



Volume I, Issue I —July — December — 2017

**Journal-Schools of economic  
thought and Methology**

ISSN-On line: 2523-6997

**RINOE®**



**RINOE®**

## **Indexing**

Academic Google

Research Gate

Mendeley

## **RINOE Journal-Schools of economic thought and methology**

### **Directory**

#### **CEO**

RAMOS-ESCAMILLA, María, PhD.

#### **CAO**

CHIATCHOUA, Cesaire. PhD

#### **Director of the Journal**

PERALTA-CASTRO, Enrique, MsC.

#### **Institutional Relations**

IGLESIAS-SUAREZ, Fernando BsC

#### **Editing Logistics**

IBARRA-CRUZ, Cristian BsC

#### **Designer Edition**

SERRUDO-GONZALES, Javier, BsC.

**RINOE Journal- Schools of economic thought and methology**, Volume 1, Issue 1, July – December 2017, is a journal edited semestral by RINOE. S/C Zacharie kamaha, Street: Boulevard de la Liberté, Apartamente: Immeuble Kassap, Akwa- Douala. P.C.: 5963, Republic of Cameroon.

WEB: [www.rinoe.org](http://www.rinoe.org), [journal@rinoe.org](mailto:journal@rinoe.org). Editor in Chief: RAMOS-ESCAMILLA, María. ISSN-2523-6997. Responsible for the latest update of this number RINOE Computer Unit. ESCAMILLA-BOUCHÁN, Imelda, LUNA SOTO, Vladimir S/C Zacharie kamaha, Street: Boulevard de la Liberté, Apartamente: Immeuble Kassap, Akwa- Douala. P.C.: 5963, Republic of Cameroon. Last updated December 31, 2017.

The opinions expressed by the authors do not necessarily reflect the views of the editor of the publication.

It is strictly forbidden to reproduce any part of the contents and images of the publication without permission of the National Institute for the Defense of Competition and Protection of Intellectual Property.

## **Editorial Board**

VASQUEZ-GALAN, Belem, PhD.  
*El Colegio de la Frontera Norte, Mexico*

PEREIRA-LOPEZ, Xesus, PhD.  
*Universidad de Santiago de Compostela, Spain*

MAGAÑA-MEDINA, Deneb, PhD.  
*Universidad Juárez Autónoma de Tabasco, Mexico*

PIRES-FERREIRA-MARÃO, José, PhD.  
*Federal University of Maranhão, Brazil*

SEGOVIA-VARGAS, María, PhD.  
*Universidad Complutense de Madrid, Spain*

GANDICA-DE ROA, Elizabeth, PhD.  
*Universidad Católica del Uruguay, Uruguay*

FRANZONI-VELAZQUEZ, Ana, PhD.  
*Instituto Tecnológico Autónomo de Mexico, Mexico*

BELTRAN-MIRANDA, Claudia, PhD.  
*Universidad Industrial de Santander, Colombia*

GOMEZ-MONGE, Rodrigo, PhD.  
*Universidad de Santiago de Compostela, Spain.*

BANERJEE, Bidisha, MSc.  
*Amity University, India*

## **Arbitration Committee**

ABARCA-ASTETE, Raúl, MsC.

*Universidad Nacional de San Antonio Abad del Cusco, Peru*

BORDA-PILINCO, Manrique, MsC.

*Universidad Nacional de San Antonio Abad del Cusco, Peru*

CONCHA-LEZAMA, Rene, MsC.

*Universidad Nacional de San Antonio Abad del Cusco, Peru*

VENERO-GIBAJA, Roger, MsC.

*Universidad Nacional de San Antonio Abad del Cusco, Peru*

DIAZ-UGARTE, Jorge, MsC.

*Universidad Nacional de San Antonio Abad del Cusco, Peru*

JORDAN-PALOMINO, Teófilo, MsC.

*Universidad Nacional de San Antonio Abad del Cusco, Peru*

MIRANDA-CARRION, Narciso, MsC.

*Universidad Nacional de San Antonio Abad del Cusco, Peru*

MARTINEZ-CAMACHO, Román, MsC.

*Universidad Nacional Autónoma de Mexico, Mexico*

CARRILLO-HUERTA, Francisco, MsC.

*Universidad Tecnológica de Nezahualcoyotl, Mexico*

CEPEDA-FERNANDEZ, Rodrigo, MsC.

*Tecnológico de Estudios Superiores de Coacalco, Mexico*

## Presentation

In Pro-Research, Teaching and Training of human resources committed to Science. The content of the articles and reviews that appear in each issue are those of the authors and does not necessarily the opinion of the editor in chief.

*As a first article we present, The impact of knowledge management on innovation for the development of tourism businesses in the Municipality of Caborca, Sonora, by SAUCEDO-MONARQUE, Javier VILLARREAL-VILLARREAL, Luis Alberto, HERNÁNDEZ-PONCE, Oscar Ernesto, as the following article we present , Development of an instrument for measuring entrepreneurial skills for students of higher education institutions, by ÁLVAREZ-BOTELLO, Julio, CHAPARRO-SALINAS, Eva Martha, HERNÁNDEZ-SILVA, Maria Del Carmen, TORRES-VELÁZQUEZ, Alejandra Magali, as terecer article we present, Culture of innovation in small business, by LÓPEZ PARRA, María Elvira, AGUIRRE CHOIX, Ricardo, GONZÁLEZ NAVARRO, Nora Edith, ACEVES LÓPEZ, Jesus Nereida, as fourth article we present, The computer security culture reduces the risk of information loss and leakage, by RAMIREZ-OCHOA, Dynhora Danheyda, BARROSO-BARAJAS, Alfonso José, SIQUEIROS-GARCÍA, Martina Ivonne, VILLAGRAN-VIZCARRA, Dafnis Cain.*

## Content

Article	Page
<b>The impact of knowledge management on innovation for the development of tourism businesses in the Municipality of Caborca, Sonora</b> SAUCEDO-MONARQUE, Javier VILLARREAL-VILLARREAL, Luís Alberto, and HERNÁNDEZ-PONCE, Oscar Ernesto	1-10
<b>Development of an instrument for measuring entrepreneurial skills for students of higher education institutions</b> ÁLVAREZ-BOTELLO, Julio, CHAPARRO-SALINAS, Eva Martha, HERNÁNDEZ-SILVA, Maria del Carmen and TORRES-VELÁZQUEZ, Alejandra Magali	11-20
<b>Culture of innovation in small business</b> LÓPEZ PARRA, María Elvira, AGUIRRE CHOIX, Ricardo, GONZÁLEZ NAVARRO, Nora Edith and ACEVES LÓPEZ, Jesus Nereida	21-28
<b>The computer security culture reduces the risk of information loss and leakage</b> RAMIREZ-OCHOA, Dynhora Danheyda, BARROSO-BARAJAS, Alfonso José, SIQUEIROS-GARCÍA, Martina Ivonne and VILLAGRAN-VIZCARRA, Dafnis Cain	29-35

*Instructions for Authors*

*Originality Format*

*Authorization Form*

## **The impact of knowledge management on innovation for the development of tourism businesses in the Municipality of Caborca, Sonora**

SAUCEDO-MONARQUE, Javier\*†, VILLARREAL-VILLARREAL, Luís Alberto and HERNÁNDEZ-PONCE, Oscar Ernesto

*Instituto Tecnológico de Sonora. Calle 5 de Febrero 818, Centro, Urb. No. 1, 85000 Cd Obregón, Son.*

Received July 15, 2017; Accepted December 15, 2017

### **Abstract**

The present study examines the measurement of the impact generated by the factor of knowledge management in innovation for the development of small tourism enterprises in the municipality of Caborca, Sonora. Research is quantitative, exploratory, descriptive type, with non-experimental design. The documentary and bibliographic technique was conducted to find the relationship between the variable dependent on innovation and the knowledge management as the independent in this study variable. We used a structured questionnaire as an instrument of measurement, which is applied by means of a census to 120 managers or entrepreneurs of small tourism businesses established in the municipality of Caborca, Sonora. Where you applied a statistical analysis that showed a positive and significant relationship between the factors of innovation with the knowledge management as independent variable, which allows asserting that knowledge management is a decisive factor for the development of tourism businesses of Caborca, Sonora.

### **Development, Innovation, Knowledge Management, Small Tourism Businesses and Tourism**

**Citation:** SAUCEDO-MONARQUE, Javier, VILLARREAL-VILLARREAL, Luís Alberto and HERNÁNDEZ-PONCE, Oscar Ernesto. The impact of knowledge management on innovation for the development of tourism businesses in the Municipality of Caborca, Sonora. RINOE Journal- Schools of economic thought and methology. 2017.1-1:10

\* Correspondence to Author (email: jsaucedomonarque@hotmail.com.)

† Researcher contributing first author.



## 1. Introduction

Competitiveness in the tourism sector requires a productive performance, that is, obtaining greater results with the same efforts and resources. Through the efficient and systematic use of tourism resources, to generate greater added value, wealth and well-being. This activity is capable of creating the necessary opportunities for regional and social development.

The world tourism organization (wto, 2013) defines tourism competitiveness as the capacity of a tourist destination to take advantage of its strengths efficiently. Influencing the benefits of companies, as it revalues their assets permanently. Where your employees get higher levels of wages and a better quality of life. Likewise, businessmen and authorities are optimistic about the quality of life of the local population, seeking their physical and social well-being. What brings as a result the attraction of new investments.

Thus, unwto (2013) considers competitiveness as the effectiveness of permanently attracting and satisfying its visitors. In addition to the political importance for countries that seek to make their tourism economies more competitive. The elements that determine the competitiveness of a tourist destination are: productivity, innovation, diversification, specialization, professionalization and sustainability.

Tourism is a dynamic sector with great potential for growth in the future, considering its importance as an engine of economic development for any region. The world tourism organization (wto, 2014), mentions that from 2000 to 2012 tourism grew at an average annual rate of 3.6% in the world, generating 9 points of the gross domestic product (gdp) worldwide, as well as the creation of one of every 10 jobs and participating with 6% of world exports.

The tourist activity in Mexico according to the federal tourism secretariat (sectur), generates an important economic impact, in comparison with other productive branches of the country. It is considered the third source of foreign currency in the country, generates 8.4% of gdp and more than 2.2 million jobs. Its multiplier effect benefits other economic activities related to tourism. It is also a support for the redistribution of income, since it prevents the accumulation of income that is concentrated in large populations and industrial centers. In addition to generating a demand derived in the various economic sectors of the country. (sectur, 2013).

Thanks to its transversal nature, it is a key factor for the development of any country, as a consequence of the derived demand and the multiplying effect it generates, benefiting other branches of the economy. In Mexico, tourism is linked to more than 50 economic activities, generating opportunities for micro, small and medium enterprises (msmes), creating, in turn, the productive chains with the highest added value for the country.

### 1.1 Justification

The importance of this research lies in the possibility that, based on this assessment, it will allow a categorization based on the impact of knowledge management, both in the design and in the implementation of a program for the development of tourism businesses based on an Innovation management model for the Municipality of Caborca, Sonora. The academic rigor of this research ensures that the results can be applied to similar development programs, both in the public and private sectors. That is to say, there is a possibility of appropriation of the methodology followed, this allows the desired link between the academy and the public, private and governmental sectors, resulting in a coordination that leads to the impact on sustainable regional development.

It also offers an alternative way of planning its long-term activities considering and aligning them with governmental plans, in such a way that it can have efficiency in the use of the resources involved, it will also be possible to determine the optimal way to work according to the chain of value that has been established to satisfy the requirements of the desired tourism market segments.

In order to have a better understanding of innovation and its relationship with economic development, it is necessary to know the innovative activities that provide the best results for companies in the tourism sector, as well as to understand how the independent variable of knowledge management affects capacity to innovate of said companies. Likewise, indicators will be provided to compare the results with other innovative activities in the sector, which serve as an input for further empirical analysis of innovation. In addition to the surveys that cover the topics of the tourism sector.

Knowledge Management helps to know the processes, products or services and the demand that a company has, in such a way that it is understood how it is formed. In addition to the exchange of current and potential knowledge of the operation of the company. Therefore, a knowledge management system increases the competitiveness and innovation capacity of companies. Innovation implies the use of new knowledge or a new use or its combination of current knowledge.

Knowledge can be generated by an innovative company or by external acquisition such as the purchase of technology, so companies need to carry out innovative efforts to use the new knowledge (Oslo Manual, 2006).

## **1.2 Problem**

Small and medium-sized tourism companies (MSMEs) are unaware of what the innovation management process consists of and this is reflected in the incipient development of new products and processes compared to other sectors (Gallouj and Sundbo, 1998; Hjalager, 2002 Volo, 2004). International organizations such as the UNWTO (2002) or the OECD (2006), have encouraged small businesses and destinations to incorporate innovation as their competitive strategy, still do not understand the sources and patterns of innovative activity in tourism, what is indispensable for the development of better policies for their support (Monfort and Camisón, 2009). For this reason it is necessary to know if there is a relationship between knowledge management and innovation for the development of small tourism businesses in the municipality of Caborca, Sonora.

## **1.3 Hypothesis**

In response to the problem raised, the hypothesis was established: "The factor of knowledge management has a positive relationship in innovation for the development of tourism businesses in the Municipality of Caborca, Sonora".

## **1.4 Objectives**

In order to respond to the problem and planned hypothesis, the following objective was defined that would allow us to "analyze the relationship of knowledge management to know its impact on innovation for the development of tourism businesses in the Municipality of Caborca, Sonora".

### 1.4.2 Specific Objectives

To know if there is a relationship between the independent variable of knowledge management and innovation for the development of tourism businesses in the Municipality of Caborca, Sonora. Analyze the level of the relationship that exists between knowledge management and innovation for the development of tourism businesses in the Municipality of Caborca, Sonora. Know the reliability of the applied instrument to obtain reliable and valid information that allows to carry out innovative efforts to use the new knowledge.

## 2. Theoretical framework

Innovation, in more specific terms, involves the purpose of improving the competitive position of companies by incorporating new technologies and knowledge of different types. The innovation process thus consists of a series of activities not only scientific and technological, but also organizational, financial and commercial; actions that, potentially, transform the productive and commercial phases of the companies. The concept of innovation is not a new phenomenon; since it is part of the history of humanity itself. It has a deep root in the natural tendency to think about new and better ways of doing things, and the creative capacity that drives them and tries to carry them out in practice (Fagerberg, 2003, Rodríguez, Hoyos, Izaguirre and Molina, 2011, Del Rio, Cardona et al.2012).

The concept of innovation was initially described by Schumpeter in 1934 as the development of new products, new processes, new markets and new sources of raw materials, to form a new industrial organization and coined the term of creative destruction as the source of a new cycle economics in the economy and the relations of innovation with economic growth.

The existing literature emphasizes the differences between the economic approaches of industrial innovation (Freedman, 1991), research and development (R & D) and innovation (Arrow, 1962), the differences between industries (Pavitt, 1984) as well as the function of the capacities of innovation and learning (Cohen and Levinthal, 1990).

On the other hand, in an analysis of entrepreneurial mindset and innovation, researcher Stevenson mentions that innovating does not only mean creating a new product, since it can be innovated by forming a new organization or a new form of production or by carrying out a specific activity. (Castillo, 1999). The European Commission (2004) defines innovation as the renewal and expansion of a series of products or services and their complementary markets; as well as the establishment of new methods of production, supply and distribution; the introduction of changes in management, work organization, working conditions and workforce skills. (Carvalho, & Costa, 2011).

The Oslo manual (2006) defines four types of innovation: goods, processes, organizational and marketing, without considering social innovations that are not market oriented, so Echeverría (2008), proposes to identify good innovation practices and that criteria are established to develop a system of social innovation indicators.

This same manual classifies innovation, according to the degree of modification it introduces on products or processes, in radical, improvement and incremental. This same classification is described by authors such as Damanpour (1996), Dewar and Dutton (1986); Ettlie, Bridges and O'Keefe (1984), and Gatignon, Tushman, Smith, & Anderson, (2002).

The Oslo Manual of the OECD (2006) which develops the procedures for obtaining and interpreting data on innovation and technological development. It establishes as growth factors of a region the development and diffusion of new technologies. This model indicates design as something essential for innovation. As well as the definition of the procedures, technical specifications and characteristics required for the conception, development, manufacture and marketing of new processes and products. The innovation could involve a new team, a new administration, organization and methods.

The development of the concept of innovation in the service sector has a key role to indicate the necessary factors in the success of organizations and allow them to be more competitive, which have been studied in both the empirical and the theoretical (Mejía y Arzola, 2007; Albornoz, 2009; Cárdenas, 2009; Coombs y Miles, 2000; Drejer, 2010). Small and medium-sized tourism companies (MSMEs) are unaware of what the innovation management process consists of and this is reflected in the incipient development of new products and processes compared to other sectors (Gallouj and Sundbo, 1998.

Hjalager, 2002 Volo, 2004). International organizations such as the UNWTO (2002) or the OECD (2006), have encouraged small businesses and destinations to incorporate innovation as their competitive strategy, still do not understand the sources and patterns of innovative activity in tourism, what is indispensable for the development of better policies for their support (Monfort and Camisón, 2009). Diaz, & Horrillo (2013), mention in their study that the growing importance of innovation is not reflected in the degree of development of tourism research, which is still scarce and recent (Hjalager, 2010, Peters and Pikkemaat, 2006).

Just as research on tourism innovation is incipient and scarce (Monfort, 2009, Hjalager, 2010), the studies are more focused on destinations, which are descriptive and based on application of territorial models of agglomeration and innovation systems, (Nordin, 2003, Prats et al., 2008, Sorensen, 2007, Jacob et al., 2008). The few studies at company level have a clear orientation towards technology (Alderbert et al., 2011) and / or have focused on the hotel sector (Camisón, 2000, COTEC, 2007, Martínez and Orfila-Sintes, 2009, Orfila- Sintes and Mattsson, 2009).

Even the debate on the conceptualization of tourism innovation is still open (Hjalager, 2010) and researchers highlight the emergence of deepening and adapting the approach to innovation to the peculiarities of the tourism sector, especially the non-technological characteristics, which refer to its roots with the territory, based on the company's relations with the agents of the destination (Vera, 1998, Longhi and Keeble, 2000) and the importance in the configuration and management of the tourist product (Rastrollo, 2002).

According to the Organization for Economic Cooperation and Development (Gurria, 2007), the innovation system includes the existence of research centers, universities and organizations that encourage and facilitate the adoption, adaptation and creation of new knowledge and forms of organization, production and marketing. Where access to tools and technologies that allow the distribution and processing of information and knowledge, constitute the medium for a knowledge-based economy. For Martin, Alama, Navas and López (2009), "the ability to innovate is critical to increase the value of the company, and therefore they assume it as part of their intellectual capital.

Starting from the intensive knowledge generated by the relationship between the consumer, the service and the organization, the creative capacity could result in new ways of developing, executing and consuming the service, that is, an innovation in services. Hence, the authors raise the need to create a model that explains the relationship between innovation and intangibles. Innovation is considered a strategic intangible asset in the theory of knowledge, it is also one of the intangible assets of intellectual capital and considered in the different measurement and management models. Where the link is carried out for the appropriation, use and sharing of knowledge by the company.

Knowledge management is another of the independent variables considered in the proposed model, which is understood as the art of transforming information and intangible assets into a constant value for clients and staff (PricewaterhouseCoopers, 1999) and for the OCDE is the management of intellectual capital, organizational competencies and human capital available in the organization. In the 1990s, the concept of Knowledge Management was described as the application of computer programs, as well as information and communication technologies (Wilson, 2002).

This same author mentions that there are few companies that have carried out the implementation of knowledge management in their organizations. Considering only 35% of 451 companies that were analyzed in a study in 2000 by the Bain Company, reaching only a 3.5 level of satisfaction on a scale of five points. In addition, it was found that knowledge management ranked 19th out of 25 factors considered most important in business management. In contrast to the 70% that used benchmarking and 80% strategic planning.

Currently there is acceptance among researchers that the factor of knowledge management can be considered as a strategy, management and innovation in organizations (Sveiby, 1990, Nonaka and Takeuchi, 1995, Von Krogh, Nonaka and Aben, 2001). The life cycle of knowledge is carried out by organizations in an accelerated way, because knowledge is explained through explicit knowledge, which can be codified and implicit or tacit knowledge, which can not be codified, but which can be found in the experience and skills of staff (Birkinshaw and Sheehan, 2002). So the success of companies in their learning will be according to how they transform the knowledge of human capital (tacit knowledge that people have) into explicit knowledge or structural capital (Sharma, Siddiqui, Sharma, Sing, Kumar, Kaushal and Banerjee, 2007).

Studies conducted by Gustavson and Harung, (1994) and Choueke and Armstrong (1998), observed that in a work group environment where experiences are shared, small businesses have greater learning and the ability to make changes, which offer the competitive advantages.

Like the analysis carried out in the small companies of England, where it was found that learning and knowledge orientation are more important for companies to survive and develop in the long term through the innovation of their strategies than the environmental aspects of their system (Penn, Ang'wa, Forster, Heydon y Richardson, 1998); (Salajarvi, Furu y Sveiby, 2005).

### 3. Methodology

The research carried out was quantitative, exploratory, descriptive, with a non-experimental design, in which the documentary technique was used to recognize the relationship between innovation as a dependent variable and the independent variables of knowledge management, as well as the bibliographic technique in the elaboration of the frame of reference and finally in the field technique a structured questionnaire was used, since according to Corbetta (2007) who considers that the questionnaire is the most used in quantitative research.

For the elaboration of the survey, the approach based on the "subject" that deals with the attitudes and innovative activities of the company as a whole was considered. This is prepared so that they are representative of each sector of activity such as tourism in this case and that can be comparable internationally. (Oslo Manual, 2005). The questions to the subjects to survey were standardized, which means that all the subjects are asked the same question formulated identically. The standardization of the stimulus is a fundamental characteristic of the sample survey, which allows the answers to be compared and analyzed with statistical techniques (Corbetta, 2007).

The objective of the instrument was to analyze whether there is a relationship between knowledge management and innovation for the development of tourism businesses, which was made known at the beginning of the questionnaire, as well as the purpose of measuring the perception of the entrepreneur and / or manager of the impact that the aforementioned factors have. The survey was prepared in four sections, which consisted of items related to the general information of the interviewee and his company; direct questions about knowledge of innovation in tourism businesses.

The third consisted in measuring the relationship of the variables; fourth and last consisted of four items to weight the relationships of processes, services, organization and marketing with each of the variables. The following Likert scale was used for each of the responses of the reagents used in the measurement of the dependent and independent variables, where one (1) is totally disagree; two (2) disagree; three (3) is Neither agree nor disagree; four (4) is in agreement and five (5) is totally in agreement.

Subsequently a validation of the instrument was carried out with experts of the subject and once the validation was obtained, a pilot test of the instrument was carried out to generate the corresponding analyzes that assure us that the results that were obtained have the corresponding reliability and validity.

The population considered was the total of the 120 companies providing tourism services for which a census was conducted to all tourism entrepreneurs in the hotel and restaurant industry, through a personal interview, as they can have an overview of the companies and handle the concepts of the variables.

Once the surveys were applied, the analysis of the collected data was carried out to determine its validity and reliability, proceeding to its tabulation, using the SPSS program for the analysis of the results such as reliability using the Cronbach's Alpha, matrix of correlations, the coefficients of collinearity and the summary of the model with the square R.

**4. Results**

In order to know the reliability of the information obtained, the Cronbach's Alpha was used, taking with the dependent variable Y: "Innovation" and as an independent variable the variable X1: "Knowledge Management", resulting in an Alpha of .78 for the dependent variable and a value of .92 for the independent variable, which indicates the reliability of the instrument. (Table 1. Reliability statistics)

	Cronbach's alpha
Innovation	0.78
Knowledge management	0.92

**Table 1** Reliability statistics  
*Source: Own elaboration*

For the measurement of the degree of relationship of the variables under study, an analysis of the correlation was performed to better understand the data obtained between the dependent variable Y: Innovation and the independent variable X1: Knowledge Management, also obtained a significance of 0.000, less than .01. Setting the probabilities that the reported correlations are due to chance in the form of random sampling error. Also indicating a linear and positive relationship with a correlation of .676 (Table 2. Correlations).

	INN	GC
Innovation	1	
Knowledge management	0.676**	1
** p<.01		

**Table 2** Correlations  
*Source: Own elaboration*

When analyzing the collinearity where there is a relationship between the two variables analyzed, a coefficient of collinearity VIF of 1,000 was found, which expresses a complete collinearity with a Beta value of .676 and a "t" value of 5.647 between the variable of Y: Innovation as a dependent and the variable X1:

Knowledge Management, as an independent variable (Table 3. Coefficients)

Model		Non standardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
		B	standard error	Beta			Tolerance	VIF
1	(Constant)	1.597	.283		5.647	.000		
	GESTIONC	.619	.062	.676	9.961	.000	1.000	1.000

a. Dependent variable: FINAL INNOVATION

**Table 3** Coefficients  
*Source: Own elaboration*

In the summary of the model, a square R of .676 was found, which indicates that the model is explained in 46%, with a level of significance of 0.000, indicating the certainty that the results obtained (Table 4. Summary of the model).

Model	R	square R	Standard error of the estimate	Change statistics			Sig. Change in F	Durbin-Watson
				Change in F	gl1	gl2		
1	.676	.457	.40594	99.219	1	118	.000	2.105

a. Predictors: (Constant), GESTIONC  
b. Dependent variable: FINAL INNOVATION

**Table 4** Summary of the model  
*Source: Own elaboration*

**5. Conclusions**

As a result of the analysis obtained, it can be confirmed that there is a significant relationship between the dependent variable Y: Innovation and the independent variable X1: Knowledge Management, for the development of small tourism businesses in the municipality of Caborca, Sonora. Therefore, the established hypothesis can be verified where: "The factor of knowledge management has a positive relationship in innovation for the development of tourism businesses in the Municipality of Caborca, Sonora."

It was also possible to achieve the objective of analyzing the level of impact existing in the relationship of knowledge management to know its relationship in innovation for the development of tourism businesses in the Municipality of Caborca, Sonora. This will help to know the processes, products or services and the demand that a company has, in such a way that it is understood how it is formed. In addition to the exchange of current and potential knowledge of the operation of the company.

It was also possible to obtain the reliability of the results with the analysis of the applied instrument, which will allow to carry out innovative efforts in a reliable way to use the new knowledge in the development of tourism businesses in the municipality of Caborca, Sonora. Allowing a categorization based on the impact of knowledge management, both in the design and in the implementation of a program for the development of tourism companies based on an innovation management model for the Municipality of Caborca, Sonora.

Therefore, it can be said that knowledge management is an important factor in the efforts that are planned in the development of tourism companies, as mentioned above, the relationship between innovation and intangible. Innovation is considered a strategic intangible asset in the theory of knowledge, it is also one of the intangible assets of intellectual capital and considered in the different measurement and management models. Where the link is carried out for the appropriation, use and sharing of knowledge by the company.

With the implementation of a knowledge management system, the competitiveness and innovation capacity of the companies can be increased.

Innovation implies the use of new knowledge or a new use or its combination of current knowledge. In the same way, the indicators will allow comparing the results with other innovative activities of the sector, which serve as an input for further empirical analysis of innovation.

## 6. References

Albornoz, W., Del Tronco, J. (2009). *Políticas Públicas comparadas: Las reformas estructurales y sus resultados en América Latina*. México: FLACSO-México.

Arzola, M., & Mejías, A. (2007). Modelo conceptual para gestionar la innovación en las empresas del sector servicios. *Revista Venezolana de Gerencia*, 12(37).

Corbertta, P. (2007). *Metodología y Técnicas de Investigación Social*, Mc Graw Hill, México, Pág. 145.

Díaz, M. & Horrillo, M. (2013). Innovación, capital intelectual y capital social territorial: enfoques clave para el éxito de la empresa turística en el nuevo entorno socio económico. *Cayapa. Revista Venezolana de Economía Social*, 13(25), 9-33.

Drucker, P. F. (1985). *Innovative and Entrepreneurship, Practice and Principles*. New York: *Harper & Row*. Retrieved April, 7, 2013.

Echevarría, J. (2008). El manual de Oslo y la innovación social. *Arbor*, 184(732), 609-618.

Escauriaza, M. J., Subirana, J. T., & Torres, X. T. (2001). *Innovación en servicios*. Cotec.

Etzkowitz, H. (2008): Innovation in action: the Triple Helix of university-industry-government relations". *Social Science Information*. Vol, 42, n.º 3, pp. 293-337.



Gallouj, F., Sundbo, J. (1998). *Innovation in services in seven European countries*. Roskilde University. Roskilde.

Godin, B. (2008): Innovation: the History of a Category. Paper no. 1. Project on the Intellectual History of Innovation. Montreal. INRS.

González De La Fe, T. (2009). El modelo de Triple Hélice de relaciones universidad, industria y gobierno: un análisis crítico. *Arbor*, 185(738), 739-755.

Hair, J., Anderson, R., Taham, R., Black W. (2007). *Análisis Multivariable* (5a. ed.). Madrid: Prentice Hall Iberia.

Hjalager, A. (2010). A review of innovation research in tourism. *Tourism Management*, 31(1), pp1-12. Malhorta, N. (2005). *Investigación de mercados con enfoque práctico*. México: Prentice-Hall.

Monfort, V., Camison, C. (2009). Innovación en la empresa turística. (Documento en línea). Ponencia presentada en la Primera Conferencia Internacional sobre la Medición y el Análisis Económico del Turismo Regional. Donostia.

Mowforth, M., & Munt, I. (2015). *Tourism and sustainability: Development, globalisation and new tourism in the third world*. Routledge.

Nordin, S. (2003). *Tourism clustering and innovation*. European Tourism Research Institute.

OCDE/ European Communités. (2006). Manual de Oslo. Guía para la recolección e interpretación de datos sobre innovación. 3ª. Edición. España.

OMT. (2013). Reporte anual de la actividad mundial del turismo. <http://www2.unwto.org/es/annual-reports>.

Rastrollo, M. (2001). Resources and capabilities of tourism firms in the knowledge economy: Towards a framework in Sheldon, P., Wober, K, Fesenmaier, D. *Information and Communication Technologies in Tourism*. Springer Verlag, Canadá.

Rositas, J. (2006). Factores críticos de éxito en la gestión de la calidad y su grado de presencia e impacto en la industria manufacturera mexicana, Monterrey, México: UANL.

Sánchez, A. (2011). ¿Los principales destinos son también las principales potencias en la Investigación en turismo? *Estudios turísticos*, (188), 91-111.

SECTUR. (2008). Programa Sectorial del Turismo 2007 – 2012. Diario Oficial. Diciembre 2012. México. Recuperado el 21 de noviembre 2014 en [http://www.sectur.gob.mx/PDF/PlaneacionTuristica/Prosectur\\_2013\\_2018.pdf](http://www.sectur.gob.mx/PDF/PlaneacionTuristica/Prosectur_2013_2018.pdf).

SECTUR. (2013). Programa Sectorial del Turismo 2013 – 2018. Diario Oficial. 13 de Diciembre 2013. México. Recuperado el 21 de noviembre 2014 de [http://www.normateca.gob.mx/Archivos/66\\_D\\_3632\\_22-01-2014.pdf](http://www.normateca.gob.mx/Archivos/66_D_3632_22-01-2014.pdf).

## **Development of an instrument for measuring entrepreneurial skills for students of higher education institutions**

ÁLVAREZ-BOTELLO, Julio\*†, CHAPARRO-SALINAS, Eva Martha, HERNÁNDEZ-SILVA, Maria del Carmen, TORRES-VELÁZQUEZ, Alejandra Magali

*Universidad Autónoma del Estado de México, Instituto Literario no. 100, Col. Centro, Toluca, México, CP 50000*

Received July 04 2017; Accepted September 12, 2017

---

### **Abstract**

The entrepreneurship understood as the act of converting an idea into a concrete project is for social or economic purposes, is a necessary and indispensable factor for university students since it develops in them skills and competences for a self-sustaining working life, for that reason The university as an agent of innovation must promote it in its students, generating in them a more active citizen participation that leads to the development of viable projects attending to diverse personal and social demands that are reflected in a local, state, national, and if possible internationally. From this perspective the present research had as main objective to elaborate a questionnaire that allows to identify the enterprising competences of students of superior level. Thus, the instrument was subjected to rigorous statistical tests in order to validate and reliability. With the purpose of using it in future researches that intend to quantitatively measure entrepreneurship in undergraduate students.

### **Instrument, Entrepreneurship, University**

---

**Citation:** ÁLVAREZ-BOTELLO, Julio, CHAPARRO-SALINAS, Eva Martha, HERNÁNDEZ-SILVA, Maria del Carmen, TORRES-VELÁZQUEZ, Alejandra Magali. Development of an instrument for measuring entrepreneurial skills for students of higher education institutions. RINOE Journal- Schools of economic thought and methodology. 2017.1-1:11-20

---

---

\* Correspondence to Author (email: julioalvarezbotello@yahoo.com)

† Researcher contributing first author.

## 1. Introduction

In the current Mexican context, the change occurs in an accelerated and uncertain way, together with the socio-political situation in which the country finds itself, which has meant that the new generations no longer have wage security when they graduate from higher education. This uncertainty and lack of opportunities in their immediate contexts has led many young people to migrate to other countries, where job opportunities are higher. Or, on the other hand, it has also forced them to look for autonomous and independent ways of generating economic income, their own businesses that are related to their fields of study income but also new opportunities for professional development.

This is how entrepreneurship is having a great boom in the lives of young students who are looking for new strategies through which they can visualize their ideas, manifesting themselves in a viable project. From the above, there is a need to design an instrument that measures the students' skills that Mexican universities promote in their students.

### 1.1 Justification

In recent years, the study of entrepreneurship has gained increasing interest within universities, since the number of students seeking the necessary means to materialize their projects has increased considerably, generating innovative ideas in different sectors of the human activity. An important line of research that emerges from the study of entrepreneurship is to determine the capacities of young entrepreneurial university students or what are the characteristics that differentiate them from the rest of the students. Likewise, efforts have been made to study whether current universities develop in students the necessary skills to generate and develop an idea and materialize it into a viable project.

Previous research has taken as a basis several factors that seek to explain the entrepreneurial capacity of university students. Such is the case of Gutiérrez Sivira (2006), who carries out a study that identifies the role of universities and the formation of the entrepreneurial culture from a local development perspective. Or the research carried out by Mavila (2009) that aims to determine the possible factors that explain the entrepreneurship capacity of the UNMSM students, and from there contribute to the formulation of the guidelines that allow the University to develop the educational and training foundations that encourage the business mentality of their students.

Under this paradigm arises the present investigation whose relevance is to design a measurement instrument that allows to identify which are the entrepreneurial capacities that a university student must have and thus be able to develop research lines that revolve around their measurement, making possible the development of programs that allow formulating intervention strategies in Mexican universities.

### 1.2 Problem

Today's increasingly complex reality requires university students to develop skills to undertake business, that is, not only put into practice the theory taught in universities, but also be able to envision themselves in the field of entrepreneurship development. Vigorena Pérez (2006), refers that the current university has the mission of being a place where new ideas and thoughts are generated that transform society, generating young innovators. It needs to reinterpret the conception of traditionalist education to promote in the students the ideas of innovation, creativity and change. Which is only going to achieve from what is called entrepreneurial education.

Premise that aims to address this research by developing an instrument to measure entrepreneurial skills in university students.

### 1.3 Objectives

#### 1.3.1 General Objective

Develop a measuring instrument for the entrepreneurial skills of students of higher education institutions.

#### 1.3.2 Specific Objectives

- Validate an instrument to measure the entrepreneurial capacities of students in higher education institutions.
- Reliabilize an instrument to measure the entrepreneurial capacities of students in higher education institutions.
- Generate lines of research to measure the entrepreneurial skills of students in higher education institutions.

## 2. Theoretical Framework

The main objective of entrepreneurial education is to generate and produce massively independent people, generating wealth, creating and willing to take risks. On the other hand, Guerrero and Urbano (2012) mention that the entrepreneurial university concentrates on fulfilling teaching, research and entrepreneurship activities. For this reason an Institution of Higher Education Entrepreneurship (HEI) has the obligation to innovate, recognize and create opportunities, work in teams, take risks and respond to challenges (Kirby, 2005, cited by Guerrero and Urbano, 2012). In the same way, it should seek to create a substantial transformation in the organizational character and have a more promising attitude for the future (Clark, 1998, cited by Guerrero and Urbano, 2012).

In other words, the entrepreneurial university is a natural incubator that provides support structures for academics and students to initiate new intellectual, commercial and combined projects (Etzkowitz, 2003, cited by Guerrero and Urbano, 2012). Based on this, says the author, HEIs need to become more entrepreneurial institutions. Its members have to be potential entrepreneurs, and their interaction with the environment has to follow a pattern of entrepreneurship. Then, the results generated by these universities will contribute to social development and economic growth (Schulte, 2004, cited by Guerrero and Urbano, 2012).

In this understanding, undertaking means initiating, exploring, promoting, organizing, taking risks. Then an entrepreneur is the person who identifies an opportunity and organizes the necessary resources to get it going. An entrepreneur is that individual who seeks or sees an opportunity and wants or tries to convert it into a business, or simply looking for new ways to improve their life and in some cases that of others (Mavila Hinojoza, Tinoco Gómez and Campos Contreras, 2009).

Entrepreneurial education refers Vigorena Pérez (2006), is aimed at providing the young university with the skills, abilities, tools and instruments to become an agent of economic and social development thus overcoming the limitations of its context. Seeks to generate independent young people, innovative, creative entities, that automotiven to question the established rules and meet their personal goals through their own action. It is necessary to say González Geraldo (2015) that entrepreneurial education enables comprehensive education that conceives the person as the protagonist of the educational process, introducing the learner to its socio-cultural reality.

Based on the above, Gutiérrez Sivira (2006), states that it is also necessary to teach an entrepreneurial culture in the university. The Entrepreneurial Culture, the author refers is one of those constructions that the new development model requires. It involves the construction of individual behavioral patterns linked to collective actions that signify the performance of innovative tasks that generate goods and services. That is why entrepreneurship is framed within an individual and collective nature, where factors such as creativity, imagination, the energy to change a situation and the willingness to develop it are combined with the leadership capacity to motivate and synergize with the others involved, which make possible the development of a project (Gutiérrez Sivira, 2006).

From the above, Gutiérrez Sivira (2006), mentions that the enterprise is:

"The ability to carry out action projects within the context of opportunities that have been identified and that contain enough energy to organize the means and resources to implement it. It is also an individual and collective behavior that implies basic attributes and competencies and some extraordinary ones that make viable the possibility of action to be undertaken" (page 148).

Likewise, this author refers, young people should be able to generate innovation capacity, since it is seen as a tool sine qua non for the socioeconomic development of nations. Only people capable of innovating, that is, adding new practices, new products, new processes or systems in a company, institution or community in a particular product or service, will achieve the desired development. Based on the foregoing, the entrepreneurship skills that are studied in this research are: 1) Ability to socially relate, 2) Entrepreneurial innovation, 3) Entrepreneurial planning and 4) Personal accomplishment. Which are explained below.

### **Ability to socially relate**

A social or personal network, in the entrepreneurial field is a group of people who may or may not know each other and who in some way contribute to the entrepreneurial activity, be it passive, reactive or proactive. Although there are few attempts to empirically relate entrepreneurial activity to the structure of social relationships, some research suggests that personal ties have a direct impact on an individual's decision to found a new company (Gilmore and Carson, 1999, cited by O. de Castro, Justo and Maydeu Olivares, 2006).

Urbano and Toledano (2014) mention that these relationships encompass social processes that revolve around a commercial activity. Specifically, in these cases, the social network is defined as: "A set of direct and indirect relationships that the entrepreneur maintains with different people from their socioeconomic and family environment" (p 233). Through its social network, say the authors, the entrepreneur can obtain the resources, means and support he needs to start up his business or innovative project. In addition, in some cases, the authors suggest, the social network is what gives you the idea of the product or service with which you will work. In this way, the direct and indirect contacts that the entrepreneur maintains can contribute both to the conceptual development of the business and to its implementation.

### **Entrepreneurial innovation**

The ability to innovate is understood as the tendency of a company to support and carry out new ideas, as well as novelty, experimentation and creative processes that can result in new products, services or technological processes (Fernández Mesa, Alegre Vidal and Chiva Gómez, 2012).

Thus, innovation is a crucial factor in the company's results as a result of the evolution of the competitive environment (Newey and Zahra, 2009, cited by Fernández Mesa, Alegre Vidal and Chiva Gómez, 2012).

Based on the above, Elche and González (2008, cited by Fernández Mesa, Alegre Vidal and Chiva Gómez, 2012) define entrepreneurial entrepreneurship as the process of improving the company's capacity to acquire and use the skills of different members of the company and in this way use the capacity for innovation.

From the above, Leite, Correia and Sánchez - Fernandez (2015), refer that to innovate, the entrepreneur does not need only knowledge, must develop attitudes: the ability to move forward, not to be intimidated by problems, persistence, leadership, creativity, innovation and the ability to convince. Thus, the authors say, HEIs can not limit themselves to just giving knowledge and sending their graduates to the market, they have to include the factor of innovative entrepreneurship in training, so that their students are able to create their own position of work at the end of his training.

### **Entrepreneurial planning**

An entrepreneur according to Rodríguez Moreno and Gómez Murillo (2014), has the capacity to generate ideas, turn them into something novel to positively transform their life and their environment. The entrepreneur generates motivation in others to achieve objectives.

The entrepreneur must be goal oriented, that is, the ability to focus efforts to achieve objectives, taking into account the cost - benefit (Bogotá Emprender, 2010, cited by Rodríguez Moreno and Gómez Murillo, 2014).

Likewise, it must have the capacity to understand the changes in the environment and establish its impact in the short, medium and long term, optimizing strengths and acting on the weaknesses to take advantage of opportunities (Alles, 2009, cited by Rodríguez Moreno and Gómez Murillo, 2014). The entrepreneur must know what his business is, where he wants to go and how to reach the objectives, that is, he must make a strategic analysis in order to make decisions.

### **Personal fulfillment**

The entrepreneurial attitude is a state of alert that detects business opportunities based on the variety of individual perceptions (Kirzner, 1973, cited by Espíritu Olmos, 2011). Likewise, the value of the entrepreneur is based on taking advantage of the opportunities without taking into account the procedures of a misallocated distribution of resources. This attitude that entrepreneurs possess has been well studied from different approaches such as sociological, ecological and psychological. However, most of the research is based on the fact that some of the characteristics of the personal fulfillment of entrepreneurs are manifested through three features:

1. Locus of control: It is related to the belief that the actions that one performs determine the results that one obtains. People with a locus of high internal control, think that they are able to control the results, so they will devote more effort and persistence towards the desired results, which, in turn, should help start a business venture and keep it successful (Sánchez García, 2010).

2. Self-efficacy: Self-efficacy, according to Bandura (1986, cited by Sánchez García, 2010) is an attribution of personal competence and control in a given situation and reflects the perception of a personal capacity to perform a specific job or task. Self-efficacy affects the choice of action and the amount of effort exercised, being the main individual predictor of career choice.
3. Propensity to risk: This is defined as the personality trait that determines the tendency and willingness of the individual to take risks. Individuals with this trait will be inclined to high risk behaviors; that is to say, they will consider the alternatives whose final consequences may move away from their framework of expectations of results. On the other hand, subjects with low propensity to risk will tend to low risk behaviors, and avoid alternatives that may cause results that vary greatly from their expectations (Das and Teng, 1997, cited by Sánchez García, 2010).

### 3. Methodology

**Kind of investigation:** Quantitative

#### Methodology for the realization of the pilot Test

For the development and design of the instrument to measure the entrepreneurial abilities of university students, a reagent matrix was designed to theoretically identify the variables considered for the measurement of entrepreneurship, being the one shown below:

Variables	Indicator	Item	Bibliography
Ability to socially relate	Establishment of entrepreneurial contact networks	Ease to develop networks of contacts (individuals, professionals)	Goleman (2006)
		Promote meeting between social actors (private sector, social and public) to be served from the entrepreneur project	Goleman (2006) Vigorena, (2006)
	Establishment of communication sources	Presence: includes personal presentation, the use of verbal and non-verbal language regarding cultural patterns.	Gutiérrez Sivira (2006)
		Clarity: Can say what is meant in a concise and clear way. Be able to speak in a way that people can easily understand.	Vigorena, (2006)
		Empathy: It is the ability to make agreements with others. Know how to develop joint interests, facilitates the achievement of shared interests.	Gutiérrez Sivira (2006)
	Strategic planning capacity	Leadership and Setting objectives	Define specific goals or purposes in their performance
Propensity to risk (Ability to make decisions with an associated level of risk)			
Management and control of resources		Manage resources rationally	
	Applies quality controls doing "good" things		
Capacity for personal fulfillment	Personal characteristics	Self control	Goleman (2006)
		Enthusiasm and tenacity in front of all kinds of setbacks	
		Intense work discipline	
		Business vocation (Desire for creation and innovation of own companies)	
		Self-training	
Innovation capacity of the person	Innovative attitude	Attitude towards risk	Tinoco Gómez (2008)
		Innovation	
		Proactivity	
		Ability to generate knowledge	

		Ability to apply knowledge	Guerrero y Urbano (2012)
		Capacity for the dissemination of knowledge	
		Capacity for the exploitation of knowledge	

**Table 1** Matrix of reagents of the variables that measure entrepreneurship

Source: Own elaboration (2017)

Once the reagent matrix of the instrument was made, a version of it was designed so that it could be sent to experts in the field and generate a valid appearance. Regarding the scale of measurement with which the items were weighted, this is made up of five response options or indicators, which are shown in Table 2:

1	2	3	4	5
Totally disagree	disagree	Probably	agree	Totally agree

**Table 2** Indicators of the reagents of the instrument

Source: Own elaboration (2017)

Regarding the application of piloting, 30 surveys were conducted to students of different degrees and semesters of higher education institutions, both public and private, to obtain the validity and reliability of the instrument reporting the results presented below.

## 4. Results

### Validity of the instrument

To determine the validity of the instrument, the statistical test "Factorial Analysis" was used through the sample adequacy measure of Kaiser - Meyer - Olkin reporting a score of .581 for the general validity of the instrument with a level of significance of .000. that refers that the instrument has an unacceptable validity.

Sample adaptation measure of Kaiser-Meyer-Olkin.		.581
Bartlett's sphericity test	Approximate Chi-square	378.630
	gl	231
	Sig.	.000

**Table 3** General validity of the instrument

Source: Own elaboration (2017)

Regarding the validity of the variable "Capacity to relate socially", a validity of .557 was obtained, with a level of significance of .002, which shows that this variable has an unacceptable validity.

Sample adaptation measure of Kaiser-Meyer-Olkin.		.557
Bartlett's sphericity test	Approximate Chi-square	27.598
	gl	10
	Sig.	.002

**Table 4** Validez de la variable Capacidad para relacionarse socialmente

Source: Own elaboration (2017)

On the other hand, the validity of the variable "Strategic planning capacity" shows a validity of .752 with a level of significance of .000 which indicates that the items of this variable have good validity.

Sample adaptation measure of Kaiser-Meyer-Olkin.		.752
Bartlett's sphericity test	Approximate Chi-square	50.742
	Gl	15
	Sig.	.000

**Table 5** Validity of the variable "Strategic planning capacity"

Source: Own elaboration (2017)

Regarding the variable "Ability of personal fulfillment" it is observed that it has a validity of .595 and a level of significance of .022 which shows that its validity as well as the first two variables is unsatisfactory.



Sample adaptation measure of Kaiser-Meyer-Olkin.		.595
Bartlett's sphericity test	Approximate Chi-square	14.770
	gl	6
	Sig.	.022

**Table 6** Validity of the variable Ability of personal fulfillment

Source: Own elaboration (2017)

Finally, the variable "Innovation capacity of the individual entrepreneur" shows a validity of .852 and a level of significance of .000, which indicates that its reagents are valid to be applied.

Sample adaptation measure of Kaiser-Meyer-Olkin.		.852
Bartlett's sphericity test	Approximate Chi-square	90.006
	gl	21
	Sig.	.000

**Table 7** Validity of the variable Innovation capacity of the individual entrepreneur.

Source: Own elaboration (2017)

Thus, based on the above, there is an unfavorable validity of the instrument, which can be improved with a second pilot application.

**Reliability of the instrument**

To determine the reliability of the instrument, the Cronbach's Alpha test was used to determine the internal relationship of the reagents. Showing the following results:

Cronbach's Alpha
.894

**Table 8** General reliability of the instrument

Source: Own elaboration (2017)

Table 8 shows that the reliability, from the Cronbach's Alpha test, of the instrument in general is .894, which indicates that it is a reliable instrument to be applied.

As for the variable "Ability to relate socially", a Cronbach's alpha of .536 is observed, which indicates that the items of this variable are unreliable.

Cronbach's Alpha
.536

**Table 9** Reliability of the variable Ability to socially relate

Source: Own elaboration (2017)

For the variable "Strategic planning capacity" a Cronbach's alpha of .785 was obtained, which indicates that the reagents of this variable are correlated.

Cronbach's Alpha
.785

**Table 10** Reliability of the variable Strategic planning capacity

Source: Own elaboration (2017)

On the other hand, for the variable "Capacity for personal fulfillment" a Cronbach's alpha of .616 was obtained, which refers to an acceptable reliability.

Cronbach's Alpha
.616

**Table 11** Reliability of the variable Ability of personal fulfillment

Source: Own elaboration (2017)

Finally, the variable "Innovation capacity of the individual entrepreneur" shows a Cronbach's Alpha of .875 which shows a high reliability among its reactants.

Cronbach's Alpha
.875

**Table 12** Reliability of the variable Innovation capacity of the individual entrepreneur

Source: Own elaboration (2017)

Thus, by virtue of the foregoing, it is shown that in terms of reliability the instrument can be applied in future investigations. Likewise, the Pearson correlation was used to determine the internal correlation of the instrument's reagents, finding high correlations in the reagents of the instrument.

## 5. Conclusions

Entrepreneurship, at present, is a trigger to innovate the curricular designs of higher education institutions promoting in students the generation of ideas that materialize in viable projects of self-development or social development, which is why it is important to conduct research that, like this one, allow the creation of measurement instruments that generate similar research lines that allow the exploration of entrepreneurial skills to continue. From the above, the importance of the presented instrument, which although it has some areas of improvement in the validity, can be corrected by improving the application of the pilot test.

## 6. References

Espíritu Olmos, R. (2011). Análisis de la intención emprendedora en estudiantes universitarios a través de los rasgos de personalidad. *Multiciencias*, 11(1), 65 – 75. Recuperado de: <http://www.redalyc.org/articulo.oa?id=90418851009>.

Fernández Mesa, A., Alegre Vidal, J. y Chiva Gómez, R. (2012). Orientación Emprendedora, Capacidad de Aprendizaje Organizativo y Desempeño Innovador. *Journal of Technology Management & Innovation*, 7(2), 157 – 169. Recuperado de: <http://www.redalyc.org/articulo.oa?id=84724129013>.

Goleman, D. (2006). *Inteligencia social*. Kairos: España.

Guerrero, M. y Urbano, D. (2012). Transferencia de conocimiento y tecnología. Mejores prácticas en las universidades emprendedoras españolas. *Gestión y Política Pública*, XXI(1), 107 – 139.

Gutiérrez Sivira, F. (2006). Desarrollo local - endógeno y el papel de las universidades en la formación de cultura emprendedora e innovadora en territorios sociodeprimidos. *Laurus*, 12(22), 139 – 152. Recuperado de: <http://www.redalyc.org/pdf/761/76102207.pdf>.

Leite, E., Correia, E. B. y Sánchez – Fernandez, M. D. (2015). El espíritu emprendedor: Condicionamiento para la innovación. *HOLOS*, 5(), 278 – 291. Recuperado de: <http://www.redalyc.org/articulo.oa?id=481547288024>.

Mavila Hinojoza, D., Tinoco Gómez, O. y Campos Contreras, C. (2009). Factores influyentes en la capacidad emprendedora de los alumnos de la Universidad Nacional Mayor de San Marcos. *Industrial Data*, 12(2), 32 – 39.

Rodrigo Alarcóna, R., Parra Requenab, G. y García Villaverde, P. M. (2013). Efectividad de la orientación emprendedora: el papel del capital social y las capacidades Investigaciones Europeas de Dirección y Economía de la Empresa. *Academia Europea de Dirección y Economía de la Empresa España* 20(3), 1 – 9. Recuperado de: <http://www.redalyc.org/articulo.oa?id=274134674004>.

Rodríguez Moreno, D. C. y Gómez Murillo, A. X. (2014). Las competencias emprendedoras en el departamento de Boyacá. *Revista Apuntes del CENES*, 33(58), 217 – 242. Recuperado de: <http://www.redalyc.org/articulo.oa?id=479547210009>.

Sánchez García, J. C. (2010). Evaluación de la Personalidad Emprendedora: Validez Factorial del Cuestionario de Orientación Emprendedora (COE). *Revista Latinoamericana de Psicología*, 42(1), 41 – 52. Recuperado de: <http://www.redalyc.org/articulo.oa?id=80515880004>

Tinoco Gómez, O; (2008). Medicion de la Capacidad Emprendedora de ingresantes a la Facultad de Ingenieria Industrial de la UNMSM. *Industrial Data*, 11(), 18-23. Recuperado de <http://www.redalyc.org/articulo.oa?id=81619829003>

Urbano, D. y Toledano, N. (2014). Invitación al emprendimiento: Una aproximación a la creación de empresas. Barcelona: Editorial UOC.

Vigorena Pérez, F. (2006). Educación emprendedora. *Pharos*, 13(1), 59 – 65. Recuperado de: [www.redalyc.org/pdf/208/20813107.pdf](http://www.redalyc.org/pdf/208/20813107.pdf).

## 7. Anexo

### ESTUDIO DE CAPACIDAD EMPRENDEDORA

**Objetivo:** El presente instrumento tiene la finalidad de conocer el nivel de desarrollo de las capacidades emprendedoras en estudiantes de universidades latinoamericanas.

**Instrucciones:** Se le solicita marcar solo una de las opciones que mejor describa su respuesta atendiendo los siguientes parámetros.

1. *Totalmente en desacuerdo.* 2. *En desacuerdo.* 3. *Probablemente* 4. *De acuerdo.* 5. *Totalmente de acuerdo.*

Licenciatura: \_\_\_\_\_ Semestre: \_\_\_\_\_

#### 1. CAPACIDAD PARA RELACIONARSE SOCIALMENTE

1 2 3 4 5

1.1	Promover encuentro entre actores sociales (Sector privado, social y publico) para ser atendidos desde el proyecto emprendedor					
1.2	Sensibilidad social: Saber comprender la situación de un entorno e interpretar el comportamiento de los individuos dentro de ese entorno.					
1.3	Presencia y autenticidad: Comprende la presentación personal, el uso del lenguaje verbal y no verbal, respeto de patrones culturales, naturalidad y transparencia.					
1.4	Claridad: Saber decir lo que se quiere decir, de forma concisa y clara. Ser capaz de hablar de manera que las personas puedan entender con facilidad.					
1.5	Empatía: Es la capacidad de conectar con los demás. Saber desarrollar intereses conjuntos, facilita el logro de retos compartidos.					

#### 2. CAPACIDAD DE PLANIFICACIÓN ESTRATEGICA

1 2 3 4 5

2.1	Visualiza anticipadamente el resultado de sus acciones					
2.2	Define metas o propósitos concretos en su desempeño					
2.3	Administra racionalmente los recursos					
2.4	Aplica controles de calidad haciendo bien las "cosas"					
2.5	Evalúa y corrige las acciones					
2.6	Propensión al riesgo (Capacidad de tomar decisiones con un nivel de riesgo asociado)					

#### 3. CAPACIDAD DE REALIZACIÓN PERSONAL

1 2 3 4 5

3.1	el entusiasmo y la tenacidad frente a todo tipo de contratiempos					
3.2	la empatía, ponerse en la "piel" de los demás					
3.3	Disciplina de trabajo intenso					
3.4	Vocación empresarial (Deseo de creación e innovación de empresas propias)					

#### 4. CAPACIDAD DE INNOVACIÓN DEL EMPRENDEDOR INDIVIDUAL

1 2 3 4 5

4.1	Actitud hacia el riesgo					
4.2	Innovación					
4.3	Proactividad					
4.4	Capacidad para la generación de conocimiento					
4.5	Capacidad de aplicación del conocimiento					

**Culture of innovation in small business**

LÓPEZ-PARRA, María Elvira†\*, AGUIRRE-CHOIX, Ricardo, GONZÁLEZ-NAVARRO, Nora Edith and ACEVES-LÓPEZ, Jesus Nereida

*Instituto Tecnológico de Sonora. Calle 5 de Febrero No. 518 C.P. 8500.Cd. Obregón, Son. México*

Received July 10, 2017; Accepted November 21, 2017

**Abstract**

The objective of this research is to identify, from the perception of the small entrepreneurs, the situation in which their companies are in terms of innovation culture. For this purpose a quantitative type analysis was used with a sample of 51 small companies by the number of their collaborators that from 10 to 50. For this study the culture of innovation was defined and seven thematic areas were identified that measure them according to Tejeiro (2014): 1) corporate style, 2) fostering of creativity, 3) leadership and management by competencies, 4) organizational learning, 5) monitoring and technological intelligence, 6) organizational structure, and 7) relationship with the outside world. It is applied to an instrument with 29 Likert scale elements with 5 response options ranging from 1) never, 2) almost never, 3) sometimes, 4) almost always, and 5) always. The results obtained were found in all thematic areas that make up the culture of innovation. The entrepreneur replied that "sometimes" he performs actions aimed at innovation with averages ranging from 3.03 to 3.97 the highest, which shows that his culture is not directed to carry out innovative activities

**Innovation, Organizational Culture, Small Business**

**Citation:** LÓPEZ-PARRA, María Elvira, AGUIRRE-CHOIX, Ricardo, GONZÁLEZ-NAVARRO, Nora Edith, ACEVES-LÓPEZ, Jesus Nereida. Culture of innovation in small business. RINOE Journal- Schools of economic thought and methology. 2017.1-1:21-28.

\* Correspondence to Author (email: mariaelvira.lopez@itson.edu.mx)

† Researcher contributing first author.

## 1. Introduction

A company that innovates in its products, processes and commercialization, is a company that will generate greater benefit, in this respect Geroski and Machin (1992) quoted in Galvez and García (2012) comment that innovation in the field of Research and Development (R + D) it causes greater profitability and competitiveness in organizations, this is because innovation focuses on the development or improvement of new products and in turn reduces costs, in such a way that this causes an economic benefit and a greater participation in the market.

For this, the strategy must be focused on innovation, its objectives, actions, materials and human capital must be focused on seeking capabilities that provide competitive advantage (Salavou, 2004)

Freel (2000) quoted in Galvez and García (2012) makes mention in his study, that small companies that innovate have a greater increase in their sales than those that do not develop innovation, even if this does not translate into an increase in their profits, this may be because of the limitations in reducing costs, which are an important element for obtaining higher profits.

Fernández, González and Pita (2016) comment that there are many official institutions that have developed their own questionnaire, such as: the European organism Eurostat, the National Institute of Statistics in Spain (INE) who carries out the Survey on Innovation in Companies, and some autonomous organizations such as the Gemological Institute of Spain (IGE) develop their Business Innovation Survey.

## 1.1 Justification

This research hopes to generate, through a diagnosis about the current situation in terms of culture of innovation, opportunities for improvement that allow the small entrepreneur to identify the factors that can lead him to develop a culture of innovation and in that sense see permeated the activity and at the same time increase the social, technological and financial benefits.

Regarding social importance, this empirical research will be carried out in an important sector for the economy such as small business; it is expected to identify opportunities for improvement to guide their strategy towards the culture of innovation and as a result, small businesses increase their sales, lower their costs and find the competitive advantage that allows them to survive and grow.

The culture of innovation allows, in the short term, as mentioned by Porter (1991), to maintain the factors of competitiveness, generation of value, quality, customer satisfaction and competitive costs as a result of good practices. Finally, this study will support research related to the innovation culture that is explored in small businesses, and all those actions that are aimed at improving the competitiveness of this productive sector.

## 1.2 Problem

It has been shown that there is a relationship between culture and performance and innovation, and studies in this regard have increased (Denison and Mishra, 1995, Denison, Haaland and Goelzer 2003, Mobley, Wang and Fang, 2005) cited by Martínez (2010).

Cardinal (2001) and Subramaniam & Youndt (2005) cited by Santos, Figueroa and Fernández (2011) comment that radical and incremental innovative capacity differs in the type of knowledge required by entrepreneurs and that intellectual capital influences the development of capacities for radical and incremental innovation. This indicates that human resource capacities have an influence on the development of the culture of innovation in organizations.

Each organization has its own culture, characteristics and identity, so companies must identify those attributes that bring competitive advantage to their company (Schneider, 2000) and from there feed and develop them until innovation becomes a way of being and to do the things. Hult, Hurley & Knight (2004) comment that companies with a corporate culture have customs and values that constantly drive them to improve their processes, products and services, as well as looking for new business opportunities.

In this regard, Tejeiro (2014) carries out a study on the measurement of innovation culture, rescuing the following thematic areas: (1) corporate style, (2) promotion of creativity, (3) management and competency management, (4) organizational learning, (5) surveillance and technological intelligence, (6) organizational structure and (7) relationship with the outside world.

### 1.3 Objectives

Identify, from the perception of small entrepreneurs, the situation in which their companies are in terms of culture of innovation with the purpose of contributing to knowledge with an empirical study applied to a representative sample of small businesses in Ciudad Obregón, Sonora.

## 2. Theoretical framework

For the development of the theoretical framework, it starts by identifying the concept of innovation, then an analysis is made about the organizational culture and how innovation permeates organizations to create a culture of innovation.

OECD & EUROSTAT in the Oslo Manual (2007) defines Innovation as "the introduction of a new, or significantly improved, product (good or service), of a process, of a new marketing method or of a new organizational method, in the internal practices of the company, the organization of the workplace and external relations" (pp. 56). Innovation combines technology with discoveries to generate new products, processes in order to improve its position in the market, while generating competitive advantages (Rirole, 1995 cited by Alvarado and Pumisacho (2015).

Regarding the organizational culture, this must be defined considering the practices that each of the companies carries out. Schein (1988) defines the organizational culture as a way of acting in companies based on their basic presumptions, those invented, those discovered and those developed by their collaborators to deal with problems. Naranjo and Calderon (2015) comment that there are different proposals to diagnose, measure and evaluate culture, highlighting the contribution of Cameron and Quinn (1999) that propose the Values in Competition Model (MVC) and that identifies and classifies companies by the type of dominant culture. Among those mentioned are the types: clan, ad-hoc, hierarchical and market, that for purposes of this research, the culture that is most oriented to innovation is that referred to Ad-hoc because its environment is creative type and risk taking and its leader is innovative which puts its emphasis on the innovative orientation of its employees.

However, the organizational culture will impact on innovation as long as the traits, values and actions of its co-workers are aimed at favoring innovation. Some characteristics of the organizational culture that favor innovation are: creativity, autonomy, assumption of risk, teamwork, sufficiency of resources, strategic orientation towards the client, decision-making, worker participation, continuous learning and flexibility (Naranjo 2010 , pp. 61 cited by Naranjo and Calderon, 2015). Hult, Hurley & Knight (2004) recognize factors of the culture of innovation such as: (1) orientation of the product or service according to the wishes of the client, (2) orientation towards learning, this is the development of new knowledge (R + D) considering the experiences of the company and (3) orientation towards entrepreneurship that includes strategic activities to reach new markets.

Hii & Neely (2000) comment that the companies that have greater capacity to innovate are because they have the capacity to generate new ideas, identify market opportunities and implement innovation. Fernandez, González and Pita (2016) conclude that "orientation towards innovation is a philosophy in which companies develop a system of norms and beliefs about learning and common knowledge, whose results are present and guide all functional areas towards innovation "(page 3). Therefore, the orientation to innovation is a set of actions developed by companies and allows them a meaningful learning of what they are doing and also leads them to new markets, design of new products and processes, among others.

Barret (1997) cited by Calderon, Cuartas and Álvarez (2009) comments that when a significant change occurs in organizations it is possible to identify a new way of working. In this regard Newman (2000) says that an organizational transformation leaves companies in greater dispoición to compete with their environment.

Regarding technological changes, some authors such as Aguilar (2005) and OECD & EUROSTAT (2007) observe that technological innovation is related to competitiveness and innovation and highlights the types of innovation such as: development of new products and processes, new versions of them, new organizational methods and new ways of marketing the product to new markets. For Schumpeter (1952) innovation is given in conjunction with capital and profit, thus giving a technological change and economic growth.

All these adjustments within organizations must be in a framework of organizational flexibility that allows you to adapt to changes that affect you continuously and be able to guide your culture to innovation.

### 3. Methodology

Below is the type of research and the method used to develop this research.

#### 3.1 Kind of research

It is an empirical, descriptive research because the findings were described as they were observed, taking into account the objective of this research, it was also quantitative, due to the fact that numerical units were used that were treated by descriptive statistical tools..

#### 3.2 Participants

The subjects of the study were small companies that had between 10 and 50 employees in Ciudad de Obregón, Sonora. The population was determined based on the National Statistical Directory of Economic Units (DENU) which yielded a total of 1145. For the sample determination, convenience sampling was chosen because the companies were selected for their availability, resulting in a total of 51 companies available to participate.

### 3.4 Materials

The instrument used was a questionnaire adapted from Tejeiro (2014) who developed a qualitative study to obtain the indicators that measure the culture of innovation in the areas of corporate style, creativity, leadership and competency management, organizational learning, monitoring and technological intelligence, organizational structure and relationship with the outside world.

The questionnaire contained general aspects that showed information about the name of the company, number of workers, year of incorporation, company turnover, if it was of the family type, age of the respondent, gender, position and degree of study. In the second part are elements related to the culture of innovation with a total of 29 items. The scale used was that of Likert with 5 response options ranging from 1) never, 2) almost never, 3) sometimes, 4) almost always and 5) always.

For the development of the research, first the innovation culture variable and its operational conceptualization was analyzed, the instrument was adapted and applied to a pilot test of 15 companies, the information was captured in the SPSS version 17 system, a Cronbach's alpha reliability index of 0.929 for a sample of 51 companies, the results were graphed and analyzed and the conclusions presented.

### 4. Results

Below are the results that identify, from the perception of small businesses the situation in which their businesses are in terms of culture of innovation in Ciudad Obregón, Sonora. In the first part, general aspects of the respondents are presented and in the second, the innovation culture from the indicators proposed by Tejeiro (2014).

Regarding the turn of the companies surveyed, 57% were commercial companies, 2% industrial companies and 41% of service. In terms of the size of the participating companies, these 14% were micro-enterprises and 86% were small companies because of the number of their employees, which ranges from 11 to 50 employees. 51% was found in a range of 5 to 10 years of incorporation, 16% in a range of 11 to 15 years and 33% greater than 16 years in the market.

Regarding the companies analyzed, they were asked if they were relatives, in this respect 42 companies answered yes and only 9 commented that they did not have a family structure. Of the 42 that answered that if they had a family member working in the company, 35% had between 2 and 3 relatives, 46% between 4 and 6 and 7 relatives in the answer was 19%.

Regarding the age of the respondents, 27% are between 18 and 25 years old, 45% between 26 and 35 years old, 14% between 36 and 45 years old and 14% of 46 years old and older. 47% of the respondents were female and 53% male. Of the respondents 35% were in management positions and 63% were in charge of the company when the owner was not. Finally, of the 51 respondents, 2% had only secondary education, 43% high school, 51% undergraduate and master's degree and doctorate 2% respectively.

In the second part, the means of central tendencies and dispersion of the answers of the 51 small companies on the culture of innovation are shown (see Table 1).



Innovation culture indicator	Average	Dev. Std.	Confidence interval	
			Lower limit	Upper limit
Corporate style	3.97	.7397	3.769	4.187
Formation of creativity	3.08	1.190	2.753	3.423
Direction and management of competencies	3.39	.8518	3.156	3.635
Organizational learning	3.15	1.084	2.849	3.459
Surveillance and technological intelligence	3.46	1.107	3.154	3.777
Organizational structure	3.03	1.413	2.641	3.436
Relationship with the outside	3.25	1.213	2.913	3.596

**Table 1** Estimated marginal means of innovation culture indicators for the companies surveyed (N = 51) with a confidence interval of 95%

Regarding the corporate style, the participating companies, on average, answered in the range of "sometimes" and "almost always". The items that stand out in this category are the empowerment of the leaders and their collaborators in the strategic planning of the organization that includes the knowledge of the objectives, the mission and vision of the company; In addition to showing the inclusion of objectives towards innovation and autonomy in decision making, and closes with the vision that management has about innovation and if this is a priority in the organization.

To encourage creativity and in this way guide innovation, the participating companies answered that "sometimes", they encourage employees to create new ideas and hold meetings to meet new proposals. As noted, small businesses in this region of the country do not show the necessary interest to create a culture of innovation.

For the category of management and management of the competencies, the companies surveyed commented that "sometimes" they promote the training of their employees for the mastery of technological tools, besides that "sometimes" experts are asked to support the innovation process that leaves the employees of the companies vulnerable to the creation of new ideas, products and processes that allow innovation.

In the organizational learning the participants commented that "sometimes" feedback processes innovation, which include customers and suppliers, as well as other areas of the organization. In this regard, as Hult, Hurley & Knight (2004) comments, it is important, in order to achieve a culture of innovation, to guide actions towards learning, this is the development of new knowledge (R & D) considering the experiences of the company and in this way to contribute to the identification of new markets.

For the surveillance and technological intelligence that motivates the culture of innovation, the surveyed companies commented that "sometimes" they make an analysis of the future products and the technology that these could require, as well as "sometimes" they consider important the information captured from the outside as a source of innovation. For the OECD & EUROSTAT (2007) one of the types of innovation are the new organizational methods, and in this respect the companies surveyed commented on average that "sometimes" they make changes in their organizational structure based on a vision of innovation.

Finally, regarding the relationship between foreign relations and communication systems with the client, collaboration with universities, research centers and other organizations shows that "sometimes" they are considered in the field of innovation culture.

In this regard, organizations must be flexible and allow leadership with an inclusive vision that promotes the approach and connection with other instances that are generating new knowledge in an effective and efficient manner, and that will serve small businesses to orient themselves towards innovation. In order to have a broad view of the results of the surveys regarding the Culture of Innovation of the small companies, Table 2 was elaborated showing the average of the innovation culture variable.

Variable	Average	Dev. Std.	Intervalo de confianza	
			Lower limit	Upper limit
<b>Culture of Innovation</b>	3.33	.816	3.109	3.569

**Table 2** Estimated marginal means of Innovation Culture for the companies surveyed (N = 51) with a confidence interval of 95%

As you can see the average that includes the items related to the thematic areas: (1) corporate style, (2) promotion of creativity, (3) management and competency management, (4) organizational learning, (5) monitoring and technological intelligence, (6) organizational structure and (7) relationship with the outside, shows together that on average (3.33) of a range that goes from 1 to 5, respondents "sometimes" perform activities that are aimed at innovation and the development of competencies and customs that allow it to make significant changes that have repercussions on its competitiveness.

## 5. Conclusions

Considering the objective of this research to identify, from the perception of small entrepreneurs, the situation in which companies find themselves in terms of culture of innovation, it is concluded that "sometimes" they promote innovation, but to adopt a culture of innovation.

Innovation, strategic direction is necessary, this in function of the development and positioning of said strategy influencing the beliefs, norms and all the cultural manifestations of the organization. In all the categories in which the variable of innovation culture was analyzed, the answers were on average "sometimes", which shows that their culture is not directed to carry out activities oriented towards innovation.

The small entrepreneur often has a significant number of operations to perform among which is customer service, purchase and sale of merchandise, collection, financing and all those situations related to the survival of their business, however there are few companies This size focuses these efforts on innovation, and not because it is not what they want, but because of the ignorance of the benefits that their company would bring to prioritize innovation and adapt a culture of innovation.

It is recommended that small businesses promote, in the field of innovation, specialization, standardization, formalization, centralization and delegation, with the aim of affecting cultural features such as loyalty, participation, attitude towards risk, among others (Klein, 2003 cited by Naranjo and Calderon, 2015) that could benefit the adoption of innovation in each of the actions, strategies, goals and objectives proposed by the companies. Companies today must be flexible, as is the case of the development of human resources management that allows them to adapt quickly and effectively to the changes that are occurring abroad and thus adjust, in terms of innovation, to market trends.

## Gratitude

To the Technological Institute of Sonora for the support and funding in the presentation of this research work.

## 6. References

- Aguilar, C. (2005). Naturaleza del cambio tecnológico y el crecimiento económico. *Contribuciones a la Economía*. 1-23
- Alvarado, K. M. Pumisacho, V. H. (2015). Impacto de la cultura organizacional sobre la innovación de las pymes: un estudio empírico en el Distrito Metropolitano de Quito. *Sotavento mba*, Num. 25. 26-33. DOI: <http://dx.doi.org/10.18601/01233734.n25.04>
- Calderon, G. Cuartas, J. y Álvarez, C. M. (2009). Transformación organizacional y prácticas innovadoras de gestión humana. *Innovar*. 19(35) 151-166.
- Fernández, C. González, M. y Pita, J. (2016). Orientación cultural hacia la innovación en empresas. Un enfoque sociológico del sistema de innovación de Galicia. *Revista internacional de sociología*. 74(2), 1-18
- Galvez, E. J. y García, D. (2012). Impacto de la innovación sobre el rendimiento de la MIPYME: un estudio emérico en Colombia. *Estudios Gerenciales*. 28(122), 11-27.
- Hii, J. y Neely, N. (2000). Innovative capacity of firms: on why some firms are more innovative than other. Documento presentado en la VII Conferencia annual internacional EurOMA.
- Hult, G.T., Hurley, R.F. & Knight, G.A. (2004) Innovativeness: it antecedents and impacto n business performance. *Industrial Marketing Management*, 33, 429-438.
- Naranjo, J. y Calderon, G. (2015). Constuyendo una cultura de innovación. Una propuesta de transformación cultural. *Estudios gerenciales* 31, 223-236
- Newman, K. (2000). Organizational transformation during institutional upheaval. *The Academy of management review*. 25(3), 602-619.
- Martínez, M. E. (2010). Relaciones entre cultura y desempeño organizacional en una muestra de empresas colombianas: reflexiones sobre la utilización del modelo de Denison. *Cuadernos de Asminidstración*, 23 (40), 163-190.
- OECD & EUROSTAT (2007). Manual de Oslo. Madrid: Comunidad de Madrid Consejería de Educación Dirección General de Universidades e Investigación.
- Porter, M. (1991). La ventaja competitiva de las naciones. Barcelona: Plaza & Janes.
- Salavou, H. (2004). The concept of innovativeness: should we need to focus?, *European Journal of Innovation Management*. 7(1), 33-44.
- Santos, H. Figueroa, P. y Fernández, C. (2011). El capital estructural y la capacidad innovadora de la empresa. *Investigaciones Europeas de Dirección y Economía de la Empresa*. 17(3), 69-89.
- Shein, E. (1988). La cultura empresarial y el liderazgo: una visión dinámica. Barcelona: Plaza y Janés.
- Schneider, W. (2000). Why good management ideas fail: the neglected power of organizational culture. *Strategy and Leadership*. 28(1). 24-29.
- Schumpeter, J. A. (1952). Capitalismo, socialismo y democracia. México: Aguilar.

## **The computer security culture reduces the risk of information loss and leakage**

RAMIREZ-OCHOA, Dynhora Danheyda\*†, BARROSO-BARAJAS, Alfonso José, SIQUEIROS-GARCÍA, Martina Ivonne and VILLAGRAN-VIZCARRA, Dafnis Cain

*Universidad Tecnológica de Chihuahua. Montes Americanos 9501, Col del Colegio, 31216 Chihuahua, Chih.*

Received July 10, 2017; Accepted December 21, 2017

---

### **Abstract**

With the accelerated growth of technology we have witnessed the various cyber attacks that can occur to our equipments, due to the threats and vulnerabilities that threaten the security of our equipment and information. This is why it must consider that a computer culture uses the knowledge, skills, attitudes and experience conditioning the activities of personnel to solve their needs and problems through technologies for the storage, processing and transmission of information in a way Automated. The investigation is based on detecting computer security risks through a user-level analysis, applied to the administrative staff of the Technological and Polytechnic Universities in the city of Chihuahua, informing us of the vulnerabilities to which the information is exposed due to the lack of application of Security controls. The results obtained reveal the safety controls required to reduce identified risks.

### **Computer Security, Computer Culture, Risks, Threats, Vulnerabilities**

---

**Citation:** RAMIREZ-OCHOA, Dynhora Danheyda, BARROSO-BARAJAS, Alfonso José, SIQUEIROS-GARCÍA, Martina Ivonne and VILLAGRAN-VIZCARRA, Dafnis Cain. The computer security culture reduces the risk of information loss and leakage. RINOE Journal- Schools of economic thought and methology. 2017.1-1:29-35.

---

---

\* Correspondence to Author (email: dramirez@utch.edu.mx)

† Researcher contributing first author.

## 1. Introduction

With the accelerated growth of technology, all organizations have based the storage and management of information through the use of technology, which helps in making decisions to strengthen organizations, thus becoming an important asset for them; being necessary to protect it from threats and vulnerabilities that threaten the computer security of Universities.

Given the importance of information, international standardization organizations have developed good practice standards for the safeguarding and good use of information and assets in general. The present investigation makes a diagnosis, based on the IO / IEC 27001 Standard, addressed to the Technological and Polytechnic Universities in the city of Chihuahua; with the interest of applying the best practices in the management of information security. The main objective of the research development is to reduce the identified risks through systematically established procedures. The results obtained allow us to prepare an executive report for the participating Universities, which serves as a support or guide to strengthen computer security at the user level.

### 1.1 Justification

Information is part of the most important assets of any company and in turn is one of the resources most prone to vulnerabilities, requires its protection against internal and external threats. For this reason, it is necessary to carry out an evaluation to know and apply the computer security controls, which support the staff to enrich their computer security culture, in order to minimize the risks and have the appropriate treatment of data and information.

Norm ISO / IEC 27001: Information Security Management system, provides a quality standard for information security, helping to minimize the risks of damage, theft or leakage of information; allowing to maintain the integrity, confidentiality and availability of the information, in addition to guaranteeing the authenticity of it.

The development of the computer security analysis is based on the ISO / IEC 27001 standard, which allows knowing the existing vulnerabilities in the handling of physical information, as well as that which is contained in the information processing systems, in such a way that preventive and corrective actions can be taken within the organization, to avoid compromising confidential data.

### 1.2 Problem

Although the Universities have an area or department of systems which is in charge of computer security and to keep their operations stable, it is considered of the utmost importance the awareness and training of the personnel in computer culture which contributes to diminish the related problems with computer security. The lack of knowledge and adequate management of information can harm the organization, which could be vulnerable to any security incident that could damage its operations.

### 1.3 Hypothesis

The computer security culture of the administrative staff of the Technological and Polytechnic Universities in the city of Chihuahua reduces the risk of information loss and leakage.

**1.4 Objectives****1.4.1 General Objective**

Reduce security risks through a computer culture to ensure the confidentiality, integrity and availability of information.

**1.4.2 Specific Objectives**

- Determine if the employees know the security policies to safeguard the information of the universities.
- Analyze security vulnerabilities that may exist in the handling of information and systems that affect the continuity of the University's operations.
- Know the current situation regarding the subject of computer security within the University.
- Establish awareness mechanisms for staff on information security issues.
- Process the data obtained from the computer security assessment applied to the Technological and Polytechnic Universities in the city of Chihuahua, for the preparation of a technical report with the analysis and recommendations of computer security.

**2. Theoretical framework**

Currently the technology has improved a lot of activities for the human being and in some cases the human personnel has been replaced by machines, this entails a risk in which unauthorized persons have access to confidential information and can make bad use of it.

Along with the technological advances that have been generated there has been the concept of computer security which aims to preserve and safeguard damage, alteration or subtraction to the computing resources of an organization and to manage the risk when guaranteeing, in the greater possible measure, the correct uninterrupted operation of those resources; which is achieved through the implementation of a group of controls regulated by standards, procedures, methods, techniques and software and hardware systems aimed at achieving a secure and reliable information system (Aguilera López) (Voutssas M., 2010) .

So it is of utmost importance that any person who has contact with any equipment or technology is instructed in a culture of computer security having a sense of responsibility, respect, ethics and compliance with the rules and policies defined by the organization and society; that, in the long run, guarantees the confidentiality, integrity and availability of the information.

That is why this research aims to emphasize in explaining the why, the when and how of security, creating a culture of security, inculcating awareness of the knowledge, which are currently essential, to properly perform the work of people who use computer tools and work with data and information (Parra Moreno, 2012). Since an informed, trained and educated person will understand why certain standards are dictated and why it is necessary to comply with them, and not only for the sole reason that someone has said it, because it is written, or worse, because.

**3. Methodology**

The project is based on the field research modality, since it is necessary to resort to the Universities to collect data and perform an analysis with said information.

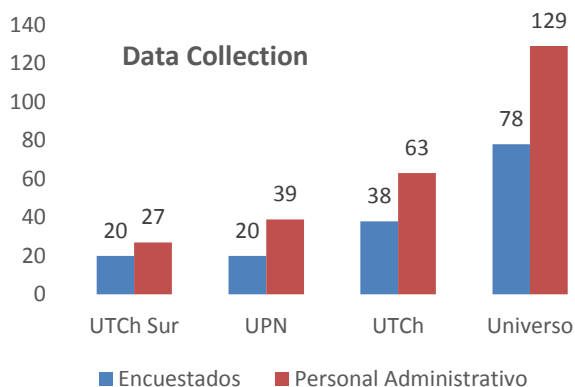
### 3.1 Type of research

For this research, the following types of research are used:

1. Hypothetical-deductive: which aims to prove that a computer culture can reduce the security risks in a company.
2. Field: since it is based on the information obtained from the administrative staff.
3. Descriptive: Since it details the processes that are carried out and those that are planned in the object of study.

### 3.2 Population and sample

The universe is made up of the administrative employees of the Technological and Polytechnic Universities in the city of Chihuahua, and in the sample information of 60% of said population was collected.



Graph 1 Population and sample

### 3.3 Information collection plan

The research techniques used for the collection of information is that of the questionnaire, in which a diagnostic assessment of the knowledge of the user of the computer security that has been implemented in the university is carried out, as well as the planning and the current situation in which are the computers to which the administrative staff have access.

### Questions to determine staff knowledge:

1. Do you know who is responsible and the area in charge of computer security?
2. Do you have an antivirus installed on the computer equipment you use?
3. Do you have access to the advanced settings of your computer, such as the control panel?
4. What type of operating system do you use?
5. What services and systems do you consider most critical in terms of availability?
6. Is there equipment that provides uninterrupted power to computers?
7. Do you know how to detect an intrusion or attack on your computer?
8. Approximately how much information you handle is restricted or confidential access?
9. Are there restricted areas in the company that can only be accessed by authorized personnel?
10. What kind of access security tools have you implemented in the company?

### Questions to know the computer security plans that are implemented in the University and are basic knowledge:

1. Do you have access to the advanced settings of your computer, such as the control panel?
2. Is there equipment that provides uninterrupted power to computers?
3. Can you download multimedia files from the internet (music, movies, programs, etc.)?
4. Do you have a block to access websites?
5. How many trainings have you had on IT security issues in the last year?
6. Do the passwords you use have combinations of number, uppercase, lowercase, symbols, letters and is more than 10 characters?

7. Is blocking or logout used on the assigned computer?
8. Approximately how much information you handle is restricted or confidential access?
9. Are there restricted areas in the company that can only be accessed by authorized personnel?
10. What kind of access security tools are implemented in the company?
11. How often is the software checked for or updated for viruses, worms, Trojan horses and unauthorized or pirated software?
12. Is there periodic maintenance on the computer equipment?
13. How often do you perform maintenance on computer equipment?
14. Do you allow your operating system to perform the corresponding updates?
15. Is Internet access in the company limited by?
16. Do you require a password to access the WIFI connection?
17. Have the services and systems of the previous list always been available?

**Questions to know the current situation of some basic security points:**

1. Which of the following computer security incidents have occurred in your workplace in the last year?
2. Do you use computer equipment?
3. Have you had to do your work more than once on your computer due to failures?
4. In what way do you carry out your information backups?
5. In order to install some software to your company computer, do you need support from the personnel of the systems area?
6. Can you download multimedia files from the internet (music, movies, programs, etc.)?
7. Do you have a block to access websites?

**4. Results**

Derived from the surveys made to the personnel of the universities, the following information is obtained:

- 74.36% use the computer equipment assigned in the company, 57.69% use some confidential or restricted access information and 46.51% use the USB memory to carry out information backups.
- 70.51% have an antivirus installed on their computer, but 64.10% do not know how often that software is updated.
- 89.87% use a Windows operating system, but 28.21% occasionally allows the corresponding updates and 29.49% does not have the habit of updating.
- 57.35% consider that the services offered by the university are always available, 26.04% consider that the academic systems are those that should always be available, but 18.75% did not answer the question.
- 37.18% say they know how to detect an intrusion or attack on their computer, but 98.72% of the staff has not had training in IT security issues.
- 83.33% use a computer with lock for closing session and 61.54% handle secure passwords.
- 52.56% perform maintenance on computer equipment, but 14.03% do not remember how often they do it.
- 53.16% do not know if they have limited internet access, 53.85% of the staff can download multimedia files from the internet.



- 50% have a block to access websites and require a password to access the WIFI connection.
- 69.23% of the personnel knows the responsible person, their position and the area in which they are responsible for security.
- 89.74% of the staff is aware that there are restricted areas where only authorized personnel have access. And 48.84% recognizes the use of fingerprint reader as a security measure.
- 92.31% requires the support of personnel in the systems area to install some software on their equipment and 42.31% have access to the advanced settings of their computer.
- 56.41% almost never had to perform more than once on their equipment due to equipment failure.
- Among the most frequent incidents occurred the computer (21.84%) and other very specific (34.48%).

## 5. Conclusions

With the investigation it can be observed that the majority of the staff uses the computer equipment, but they do not have enough training to protect and store your equipment and the information that it handles and there are very few that can detect a virus or unauthorized access.

The vast majority is aware that it has an antivirus installed and the type of operating system it works with, but it does not have the habit of updating. The universities have restricted access and with limitations in the use of connections (Internet and WIFI), as well as for the installation of programs; so it is seen that they have a security plan, but even 40% of the staff does not know the restrictions.

In the reports that were delivered in the universities, it was recommended to update and / or carry out security policies, provide courses and training workshops for personnel in which they are informed about computer security, from basic to advanced, depending on the type of information which manages the personnel to be trained.

Therefore, it is affirmed that while the personnel of the Technological and Polytechnic Universities in the city of Chihuahua do not have a computer security culture, there is an increased risk of information loss and leakage, due to ignorance or lack of custom in carrying out the good computer security practices.

## 6. References

Areitio Bartolin, J. (2008). *Seguridad de la información: Redes, informática y sistemas de información*. (S. PARANINFO, Editor, M. España, Productor, & Universidad de Deusto) Recuperado el 07 de Febrero de 2017, de Fundamentos de seguridad de la información: áreas de proceso, objetivos, servicios y políticas de seguridad: [https://books.google.com.mx/books?hl=es&lr=1ang\\_es&id=\\_z2GcBD3deYC&oi=fnd&pg=PR14&dq=Cultura+de+seguridad+inform%C3%A1tica&ots=wrpoAFEXN1&sig=SHYuHuDjTrePYDUd\\_F89anZv0#v=onepage&q=Cultura%20de%20seguridad%20inform%C3%A1tica&f=false](https://books.google.com.mx/books?hl=es&lr=1ang_es&id=_z2GcBD3deYC&oi=fnd&pg=PR14&dq=Cultura+de+seguridad+inform%C3%A1tica&ots=wrpoAFEXN1&sig=SHYuHuDjTrePYDUd_F89anZv0#v=onepage&q=Cultura%20de%20seguridad%20inform%C3%A1tica&f=false)

Aguilera López, P. (s.f.). *Seguridad informática*. (S. EDITEX, Editor) Obtenido de [https://books.google.com.mx/books?hl=es&lr=1ang\\_es&id=Mgvm3AYIT64C&oi=fnd&pg=PA1&dq=seguridad+inform%C3%A1tica&ots=Pp rpVBFgz\\_&sig=6OeGq3wLXyImkxX8m23k4vvJ8ro#v=onepage&q=seguridad%20inform%C3%A1tica&f=false](https://books.google.com.mx/books?hl=es&lr=1ang_es&id=Mgvm3AYIT64C&oi=fnd&pg=PA1&dq=seguridad+inform%C3%A1tica&ots=Pp rpVBFgz_&sig=6OeGq3wLXyImkxX8m23k4vvJ8ro#v=onepage&q=seguridad%20inform%C3%A1tica&f=false)

Montesino Perurena, I., Baluja García, D., & Porvén Rubier, I. (Ene-abr de 2013). *Ingeniería Electrónica, Automática y Comunicaciones*, versión On-line ISSN 1815-5928. (SciELO, Editor) Recuperado el 09 de Feb de 2017, de Gestión automatizada e integrada de controles de seguridad informática: [http://scielo.sld.cu/scielo.php?pid=S181559282013000100004&script=sci\\_arttext&tlng=pt](http://scielo.sld.cu/scielo.php?pid=S181559282013000100004&script=sci_arttext&tlng=pt)

Parra Moreno, D. A. (2012). *GESTIÓN DEL RIESGO EN LA SEGURIDAD INFORMÁTICA: "CULTURA DE LA"*. Recuperado el 2017 de Febrero de 09, de Ensayo para optar al título de Especialización en Control Interno: <http://repository.unimilitar.edu.co/handle/10654/6821>

Philco A., M., & Rosero, M. (2014). *publicaciones.usm.edu.ec*. (G. Sansana, Editor) Obtenido de Los riesgos en transacciones electrónicas en línea y la criptografía como modelo de seguridad informática: <http://publicaciones.usm.edu.ec/index.php/GS/article/view/44>

Voutssas M., J. (Ene-Abr de 2010). *SciElo*, versión impresa ISSN 0187-358X. Obtenido de Preservación documental digital y seguridad informática: [http://www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S0187-358X2010000100008](http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0187-358X2010000100008)

## **Instructions for authors**

A. Submission of papers to the areas of analysis and modeling problems of the:

- History of economic thought until 1925
- History of economic thought since 1925
- History of thought: individual figures
- Economic methodology
- Current heterodox approaches

### **Introduction**

Text in Times New Roman No.12, single space.

General explanation of the subject and explain why it is important.

What is your added value with respect to other techniques?

Clearly focus each of its features

Clearly explain the problem to be solved and the central hypothesis.

Explanation of sections Article.

### **Development of headings and subheadings of the article with subsequent numbers**

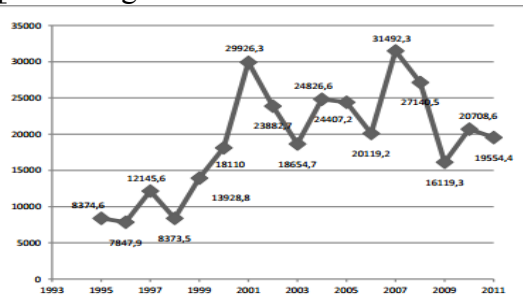
[Title No.12 in Times New Roman, single spaced and Bold]

Products in development No.12 Times New Roman, single spaced.

### **Including graphs, figures and tables-Editable**

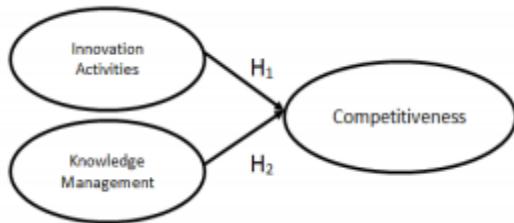
In the article content any graphic, table and figure should be editable formats that can change size, type and number of letter, for the purposes of edition, these must be high quality, not pixelated and should be noticeable even reducing image scale.

[Indicating the title at the bottom with No.10 and Times New Roman Bold]



**Graphic 1** Title and Source (in italics).

Should not be images-everything must be editable.



**Figure 1** Title and Source (in italics).

Should not be images-everything must be editable.

			OLS	I-OLS	IM-OLS	OLS	I-OLS	IM-OLS	
		$\lambda$	Panel A. Bias			Panel B. RMSE			
$\rho = 0.0$	$\gamma = 0.0$	1	-0.00011	-0.00003	0.00013	0.0267	0.0398	0.0378	
		2	0.00051	0.00039	0.00015	0.0267	0.0414	0.0395	
		3	-0.00091	-0.00143	-0.00065	0.0286	0.0461	0.0429	
		4	0.00034	0.00041	0.00115	0.0301	0.0498	0.0471	
		5	0.00011	0.00040	0.00018	0.0324	0.0537	0.0507	
		10	-0.00010	-0.00079	-0.00013	0.0455	0.0861	0.0763	
		$\gamma = 0.3$	1	0.01477	0.00378	0.00274	0.0342	0.0435	0.0360
			2	0.01778	0.00754	0.00618	0.0361	0.0472	0.0391
			3	0.02092	0.01064	0.00925	0.0388	0.0518	0.0438
			4	0.02340	0.01364	0.01236	0.0418	0.0555	0.0471
	5		0.02652	0.01721	0.01454	0.0448	0.0607	0.0516	
	10	0.04198	0.03247	0.03146	0.0641	0.0952	0.0829		
$\rho = 0.3$	$\gamma = 0.0$	1	-0.00085	-0.00021	-0.00073	0.0364	0.0545	0.0531	
		2	0.00019	-0.00015	-0.00011	0.0374	0.0565	0.0550	
		3	0.00015	0.00076	0.00046	0.0400	0.0627	0.0597	
		4	0.00043	-0.00011	-0.00070	0.0417	0.0711	0.0668	
		5	0.00165	0.00206	0.00213	0.0454	0.0791	0.0711	
		10	0.00073	0.00136	0.00112	0.0661	0.1267	0.1128	
		$\gamma = 0.3$	1	0.02299	0.00570	0.00458	0.0490	0.0643	0.0527
			2	0.02818	0.01123	0.01035	0.0523	0.0676	0.0561
			3	0.03264	0.01611	0.01445	0.0571	0.0720	0.0620
			4	0.03581	0.01957	0.01907	0.0591	0.0773	0.0690
	5		0.04081	0.02569	0.02416	0.0647	0.0872	0.0754	
	10	0.06063	0.04727	0.04458	0.0914	0.1369	0.1187		

**Table 1** Title and Source (in italics).

Should not be images-everything must be editable.

Each article shall present separately in **3 folders**: a) Figures, b) Charts and c) Tables in .JPG format, indicating the number and sequential Bold Title.

**For the use of equations, noted as follows:**

$$Y_{ij} = \alpha + \sum_{h=1}^r \beta_h X_{hij} + u_j + e_{ij} \quad (1)$$

They must be editable and number aligned on the right side.

### **Methodology**

Develop give the meaning of the variables in linear writing and important is the comparison of the used criteria.

### **Results**

The results shall be by section of the article.

### **Annexes**

Tables and adequate sources thanks to indicate if they were funded by any institution, University or company.

### **Conclusions**

Explain clearly the results and possibilities of improvement.

### **References**

Using APA system, should **Not** be numbered, either bulleted, however, if necessary, will be because reference number or referred to in any of the article.

**Data Sheet**

Each article must submit your dates into a Word document (.docx):

Journal Name

Article title

Abstract

Keywords

Article sections, for example:

- 1. Introduction*
- 2. Description of the method*
- 3. Analysis from the regression demand curve*
- 4. Results*
- 5. Thanks*
- 6. Conclusions*
- 7. References*

Author Name (s)

Email Correspondence to Author

References



Douala, Republic of Cameroon \_\_\_\_\_, \_\_\_\_\_ 20\_\_\_\_\_

### **Originality Format**

I understand and agree that the results are final dictamination so authors must sign before starting the peer review process to claim originality of the next work.

---

Article

---

Signature

---

Name



Douala, Republic of Cameroon\_\_\_\_, \_\_\_\_ 20\_\_\_\_

### **Authorization Form**

I understand and accept that the results of evaluation are inappealable. If my article is accepted for publication, I authorize RINOE-Republic of Cameroon to reproduce it in electronic data bases, reprints, anthologies or any other media in order to reach a wider audience.

---

Article

---

Signature

---

Name



# Journal-Schools of economic thought and Methodology

“The impact of knowledge management on innovation for the development of tourism businesses in the Municipality of Caborca, Sonora”

SAUCEDO-MONARQUE, Javier, VILLARREAL-VILLARREAL, Luís Alberto and HERNÁNDEZ-PONCE, Oscar Ernesto

*Instituto Tecnológico de Sonora*

“Development of an instrument for measuring entrepreneurial skills for students of higher education institutions”

ÁLVAREZ-BOTELLO, Julio, CHAPARRO-SALINAS, Eva Martha, HERNÁNDEZ-SILVA, María del Carmen, TORRES-VELÁZQUEZ, Alejandra Magali

*Universidad Autónoma del Estado de México*

“Culture of innovation in small business”

LÓPEZ-PARRA, María Elvira, AGUIRRE-CHOIX, Ricardo, GONZÁLEZ-NAVARRO, Nora Edith and ACEVES-LÓPEZ, Jesus Nereida

*Instituto Tecnológico de Sonora*

“The computer security culture reduces the risk of information loss and leakage”

RAMIREZ-OCHOA, Dynhora Danheyda, BARROSO-BARAJAS, Alfonso José, SIQUEIROS-GARCÍA, Martina Ivonne and VILLAGRAN-VIZCARRA, Dafnis Cain

*Universidad Tecnológica de Chihuahua*



2 5 2 3 | 6 9 9 7

ISSN 2523-6997



[www.rinoe.org](http://www.rinoe.org)