

Design of a Local Development Model for the Textile Industry of the Tulancingo Region in the Tulancingo Polytechnic University-Business Link; based on the knowledge network approach

Diseño de un Modelo de Desarrollo Local de la Industria Textil de la Región Tulancingo en el Vínculo Empresa-Universidad Politécnica de Tulancingo; basado en el enfoque de red de conocimiento

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Abstract

This paper proposes a model for Local Development of the Textile Industry in Tulancingo region in order to make a link between Company-Universidad Politécnica de Tulancingo; under the approach of knowledge network. The research methodology is exploratory, descriptive type with nested design, including the steps of collecting data with SPSS and ATLAS Ti software. The overall objective is to design a model for local development of Textile Industry of the Tulancingo region with a focus on knowledge network between the textile industry in the region and the Universidad Politécnica de Tulancingo as organizational structure, based on the condition of the employer Tulancinguense; for the competitiveness of the industry. For this study establishes the following objectives: develop a business assessment to identify those organizational factors that facilitate learning of the textile industry, to identify common interests of entrepreneurs, shaping the collaborative networking of knowledge in the relationship business-university. The dynamic of the model is targeted at exchanging various aspects of knowledge, strategies, technologies and skills that will build local learning, and the development of the textile industry in Tulancingo region.

Textile industry, link Company-University, Knowledge Network, Organizational Factors

Resumen

El presente trabajo de investigación propone un Modelo de Desarrollo Local de la Industria Textil de la Región Tulancingo en el Vínculo Empresa-Universidad Politécnica de Tulancingo; bajo el enfoque de red de conocimiento. La metodología de la investigación, es de tipo exploratoria, descriptiva con diseño anidado, incluyendo las etapas de recolección de datos con los programas SPSS y ATLAS Ti. El Objetivo general es diseñar un Modelo de Desarrollo Local de la Industria Textil de la Región Tulancingo bajo un enfoque de red del conocimiento entre la industria textil de la región y la Universidad Politécnica de Tulancingo como estructura de organización, basada en la condición del empresario Tulancinguense; para la competitividad de la industria. Para el estudio se establece los siguientes objetivos: elaborar un diagnóstico empresarial que permita identificar aquellos factores organizacionales que faciliten el aprendizaje de la industria textil, identificar los intereses comunes de los empresarios, conformar el trabajo colaborativo en red del conocimiento en la relación empresa – universidad. La dinámica del modelo va dirigida al intercambio de diversos aspectos del conocimiento, estrategias, tecnología y habilidades que permitirán acumular el aprendizaje local, así como el desarrollo de la industria textil Región Tulancingo.

Industria textil, Vínculo empresa Universidad, Red de conocimiento, Factores Organizacionales

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Introduction

The process of globalisation of the economy, with the necessary changes in production, distribution, exchange and consumption, with the growing presence of knowledge and information, has significantly affected the organisational, productive, strategic and management model of companies (Vilaseca and Torrent, 2005). Gradually, organisations are becoming more flexible, decentralised and specialised in the generation and management of a certain type of knowledge and activities, and cooperative relationships and alliances with different agents in the environment are becoming increasingly important. The creation of value ceases to depend directly on the organisation and is distributed along the chain, the dependence between members increases and organisational structures in the form of a network begin to appear (Achrol and Kotler, 1999).

This research consists of determining the factors that facilitate the creation of a model for the development of the entrepreneurial capacity of the textile industry in the Tulancingo region, in the company-university link. An exploratory nested design study was carried out, which made it possible to identify and describe the common interests identified in the first and second phases of the research; in the third phase, the factors of the structure of the learning company; the methodology applied allowed the manifestation of the congruence between the results identified in the qualitative phase with the quantitative results with respect to the common interests and the needs of the sector.

The transformation industry is one of the most important economic sectors in the State of Hidalgo and the Hidalgo Textile Small and Medium Enterprise (SME) in the Tulancingo Valley is no exception. Therefore, Cuautepéc de Hinojosa, Santiago Tulantepec and Tulancingo de Bravo represent a vital economic activity that is reflected in the State's economic output (Economía, 2005). Despite the above, the participation of this sector in the aforementioned municipalities has shown a downward trend in recent years, which means that there is a priority need to identify the problems and determine alternatives that will allow this industry to resume its course towards sustained growth, since it is a fact that it is an important industrial zone in the country, as are Moroleón and Jilotepec, in the same line of business.

The textile and clothing industry is the fourth largest manufacturing activity in Mexico, however it has been affected by the excessive entry of legal and even illegal foreign products with which Mexican knitted fabric products have to compete, as well as facing problems derived from unfair and illegal trade practices by Asian countries such as: dumping, smuggling, piracy, under-invoicing and triangulation of merchandise (Ministry of Economy, 2005). The municipalities of Tulancingo de Bravo, Cuautepéc de Hinojosa, Santiago Tulantepec and Singuilucan occupied the first place in the number of employed personnel in the region with 48.4%, dedicated to textile production (Ortega, 2000).

The textile industry in the region of Tulancingo presents deficiencies in relation to its structure, the entrepreneurs have not managed to establish a suitable and functional organisational structure in line with the demands of the environment, there is a lag in organisational culture, and the entrepreneurs have at most secondary schooling, the management that they carry out is empirical.

The specialisation is inherited from generation to generation, there is no specialised design staff, they design their own garments based on magazines specialised in the sector, the machinery comes from Italy and Japan and in the middle of the year it is left idle due to seasonal production (Pérez and Ríos, 2005). In this sense, the entrepreneur acts as the orchestra man, as he purchases raw materials, participates in the elaboration, design, commercialisation and direct sale of the product. Sánchez, Terrones and Domínguez (2012), defined the business structure of the textile industry in the region as being made up of family MSMEs, mainly dedicated to the manufacture of knitted garments and, to a lesser extent, flat fabric clothing, cashmere and underwear, which from their origin are placed in conditions of unequal competition with large companies and also among themselves, whose objective is to survive rather than grow successfully; they identified 10 substantial problems that affect this business sector, which are the following: lack of a regional market place, social insecurity, inefficient and unsafe communication routes, high cost, low quality of inputs, deficiency in design training, unfair competition, lack of business training, inadequate technology, lack of organisation and inadequate sectoral public policies; which in turn show their own causality.

Considering the information presented above, it is important to strengthen and potentiate these points of opportunity in a structure that allows the exchange of knowledge and innovation where a structure emerges with the conscious participation of actors from governmental and non-governmental institutions. If the textile company of Tulancingo is to enter into the global current of economic modernisation, it is first of all necessary to investigate what type of entrepreneur is available to undertake modernisation. Everything indicates that small and medium-sized companies are still anchored in old methods whose central axis is acting alone, and it is not known if working in networks can increase competitiveness and economic efficiency.

A Model of Local Development is proposed that allows the development of the textile industry in link with the Polytechnic University of Tulancingo of common interests; the model specifies the mutually advantageous aspects for the progress of the studied industrial sector, in the synergy directed to solve the interests in common with the knowledge of the academy and the experience of the producer of the industry; with the firm conviction of the academic commitment and the reinforcement of the features of the cosmopolitan leadership and structure of the company as a strategy for the birth of the company-university alliance in favour of the development of the sector.

Based on the above it is possible to formulate the following research problem given through the research question:

How to develop the entrepreneurial capacity of the textile industry in the region of Tulancingo, in a collaborative learning environment with the Polytechnic University of Tulancingo (UPT) to raise its competitiveness; raising the following research hypothesis, H1: 50% of entrepreneurs infer that they would like to belong to an association to work jointly and in turn linked with the Polytechnic University of Tulancingo. Therefore a research proposal is presented to determine the relationship between the company and the university as well as the use of higher education institutions as a catalyst for knowledge management, it is imperative to establish the generation of knowledge within companies for the creation of value that establishes more solid foundations to cope with the sudden changes of the time.

This article has been structured in three sections, in the general theoretical framework the first shows a summary of the theoretical references of the research, the second section refers to the methodology of the research, which is located to be an exploratory, descriptive research with nested design, including the stages of data collection with SPSS and ATLAS Ti programs.

In section three, the results of the qualitative-quantitative-qualitative phases are analysed and interpreted; the proposed basket of common interests model is described.

Finally, the Local Development Model for the industry is presented, a proposal made according to the results of the research.

Theoretical framework

The Textile Industry of the Tulancingo Region

According to Lira (2010), the Textile Industry of the Tulancingo region has its background since colonial times, it was the political and administrative centre of the region, in the seventeenth century its economy was based on agriculture and livestock; in the eighteenth century began to emerge in Tulancingo the textile industry, which already had an important tradition since pre-Hispanic times, he also says that in 1791.

The subdelegate of Tulancingo describes it as a flourishing textile centre with more than 200 weavers, years later it increased to 300 weavers, this boom was due to the mining in Pachuca and Real del Monte. By 1826 the weavers were still the majority in the city of Tulancingo, which were called open house weavers, that is to say with workshops and premises open to the general public. In the 19th century, several factories were established in the region, founded by foreigners, such as the Fábrica de los Ángeles, who took advantage of the extensive textile tradition of the city.

The industry's production systems are characterised by production orders, that is to say that although a written order is not made, a sample garment is made and it is proposed to the client so that he/she can give the indications of the change and the model of the garment.

The products produced are as follows:

Knitted garments, jumpers and other garments for women, men and children.

The production of trousers, trousers (sportswear), bedspreads, shirts and jackets.

For knitting, the high production season is from July to December, and the low season from January to June, in these months some are dedicated to the production of light clothes made of non-heated fibre for the hot season, others undertake alternative businesses. Therefore their production cycles are governed by the decisions made with the seasonal changes.

In high season, textile industry producers have a weekly production of 5000 garments, and in low season 500 garments (Montiel, 2015).

Business-university linkage

According to Santos, cited by Morales (2007), linkage is the set of relationships established between universities and the productive sector, a set of activities aimed at producing goods and services that are the result of agreements, decisions, alliances and cooperation and agreements between productive sector organisations and research centres.

The company-university linkage is an obligatory phenomenon of the current processes of productive flexibilisation, which requires the sectors of the economy to adjust to the parameters of solving problems of technological adaptation and innovation; the knowledge networks give a new vision of the linkage with universities, sectors of the economy and the government, creating an environment of interaction beyond themselves. (Mendoza, 2008). Linking not only facilitates access to science and technology, but also makes possible the application of expert knowledge to solve problems.

Knowledge networks and their success factors

Martinez and Corrales (2010), comment that the construction of knowledge tends to develop within the framework of new forms of organisation, more flexible and dynamic.

In which new configurations emerge in which not only scientists and academics participate, but also those who through research and the application of knowledge seek solutions to specific problems together with this, the internationalisation of science, enhanced by the large-scale application of information and communication technologies, constitute the general framework in which knowledge networks have been born and have developed.

In the same vein, they define that networking is the result of the adoption of flexible and participatory forms of organisation, implemented when creating and applying knowledge to problem solving, in which many characteristics are combined, such as the presence of actors from different backgrounds who relate to each other in order to address specific problems and propose solutions, bringing their capabilities into play and seeking to complement them by this means.

In an innovation network, the generation and transfer of knowledge must take care of its dimensions:

- The epistemological: what is its nature?
- The ontological: what is its origin?

This in order to establish the appropriate channels of communication that allow the proper flow in the network through all the agents participating in the network such as: the individual, the group, the organisation and the organisational relations. (Méndez, 2008).

The success of the network may be due to:

- Interest by each of the network participants.
- Common interest in actions that put their sector at risk.
- Partners should have different characteristics and knowledge sharing skills.

Good relations, i.e. good management among its members; integrating as networks allows them to increase the possibilities of competition in the sector, having greater opportunities to increase their collective learning, be it in technological and organisational knowledge. (Barrón, Araiza and Cuesta, 2006).

Factors of a learning organisation

A learning organisation comprises the following factors:

Strategy - The company's strategy, its implementation, evaluation and improvement processes are a source of learning. That is, it enables the development, formulation and revision of strategic business plans as they evolve; the decisions of CEOs and managers are seen as conscious experiments, rather than as a set of solutions.

Participatory politics - incorporates the opportunity to involve every individual in the processes of formulating strategic and company policy. There must be a deliberate policy to encourage diverse input, recognising that a guided debate is fruitful as long as it can address tensions or even conflicts between various social values of different people defending their own benchmarks. In the same vein, Pedler, Burgonie and Boydell cite three basic references:

All groups have the right to participate in such a way that their social values are taken into account. This is the ethical dimension of business.

Diversity is valuable because it leads to more creativity, ideas and innovative solutions.

The effort to satisfy all groups involved in the company must result in higher quality given the high demands of the market and in an internal learning climate that provides greater satisfaction for a job well done.

Information Technology

Objectives:

To disseminate as much information as possible to all people.

To empower people to understand the company's systems and processes.

To discover systems and their influence on results. Investigate special causes that can lead to out-of-control situations.

Internal exchange. The purpose is to think about the internal customer. For this the dialogue must be constant about expectations, negotiations, new contracts for goods and services. The concept of quality is active for the whole company from suppliers to customers in its double dimension: internal and external. Collaboration and cooperation are encouraged instead of competition between departments in order to favour learning models that should lead to an optimisation of performance.

Flexibility in rewards

In line with the aspiration to achieve higher levels of participation, new ways of rewarding employees should be explored. Money should not be the only reward. We should ask ourselves what are the basic assumptions of variable financial compensation.

Encourage hard work and dedication

Discourage employees from leaving for competitors.

Encourage the application of their skills on the job.

Satisfy internal fairness and equity needs.

In companies in a constant learning process, the premises of their social variables must be explained, shared, analysed and new alternatives experimented with, otherwise the old models are no longer efficient.

Structures that facilitate the development of people and business. Flexible functions, in accordance with the needs of customers and suppliers, allowing for personal growth and new forms of structures. Departments as temporary and flexible structures in response to change. Their purpose is to create an organisational architecture that meets current needs and responds to new changes.

External workers as sensors of external reality

External collaborators relate to the company in a process of constant learning through their professional services, participating orders and shared and disseminated information.

Inter-company learning

The main features are: cross-departmental training, collaboration in research and development activities; exchange of jobs and suppliers to learn from both companies. We also facilitate learning from other companies that we are competing in similar markets. Mutual learning as companies in order to win/win on technological advances, standards of respect and fairness for the design of new products.

Learning climate

In learning companies managers see their new main task as facilitating innovation activities and learning from new experiences for their employees. Managers encourage employees to question their own ideas, attitudes and social values. Unintentional mistakes are allowed, so that they try out new experiences and new ideas. External groups are studied to analyse differences and their diversity, in order to help in the formulation of participatory policies. The idea of continuous improvement is simplified when we facilitate constant learning.

Personal development for all

Physical and intellectual resources are available to all individuals and employees at all levels, up to and including external agents. Career guidance, performance feedback systems and professional development. Workshops, seminars, self-learning materials, development groups, trainers, mentors and career advisors. Databank with information on people who are working in project development (Gore, 2006).

Methodology to be developed

The first phase was carried out by organising an academic business forum according to the principles of participatory action research. An instrument was used to initiate the exploratory study that would show us the benefits that can be obtained from the business-university link through participation in a knowledge network, to solve problems and identify common interests and observe the attitude of the entrepreneur to collaborative work.

The second phase (quantitative) consisted of the application of the instrument to a sample of 87 entrepreneurs, to identify common interests and the convenience of joining a group of entrepreneurs of the same line of business and the Polytechnic University of Tulancingo, in collaborative work to unite strengths and abate threats and difficulties in order to contribute to the growth of the textile industry and the instrument to know the type of relationship between entrepreneurs of the same industry and higher education institutions. In a third phase, an open interview was applied to 6 entrepreneurs of the textile industry in the region of Tulancingo who have the most experience in the sector, an instrument to identify the organisational factors that allow learning in the textile industry of the region in a knowledge network. The organisational factors were: shared vision, individual learning, group learning, adaptive culture.

Results

Variable "Common Interests" of the Textile Industry of the Tulancingo Region. This variable is approached qualitatively and quantitatively. The results of the application of one of the instruments of the qualitative methodology are presented below, with the holding of the Academic Business Forum with the textile industry of the Tulancingo region, in which 40 entrepreneurs from the region participated.

The discussion of each of the working tables was based on the guiding question: What benefit can be obtained from the business-university link through participation in a knowledge network? The businessmen together with the students and academics gave their answers and opinions in relation to the awareness of the current problems experienced by the industry in congruence with the themes of the working tables, in each table was an academic specialist (moderator) in the theme of the working table, the diagnosis of the needs and common interests of the industry was obtained which is as follows:

In terms of the production process, the following is required: training in specialised technical support, tailoring, design and pattern making, timing and movements, implementation of quality systems, the need to have a supply of quality inputs and to abolish the monopoly of inputs.

In relation to the infrastructure of the company, they need design software, they need specialised personnel for technical support, the machinery and equipment they use is obsolete as it is machinery with technology from the 1960s.

In terms of marketing and sales, they argued that there is a lack of security for the distribution and sale of their products, therefore they propose to establish a distribution and design centre in the region to market their products. They note that they need training in the use of information technologies for the promotion of their products, they require training for the sales force, and they require effective government support to remain in the market.

In the same vein, the entrepreneurs participating in the technological development and innovation roundtable noted the need for a diagnosis of innovation needs and the creation of strategic alliances to reduce costs.

In terms of design and avant-garde, they commented that it is necessary to create a regional design centre for training.

In terms of information systems, the use of information technologies is necessary, as companies do not have them and do not use them.

In terms of exports, the sector's entrepreneurs are unaware of the barriers to exports, they need to import quality materials in order to export quality products, and they need to create export plans.

In the second quantitative phase, an instrument was applied to identify the "common interests" of the industry, applied to a sample of 87 entrepreneurs, obtaining the following result.

As points of opportunity in this case, are those "common interests" that represent greater relevance with respect to the average and those situations expressed by the entrepreneur, the priority to these aspects will allow the collaborative work between the entrepreneur and the UPT; of which the results of the average were the following:

I want to know how my product can be more competitive 8.54, I would like to know about the aspects that will allow me to effectively manage my company 8.33, I am interested in knowing about programmes and organisations that support my company with financing (PROINNOVA, INNOVAPYME, INNOVATEC) 8.24, I want to know about management practices so as not to put my business at risk 8.03 , I need to know about the benefits and how to apply new information technologies 7.9, I want to know how to integrate and optimise the technology I have to my production processes 7.89.

The statistical analysis of the variable common interests shows the calculation of the mean of each of the items. If we observe the behaviour of the mean, we can see that all the items have a value higher than 6.97, which indicates that the category with the highest frequency within the variable common interests is the one that corresponds to Greater

Relevance

With regard to the third qualitative phase, the variable structure of the learning company was analysed with the Atlas Ti programme, analysing the following categories: Shared vision of the learning company, individual learning, group learning and adaptive culture, taking up the aspects of recognition, availability to change, communication of errors, from which the following results were obtained:

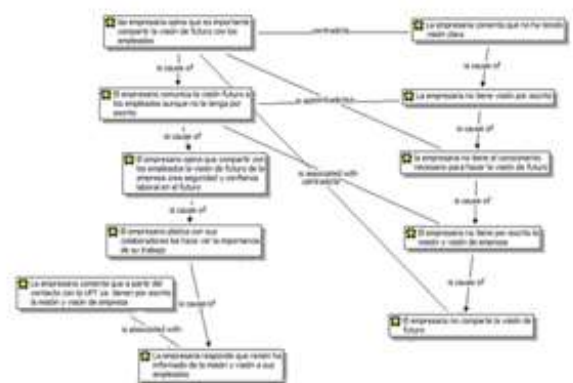


Figure 1 Shared vision of the company

With regard to the shared vision of the company, it was found that some employers do not have a written mission and vision, arguing that they do not have the necessary knowledge to elaborate them, and for this reason they do not share the vision of the future.

Arguments were identified in which they think that it is important to share the vision of the future with the employees, they communicate it even if they do not have it in writing and this makes the employee feel secure and confident at work.

One of them talked about his experiences of the forum and the contact with the Polytechnic University of Tulancingo and commented that since he has been in contact with the UPT, they already have a written mission and vision of the future, which their employees already know (Figure 1).

There is an urgent need to raise awareness among entrepreneurs of the importance of having the ability to create visions that inspire action to find common cause in the objectives that will improve their company and the industry.

He is also aware that he is not irreplaceable, so he prepares from childhood the family member who will replace him in the future, generally preparing the eldest son to take his place (Figure 2).

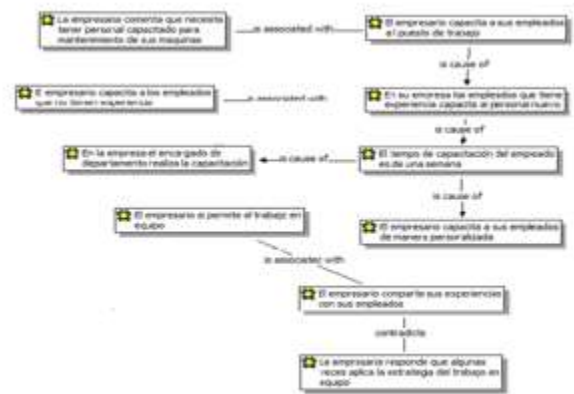


Figure 3 Group learning

Managers need to encourage group learning, promoting self-directed, or cross-functional, teams so that they can share the range of skills and abilities to solve problems (Lussier, 2005). Continuing education is one of the enablers of organisational learning; it is the ongoing commitment to education at all levels; supporting the growth and development of members (Gibson, Ivancevich, Donnelly, and Konopaske, 2006).

According to the experiences of the entrepreneur, teamwork is a strategy to get things done in his company, therefore he sometimes allows it, he talks to his workers making them see the importance of their work in the company, he shares his experiences with them so that they can apply them to their work area. The industrialist comments that he hires personnel with experience in the industry and that sometimes allows the worker to perform in his area with the other colleagues.

They have to work in coordination with each other because they share their experiences and if the person in charge is not available at a given moment, the training for the new employee is carried out by the one who has more experience.

When an inexperienced worker arrives in the company, training is preferably carried out directly by the employer; on-the-job training lasts one week. (Figure 3).

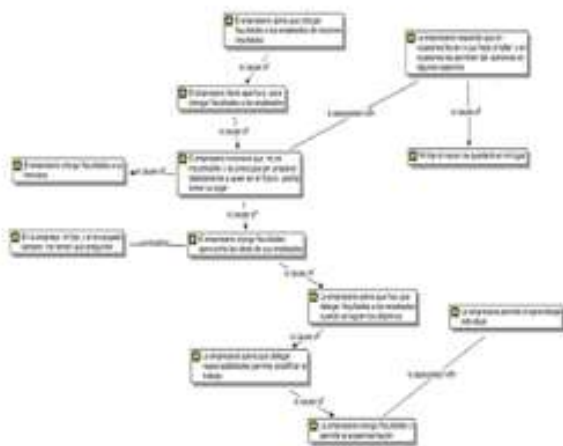


Figure 2 Individual learning

In learning organisations the leader delegates authority to employees to solve problems and to find better ways of doing their work (Lussier 2005).

One of the important points of the information provided is how the entrepreneur allows individual learning and experimentation in his company, he is of the opinion that empowering employees gives better results; therefore he is open to delegate authority to his collaborators, he is of the opinion that giving responsibility allows him to fulfil the objectives, to take advantage of the ideas of his employees and to simplify the work; in very delicate situations the manager or family member has to ask him.

It can be seen that group work is allowed in the training, as the worker or the person in charge gives the go-ahead when the new employee is ready or not to be left alone on the job. Adaptive culture For the analysis of the adaptive culture dimension, the following concepts were taken up:

Adaptive cultures value innovation, encourage and reward experimentation and risk-taking by managers (Jones, 2008).

Forés and Camisón (2008); mention that one of the characteristics that the organisational culture must possess is a positive orientation of workers towards innovation and learning, commenting that without the commitment of employees to this innovation, the process of adapting the company to the external environment would be a failure.

The employer argues that empowering employees leads to better results and that by rewarding employees fairly and objectively, employees do their work better, he says, according to his experience, it is a strategy to achieve better results by creating an atmosphere of harmony and collaboration. Recognition is given verbally and in kind. (Figure 4).

When it comes to correcting errors, the entrepreneur looks for the root of the error, communicates it in a serious, discreet and respectful manner (Figure 6); therefore a climate of openness and accessibility is observed, debate and conflict are accepted.

Figure 4 shows that there are contradictions in relation to the vision of the future, because not all entrepreneurs have the vision in writing, they think that it is important for employees to see the company as a whole, but they had not given importance to having these aspects in writing and sharing it with employees. He says that he does talk to his employees about the fact that if they do their job well, they will have a better future.

It is observed that the entrepreneurs want to initiate changes (Figure 5), they are willing to establish other changes for their company in relation to learning to plan the future aspects of their company, starting with the drafting of the mission and vision, they comment that as a result of the forum they have the concern to start working on these aspects with the U PT.

In this sense, it is observed that entrepreneurs in the textile industry, simply because they are Micro, Small and Medium Enterprises, have the characteristic of being able to adapt more easily to the surrounding environment; it is observed that they value innovation in the employee and this is another of their competitive advantages to be able to adapt to the environment.

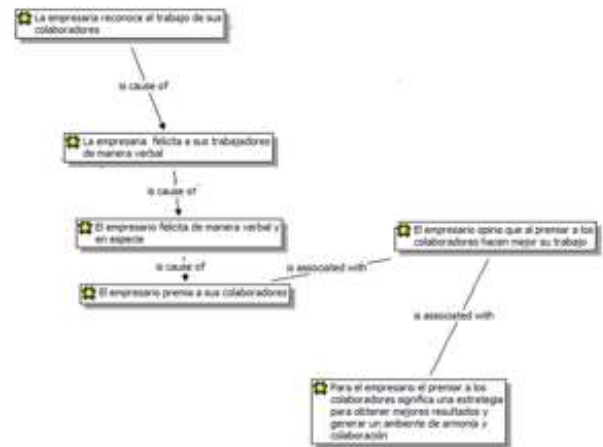


Figure 4 Recognition

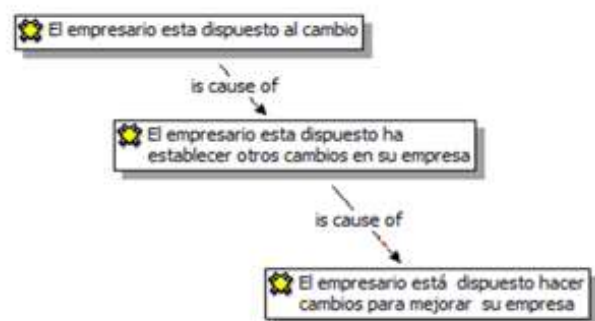


Figure 5 Readiness to change



Figure 6 Error Communication

It can be concluded from the results of this figure that the textile industry in the region of Tulancingo, Hidalgo presents traits of having an adaptive culture.

In order to deepen the results of this mixed research with nested design, triangulation was carried out.

The results obtained were:

There is congruence between the results identified in the academic business forum with the quantitative results regarding common interests, which can be the basis for acceptance of collaborative work for the formation of the network between the textile industry and the Polytechnic University of Tulancingo.

The entrepreneurs present traits of a learning company culture, which were presented in each of the phases of this research; another important aspect for the conformation of collaborative work in the network between the company-university.

From the moment that the business people came to the UPT, they showed an interest in establishing links with the institution.

In the forum, they argued that they had no links with higher education institutions, but expressed the need for the intervention of the UPT in order to develop solutions focused on their common interests.

Based on the analysis of the results obtained, a Model of Local Development of the Textile Industry of the Tulancingo Region in the Tulancingo Polytechnic University-Business Link is designed; based on the knowledge network approach; with the identification of the common interests for the conformation of the knowledge network, which assumes the results found in this research; it is observed that both entities can contribute knowledge aimed at the solution of the interests found.

The dynamics of the model is aimed at the exchange of various aspects of knowledge, strategies, technology and skills that will allow the accumulation of local learning.

As well as the development of the textile industry in the Tulancingo region, the model specifies the mutually advantageous aspects for the progress of the sector, in the synergy of solving common interests with the knowledge of the academy and the experience of the producer.

The technical and research experience of academics in their discipline of knowledge is the basis for growth and development in technology and innovation in an organisation; it is necessary for UPT academics to be open to developing hybrid research projects that are applicable to companies, aimed at technology innovation, and for the entrepreneur to reinforce the aspects of organisational learning that will allow the permeability of knowledge for the benefit of his or her company.

The synergy and follow-up of these aspects will allow the development and local impulse of the textile industry in the region (Figure 7).

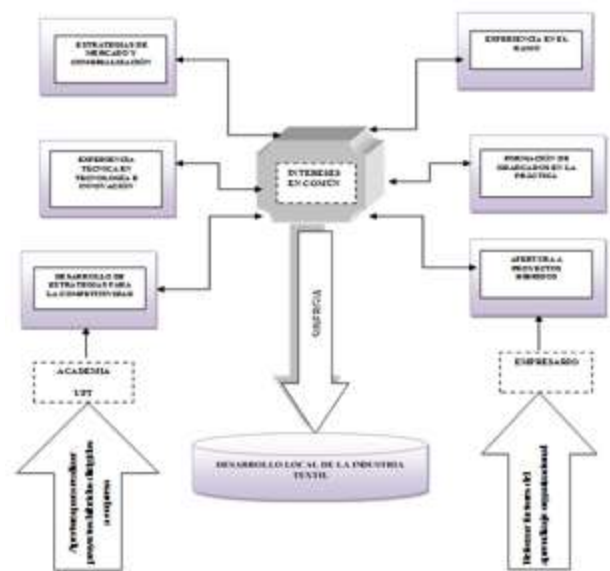


Figure 7 Local Development Model of the Textile Industry in the Tulancingo Region.

Acknowledgements

Thanks to the entrepreneurs of the Textile Industry of the Tulancingo Region, for trusting in the Polytechnic University of Tulancingo and for the openness in carrying out this study.

Conclusions

According to Barrón, Araiza and Cuesta (2006), the success of the network is defined by the following aspects: Particular and common interests of network participants, participants must have different characteristics and skills, good relationships.

These aspects, they comment, are characteristic of the possibility of forming networks; by integrating as networks, they allow the possibility of competition in the sector in question, having greater opportunities to increase their collective learning, in technological and organisational knowledge.

A first attempt at organisation was made with the textile industry entrepreneurs in the region, in the first of the action participation phases of the research, the entrepreneur had the experience of working for the first time in a collaborative manner with the academy, where the particular and common interests of the participants were identified, it was observed that they worked as a team in each of the tables, breathing an atmosphere of trust and collaboration; these aspects rebounded with the results of the quantitative phase, where what was expressed in the forum and the application of the instruments coincided.

It is worth mentioning that the application of the interview technique and the ATLAS Ti tool resulted in the following aspects:

Entrepreneurs argue the need for business-university collaboration for problem solving, the entrepreneur presents traits for collaborative networking, the guild is organised in cooperative society.

These features are points of opportunity for the UPT, through the academy, to follow up on the signs of collaborative work with the textile industry in the region.

Lara (2007), explains that the main factors behind the poor development of knowledge networks in Mexico are: the culture of researchers to do individual work that leads to little interaction with their peers, the lack of government support as a bridging agent for the link between academia and the productive and social sectors, and the low economic resources allocated for the development of science and technology.

The expectation of change in the country is placed in the public policies of CONACYT which guide the financing of research networks that have links with industry and public sectors for the production, dissemination and integration of knowledge.

In the same vein, the contact and relationship achieved with the region's entrepreneurs is a point of opportunity for the conformation and formal creation of a model that allows the development of the region's textile industry in a knowledge network; therefore, it is necessary to make the academy aware of the imperative need to generate strategic research that has a positive impact on the creation of regional innovation systems, generating learning spaces in the creation of a knowledge network for the promotion of the industry.

References

- Achrol, R.S.; Kotler, P. (1999). Marketing in the Network Economy. *Journal of Marketing*. (6) 146-173.
- Barrón. J.G., D.L., Araiza. G.J, Cuesta M.R. (2006, Junio) Formación de redes de cooperación Universidad-empresa-gobierno. Ponencia presentada en el Congreso Iberoamericano de ciencia, tecnología, sociedad e innovación CTS + I, México.
- Forés, J & Camisón, C. (2008). La capacidad de absorción de conocimiento: factores determinantes internos y externos. *Dirección y organización*, 36, 35-50
- Gore E., Vogel E., Soler C., Cárdenas J. A. (2006). *Gestión y conocimiento en organizaciones que aprenden*. México: Thomson.
- Gibson, J.L., Ivancevich J. M, Donnelly J.H., Konopaske R. (2006), *Organizaciones: comportamiento, estructura, procesos* (20ª ed.). México: Mc Graw Hill.
- Jones R. (2008). *Teoría Organizacional. Diseño y cambio en las organizaciones* (5ª ed.). México: Pearson Prentice Hall.

Lara, R.J.J. (2007, Abril) Modelos de redes del conocimiento. En Relaciones nacionales e internacionales. Formación de redes. Ponencia presentada al Octavo Congreso Nacional y Cuarto Congreso Internacional de la Red de investigación y Docencia sobre Innovación Tecnológica. Virtual educa 2005, 1-9. Culiacán, Sinaloa México.

Lira, L. (2010). Historia de los tejedores en Tulancingo. Recuperado de Hidalgo <http://www.arqperea.com/modules/news/article.php?storyid=1163>.

Lussier, R.N. Achua C.F. (2005). Liderazgo. Teoría, aplicaciones, desarrollo de habilidades (2da ed.) México: Thomson Learning.

Martínez, S. A. y Corrales E. M. (2010) Administración de conocimiento y desarrollo basado en conocimiento, Redes e innovación. México: Cengage Learning Editores, Inc.

Mendoza, D.M. (2008), las redes de conocimiento en el ámbito universitario, el caso de las universidades tecnológicas. Sinnco. Recuperado de octi.guanajuato.gob.mx.

Méndez, T.A., Aguilar, R.A., Carrasco, M.R., Cortes, R. G., Osorio, R.E., (2008). Creación de redes de investigación e innovación: Una alternativa para la generación y transferencia del conocimiento. Sinnco. Recuperado de octi.guanajuato.gob.mx/.../MT2008/.../MT#-MENDEZ.OSORIO.CORTE

Morales, P. A., (2007, Abril). La vinculación Universidad – empresa-gobierno: un soporte para el desarrollo local. Ponencia presentada en el octavo congreso Nacional y Cuarto Congreso Internacional de la Red de Investigación y Docencia sobre Innovación Tecnológica. RIDIT. Territorio Industria Tecnología. 1-17. Culiacán, Sinaloa, México. RIDIT.

Montiel, O.R (2015). Creación de un Clúster como estrategia comercial, apoyado en tecnologías de la información, a la cooperativa “mano a mano tejiendo el futuro de Cuauhtepac S.C. de R.L. de C.V.” Tesis de grado de maestría en dirección comercial no publicada de la Universidad Politécnica de Tulancingo.

Ortega, B. A. (2000). Hidalgo: Realidad y Retos. Hidalgo: Universidad Tecnológica de Tulancingo de Bravo.

Pérez, P. E. y Ríos, C. M. P. (2005). Estudio de las ventajas Competitivas de la industria textil en tejido de punto del municipio de Cuauhtepac de Hinojosa, Hgo. , para incursionar al mercado de Guatemala, Hidalgo: Universidad Politécnica de Tulancingo.

Vilaseca J. R, Torrent J.S. Batalla J M, (2005) La formación virtual y la empresa red. Universidad Oberta de Catalunya. Recuperado de <http://www.pagina-aede.org/Oviedo/m120.pdf>.

Terrones C. A, Sánchez T.Y, Dominguez V.B (2014). Evaluación de Proyectos Productivos y conformación de Redes de la Región Tulancingo. Universidad Politécnica de Tulancingo, informe técnico Proyecto PROMEP.