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Epistemology Of Business Innovation, An Approach From The Human Dimension Of The Action

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***Abstract*—In the present article of reflection, we try to establish the epistemological dimension of innovation, as a human action, from its nature and as an interdisciplinary object of study in its essence and application in the business context, as a contribution to the contemporary paradigm that defines innovation, as a need for organizations to survive. For this purpose, we start from the Shumpeterian vision of the economy, which has shaped a large part of the world innovation system.**

Keywords—Innovation, epistemology, enterprise, action, paradigm

I. INTRODUCTION

Innovation has become one of the business paradigms of our time (Castro, & Fernández de Lucio, 2001). Already in the 1930's Shumpeter defined it as the engine of the growing economy.

However, it would be in the 70's with the arrival of New Information Technology, that companies and organizations in general focus on innovation as the center of their corporate strategy, and in response to the changing dynamics of the contingencies of the technologic environment, and the fragmentation of consumers (DeYoung, 2005). In this sense, it is necessary to reflect on the nature of innovation from an epistemic approach, which allows to understand its reality and scope in the business framework. For this purpose, we start from the epistemological categories and some of the Shumpeterian visions of the economy, all valid and applicable to business innovation.

II. STATE OF THE ART: THE NATURE OF INNOVATION

The concept of innovation comes from Latin *innovatĭo, -ōnis*. Innovation is an action not a thing, moreover, it is a human action. The innovative action is ordered from the intelligence, not as an act of chance but as a reasoned process of observation, analysis and synthesis, in which the unity of thought (the idea) becomes the constitutive substance of innovation. Without the idea, innovation is not possible. The idea cultivated in innovation actions forms the human inventiveness that, in turn, constitutes the natural potency for innovation. Innovation is the act of being to innovate, and to innovate is the natural act of human inventiveness. In short, the idea comes from inventiveness, whose purpose is innovation, that is, the production of new ideas.

The natural dimension of innovation is directly related to one of the higher faculties of the human being, intelligence. Human intelligence expresses itself through the actions of innovation. This relationship between intelligence and innovation constitutes the deontological dimension of innovation, its principle, which starts, by its nature, as an intelligent action. Likewise, the purpose of human innovation -its teleological dimension- involves the search for the good, which must produce the solution of a problem generated by the needs for survival and progress (Varela, 2001).

The action of innovating is inscribed in human nature. The human need to survive in changing natural environments translates into the constant adaptation of man to change. It follows that change is a determinant exogenous reason for the motivation of innovative action. Without change and without the need for adaptation, there would be no need for innovation (Burns, & Stalker, 1961).

It is possible to deduce that human innovation obeys the nature of change. The complexity of innovation will depend on the complexity of the change (Cook, & Brown, 1999). This cause-effect relationship assumes that the change, in turn, comes from a previous formal cause, the crisis. Change is the consequence of a crisis. Without crisis there is no possibility of change. In this sense, change is befitting to human nature. In fact, the existence of humans involves permanent change, the passage from potency to act, which would not be possible without change (Barjis, Ashish, & Meshkat, 2013). It can be said that innovation can be conceived from the theoretical, as any idea that once applied produces a change from a crisis or unresolved problem. This, in short, is the essence of innovation (Romero, 2005). But, for this phenomenon to happen, the presence of an intelligible systematic process is necessary. It could be thought that innovation, in some cases, could occur spontaneously or by chance (Carballo, 2006). However, this explanatory position is not clear, considering that even a deduction made about any phenomenon, at any given moment, has an origin related to a specific problem-related activity.

This is understandable if we consider, for example, the discovery of fire and its corresponding applications; keeping the heat in the cold, cooking food to be digested more easily, these and some other needs were, at the time, the problems that ended with an innovative solution: the use of fire. Before this solution, fire existed not as a resource but as a mythological deity (Zoltan, Henri, & Nijkam, 2002). Therefore, it can be deduced that the essence of innovation is ordered to its own nature: action to innovate, which constitutes a systematic process oriented towards human inventiveness. The essential product of innovation is invention. Consequently, the mere action of innovating is not enough for innovation in itself, the invention is the evidence of the final product and it is required within the process, to close the cycle (Saiz, 1999).

Nevertheless, it is possible to consider that the invention can be the result of an innovation process directed towards the production of a product or service. These categories emanating from the conceptualization of the industrial economy are pointed out in order to clarify some contemporary conceptions of innovation, in which every product is a service and every service is a product.

2.1. Innovation as an action

In the previous epigraph, it was stated that innovation is a human action; not an accidental action, but a final action. Consequently, the action in process is to innovate what the final action is to innovation.

It is necessary then, to explain theoretically that the action of innovating can happen in three different moments. According to its order and its complexity these moments are considered part of a process of change and human crisis. These three moments are: evolution, revolution and transformation (Orlikowski, 1996).

According to the above, the evolutionary moment is given by those changes prolonged in time. These changes are almost imperceptible between generations, but they conclude with an invention-solution in response to the permanent and systematic experimentation of a specific community. The appearance of writing is a clear example of imperceptible change, because it can be proven that, over time, it has evolved and its changes have been transferred over several generations. Its perfecting and the final product on the language is the result we know now and still, it has not finished evolving (Gisbert & Bullen, 2015).

Now, when we talk about revolution as a moment of innovation, we can say that it is provoked in history by the change of some complementary forms, of a specific fact in which the constitutive structures are maintained. For example, political revolutions such as that of France, the United States and the independence of the American nations, changed the agents of government, replacing the overseas ones with national ones. However, the constitutive form of government remains as the political constitutive principle (Barea & Billón, 2002).

Likewise, when we talk about transformation as another innovative moment, we can explain that this phenomenon happens when the essential structure of the nature of an event or a thing changes substantially. This phenomenon is observed when identities are changed (Albert, Ashforth, & Dutton, 2000), for example, the tiger that is a wild beast by nature and, through human influence, becomes a docile pet that strolls around a family mansion. The action of innovation obeys a complex process that brings together a series of elements that depend on the environment, country, sector or company and the mechanisms that intervene in it. These elements are considered the driving force of innovation. In this way, the results of innovating are also subject to the decisions of those involved in the action of innovation, and their results are linked to all the events that surround the action.

2.2. Scientific and technological dimension of innovation

Innovation is a logical and systematic process that involves specific methods of scientific and technological research. Methods that focus on experimentation and the design of prototypes oriented by trial and error. This research dynamic is known as basic research, in which the objective of the studies is to find the solution of a specific problem (Orlikowski, 1996). There is no specific science that studies innovation, not because of the lack of object

or discipline, but because innovation is the result of applied research to which most disciplines converge.

The step from “innovating” to “innovation” implies the systematic organization of a disciplinary process, in which the subjects who do the study are specialists in specific topics, and they share and validate their knowledge with the scientific community around said area of knowledge (Marino, y otros, 2001). The concept of science observed here arises from any activity of systematic study that seeks the truth of a given problem. And, the concept of applied research consists of the transfer that can be made of that truth, based on practical solutions applicable to previously defined problems.

The scientific activity of innovation shapes the subject that aims to innovate, turning them into scientists of innovation, regardless of their workplace, be it a research center, an organization of business, education, etc.

Applying the scientific and technological concept to the innovative approach suggests that innovation must, in a strict sense, arise from scientific activity, considering that the mechanisms of validation of knowledge (Argyris, 1999) -expressed in inventions, prototypes or processes- require verifications that only its peers in knowledge can carry out (Freeman, 1982). The development of tools to solve problems is known as technique -technical knowledge-. It can be defined as the extension of the human body and of the multiplicity of its capacity for adaptation and domain: The improvement of techniques is known as technology -application of scientific knowledge to the technique (López, 2007).

2.3. Innovation as an object of study

Innovation is an interdisciplinary field in which natural, social or human sciences converge, as well as the different branches of technology (Banse, 2007). It is not an exclusive object of a specific science or technology: it is not exclusive to scientific research professionals either. On the contrary, every subject that complies with the respective scientific methods and carries out an innovation activity, rises to the status of scientist, even if doing so within the framework of an organization not necessarily dedicated to science. This activity is currently known as knowledge management in terms of the promotion of business research and development units (Nonaka & Takeuchi, 1995).

In itself, there is no discipline that has innovation as its object. Likewise, innovation is not an object that claims any science. It is known that innovation can be an indicator of the development of a society (Arocena & Sutz, 2003) or the degree of opportunity of the intellectual capital of an organization etc. What turns innovation into a measure of knowledge management is that it can be used for valuation in benchmarking of two or more business cases or of economic dynamism. The multiple studies of specialized literature have shown that innovation is not an isolated process of society but, on the contrary, it has been a cultural process associated with the research capacity of the peoples in relation to the problems of adaptation of the natural environment (Allaire & Firsirotu, 1984).

From the very origin of man, innovation has accompanied him. Along with the desire for survival, there has always been the need to do and seek new and better ways to develop things and implement them in practice. Some experts in the field consider the concept of innovation as a process of change that necessarily involves knowledge, learning (Benavides, 2004). When hunting, working the land in agriculture, or exploring the oceans, man has sought to solve their needs and problems to ensure their survival. Modern man is also part of this phenomenon. The industrial revolution, advances in means of transportation, communications, technological development and the role of man in social development is unquestionable, all these processes of change, are part of the stimulus and motivation of innovation (Mintzberg, 2007).

Inventions lack economic importance, as long as they are not put into practice. And the application of any improvement is a completely different task from the invention and requires different skills. While entrepreneurs can be inventors, they would be by coincidence and not by nature. Rosenberg (1979), showed that not every invention is translated into a technological change and not every innovative technological change originates in inventions. Likewise, Albornoz (2009), identified that the application of innovation policies and their challenges is not enough, but rather the implicit need to measure the effectiveness of their execution arises, as well as the need to establish measurement mechanisms that can present the results of these processes, in the same line as Minzberg and Rose (2003).

2.4. Innovation as object of Economy

The main efforts of empirical research on innovation have been developed on the role that it plays in the economy and in social change. For this, multidisciplinary research has been carried out, illustrating the need to study innovation from different perspectives (Fagerberg & Godinho, 2005). For some economists, the main focus on innovation concerns the allocation of resources for it and also its economic impact. It has also been approached from a technological point of view, which has become very important in recent years (Fagerberg & Srholec, 2008).

Although the process of innovation has been treated as a ‘black box’, what happens with this box has been delegated to specialists from different disciplines. Much of what is currently happening with innovation is directly related to learning processes

and knowledge, a central topic in cognitive science (Easterby-Smith, & Lyles, 2003). The learning process is presented in different ways, individually or collectively (Lank & Mayo, 2003).

In a way, innovation is related to multiple professional disciplines and currents, from where researchers try to explain and respond to particular needs (Barnard, 2014), through change and evolutionary processes.

To conceptualize innovation, a distinction must be made between innovation and invention. Innovation is represented as the first attempt to bring something to practice, while invention is represented as the first initiative of an idea to create or modify a product or process. Schumpeter, established a distinction between invention and innovation. An invention is an act of intellectual creativity, without importance for economic analysis. Innovation is an economic decision:

> "While inventions may be carried out anywhere, especially in Universities and Centers of Specialized Studies, innovations or innovation processes occur mostly in companies or organizations". (Schumpeter, 2002)

According to Kline & Rosenberg (Kline & Rosenberg, 1986), innovation is a continuous process. The most important innovations go through drastic changes over time.

Shumpeter, through the conceptualization of innovation, is responsible for combining the factors of knowledge and skills; knowledge of the market, an effective and functional distribution system, sufficient financial resources, etc. Thus, what we might believe is a simple innovation is often the result of a long process of many related innovations (Edquist, 2001). This is one of the reasons why technology and innovation specialists find it natural to apply perspective systems instead of focusing exclusively on inventions or individual innovations (Boscherini, López, & Yoguel, 1998). Schumpeter himself classified innovation into five different types: new products, new production methods, new sources of resources, the exploitation of new markets and new ways of organizing markets. Daft (1979), however, classifies them into: technologies, products and services, strategy, structure, and finally, culture.

It is not possible to approach the field of innovation without considering the Schumpeterian thought of economic development. He explains how the spontaneous and discontinuous alterations in the causes of the value stream and the perturbations of the center of equilibrium appear in the sphere of industrial and commercial life, and not in the sphere of the needs of the consumers of finished products. According to this approach, the satisfaction of the needs of consumers, which are the purpose of all production and economic situation, work as a natural starting point for development. Generally, the innovations of the economic system do not occur in this way because they usually occur spontaneously first in the consumers, later adapting to the productive apparatus and its pressure. Therefore, it is the producer who initiates the economic change, educating the consumer if necessary. The producer teaches consumers to demand new products and services or things that differ in some aspect from the existing ones (Foss, Foss, & Vasquez, 2006).

Consequently, although it is permissible and necessary to consider the needs of consumers as independent and, furthermore, as the fundamental force in the theory of the circular flow, a totally different attitude must be adopted when analyzing the change to make significant decisions within the process. According to Schumpeter, producing means combining materials and forces that are within our reach. Considering this definition, it follows then that the changes in the productive processes consist of different ways of combining said materials and forces. To the extent that a new combination of the above may arise, by constant adjustment, there is undoubtedly a change and possibly a growth, but one cannot speak of a new phenomenon. However, to the extent that this is not the case, that the new apparitions arise discontinuously, we can affirm that we are facing the phenomena that characterize development.

Consequently, we can only refer to this last case when we speak of new combinations of productive means. Thus, development is defined by the implementation of new combinations that achieve the optimization of resources and economic efficiency. Schumpeter defines a company as that who carries out the new combinations, and entrepreneurs as the individuals in charge of directing these combinations. The figure of the entrepreneur is the key piece in this dynamic theory of economic development (Schumpeter, 2002).

There are two fundamental aspects that accompany the creation of the new combinations according to Schumpeter:

> "The mere combination does not have to be done by the same people who control the current productive process, although it can happen. These combinations usually take time in new companies, which generally do not arise from the old ones, but instead start a production cycle by their side. In the economy of competition, generally, new combinations arise that suppose the elimination of the old ones. The implementation of the new combinations means, therefore, simply the different use of the productive resources of the economic system. Primarily, in employment in a different way of existing resources, in doing new things with them,

regardless of whether or not these resources increase" p.65

Schumpeter observed that, in the development of leading economies, large companies were the most innovative, involved in what he called "creative destruction": the creation of new methods of productive transformation destroyed the existing models that had given results in innovative corporations (p.25). Focusing on the product and the innovation process -while useful for analyzing some issues- may ignore other important aspects of innovation. For example, during the first half of the 20th century, many of the inventions that made it possible for the United States to stand out from the other capitalist economies were innovative, involving completely new types of organization, production and distribution (Ashforth & Mael, 1989).

Bruland and Mowery (2004) suggest dividing the category of the innovation process into technological process innovation and organizational process innovation (Bruland & Mowery, 2004). The first is related to new types of machinery, and the last to new ways of organizing work. However, organizational innovations are not limited to new ways of organizing the production process within any company. Organizational innovation, in the sense addressed by Schumpeter, also includes arrangements between firms such as the reorganization of entire companies. Furthermore, as in the case shown in the United States, in the first half of the last century, the most important organizational innovations have occurred in distribution with great consequences and results for a wide range of companies (Chandler A. D., 1990).

Another approach, also based on the work of Shumpeter, has been the classification of innovation according to the comparison of current technologies. In the same line, Freeman and Soete (1997) define from this perspective that continuous improvements of the type mentioned above, are often characterized as incremental or marginal innovations, as opposed to radical innovation, which refer for example to the complete or total change of machinery or a technological revolution, which consists of a set of innovations that together can have a very broad impact. Shumpeter focused, in particular, on the last two categories, those that he believed were of greater relevance (Schumpeter, 2002). However, the cumulative impact of incremental innovations is immense, so we cannot ignore these clues to a biased view of the long-term economy and the change of paths (Mathew, 2010).

The economic benefits of radical innovations, including those of airplanes and automobiles, require in many cases a series of cumulative improvements. Arguably, most of the economic benefits come from incremental innovations and improvements. There are cases in which a delay between invention and innovation is considered; a delay of several decades, in fact (Valente & Rogers, 1995). Such delay is reflected in the responses to the different requirements for the development of ideas and the time for their implementation.

One of the reasons why the innovation was ignored for some time was because it seemed impossible to accomplish. Shumpeter was the first author to object to this practice through his first works. His own process account emphasized three main aspects:

- The fundamental uncertainty inherent in all innovation processes
- The need to move fast before someone else does
- The prevalence of resistance to new forms - Inertia- at all levels of society.

This inertia was considered endogenous, since it reflected the embedded character of existing knowledge and its habits which, through energy saving, was faced with the decision of bias, turning against new ways of doing things. According to Scheine (Scheine, 1998), Schumpeter saw innovation as the result of the continuous battle in historical time between the individual entrepreneur, novel solutions to problems and needs, and social inertia, with the last view as endogenous.

III. THE METHOD OF INNOVATION

In the initial section of this reflection, it was established that innovation is not possible without an idea. Thus, the idea becomes the constitutive substance of innovation and suggests that it is the beginning of the innovation method. However, in order to achieve the results of innovation, may these be benefits or profitability, it must be assumed that the organization composed of people should obtain a certain degree of motivation and unity.

According to Pérez-López (1987), motivations can be extrinsic, intrinsic and transcendent: extrinsic like the incentives that are expected from the environment; intrinsic, any result expected to be experienced internally by acting, as learning or recognition; and, transcendent, the influence in other people of the action that a person performs (Argyris, & Donald, 1978).

Innovation starts, fundamentally, from the intrinsic and transcendent motivation to improve the living conditions of the human being in a complex context. It must be considered that there may also be some incentives that make the innovation action even more attractive.

Ideas, without a doubt, are enhanced by a transcendent motivation that has to be fed by internal and external information. Organizations can and should use internal and external ideas, as well as internal and external access routes to the market, in

order to develop their business (Chesbrough, 2011). Not having ideas to innovate in the future would be disastrous. The future is nourished by the ideas that challenge it (Walsh, 2014).

After choosing the right ideas, it is critical to pose a challenge. The challenge is the second point of the method for innovation. It can be said that a challenge consists of problems to solve plus opportunities to take advantage of. The important thing is that the chosen ideas solve the problem creatively and that they are able to take advantage of the opportunities that others do not see or project forward.

As a consequence, the people in charge of innovation should break their paradigms and conventions to allow the idea -that has been focused on a challenge- to project itself. This is what is known as “having a vision”. The example of Steve Jobs can help us clarify this step of the method of innovation: how could an individual so fickle, insolent, rude, impulsive and stubborn become the revered boss who rebuilt Apple and created a brand new range of revolutionary products that marked an era, transformed the company into the most valuable and admired in the world and altered the daily life of people belonging to all economic and social strata? Jobs was an introspective man but had clearly retrospective inclinations; he preferred to look forward, towards everything good to come (Schlender and Tetzeli, 2015).

Establishing a vision is strongly linked to a deep belief. Why is one going to do innovation? What are the values and principles that will be promoted? Why is change wanted? Answering these questions is the starting point for the planning phase of a business model that supports innovation. The strategic model, by being conceived as the science of doing the impossible, breaks with the hierarchy of organizations. It automatically forms activities and contents that must be planned and subsequently taken to reality by people from within the company or outside it. Customers and allies can participate, for example; people with different interests and with complementary knowledge, but moved for the same passion: to achieve the impossible and break the *status quo* (Montenegro and Calvache, 2016).

As a result of the planning or ideation of innovation, one can have a prototype of a product, process or solution that can be tested in a selected market. This is a stage that is increasingly carried out in real time. The world is in a permanent beta state of innovation. The prototypes are constantly accepted by the market as if they were the final versions.

The method ends with the execution or implementation of the innovation. The result can be success or failure. Failure should be understood as a possibility of learning that provides feedback and information -which would become knowledge- to start a new cycle of innovation design, possibly with greater tools (Bruner, 1996). Then, the method for innovation is a permanent loop that grows based on previous experiences, and that constantly makes larger leaps as a result of greater problems that need to be solved and opportunities that are being designed.

There are many ways to innovate, but one condition is speed. The executives of the organizations must have a long-term vision and achieve results; but for this they must be diligent in designing a model with better alignment to the objectives and culture of the company. (Prats and Siota, 2018)

IV. DISCUSSION

In the first decades of the twentieth century, it became obvious to observers, economists and scholars of the subject that innovations most times involved teamwork and were also taking a more prominent place within larger organizations (Bruland & Mowery, 2004).

In some theoretical works, Schumpeter recognized and emphasized the systemic need for entrepreneurial cooperative study in large companies. The systematic theoretical and empirical work in innovation projects in companies, as well as the management of this type of projects has emerged. Schumpeter has also emphasized that innovative companies need to consider potential problems or potential needs, that the dependence of the road can create and enjoy the advantages of being the first to move, however, there is a risk of get blocked on the road through various self-reinforcing effects. If in the end, it turns out that there was a superior path, which some other company found, the previous motivator can be in serious trouble, because then it can simply be too expensive or too late to change paths. In this case, it is suggested that, in the primary phases of an innovative project, before the optimal knowledge about the alternatives of change is generated, the strategy of contingency is realized, simply to avoid getting stuck in a singular path, and remain open and competent to new ideas and solutions (Schumpeter, 2002).

In the business world, anticipated innovation requires a pluralist leadership that allows a variety of competent perspectives (Van de Ven, 1999), in contrast to the homogeneous style of a single leader that, in the management literature, is sometimes considered as the most advantageous.

Van de Ven, in his book "The Innovation Journey", explains that innovation is not only a matter of technique, nor an orderly, programmed and sequential process, but rather corresponds to a set of non-linear factors that converge in a whole to achieve a result. All these factors must necessarily involve people, who, through motivation and coordination, determine the development and practice of new ideas

that ultimately contribute to achieving the desired goals in a changing and demanding contemporary world (Van de Ven, 1999). In this approach, openness to new ideas and solutions is seen as essential for innovation projects, especially in the early stages. However, over time, companies have learned and developed mechanisms that allow them, by necessity, to monitor and investigate the processes of other companies. This is done in order to broadly seek new and better ideas and sources of inspiration (Fukuyama, 2000)

There is a great capacity to learn in the interaction with external sources because a pressure is generated that motivates them to follow their example. This increases the innovation of the actors, the individual firms and the economic system to which they belong (Van de Ven, 1999). This phenomenon is of special importance for small companies, as they try to compensate for small internal resources, with the search for elements that allow them to improve, and they may do so through their relationship with the outside world. Thus, the ability to absorb knowledge from the outside world, known as absorption capacity according to Cohen and Levintha (Cohen & Levintha, 1990), is necessary and essential for innovative companies, large or small. Studies show that this knowledge is cumulative and has a character inscribed to the company. In most cases, companies develop their knowledge of how to do things progressively. That knowledge is based on the routines that are reproduced through practice (Nelson & Winter, 2002).

According to Tushmant and Anderson (1990), the basis of the organizational structure of the company and its knowledge co-evolve over time. They co-evolve into a configuration that is beneficial in the permanent and routine operations of the company. Although this affirmation has been discussed, such configuration, on the one hand, facilitates the daily internal communication of the company but can limit the capacity of the company to absorb new knowledge created elsewhere. If the new external knowledge significantly challenges the existing configuration of the company, this phenomenon is called competence-destroying technological discontinuity (Tushman & Anderson, 1990). In this way, the organizing needed to innovate is a delicate task. Research in this area has indicated, among other things, the need for innovative companies to allow groups of people within the organization to have enough freedom to experiment with new solutions (Van de Ven, 1999), and patterns of interaction within the company are stabilized, allowing to mobilize all their knowledge base to face new challenges (Nonaka & Takeuchi, 1995).

V. CONCLUSIONS

Innovation is an object of interdisciplinary study, addressed mainly by economics, with the collaboration of other disciplines such as administration, sociology and the psychology of the organization.

Innovation arises fundamentally from the need to adapt to the environment, through changes of improvement applied to the development of tools, processes and products in the different fields of human society.

Innovation starts with the creative intellectual action of the human being, which require experimentation and the application of theoretical and practical knowledge in a specific objective of solving a problem.

Innovation originates from the idea -unity of thought- as a trigger for the systematic process of innovation itself, in which past knowledge is the starting point for new knowledge.

Innovation is a not spontaneous act of creativity. On the contrary, it supposes a meticulous and rigorous system of sequential discoveries through scientific and technological research.

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