

The challenge for universities: Fostering a innovation culture through the promotion of entrepreneurship

El desafío de las universidades: Fomentar la cultura de innovación mediante el impulso al emprendimiento

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Abstract

This article discusses the role of universities in the promotion and fostering of innovation culture in the classroom through the development of entrepreneurship issues, promoting initiatives that transform ideas into value-added actions. Through a cross-sectional and descriptive research, this study was carried out with 300 bachelor students in three countries: Mexico, Brazil and Colombia during the years 2016 and 2017, in which the characteristics of these entrepreneurial students were measured, behaviors and attitudes leading to the construction of concrete behaviors were identified. The contributions resulting from this analysis point out the need to promote changes in academic programs that make visible the idea that, in an innovative world, linking knowledge with common objectives is of vital importance. It's highly recommended betting on technological development, creation of patents and new business; as well as taking advantage of the benefits generated by entrepreneurship culture to trigger innovation in university students through awareness programs, together with the practice and implementation of entrepreneurship projects that foster incubation and business ideas allowing the linking of the University with the company.

Entrepreneurship, Innovation, University

Resumen

En este artículo se discute el papel que tienen las universidades en la promoción y fomento de la cultura de la innovación desde las aulas a través del desarrollo de temas de emprendimiento, promoviendo iniciativas que transformen las ideas en acciones de valor agregado. A través de una investigación de tipo transversal y descriptiva, se realizó un estudio con 300 estudiantes universitarios en tres países: México, Brasil y Colombia, durante los años 2016 y 2017 en el que se midieron las características del universitario emprendedor, se identificaron conductas y actitudes que llevan a construir comportamientos concretos. Las aportaciones producto de este análisis, apuntan a la necesidad de promover cambios en los programas académicos que hagan visible la idea de que en un mundo innovador, enlazar conocimientos con objetivos en común es de vital importancia. Es altamente recomendable apostar por el desarrollo tecnológico, creación de patentes y nuevos negocios; aprovechar los beneficios que genera la cultura de emprendimiento para detonar la innovación en los universitarios a través de programas de sensibilización, conjuntamente con la práctica e implementación de proyectos de emprendimiento que permitan fomentar la incubación e ideas de negocios que permitan vincular a la Universidad y a la empresa.

Emprendimiento, Innovación, Universidad

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Introduction

In today's business environment, innovation has become a necessity since competitiveness to any business goes further than a local effect with a traditional referent in the reality of the current century. It is clear that companies having identified this competitive advantage from the beginning are now reaching their objectives. Nevertheless, many of those that started as a response to the advancement of entrepreneurial development programs, couldn't realize the importance of the promotion of the culture of innovation.

Innovation in a global and national context is a dominant topic in the transformation of educational systems and institutions in order to solve the demands related to globalization. Facing the issue of innovation and especially disruptive innovation in specific is unavoidable since universities for many years were among the main sources of innovation, and many of them turned out to be seriously committed to innovate and transform their operability in teaching activities to deal with business growth. Their integration has given important results such as patents, new products and services, better production processes and technological contributions to the world. However, there are also higher education institutions that still lack programs or processes aimed to reach this objective.

Nonetheless, the challenge is not to change the traditional functions of universities but a question of renewing the way in which these transferred to enterprises; that is, to produce and manage knowledge with commercial value (Cabral, 2008). The reformulation of the role of universities implies that the organization of teaching centers, academic and administrative processes should be planned and deployed in a way that is consistent with the dimensions and lines of faculties, schools, teaching units, programs and studies in environments and scenarios; such as the identification and resolution of needs and knowledge to improve the commercial and economic fields. In such a way, that innovation should not be considered as a substitute of scientific development but a technological breakthrough contribution emerging from the university and bringing audacity and creativity to scientific knowledge. Herrera, Guerrero & Urbano (2018) discuss the relevance of the participation to the government, universities, entrepreneurs and investors in the evolutionary process in order to transform emerging economies into entrepreneurial societies.

For a reason the configuration of entrepreneurial ecosystems is also promoted, where the contributions of educational institutions are focused on innovation and training in business activities. Until now, technological development has focused on communication matters since the third millennium brought with it the overcoming of access boundaries to global knowledge from technological forms and platforms, thus fostering the perception and configuration of universities. Hence, the so-called third mission or applicable production of knowledge that surpasses the usual functions of teaching and research to promote the training in the perspective of entrepreneurs of territorial projects. An idea that genuinely enables the underpinning of immediate economic and social development (García-Peñalvo, 2016).

It is the authors' interest to discuss, therefore, the promotion and advancement of the culture of innovation from the classroom, which is accordingly related to the evolution of the topic of entrepreneurship. That is, higher education institutions should ensure not only that students learn theoretical or analytical content and develop entrepreneurial processes, but also that a sense of proactivity is fostered in them so that they are able to turn ideas into actions with the benefit of innovative contributions.

On other words, students prepared in an environment of innovation create opportunities through undertaking competitive business ideas, which strengthen a global strategy of application of knowledge in order to improve the life quality of individuals and society in general.

Particularly in many of our Latin American countries, a general disrepute remained for pragmatism, manual labor, materialism and hard work, as Lipset (2018) says. Those behavioral traits prevented the development of modern, rational commercial companies that competed and assumed calculated risks. In addition, this same, as the author says, was there in the past and nowadays in the educational systems that persisted with such practices that hold back innovation.

That is how in this work hereby, we collect information from three public universities in Brazil, Colombia and Mexico that did research on the educational effect of entrepreneurship so that they would be able to suggest some strategies to promote the innovation.

Innovation

For the purposes of this dissertation article on the importance of universities promoting the culture of innovation through the development of entrepreneurs, some of the concepts of analysis such as entrepreneurship and innovation are reviewed below. In this regard, the definition is attracted of innovation of Schumpeter (1911), which referred to the fact that innovation is any "new combination of existing knowledge" and in which therefore non-technological innovation as well as that derived from new or better organizational forms and sources of raw materials or market diversification.

In the conception of the Austrian economist Schumpeter (1939), the entrepreneur can be described as an agent of change in the economic cycle of development, an individual with ideas that combine capital and work, and has something truly innovative, capable of initiative, calculated risk Schumpeter's words that entrepreneurship is innovation have never seemed as appropriate as they are today. Carrying out innovations is the only function that is fundamental in history. He also stressed that it is the entrepreneurial spirit that replaces the Pareto optimum of today with the new different of tomorrow (Sledzik, 2013).

Innovation is a process focused on the creation of new knowledge for the development of commercial solutions (Herkema, 2003). Above all, try to acquire, adopt and share new knowledge that improve products and services in an organization or company. Innovation makes possible the combination of ideas and knowledge in such a way that they bring positive changes to the organization and make it easier to compete in the market by satisfying the demands of the key players.

In order to achieve successful innovation, it is necessary to foresee new combinations of basic productive factors as referred by Chen, Zhaohui and Xie (2004), as well as to develop innovation capacities based on knowledge and application of an effective knowledge management system. Therefore, to carry out the process of innovation consists of carrying out activities based on knowledge that are essential in the creation of capacities for the development of products (Cardinal, Allesandri and Turner, 2001). Certainly, as Herkema (2003) provides, knowledge as a resource as well as its management is a preponderant factor to determine the capacity that organizations have to innovate.

The importance of having an effective knowledge management system is to make better use of its internal resources, but also to use external knowledge in order to improve the level of previously acquired knowledge. The transformation of productive organizations is always linked to innovation processes, since it is what gives value to their consumers and customers, and encourages them to come to try new products. On the other hand, this transformation also has to do with the transfer of research and development results (mainly from higher education institutions) that lead organizations to increase their productivity.

Drucker (1985), always interested in the subjects of entrepreneurship, contemplated innovation and entrepreneurship as practices aimed at an end. The entrepreneur pursues the maximization of opportunities and is not so interested in how to do things, but in how to identify what needs to be done and then apply resources and initiative. Naturally, there are innovations born of ingenuity. However, most result from a deliberate search for innovation opportunities that are found in a few situations. That is the reason why Chiavenato (2010) states that since creativity and innovation allow the company to navigate in perfect harmony in a world in a constant state of transformation, it is necessary to execute the value chain of innovation, which will be more detailed exposed ahead.

Entrepreneurship

In relation to the concept of entrepreneurship, describing its historical evolution would make it extensive, quoting Verin (1982) who refers how from the seventeenth and eighteenth centuries qualified as an entrepreneur to the architect and the master builder. This identified the characteristics of people who undertook the construction of large works to order, such as building and houses. It is associated with the concept of business because it identified as a particular economic activity, which requires prior evaluation on production (its equivalent in money) and that at all times of execution the criteria for evaluating the company are already determined in variables of product and money.

“Emprendimiento o Emprendedurismo”, both words in Spanish as a translation of *Entrepreneurship* which is the way to describe the entrepreneurial spirit and is defined in the Dictionary of the Royal Academy as "the quality of the entrepreneur." The Global Entrepreneurship Monitor (GEM) defines it as any attempt made by individuals to start a new company, including becoming self-employed.

Developing the entrepreneurial spirit is necessary not only for the creation of new companies and therefore new jobs, but also for the sustainability of those that already exist. Entrepreneurship is a process of discovery, evaluation and exploitation of entrepreneurial opportunities that entails starting a new business by offering a product or service to consumers. The entrepreneur, on the other hand, is the person who discovers, evaluates and exploits that opportunity (Shane & Venkataraman, 2000). Consequently, two factors are needed for an entrepreneur to break in: on the one hand the entrepreneurial opportunity and on the other the intention and capacity of the person (Fayolle and Liñán, 2015). In the academic perspective, entrepreneurship has been an area of study for many researchers as for Leite (2015) who affirms that entrepreneurship is not a recipe, but rather a necessity of the market and since the commitment with this market is fundamental, the universities should find the ways to remedy that need.

McGinnis (1987, cited by Gutiérrez, 2011) states that an entrepreneur "believes in innovation and is creative, but with a pragmatic imagination". Chiavenato (2010) confirms, saying that creativity and innovation are not only a matter of talent and opportunity, but that it is doing something different with a logic that must be unraveled.

In this context, small and medium enterprises, usually the result of entrepreneurial efforts, lack sufficient support or financing to obtain new technologies, so that the new entrepreneurs themselves must be alert to the approach of research and development opportunities. Moreover, is that in the context of entrepreneurship, this item is even weaker, since it is also noticeable as a problem to obtain support for the integration of new technologies in newly created companies. Certainly, it has been compensating from the universities (although not at the desired level) with efficient projects of innovative application of knowledge. This leads to the promotion of entrepreneurship with a sense of innovation, so fostering a culture of innovation in universities would make it possible to take better advantage of the opportunities for economic growth for small and medium-sized enterprises, in particular.

Innovation is the specific function of entrepreneurship according to Drucker (1985) either in an existing company, in a public service institution or in a new company started by a single individual in the family environment.

The entrepreneur creates new resources that generate wealth or increases the existing resources with an improved potential to produce wealth by the means. Creating something new is specific to each organization that is undeniable; face the obstacles to innovate, it is not so much. Applying an innovation process is something that entrepreneurs and entrepreneurs require to create the innovation value chain. This is understood as the sequential process of three phases: generation of the idea, its development and dissemination of the concepts created (Hansen and Kirkinshaw, 2008, cited by Chiavenato, 2010).

Innovation processes are what allow companies to assess the state of their innovative capacity, compare it with that of other companies and design plans to increase it. This generic process of innovation initiates the identification of opportunities, followed by the development of concepts and business models, to end with the commercialization and implementation of ideas.

In each of the stages of the process there are filters that are making the number of entrepreneurs or innovative entrepreneurs is reduced. First, the ideas are filtered, and then the concepts generated from them are filtered. In addition, once these are integrated into a business model they have to go through the filter of both financial, technical and commercial feasibility. Once these filters have been overcome, they will only require the integration of a launch so that both commercialization and implementation are carried out properly.

In consequence, the promotion of the culture of innovation also has a significant impact when talking about entrepreneurship since it is clear that the generation of new projects translates into a multiplier effect of the economy, generating new jobs, social development and of course the impact Innovation has to do with facing the challenges and the ability to take advantage of opportunities in the best way and thus ensure that companies overcome the mortality stage and strengthen their ability to compete. It is particularly interesting that despite the fact that entrepreneurship for the creation of new companies has grown in recent years, there is still little innovation that forges companies with greater capacity for growth and competition in such companies resulting from the entrepreneurial process.

At this point, it is recovered that the factors that shape entrepreneurship are very diverse, such as innovation processes, access to technology, opportunities for a larger market, and the existence of a new group of more efficient entrepreneurs, among others. . The above generates recommendations for the future of entrepreneurship as cited by Brenes and Haar (2017) highlighting that the private sector works together with universities and research centers to improve the entrepreneurial culture. In the same order of ideas, it is emphasized that for the continuous improvement in the training processes, crucial for the interaction with the companies, it is about thinking and acting as entrepreneurs within the university (Baaken and Rossano, 2016). To conclude, as stated by Spinelli and Adams (2012) that at the heart of the entrepreneurial process lives the innovative spirit.

Now, organizations clearly do things differently when they come from research and development activities. An innovative environment also pressures companies to seek alternatives for studies and research. In sum, the university is fundamental as an inexhaustible source of knowledge, motivation and reference, thus fostering the process of rapprochement between education and experience. Centella (2016) considers that in a world that is increasingly global but at the same time more tense and with more differentiation, it is important that universities also change substantially. For this, in the fulfillment of the three missions: 1. Teaching or teaching, referred to the transmission of knowledge to obtain an academic degree, 2. Scientific research and preparation of future researchers, referred to cultivate science and teach and 3 Research management and knowledge transfer oriented to transfer their knowledge. Highlighting the latter as the effective contribution to innovation and entrepreneurship.

Definitely, we can not fail to mention that universities that promote an entrepreneurial culture in their programs and promote innovation in their students, therefore generate the opening of new markets, generate industrial and business development, which in turn has an impact on better employment opportunities for college students. In this sense, all actions that can be developed by universities and research centers, teachers and students to promote and develop a culture of innovation with a specific focus on entrepreneurship will benefit the country's development on a large scale.

Methodology and analysis process

To the generation of proposals aimed at promoting innovation in the classroom, we have started from data obtained in a research that measures the characteristics of the university as an entrepreneur. This research was carried out with 300 university students in three countries: Mexico, Brazil and Colombia, during the years 2016 and 2017. Being transversal and descriptive, it identifies behaviors and attitudes that lead to the construction of concrete behaviors. The research is non-experimental because there is no manipulation of variables and only the phenomenon is observed as such in the natural context and later analyzed.

This research has focused on Mexico, Colombia and Brazil, countries with different political and social backgrounds, also with diverse population media, which nevertheless has an educational sector with Higher Education Institutions that common patterns among them, indicating trends that It can point to how innovation can evolve in the region through entrepreneurship driven by university students. If we consider that universities are promoters of innovation and also favorable spaces for the promotion of entrepreneurship, from this study we can determine the similarities that exist among university students in these countries.

For data collection the questionnaire "Características Personales Empresariales de *Management Systems International*" was applied, in order to know the level of entrepreneurial skills required to form a company. It does not necessarily have a value in absolute terms and its effectiveness and impact among the participants is precisely its neutral and depersonalized character. This instrument is composed of 55 statements that evaluate ten characteristics, and the two required for the present article were extracted: A) look for opportunities and G) get information" whose affirmations have to do with the attention to the opportunities that are presented, to the initiative, to innovation, decision making and information achievement.

Derived from the limitations of financial type and time, before the large population of the universities in question, the formula for sample calculation $n = z^2 * p * q / e^2$ was used. Thus, with 95% confidence and a maximum permissible error of 10%, the questionnaire was applied to 100 students of each university without discriminating for its application any specific parameter of age, gender or semester of study. The answers to the questionnaire were carried out in the presence of the interviewers.

The structured questions asked respondents to indicate on a 5-point Likert scale: 1 = Never 2 = Rarely 3 = Sometimes 4 = Usually 5 = Always. Since obtaining an Alpha of Cronbach .864 which gives a fairly good reliability in the results obtained.

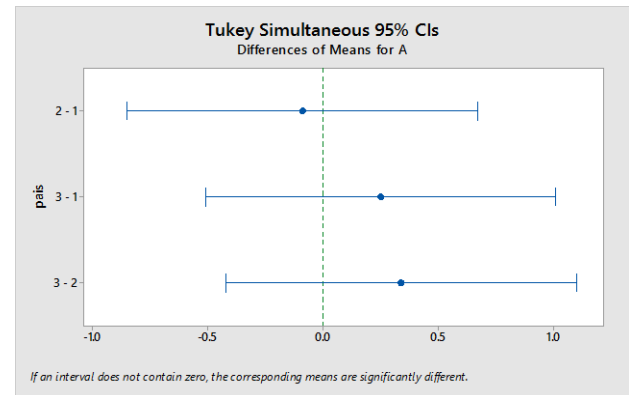
As previously noted, in the process of change to incentivize the innovative behavior of university students, it is important to first determine the characteristics with which they count as entrepreneurs. Campos, Figueroa and Sandoval (2014) run that Aronsson (2004) and Kirby (2004) found empirical evidence that the acquisition of knowledge about entrepreneurship, may be a factor influencing the development of entrepreneurial skills with consequent attention innovation, as Aronsson on the one hand says that entrepreneurship can be encouraged through teaching and secondly, Kirby says that entrepreneurial skills are not only innate but also can be acquired through learning and contribute to innovation as it has been revised from the Schumpeterian theory that introduced the concept of innovation as the basis of a person with entrepreneurial attitudes.

The results show that on average students are at a level of 17 to 19 points on an expected maximum of 25 points in the indicated characteristics (A & G). The Test HSD (difference frankly significant) of Tukey is a test of multiple comparisons, which allows to compare the means of the levels of a factor after having rejected the null hypothesis of equality of means by the ANOVA technique. It is, therefore, a test that tries to specify, a generic alternative hypothesis like that of any ANOVA test. That is, it is based on the distribution of the standardized range, which is the distribution that follows the difference and the minimum of the differences between the sample mean and the population mean of normal variables $N(0, 1)$ independent and identically distributed.

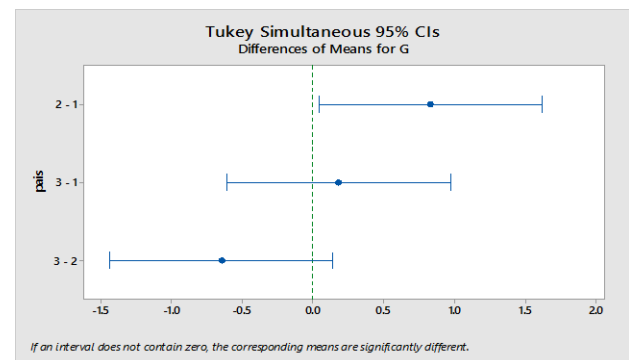
This establishes a threshold, as in other methods, such as the Test and all sample mean differences between the levels of the factor studied are calculated. The differences presented above this threshold were found in significant differences, which were not the same as the non-significant differences.

This means that efforts are required to improve more than 30%. Recommendations in this regard could facilitate that by improving entrepreneurship skills, innovation among university students is encouraged. Means for each country and questions are shown in Graphics 1 and 2.

For Characteristic A) “look for opportunities” Brasil = Colombia; México = Colombia; México = Brasil. Three of them are equal For Characteristic G) “get information” Brasil > Colombia; México = Colombia; México = Brasil. These results allow that the recommendations proposed in terms of fostering a innovation culture through the promotion of entrepreneurship could be considered from any of the three university environments



Graph 1 Characteristic A) “look for opportunities”



Graph 2 Characteristic G) “get information”

Discussion and Conclusions

Based on the research data and the previous statement of reasons, it is necessary to create more technology by giving university students a clearer vision of what is really innovative, not to a specific sector, but with the particularity that it is the difference to be competitive in a globalized world. Likewise, it is highly recommended to bet on it for technological development, creation of patents and new businesses. Promote entrepreneurship with a greater scope.

On the other hand, it is necessary to promote changes at the academic level to facilitate the understanding of university students that in an innovative world, linking knowledge with common objectives is vitally important, closing interdisciplinary gaps. The link with companies must be maintained at all costs. The universities are not at odds with the companies. Hence, it is essential to consider the following:

1. That during the process of business development in the universities it is ensured that students also carry a clear recognition that the commercialization of products and services requires a technological base.
2. That when it comes to culture of innovation, the transfer of knowledge is integrated as part of the sustainable development and the economic environment of the organizations
3. That entrepreneurship also requires a commitment to research and development

Innovation is also a stage in the process of technological change, in which invention and diffusion also intervene. Certainly, innovation characterized by the appearance of technological innovations, although in this sense, innovation is more properly in the commercialization of novelties and diffusion is present in the propagation of innovations. Today, technology is present in what we see, feel, hear, touch and taste. When we wake up, get up, walk, exercise and rest; in breathing and perspiration. We refer to objects, materials, techniques, manufactures, processes, services and products. To implements, tools and machines.

Also to investment technology or that which we consciously communicate, access and interact with information in the virtual field. In particular, Information and Communication Technologies (ICT) transcend everyday habits and routines of interpersonal and social communication (Cáceres, San Román and Brändle, 2009), and are even seen as potentially addictive and risky. Human health in the mental and physiological aspects, manifested in psychological vulnerability and tension, fatigue and discomfort (Echeburúa and Corral, 2018).

It could be taken the benefits generated by the entrepreneurship culture to trigger innovation in university students through awareness programs together with the practice and implementation of entrepreneurship projects that encourage the incubation and development of business ideas to consolidate companies in the future. This is where the transcendence and impact of technology for the support, registration or control of what we do, we are moved, we feel or we are. What is expected is that the technological activity from the universities be considered in a critical and creative perspective, at the same time as inclusive and integral.

That the teaching-learning process, the practicality of educational training, transitions on the basis of experiences and situations that incorporate the objective and competent use of technology; that add the different ways of reasoning, identity and collective action. Thus, students would have to learn to recognize, classify, hierarchize, interpret, discriminate, integrate and combine data, information and knowledge but also to enhance concepts, models and procedures. Clearly, in local, regional, national and international environments.

However, the promising panorama for the education and application of the scientific knowledge characteristic of the universities, starts in the case of public institutions of structural factors in which the State is determining through the formulation of its public policies. It is therefore a scenario that contrasts with the knowledge management of public universities and the greatness of knowledge applicable to entrepreneurial projects, training of qualified professionals and common development. It is worth noting that the most innovative universities in Europe stand out for their advances in science, innovation of new technologies and promotion of markets and industries (Ewalt, 2018).

The mission of the university in the second decade of the third millennium resides, therefore, in keeping up with the challenges presented by the social environment as a whole and for this the collaborative work between universities and business and government entities is fundamental. Just as universities affect the professional training of their students to be incorporated into the labor market, today the process of acquiring knowledge and skills must be done with the benefit of promoting innovation and entrepreneurship as a goal of sustainable regional development.

And when we speak of a regional conception, we do it at a Latin American scale since, as we have already said, our region shares structural and organizational similarities that can be seen by the universities and their instances, a way of supporting economic growth of the countries that make up Latin America. The work is not simple but once we find ourselves on the path of the future we can only continue in the management of knowledge.

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