to innovative and competitive companies that contribute to economic development.

2.3. Components Of Knowledge Transfer

In order to adapt a knowledge transfer model for the creation of articulation strategies between agro-industrial sector companies, universities and the public sector in the municipality, three fundamental components must be taken into account: applied research, innovation and tax incentives, which are detailed below.

2.3.1. Applied Research

According to Vidal et al. (2024) applied or descriptive research refers to the description of research results based on questions asked by the researcher without giving a detailed explanation of why the events occur, and are based on statistical data obtained from surveys, interviews, amongst others in order to provide a solution to existing problems and also identify fundamental aspects that can be improved to obtain optimal results and ensure greater competitiveness; this is where experts, entrepreneurs and universities should look for appropriate policies to develop new technologies and strategies that favour the economic growth of the agroindustrial sector (Vidal et al., 2024).

2.3.2. Innovation

Innovation can be defined according to Fagerberg et al. (2010), as: "a process that allows combining skills and techniques in order to provide novel solutions to particular problems" (Fagerberg et al., 2010). And that involves the results of applied research in the adoption of new technologies or in the improvement of existing technologies (UNESCO, 2018), in such a way that business behaviour can be constantly energised at the productive level. From the above, it can be said, that innovation in terms of production systems, final products and marketing methods; it is key for companies in the agroindustrial

sector of the municipality and the department to achieve a higher competitiveness index compared to other national companies, in order to increase the local economy and position the sector at a high national level. This is where companies must identify which products or processes should be innovated so that, together with universities, action plans can be developed that contribute to the strengthening of the sector. Likewise, universities must work internally with students so that innovative ideas are generated at the academic level that can be developed and exposed to entrepreneurs to be marketed and produced.

3. METHODOLOGY

According to Sampieri, Collado, Lucio (2014),"Research is understood as a set of systematic, critical and empirical processes that are applied to the study of a phenomenon or problem" (Sampieri; Collado; Lucio, 2014). In this way, the research carried out is framed in a qualitative approach where the phenomena that occur are understood taking into account the opinions and perspective of the participants in a natural and spontaneous way in order to collect data and points of view (Sampieri, Collado, Lucio, 2014).

For that reason, this research investigated the transfer of knowledge thru the application of an interview to a group of experts to collect qualitative information that allows comparison with existing theories and models, in order to propose strategies from universities that can be used by companies in the agro-industrial sector.

According to the level of depth, the applied research at work refers to the description of research results based on questions and is based on statistical data obtained from surveys or interviews According to Arias (2012), "Descriptive research consists of the characterisation of a fact, phenomenon, individual or group, in order to establish its structure or behaviour" (Arias, 2012).

In that order, the design of the research is non-experimental, since a process of observation, analysis and explanation was carried out without exercising control over the phenomena that compose it and the researchers do not exercise manipulation on the variable under study, its dimensions and indicators, but their behaviour is observed in a real time and context to then submit it to an analysis (Palella and Martins, 2012). Likewise, the type of the study is framed in a field investigation, which, according to the postulates of Ramírez (1999), a collection and systematisation of information is carried out from the context where the events occur, that is, in the agroindustrial sector (Ramírez, 1999).

On the other hand, this research is of a transectional type, due to the analysis of the knowledge transfer variable, its dimensions and indicators at a single moment thru the contributions of experts from the application of a data collection instrument, without exercising control over the results, which were subjected to a verification and analysis process to obtain a common answer to the problem posed (Palella and Martins, 2012).

The population corresponded to all possible reporting subjects related to the agroindustrial sector of the municipality of Valledupar. In this sense, for the selection of the sample, a non-probabilistic sampling was used, which consists of making the selection taking into account the characteristics of the research and convenience, instead of applying a statistical criterion (Hernández Sampieri, Fernández Collado, & Baptista Lucio, Research Methodology, 2014). In this way, the sample determined for this study corresponded to twenty knowledgeable experts of the agroindustrial sector of the municipality of Valledupar, Cesar – Colombia. Considered important for the development of the present research because they are leaders of business guilds, university rectors, researchers and leaders of government entities linked to the agroindustry of the region.

Likewise, in the present research, a structured interview was used as a data collection technique that consists of asking questions designed in a logical order (Arias, 2012), under the guidelines of the Delphi or Expert Consultation Method, which is defined as a process where a group of people who are considered experts in a specific topic are consulted, to try to reach a consensus and solve a common problem (Krajewski and Ritzman, 2000). In this way, as an instrument to obtain the information, a questionnaire was designed aimed at a group of experts made up of people related and knowledgeable about the agroindustrial sector and business development of the municipality of Valledupar that consists of a set of questions designed in order to collect the necessary information to achieve the objectives of the research project (Sampieri, Collado, & Lucio, 2014).

The information collected thru the application of the instrument and the consulted sources was analysed thru a data triangulation process, which "refers to the use of various methods (both quantitative and qualitative), data sources, theories, researchers or environments in the study of a phenomenon by comparing and verifying the information obtained at different times" (Okuda and

Gómez, 2005).

For the purposes of triangulation, the first method of data source is the interview, and the second method is the research of bibliographic sources that allow to orient the analysis of the perception of each interviewee in order to propose knowledge transfer strategies. Taking this into consideration, the answers obtained in the interviews to the expert group were unified and common arguments or opinions were sought to reach a final consensus that represents a concrete answer to the problems exposed in this research.

4. RESULTS AND DISCUSSION

After the application of the data collection instrument to the interviewed subjects knowledgeable about the agroindustrial sector, an analysis is carried out where the position of these is identified in front of the topics treated in each of the questions asked in the interview. Below, the opinions of the experts are detailed, which were taken as the main element to carry out the information triangulation process. Subsequently, these were compared with the theories consulted throughout the development of this research, being the second component of the triangulation process and as a result the proposed strategies for the improvement of knowledge transfer between universities and companies of the agroindustrial sector were generated. The following are the answers to the objectives raised in this work.

4.1. Improving The Productivity And Competitiveness Of The Agro-Industrial Sector From Research

For the agro-industrial sector, research must be applied and must arise from a need that must be covered and that in turn must be validated by the guilds that participate in the value chain. This is in order that the research carried out does not remain in books and shelves and that they are only consulted by the scientific guild. Therefore, research must be carried out in a practical way and it must be decentralised, that is, take students to the territories, in this case the field, so that in this way the research approaches point to the resolution of priority needs in issues of process and development of the Agroindustrial sector. It should be borne in mind that for this to happen, an articulation between the parties must be made.

Likewise, the research should be carried out on specific topics that have been identified as bottlenecks in the value chain so that the productivity and competitiveness of the sector in the region can be improved. In this way, the research has to start from the needs of the producing entrepreneurs, in order to solve the problems that originate.

For example, it is necessary to do initial research on the entire issue of the production of the municipality's crops; and from there to move on to the issue of the transformation of the harvests that are held from each of them. It should also be carried out on reports or research background or practises oriented in the local context; in this way the basic thing is solved, the absence of information. In addition, research should be done on how it is produced to have and obtain good harvests to generate added value.

In this way, it is necessary to resume lines of work that have already demonstrated success within the process. One of the proposals is the university-company -state alliance and it is when these three actors are combined, complemented and articulated, each with its strengths, each with its dynamics as the only way to generate a regional development process, where there is the possibility of putting to produce properly and it is necessary to put to talk these three actors for their articulation.

Likewise, another strategy that has worked in the academic part is the "formative research", it is based on the development of lines of work with students of professional or undergraduate university training which integrates doctors or masters in the research proposal, which means that they can generate new solution alternatives consistent with the needs of the environment.

In that order, the first thing to do is to clearly identify the productive bets of a region. Knowing what your strengths and opportunities are in the lines is productive to be more competitive, if the productive bets are not known, no kind of research can be focussed. Secondly, the productive apparatus must be reviewed, in what conditions it is in the technological and human talent issue. Thirdly, to review the tax issue, that is, the conditions of the sector to compete in the National and regional markets. Fourthly, the infrastructure and machinery should be reviewed, and as a final point, the issue of project financing should be reviewed.

At the same time, there must be a consensus, an agreement of wills of facts and rights between the public sector, the private sector and the university, in order to identify the projects that respectively have to be developed in favour of the region to carry out research and position the agroindustrial sector and give it the true dimension of an agroindustrial productive region. In fact, a State public policy alined with development plans is required. As well as

investment resources available for a good development in land technification, irrigation systems, advanced technology and loans with soft interests.

In conclusion, the experts affirm that the improvement of the competitiveness and productivity of the agroindustrial sector is achieved from the creation and the incentive of research programmes that focus on the real and current needs of the local and regional agroindustrial sector, that is to say that scientific products are developed that solve problems presented by entrepreneurs in their productive chain and that in the same way contribute added value to it.

However, state programmes for the development of science and technology should be activated and promoted, since an articulation between Universities, Companies and the State should be aimed at, as pointed out by Etzkowitz and Leydesdorff (2000) in the Triple Helix transfer model, where what is sought is a synergy between universities, companies and the state, which, strengthened and managed in the appropriate way, generates important contributions to the economy, since the projects or ventures generated from universities, supported by the state as financing entity, they give rise to innovative and competitive companies that contribute to economic development, in this case of the agroindustrial sector and in the same way they support existing companies for the improvement of all the links in their productive chain.

4.2. Knowledge Production Processes In Favour Of The Productivity And Competitiveness Of The Agroindustrial Sector

The knowledge production processes must be based on the different knowledge related to the needs of the agricultural and livestock sector, the productive processes for its improvement, as well as the target market and the products in greatest demand, in order to generate manufacturing processes from primary production and satisfy the needs of local, regional consumers and possible export opportunities. However, the production of knowledge is a marriage between universities, companies and the state where it is intended to find a solution to the existing problems of the sector. For that it is important that there is participation; that is, that there is an exchange of ideas in order to identify, analyse and discuss together so that we work in harmony in the search for solutions and meet the objectives.

In that order, the state-university-business articulation should be strengthened and it is necessary that between the three of them they identify which are the projects that should be developed, in order to prepare human capital and all the aspects that generate competitiveness in the region, identified with a prospective towards where development should be oriented.

In this way, the universities must work hand in hand with the public entities, which based on the established development plan, can integrate with the guilds representing each of the agroindustrial productive sectors in order to identify the difficulties and needs, in order to point the research to the relevant research centres since in the universities, the research groups do not solve the real problems faced by the producers of the region in general.

Likewise, the knowledge that is generated must be open; that is, collaborative works between public and private universities with companies in the productive sector are produced, available in publications, databases, repositories and physical and digital libraries without restrictions. At the same time, universities should organise and promote science and technology fairs and forums, where students and teachers of all levels have spaces to show the products developed. In addition, it is necessary that each of the entities that interact in the chain know their role, since one of the significant difficulties arises due to non-collaborative and independent work without participatory purposes.

On the other hand, technical, technological, professional and postgraduate training should continue to be motivated and encouraged. For this, it is required that universities and institutes determine the training of new professionals in disciplines that can help the economic development of the territory, that is, disciplines related to the productive bets of the territory. In an agricultural, livestock and agro-industrial region, knowledge has been built from generation to generation, it is an ancestrally important sector, which generates a countless number of direct and indirect jobs that link families and their members with labour and productive capacities.

4.3. Improving The Transfer Of Knowledge From Universities To Companies In The Agro-Industrial Sector

The experts in agroindustry, taken as a sample to apply the data collection instrument for this research conclude that research should be generated that responds to the needs of the sector, in addition to starting to articulate the universities and research centres that are in the department, that would potentiate the resources but also the existing

knowledge and experience from the academy to improve agroindustry.

However, universities have a great advantage with interneship programmes, which are not being used as they should, that is, the responsibility of the university is to send the student to carry out this process; for the interne or interne their function is to meet the necessary requirements to obtain their degree, but on many occasions that exercise does not generate a favourable result for the student and the same happens with companies, since the talents or potentialities of the student are not exploited, nor are they applied for the benefit of the company. For example, many times companies have prepared and proactive internes, but they do not give them the responsibility of directing a programme or a project focussed on solving the needs of the sector, losing the possibility of generating new solutions to existing problems. Therefore, interneship programmes should be expanded, creating a link between the two actors.

In addition to this, spaces such as forums or conversations can also be opened that contribute to entrepreneurs expanding their idea of having a business. Most of the farmers who are part of the agribusiness have their business as a hobby; they inherited a farm, they start planting seeds and the farm gives them money to support themselves, which is enough for them. Important variables such as the profitability of the hectares planted, the opportunity cost or the impact of changing products or seeds are not measured. In this sense, it is required that universities be more aware of their role in economic dynamics and thus open more spaces for the dissemination of experiences and create strategies that allow them to better impact the sector.

In this context, speaking the same company language is essential. At the level of science, we should basically talk about what added value is being generated and what profit or utility is being obtained; since, it is recurrent that researchers do not understand that producers are a fundamental piece in the process. The producers are the associations, the guilds, the private companies, they are the ones who consume the raw material of the agricultural production. Therefore, it is necessary to ensure that the research is in line with what companies and producers want and need.

It should be noted that the Guild-Academy relationship has given positive results in all the economies of the world in the agricultural sector. For this reason, postgraduate studies should be encouraged, so that students and new generations understand the magnitude of what the primary sector and the manufacturing sector represent for the region's economy. The potentialities for the future must be evaluated and include the climatological challenges that are currently being faced and in all this process the academy is fundamental, since it must reflect a greater dynamism, achieve more ownership of its relationship with the guilds and, in this way, contribute more to the development of the agroindustrial sector.

According to the above, it is necessary to clearly identify the productive vocations of the territory, so that the academy can deliver information that is relevant to the needs of entrepreneurs and that is linked to the approach of universities, to design specific academic programmes and link students in research projects related to the current problems of the municipality. Thru the strengthening of the relationship between the University-State-Enterprize trinomial.

Faced with this scenario, it is necessary to constantly visit companies and generate spaces for participation and invite entrepreneurs to give lectures within universities, that is, take the most influential and representative entrepreneurs in the sector and take them to universities more often and try to generate more impact. It is necessary to take students out of the classrooms and take them to real and practical scenarios, generating less theoretical knowledge and more alined to the needs of the economic system of the region.

From the above statements, it can be concluded that experts pose various scenarios that can provide a solution to the presented situation. One of them is to strengthen the interneship or business interneship programmes, in order to give more responsibility to students and make better use of their capabilities within companies. In the same way, it is proposed to strengthen the relationship between companies, academia and the State, thru the generation of spaces for participation and communication between these actors of the process, which is framed within the approaches of Etzkowitz and Leydesdorff (2000), which describe the components of the Triple Helix model for knowledge transfer.

It is also recommended to generate research that is alined to the real needs of the environment, to know the productive potential of the municipality and to promote in universities a more practical than theoretical learning style, in which students can leave their classrooms to have direct contact with the business environment and achieve greater dynamism in the economic development of the municipality.

4.4. Strategies For Knowledge Transfer Between Universities And Agro-Industrial Companies

By analysing the information previously provided by the experts and taking into account the triple helix model, which is the one that best suits the needs of agroindustry, basic strategies are proposed for strengthening the knowledge transfer processes between universities, companies in the agroindustrial sector and the governmental entities of the municipality of Valledupar. Each of the proposed strategies are detailed below:

To offer consulting and advisory services for companies in the agro-industrial sector, thru students or the teaching staff available at universities, as support in technical aspects or solution of specific problems of interest to entrepreneurs, which contribute to the improvement of their productive processes.

Development of Sectoral Working Tables, in which the needs of companies are prioritised by sectors according to the productive activity carried out, that is, the different guilds of the local agroindustry (livestock, dairy, coffee, cocoa, amongst others), the academy and the financing entities meet in the same space, to generate a diagnosis of the current state of the sector and design action plans that strengthen and improve the productive processes.

Presentation of success storeys in the agribusiness sector, thru events that have the participation of agribusiness entrepreneurs and students, to encourage small businesses and universities to apply innovative processes and continuous improvement.

Execution of forums or conversations in universities where entrepreneurs from the agro-industrial sector are invited as speakers, to share their experience to students.

Execution of Business Conferences where the financing and government entities offer their services or benefits to small and medium-sized companies in the sector, as a promotion to their innovation and development processes.

Strengthening of agreements between universities and agro-industrial companies to support the business interneship processes of their students and the development of training visits to their facilities.

Expansion of the academic offer of universities in the field of complementary education, undergraduate and postgraduate, which is in accordance with the needs and productive potential of the agroindustrial sector of the municipality of Valledupar.

Creation of a Service Office for Entrepreneurs, which is permanently available to receive requests and provide support on specific issues, and that in this way, from the academic processes, projects can be generated that aim to solve the specific needs and problems posed by each company.

5. CONCLUSION

According to the development, it was possible to verify that the models formulated by the different authors have a great relationship with the current state of the agroindustrial sector of the municipality, and that, thru the application of a formula that combines some of these models, a considerable growth of the local agroindustry could be achieved and thus increase its participation within the economic dynamics of the municipality. Likewise, according to the opinions of the interviewed subjects, the promotion of collaborative relations between universities, companies and the state is extremely essential, as a fundamental structure for the strengthening of the productive chain and the improvement of communication and synergy between the guilds.

On the other hand, the various parts that make up the knowledge transfer processes were understood and some benefits were presented to which small or medium-sized enterprises can access by the implementation of innovative processes in their activities, such as tax deduction and other tax incentives.

As a result of the above, a series of basic strategies are proposed aimed at strengthening the transfer of knowledge from universities to companies in the agroindustrial sector of the municipality, amongst which are: including a component of technical assistance, advice and / or consulting on issues of interest to agroindustrial companies in the university's service portfolio to respond to a specific problem situation, as well as the creation of sectoral working tables, the presentation of success storeys of the sector or the execution of business conferences between the financing entities and the business guild. In addition, an implementation plan for the aforementioned strategies is presented, designed based on the contributions of each of the interviewed experts, with which it is expected to achieve a significant impact on their levels of competitiveness and productivity.

Finally, it is recommended that the relationship between universities, agro-industrial sector companies and the state be strengthened thru institutional co-operation programmes that include: from universities, the expansion of their portfolio of academic services to companies, which can contribute to the solution of specific problems and

needs of the agro-industrial sector, as well as the creation of an entrepreneur service office, where the generation of classroom projects is encouraged that allow companies to have an important input that facilitates decision-making and the improvement of their processes.

From the companies, it is recommended to strengthen the agreements with universities, research centres and /or scientific institutions, to expand their interneship programmes and allow students to link to them and improve their skills in specific areas of knowledge, as well as the application of their learning in the classroom to real situations that arise in companies. In this way, an exchange of knowledge between academia and the productive sector is generated, necessary for the improvement of the economy.

Finally, government entities are recommended to expand their support programmes for small and medium-sized enterprises, thru the creation of incentives for innovation and development, which can range from reducing tax burdens to accessing credit lines with lower interest rates and better payment terms to strengthen their productive processes. In the same way, it is imperative that the national government and regional entities allocate greater resources for business development and that the real needs of the sector are taken into account when creating Development or Investment Plans for municipalities, to ensure the inclusion of agribusiness in national and local budgets.

REFERENCES

Arias, F. G. (2012). El proyecto de Investigación Introducción a la metodología científica. Venezuela: EDITORIAL EPISTEME, C.A.

Banco Interamericano de Desarrollo. (2010). Informe de Sostenibilidad. Washington D.C.: Natasha Ward.

BID, B. I.D (2015). Informe sobre Sostenibilidad.

Chang, L., Lee, K., Kang, S., & In, W. (2005). KMPI: Measuring Knowledge Management Performance. Information & Management, 469-482.

Chavez. (2007). Introducción a la Investigación Educativa. Maracaibo: Editorial Gráficas González.

Cuello Quiroz, A. L. (2016). Estrategias de innovación para el desarrollo competitivo del sector agroindustrial del departamento del Cesar. Valledupar: Universidad Tecnológica de Bolívar.

Fagerberg. J., Srholec, M., Verspagen. B. (2010). The Role of Innovation in Development. Review ofEconomics andInstítutions, 1 (2), Article 2. doi: 10.5202/rei.v1i2.15 Retrieved from https://rei.unipg.it/rei/article/view/15/19

García Mogollón, J. M., Cualdrón Guerrero, C. A., & Bolivar León , R. (2013). Diseño de un modelo de transferencia Universidad-Empresa, para la I+D generado por grupos de investigación de la Universidad de Pamplona. Revista Escuela de Administración de Negocios, 74, 109-119. https://www.redalyc.org/articulo.oa?id=20628498007

Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, M. (2014). Metodología de la Investigación. México D.F: McGRAW-HILL / INTERAMERICANA EDITORES, S.A.

Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, P. (2008). Metodología de la Investigación. México D.F.: McGraw Hill .

Kim, L. 2000. La dinámica del aprendizaje tecnológico en la industrialización. Working Paper, United Nations University, Institutefor New Technologies. Availableat www.campus-oei.org/slactsi/linsu.pdf.

LEYDESDORFF, L. (2010). The Knowledge-Based Economy and the Triple Helix Model. Annual Review of Information Science and Technology, Vol.44: 367-417.

López Gómez, M., Schmal Simón, R., Cabrales Gómez, F., & García Tobón , C. (2009). Los procesos en un modelo de gestión de patentes universitarias. Ingeniería e Investigación, 135-141.

Nonaka I., Toyama R. y Byosiere P. (2001). A theory of organizational knowledge creation: understanding the dynamic process of creating knowledge. En Dierkes, Antal-Berthoin, A., Child, J. y Nonaka, I. (Eds). Handbook of Organizational Learning and Knowledge Creation (pp. 491-517). UK: Oxford University Press.

Nonaka, I., Takeuchi, H. (1995). The Knowledge-creating company: How Japanese companies create the dynamics of innovation. Oxford University Press. https://books.google.com.co/books?id=B-qxrPaU1-MC&printsec=frontcover#v=onepage&q&f=false

Palella Stracuzzi, S., & Martins Pestana, F. (2012). Metodología de la Investigación Cuantitativa. Caracas: Fedupel.

Ramirez, T. (1999). Cómo hacer un Proyecto de Investigación. Caracas: Carhel .

Smith, K. (1995). Les interactions dans les systémes de connaissances: justifications, conséquences au plan de

l'action goubernamentale et méthodes emperiques. STI Revue, 75-114.
UNESCO. (2018). INNOVACION PARA EL DESARROLLO SOSTENIBLE. https://unesdoc.unesco.org/ark:/48223/pf0000265693
Vázquez González, E. R. (2017). Transferencia de conocimiento y tecnología en universidades. Revista de Ciencias Sociales y Humanidades, 75-95.
Vidal, T. C. R., Bolívar, F. J., Freja, J. E., Sierra, C. S., & Álvarez, L. P. (2024). Business Resources for the Implementation of Home Automation Technology in Homes in Residential Areas. REVISTA DELOS, 17(57), e1543. https://doi.org/10.55905/rdelosv17.n57-003
Waissbluth, M. (1994). Vinculación de la investigación científica y tecnológica. Caracas: Nueva Sociedad-Unesco.
World Economic Forum. (2017). Agenda. ¿Qué es la competitividad?: https://es.weforum.org/agenda/2016/10/que-es-la-competitividad/
World Economic Forum. (2017). Informe de Competitividad Global 2016-2017.