

ORGANIZATIONAL INNOVATION STRUCTURE

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Abstract

Innovation needs a structure based on paradigmatic values that allow the transmutation of an organization towards the survival into an organization ready to learn. To understand this context, it was performed a theoretical rereading, constructing a parallel between the structure of scientific revolutions to the progress of science and the innovation structures for organizational development. This applied qualitative approach can be considered as an exploratory descriptive of bibliographic order. This study goes beyond the discussion of the technological paradigm for the understanding of the innovation and people paradigms, building, in the end, innovation structure framework, which promotes the understanding of internal organizational processes that cause the necessary state of crisis for the creation, implementation and acceptance of innovation. The proposed framework is a relevant tool to the understanding of organizational behavior and development in the different processes of innovation, whether incremental, distinctive or radical ones.

Keywords: innovation; innovation management; innovation structure; innovation paradigm.

ESTRUTURA DA INOVAÇÃO ORGANIZACIONAL

Resumo

A inovação necessita de uma estrutura baseada em valores paradigmáticos que permitam a transmutação de uma organização voltada para a sobrevivência em numa organização pronta para aprender. Para entender esse contexto, foi realizada uma releitura teórica, traçando um paralelo entre a estrutura das revoluções científicas para o progresso da ciência e as estruturas de inovação para o desenvolvimento organizacional. Esta abordagem qualitativa aplicada pode ser considerada como um estudo descritivo exploratório de ordem bibliográfica. O estudo vai além da discussão do paradigma tecnológico para a compreensão dos paradigmas da inovação e das pessoas, construindo ao final, um framework da inovação organizacional, que promove a compreensão dos processos organizacionais internos que provocam o estado de crise necessário para a criação, implementação e aceitação da inovação. O framework proposto é uma ferramenta relevante para a compreensão do comportamento e desenvolvimento organizacional nos diferentes processos de inovação, sejam eles incrementais, distintivos ou radicais.

Palavras-chave: inovação; gestão da inovação; estrutura de inovação; paradigma da inovação.

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1 INTRODUCTION

The reinforcement of the competitiveness helped by the phenomenon of globalization is contributing to economy in the last decades with the quick and efficient new technologies in organizational processes and ways (Cassiolato, 1999). In this globalized world the information and communication technologies (ICTs) promote not only the dissemination of information more and more quickly as well as, in the organizations, promote an even more urgent necessity of appropriate decision-making. As state Hamel and Prahalad (1995), the organizations whose essential competences are more developed will take advantage over their competition. The major competitive differential becomes the capacity of the organization innovating, quickly answering to external pressure.

However, the capacity demanded is not always available in the organizational profile and structure. Some changes that enable the development of the organization and help it to become what the external pressure demand are necessary to ensure the organization survival. These external changes impose internal organizational changes, i.e., the organization needs to be ready to think differently its own way of being and doing things. The organization needs to be ready to innovate.

This study comes from the understanding based on the constructive philosophy in which Freire *et al.* (2010) state that innovating is to create something new and to go beyond the systematization of existing knowledge. Innovating is acquiring knowledge and managing it in order to apply it efficiently and effectively. We also highlight that the path to *improve the way of doing something* is different from *how we learn to do something new*. To innovate – whether incremental, distinctive or radical innovation – it is needed to build a structure based in paradigmatic valued that allow the transmutation from *organization towards survival* into a *ready-to-learn organization*, expanding its capacity of creating its future.

Actually, according to the point of view of Freire *et al.* (2010), it can be stated that being open to innovation is to integrate preexisting knowledge to new proposed ideas, developing them or replacing them. The process of searching for meaning and coherence between different ideas is already part of the process of innovation, because these moments of paradigmatic discussions make the environment suitable for innovation. Paradoxically, reacting to new ideas is the starting point to innovation.

In this context, it is perceived the organizational development as a succession of periods related to the tradition, highlighted by paradigmatic discussions and non-cumulative ruptures that promote essential changes, which can be called Innovation.

In order to understand this new way of looking to innovation a qualitative, exploratory, descriptive and bibliographical study was held, which provided a re-read of the *Scientific Revolution* theories by Thomas Kuhn (2006). It was built a parallel, as a metaphor, between: (1) the structures of scientific revolutions for the progress of science and, (2) the structures of innovation to organizational development, building a Conceptual Framework of Innovation Structure and relating internal processes that cause the state of crisis necessary to creation, acceptance and implementation of the paradigm innovation.

In this study this Framework is presented and, to its preparation, it was held a research using the resource of metaphor so that it can be possible to look to the innovation phenomena under a provocative point of view, as suggests Vergara (2005), “insights” to understand it. That is, it will be used the symbolic approach to the description of the “scientific revolution” built by Thomas Kuhn (2006) in order to understand the structure of paradigm innovation in organizations.

There will be no enough space to discuss separately about both concepts – Scientific Revolution and Innovation – and still present a relationship between them that will enable the paradigm innovation in the organizations. Thus, it was opted to use metaphor as a logic of arguing, comparing both concepts and bringing the theory of Kuhn (2006) to base the proposal of a new understanding about the process of innovation and the categorization of paradigm innovation by Tidd, Bessant and Pavitt (2003) for the changes in the mental models that dictate what and how companies manage their businesses. This study approaches this kind of innovation, as following.

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2 ORGANIZATIONAL DEVELOPMENT BY RUPTURE OF PARADIGMATIC BELIEFS

Leonard-Barton (1998) states that organizational capacitation is a system of interconnected and interdependent kinds of knowledge that aggregates employees’ skills and knowledge, as well as equipment, infrastructure, values and standards. That is, besides knowing what to do and how to do, it is necessary to build internal conditions for the organization to do it, or physical and paradigmatic structures to do what is necessary to be done and that should be disseminated to the organization.

When it comes to a paradigmatic model incorporated to the culture of the organization, Freire *et al.* (2010), when define organizational culture as the Morphic Field that registers the Individual Mental Models and Organizational Paradigms, accessible to recovering in any time

and space, understand that these Fields are built and strengthened during the co-existence of participants by means of lengthy processes of imitations and redundancies. According to the same authors, through an interactive view and based on Sheldrake (1995) and Kuhn (2006), the employees are considered products and producers of the organization, stating that the interconnections, interpenetrations, interactivity and interdependence of these employees build the organizational culture. These Fields enable or avoid changes in the organization, blocking or not their development.

The authors conclude that organizational changes cannot be imposed by the leadership, because if it happens, the employees will be motivated to question the “validity” of the dominating paradigms and taking to breaking down their cultural basis.

In this study, Freire *et al.* (2010), drawing a parallel between scientific revolutions and processes of organizational changes, suggest that in order to eliminate the State of Crisis caused by changes, the processes that cause the solutions proposed by Kuhn (2006) must be understood. The author states that, in order to organizational changes to succeed, it is needed to manage the networks sustaining the dominating paradigms of the organization. To achieve innovation it is necessary more than changes in processes and goals; interventions in the process of building and developing paradigmatic values are needed.

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2.1 NATURE AND NECESSITY OF INNOVATION

The path followed by an “organization composed of many groups and needs different approaches to improve its performance” (HAYES *et al.*, 2008, p. 302) and to improve its way of doing something. According to these authors, there are different kinds of learning in the organization. Some groups are improving and, at the same time, other groups are building a new knowledge. This obliges the organization to be capable to combine efforts, in the sense of avoid dispersion of knowledge generated by both groups during the interrelations.

Senge (2006) proposes a path in which the organization is able to build a *modus operandi* that integrates the parties in order to achieve a common goal. For this purpose, he proposes that the organization be open to get continuous learning, transforming an “organization that aims to survive” into an intelligent organization that is able to learn quickly and that is ready to face the challenges of the accelerated dynamics of a competitive market – Expanding its capacity to create its own future (SENGE, 2006, p. 47). In other words: to innovate continuously.

According to Drucker (1987), innovation is a tool of the entrepreneurial spirit, because it is a resource for new ways of creating wealth. According to the author, the entrepreneurs want more changes than already exists; they seek to create new and different values. In accordance, Baregheh, Rowley and Sambrook (2009), state that innovation is a process of several interrelated steps where the entrepreneur organizations transform ideas into new and improved products, services or processes, with the objective of advancing, developing and competing, taking advantage of changes to differentiate from others succeeding in their market.

These changes have typical fields that provide opportunities of innovation in a more entrepreneurial manner. Drucker (1987) suggests the existence of seven sources of opportunity to innovation as shown in Table 1.

Table 1 - Sources for Innovation

SOURCES	OPPORTUNITIES FOR INNOVATION
The unexpected	The unexpected success, failures and changes that happen without forecast.
The incongruence	An opposition between reality and what may be or could be, creates a possibility of innovation.
Necessity of process	When a weakness is evident in a process, but people accommodate instead of search for improvement. There is an opportunity of improvement to the organization perceive its necessity.
Changes in the structure of the industrial sector or market structure	It happens when the necessities of the industry or market change, as the demands and preferences of consumers.
Demographic changes	Changes in the size of the population, age of the individuals, levels of employment education etc., increase opportunities of innovation.
Changes in perception	Opportunities of innovation rise when beliefs and the perception of the society change.
New scientific technical knowledge	Progress in scientific and non-scientific knowledge creates new products and services.

Source: prepared by the authors based on Drucker (1987)

The concept of innovation has been evolving during the time, because the innovation itself, empirically, is going through the influence of intern and external environmental changes. Since the term innovation was defined as a scientific construct to the economic development (Schumpeter, 1988), going through the definition of innovation as an absorptive capacity of competitive changes (ATOCHÉ, 2007; DOSI, 1982; COHEN; LEVINTHAL, 1990; KOGUT; ZANDER, 1992; ZAHRA; GEORGE, 2002), until reaching an understanding of the alignment

needed to match the organizational strategy (TIGRE, 2006; TIDD, BESSANT AND PAVITT, 2003; DAVILA, EPSTEIN AND SHELTON, 2007), it is been more than four decades of studies and technical-scientific research.

Taking a glance at the evolutionary history since the conceptualization of the expression technological innovation, the ideas of Dosi (1982) and Schumpeter (1988) can be identified. Schumpeter (1988), in his studies with an overview in economy, concluded that innovation in production does not rise spontaneously from customers' needs, but customers are "educated" to accept innovations. Therefore, the change begins with the producer and the customers learn to want new things or different things if compared to what they already use. Schumpeter (1988) states that innovation is important to the development and to new combinations in production if we want different changes in the Market, such as: the introduction of a new good, something that customers do not know; the introduction of a new production method, not yet tested by the Market; a new market opening, that is, a market in which the company is not yet inserted; a new phase of raw materials or semi manufactured goods and; the establishment of a new industry organization or a new industrial site.

Thus, towards the point of view of technological innovation (SCHUMPETER, 1988; DOSI, 1982) as a key aspect to the basic supply arrangement to new industries, company and jobs, the Organization of Cooperation and Economic Development (OECD, 2010) brings the Oslo Manual, in which many guidelines to collect and interpret data are proposed. The Manual, which in Brazil was translated and edited by FINEP (Study and Projects Financing Institution), is in its third edition and defines innovation as the effectuation of a product/service, process, marketing method, a new or significantly improved organizational method in the organization, in the workplace or in external relations.

The categorization of innovation made by OECD (2010) explains that product innovations involve significant changes in the characteristics of products and services, including brand new goods and services or important improvements of existing products. The innovations in processes represent expressive changes in production methods and in distribution. The organizational innovations refer to the implementation of new organizational methods, such as changes in business practices, in organizing the workplace or in the external relations of the company. With respect to Innovation in organizational ambit, OECD highlights the strategic changes of the organization such as the introduction of significantly changed organizational structures, the adoption of advanced management techniques and the implementation of new corporate strategies. Regarding marketing innovation, OECD describes

the adoption of new marketing methods, including changes in the design of products and packages, in promoting of products and disposal, and in pricing methods of goods and services.

Knight (1967) classifies the kinds of innovation differently and states that these kinds of innovation are related. The author confirms the categories of Product Innovation and Process Innovation, but brings two other classifications: Organizational Structure Innovation and People innovation. The Organizational Structure Innovation is similar to the classification made by OECD to the Organizational Innovation, because it is related to work assignments, authority relationships, systems of communications or formal organizational reward systems. It is highlighted that this kind of innovation is interrelated to Process Innovation; however, it includes authority relationships. People Innovation brings two ways to effect direct changes in the people participating on the organization: a) changing the personnel by hiring and firing; b) changing people's behavior or beliefs in the organization by means of techniques such as education or psychoanalysis.

Regarding this logical thinking, where innovation can be categorized, Tidd, Bessant and Pavitt (2003) state that innovation presents itself in many ways, among them the “4 P's of innovation”, with two kinds of innovation which are well-known in the scientific literature: Product Innovation and Process Innovation, and two new kinds: Position Innovation and Paradigm Innovation. The authors (TIDD; BESSANT; PAVITT, 2003) categorize Product Innovation and Process Innovation similar to Knight (1967) and to OECD (2010), being Product Innovation correspondent to the change of products and services and Process Innovation related to the change in how processes and products are created and delivered. New categorizations are brought with respect to position innovation that, to the authors, happens with the changing of concept where products/services are inserted and because of the paradigm innovation that is generated when there is some change in the mental models that dictate what and how companies manage their businesses.

This study is all about this category of innovation – paradigm innovation. The authors (TIDD; BESSANT; PAVITT, 2003) describe little about this kind of innovation in their book, quote and exemplify it, but do not exploit or describe them deeply. Based on examples, it is supposed that they are related to the changes in organizational paradigms necessary to promote changes in business models.

In this context, it is understood that in order to have the four basic kinds of innovation proposed by OECD (2010) – organizational, product, process and marketing innovations – it is absolutely necessary the initial promotion of paradigm innovation (TIDD; BESSANT;

PAVITT, 2003) and people innovation (KNIGHT, 1967), so that the changes in mental models in each individual participating in the organization can be possible and, consequently, to have acceptance and promotion of innovation.

2.2 INNOVATION AS THE ASCENSION OF A NEW PARADIGM

According to the authors Tidd, Bessan and Pavit (2003), an important dimension in change is in the level of novelty/intensity involved in process/product or services, which are the following: incremental innovation and radical innovation. Lastres *et al.* (2003) explains this level of novelty as being incremental innovation, in which there is the introduction of some improvement in a product, process or organization of the production, without changing the structure of the company. Radical innovation is where it is necessary to change the organizational structure in order to develop a new product or process. Thus, paradigm innovation becomes necessary.

In his book, Kuhn (2006) highlights that, in order to promote changes in science, it is necessary first to identify, understand and register basic aspects of its constitution. From this effort, it should be understood the methodological guidelines of each community as complex phenomena, differentiating their paths by the “incommensurability of their ways of seeing the world and practice their Science” and not by arbitrarily determine a specific set of acceptable beliefs. Nevertheless, Kuhn (2006) also points out the importance of this arbitrariness to the coherence of professional initiation in the scientific practice, because the “efficient research rarely begins before a scientific community have certain answers” to basic questions related to nature (KUHN, 2006, p. 23). To a better understanding of Science, the scientific work should be registered not as an isolated event, but encompassing the complex and long process of research, including the “reconstruction of the precedent theory and the revaluation of previous facts” (KUHN, 2006, p. 26)

In this study, this process of reconstruction is being treated as paradigm innovation and people innovation, which correspond do the ascension of new individual mental models and, consequently, to a new organizational paradigm. In the conception of Kuhn (2006), the organizational development is directly linked to the paradigms that base this development, considering paradigms as achievements that share two essential characteristics: “sufficiently unprecedented in order to attract a durable group of supporters, moving them away from other kinds of dissimilar scientific activities” and “sufficiently open to let all kinds of problems to be solved by the redefined group of science practitioners” (KUHN, 2006, p. 30).

A paradigm is an “accepted model or standard” (KUHN, 2006 p. 43). It is the starting point of a path to be walked by any of the participants of a practical community; the initial certainties of a group United to look at a same problem through the same lenses; the boundaries of understandings and a horizon of explanations.

Or, as Fleck (1986a) states: There is a certain collective of people with a common way of thought. This style is in development and is, in each stage, connected to History. It creates a defined attitude, which is given by sociological methods to the members of this collective, and dictates how these members see. (FLECK, 1986a, p. 72).

Regarding the concept of the term paradigm, many authors are seeking to define it in order to understand it in their processes of birth, management and death. Resende (1995) highlights the classic platonic view where the paradigm belongs to an abstract world and is equivalent to the idea, to the vision and, mostly, to the aspect of what is already offered by what is being seen and not only by the vision of something. Boog (1996) advances bringing the perception of the paradigm as a reference used to decision-making. These lenses condition the world vision and define the way of expressing values, beliefs and myths and, mostly, shape their ways of living, giving consistence to the individual actions of groups and companies. Morin (2005) complements, in a better explanation, that the paradigm of a social group is the hidden “supra-logic” beginning that rules one’s vision and the perception in relation to objects around his/her and the world as a whole, without the subject being conscious of the process mutilates knowledge and disfigures the real thing.

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By the disciplinary economics perspective about technological evolution, Dosi (1982) use an epistemological analogy from Kuhn (2006) to define the concept of technological paradigm. Thus, the author clarifies that innovation is a selective, directed and cumulative process in the acquisition of knowledge, competences and tools to solve technological problems. To the author, the demand for certain technology that gives an industrial advance leads to an investment towards a specific innovation.

This study corroborates with the conclusions of Dosi (1982), but advances over the limits of their studies. The present discussion perceives innovation not only as technological advances that, such as products, are directed by the economic demand. Innovation is understood as a continuous, constructive sociocultural process that demands the management of internal and external environments, drivers of the construction of individual and group mental models, and of the organization itself (FREIRE, 2008).

In this sense, conclusions made by the medical doctor and philosopher Fleck (1896-1961), which came before the definition of Kuhn for the expression paradigm are rescued. The

author stated that Science has a social historical background and is constituted by the “way of thinking” affinities that bond the participants of a group in a “thinking collective”. To align the term innovation the author’s words are clear:

Every way of thinking corresponds to a practical effect. Every thought is applicable, since the conviction demands, be the right conjuncture or not, be a practical confirmation. The practical efficiency check is, thus, so bonded to the way of thinking as the assumption. (FLECK, 1986b, p. 151).

Due to these definitions, it is stated that innovation corresponds to the ascension of a new paradigm when understands the constructive process of the thinking collective in which the paradigms rise and die in the organization in such a way of proposing a conceptual Framework that denounces the possible ways of managing the individual mental models and the dominating paradigm, for its reconstruction or the rising of other paradigmatic values. In understanding the collective and dominating process itself, it will be possible to realize the standards and models that have been accepted *a priori* by the group and the values that each individual is using as a foundation of thought, feel, talk and act in community.

2.3 CRISIS AND EMERGENCIES IF NEW ORGANIZATIONAL PARADIGMS

There is a respectable number of relevant literature about the technological paradigms and the ruptures in the organizational trajectories that could be considered to serve as a foundation to argumentations and discussions in this study, such as the already outlined studies of Atoche (2007), Cohen; Levinthal (1990), Davila, Epstein and Shelton (2007) Dosi (1982), Zahra and George (2002), Kogut and Zander (1992), Tigre (2006) and Tidd, Bessant and Pavitt (2003).

It is highlighted, however, that it is not about breaking with these literatures. On the contrary, these authors are assumed as important explanations of the phenomena approached. Nevertheless, their argumentations are considered, in this sense, insufficient to describe the structure of innovation for being disciplinary world visions, most of technological and/or economical. Bringing up the vision of Kuhn (2006) about the processes of construction, deconstruction and collective reconstruction of organizational paradigmatic values, it was possible to identify the innovation structure and its implications to paradigm innovation (TIDD; BESSANT, PAVITT, 2003) and people innovation (KNIGHT, 1967) and, consequently, to the ruptures that lead to product, process, marketing and organizational innovations.

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From the understanding of Kuhn (2006) about the expression paradigm, it is noticed that this construct is open enough to sustain the appearance of crisis and that there is an emergency for new paradigms and theories. The emergency for new theories is usually preceded by a period of pronounced professional insecurity, because it demands a large-scale destruction of paradigms and great changes on regular science's problems and techniques" (KUHN, 2006, p.95)

Crises rise from the deep necessity for new consistent values to explain recurrent anomalies, that is, in different times and moments many situations with dominating paradigmatic presence are experienced. The results are not well controlled. The puzzles fail in not producing the outcomes desired by the paradigm.

Then, the phase of pre-paradigmatic insecurity crisis begins. The existing certainties until then does not explain the situations that occur in the scientific experiences in the studied field and need to be replaced or adapted. The "proliferation of versions of a theory is a very usual symptom of crisis" (KUHN, 2006, p. 99). However, failing in a field of application does not mean a crisis situation that will origin the substitution of the current certainties, but only a need for new articulations of these certainties to accurately answer to the anomalies.

The replacement of the current paradigmatic certainties is not automatically done. On the contrary, it will occur only after debating the many explanations arose in order to understand and explain this new phenomenon. If after a long period studying the applications of the current paradigm, these paradigmatic certainties were refused and, although other ones are very efficient in solving the puzzles with precise answers accepted by the organization, this new paradigm will definitely replace the previous one.

In Science, the process of exchanging a dominating paradigm that Kuhn calls crisis, will be tried out by theoretical and experimental scientists in order to conceive many articulations for the existing theory, searching interpretations inside the dominating paradigm that allow to explain the anomalies. When the new versions of the theory fail in the search and, to the contrary, still confirm the anomalies, the “emergency” happens and the scientific community is “ready” to accept the substitution of their paradigmatic certainties.

Developing an articulation appropriate enough to answer to the existing emergencies is a challenge, because it is extremely difficult to be produced and accepted. A new idea rises only after a fail characterized in the normal activity of problem solving and from many articulations of existing ideas (KUHN, 2006).

In Science, according to Kuhn (2006), the first signs of fail and the articulations of theories confirming them and do not explain satisfactorily the phenomenon, happen decades before the approval of a new theory that can offer an accepted, precise answer to crisis. Such condition can be seen in the organizational world. Organizations take long to realize that their outcomes to Market are no longer satisfactory and, even with many losses from this resistance, they keep without changing.

The process of crisis is long until the community look for a substitute paradigm that answers the outstanding questions and when anomalies keep rising among existing beliefs and their applications in different fields, confirming the need and urgency to seek answers. In Science and in the organizations, only the “failure of existing rules is the prelude to the search for new rules” (KUHN, 2006, p. 95)

The resistances to the substitution of the dominating paradigm exist and constitute, actually, the effort of the organization in not allowing the deepening of frivolous sectorial conflicts and the rise of inefficient theories. The dominating paradigm is not denied until the very moment of its replacement. It is defended and the people involved seek for their confirmation and articulation until the final moment of their existence, when accept that this paradigm cannot be extended and changed enough to offer precise answers to the problems arising from itself. Therefore, after this, a new theory begins to have its open space.

Another important vision to be understood is when the author states that this new theory is coming to not only satisfactorily offer a solution to the problem, but also recognize the problem itself as significant under the practice. Pointing problems that are not acknowledged by law does not attract a satisfactory audience to the promotion of changes, simply because the community does not identify the basis and paths and even their value as an anomaly of its own practice.

It is important to highlight that, in its positive aspect, the resistance of regular Science to changes, also present in the organizations, is positive mostly because it imposes difficulties to theoretical inconstancies and adventures of high-risk changes. Kuhn clarifies that these resistances, instead of harming the emergence of new ideas, promote them and even provide a safe emergence, even in a slow way.

We can say that the resistance to changes promotes a competition based on deep debates that force the individual and collective thinking, looking for a confirmation of the paradigmatic certainties and new solution options. It also forces creativity, because the development of an innovation is not punctual; it is a long process, where many ideas are created with the objective of searching solutions for the reality. As the author describes, “Such as artists, the creator scientists need, in certain occasions, be able to live in a disordered world” (KUHN, 2006, p.109). It is the self-organization. Accepting the new involves changes in the constructive bases of organizational experience. When one finds the correct substitute paradigm, the process of adjust of the organization and their parts to new paradigmatic values begins.

From this perspective, scientific revolutions can be (KUHN, 2005) to organizational innovation processes. According to the author “every crisis begins with the obfuscation of a paradigm and the further relaxation of rules that guide the regular research” (KUHN, 2005, p.115). And, when the state of crisis begins, a bigger number of leaders become concerned and dedicate “an even greater attention” to the anomalies, looking for answers that can be accepted by the organization.

As can be seen in this period of search, diverse and divergent focuses of the problem rise, as well as possible solutions. Yet, none of them gives safety and the certainty enough to be accepted without reservations by the group. Thus, the state of crisis begins. Crises can rise, sometimes in one specific area, sometimes in the whole organization. Sometimes even in the market as a whole. It depends on the comprehensiveness of the problem, in answers, standards and knowledge that always served as a foundation to their goods and services.

According to Kuhn (2006, p.131), there are two kinds of phenomena that cause the rising of changes. (1) Phenomenon which nature is given by the dominating paradigm, however

details should be explained by new articulations in theory, which causes an evolution of the existing paradigm and not its substitution. That is, the innovation of the improvement happens from what already exists, without breaking its basis of understanding. (2) Anomalies acknowledged by the Academy and cannot be explained by the dominating paradigm. This will give rise to the state of crisis in normal science and the probable substitution of the accepted paradigm. That means innovation totally breaking up with the old, creating something very new.

The state of crisis, in which paradigmatic discussions are processed, is called scientific revolution by Kuhn (2006). The author states that *scientific revolution* are episodes of non-cumulative knowledge, in which an older paradigm is totally or partially replaced by a new one, which is incompatible to the previous paradigm, which to this study was configured into paradigm innovation. The choice between paradigms in competition shows that the criterion analyzed to this choice cannot be determined by the proceedings dictated by the current paradigm. Thus, the debate becomes circular, because each group use their own perspective to argue in favor of their ideas, that is, the logic of the discussion pointed by each member of the group is given from standards, values, norms and methodologies defended by their way of seeing the world – a “deaf debate” is created (KUHN, 2006, p.154). As explained by Fleck (1986c) the participants of the collective thinking unite because they think similarly and would not be capable of communicating with people that do not share their understandings. For this reason, among the collective thinking, according to Fleck (1986c), there is a great distance depending on the degree of difficulty of understanding and communicating.

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The path proposed by Kuhn (2006) to promote the communication among the collective thinking is the use of persuasive argumentation techniques over the anomaly, the inefficacy of the dominating paradigm and the proposal of the new paradigm, also pointing the nature and the logic of the issue, gaining the approval of leaders about what new paradigm will be accepted.

2.4 THE PARADIGM INNOVATION: A NEW WAY OF LOOKING AT THE WORLD

Kuhn (2006) conceives some compatible relationships between old and new theories that can be related to the organizational changes that generate innovations. These changes are the following: a) Cumulative Changes: New kinds of phenomena would reveal the existing order in some aspect of nature not yet discovered. Paths for new applications of the dominating theory are open. The group selects phenomena that can be solved by means of conceptual techniques and tools similar to existing ones; b) Evolutive Changes: New knowledge substitute

the oblivion, evolving the paradigm by means of new articulations between theory and practice. The evolution would happen by the struggle of the group not when looking for answers around them, but in fields or in organizations beyond their horizons; and c) Substitutive Changes: New knowledge substitutes different and incompatible knowledge. Substantial and non-substantial differences between the dominating paradigm and the novelties are revealed.

Guided by a new paradigm, the group can adopt new tools and orient their look into new directions, because during the changing period the group starts to perceive differently about their own experience. Deepening the relation with the organizational innovations, it is highlighted situations shown by the author in which scientists, even looking to the same previously examined points and adopting familiar tools can realize surprising things and lead to see the world defined by their research commitments in a different way (KUHN, 2006).

In the organizations this process is seen when a change is necessary and innovation is implemented, may be in management, process, design or product, the whole organization starts to realize innovation as a new way of doing and seeing their own experience, rising a new concept to the organization. In the beginning, this change is refused, but as soon as it is accepted, becomes the new way of being dominating in the organization.

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2.5 PEOPLE INNOVATION: THE INNOVATIVE INDIVIDUAL

The paradigmatic change, classified by Kuhn (2006) as perceptive transformation, is explained by the example of the man that looks to the unknown for the first time, trying to identify, recognize and understand it from concepts and existing rules by his/her usual world. When one cannot relate these worlds, the result is an extreme disorientation and an intense personal crisis. As soon as the individual learns how to deal with his/her new world, all his/her visual field changes and objects become the same as previously seen. Literally or metaphorically, the individual gets used to see and understand the world experience a revolutionary transformation on his/her perspective.

In order to experience similar transformations, building a consolidated learning, the individual needs first to get in contact with the unknown and be hardly exposed to the anomaly. However, after the experience provides the indispensable categories, the individual will be able to realize the differences, identify, classify and relate them to the unknown and look the most significant concept to help him/her to realize the new knowledge.

According to Kuhn (2006), the change in the scientific perception that follows the paradigm change happens for two reasons: the *individual genius* and the exploitation of *open possibilities* by a change of the dominating paradigm or previous ones.

What happens during an innovation is not reduced to an interpretation of stable, individual data. First of all, because the data is not stable; secondly, because this process is not easily interpreted just because of this instability. The scientist participating of a scientific revolution is not an anomaly interpreter, but "... a man in front of the same constellation of objects as before and, conscious of it, he finds these anomalies totally changed in many details" (KUHN, 2006, p. 159).

In sequence, the change of paradigms begins with a non-structured event, as an abrupt intuition clarification of an individual recognizing anomalies and starting the state of crisis. "Moments described as solutions came during sleep", "sales dropped into our hands", "a sudden clarification that solves a puzzle" that before was obscure. Intuition gather great portions of autonomous and congruent experiences that came from an old paradigm and change them into a block of experiences that will be gradually linked to the new paradigm (KUHN, 2006, p. 161).

There are "immediate experiences" that allow the arising regularity of a paradigm, so that little discussions initially begin, however the commitment of the individual with the dominating paradigm will provide a lot of experiences and debates to its conclusion and acceptance. In this sense, Nelson and Winter (1982) warn that in order to transformation can be consider an innovation, *a priori*, measurable and expected outcomes are not taken for granted. The timing is perceived to change what is being done in the company, but there is not a set of expected scenarios that will lead to certain successful outcomes.

For this reason, the state of crisis begins. By the necessity of diminishing the adventures and risks in a manner that give more confidence to people, i.e., innovation begins with the creation of knowledge of an individual and is processed as innovation after discussions to validate and study viability.

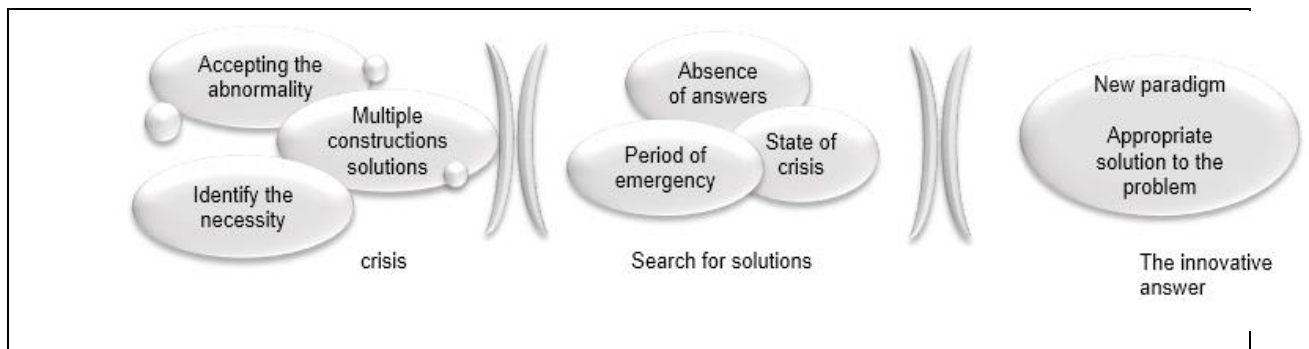
2.6 PROPOSITION OF THE INNOVATION STRUCTURE FRAMEWORK

The proposed Framework has as a goal the promotion of Paradigm innovation (TIDD; BESSANT; PAVITT, 2003) and of People innovation (KNIGHT, 1967) in supposing that without these two kinds of innovation the other (kinds of innovation) will not be possible. This article gets close to this category of innovation. As already mentioned the organizational

paradigm innovation depends on changes in the mental models of the individuals participating in the company, because they define what and how people make their decisions and, consequently, will define how companies manage their businesses. When rescuing People innovation (KNIGHT, 1967) it is perceived the way of causing changes in paradigm by the promotion of modifications in their behavior or beliefs.

Following the metaphor in construction, the process of scientific revolution (KUHN, 2006), which origins a new scientific theory develops in a similar way to innovation in the organizations, as in Figure 1 and in the following steps: i) Identify the necessity of idea/study in order to solve some problem; ii) Recognize the problem as abnormal by practice, i.e., whether what is being used solves the problem or not; iii) Search for and present multiple ways with the objective of giving acceptable answers, using the data that arose in the problem; iv) Create the state of insecurity during a long period of study and debates over the problems recognized and the articulations; v) Accept the absence of any possibility of finding appropriate answers from the current way; vi) Period of emergency to the appearance of a theory that can reply what is done nowadays, pointing ways and giving the expected answers; and vii) Defining a new theory that presents an appropriate answer to the problem.

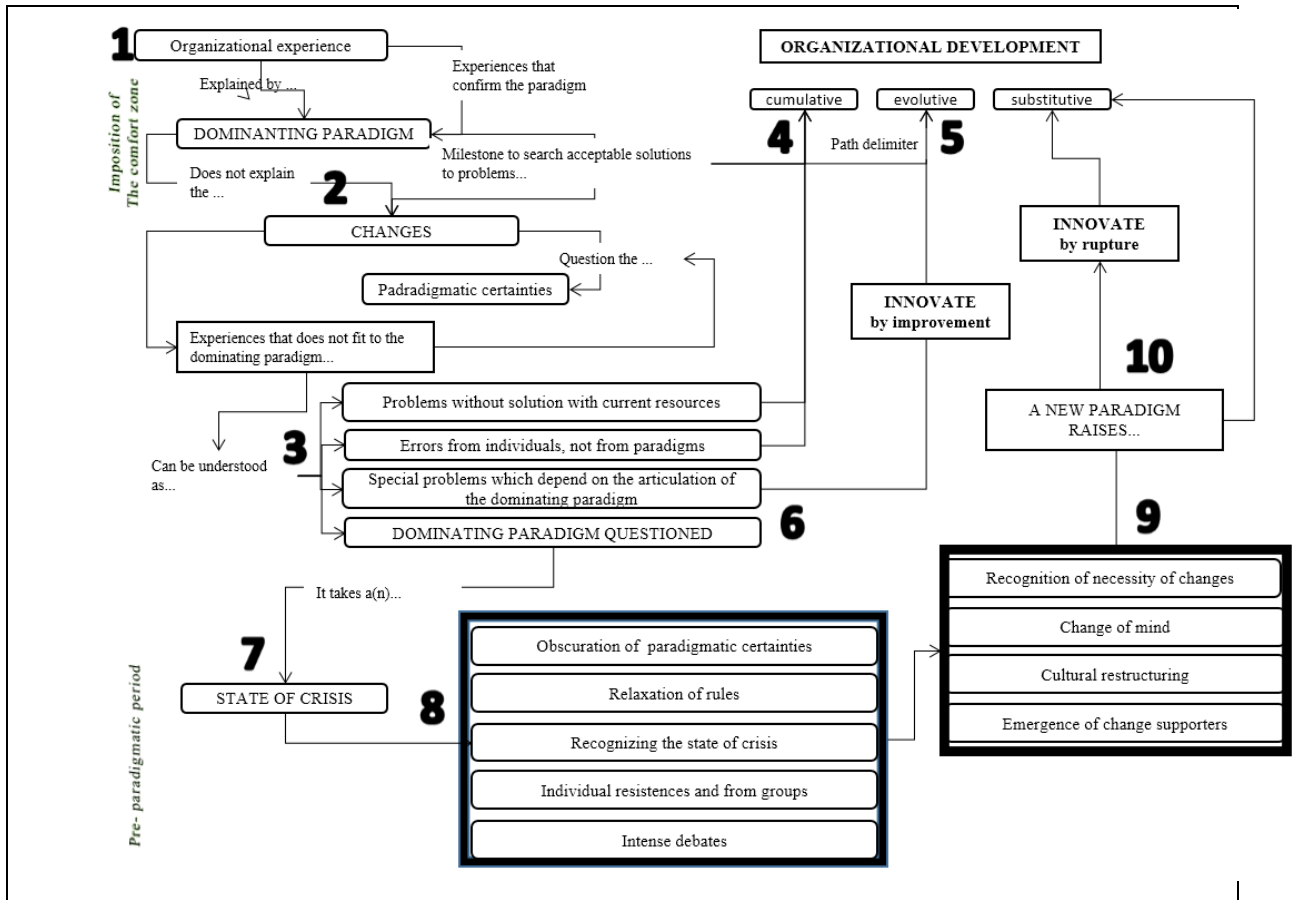
Figure 1 - Process of Scientific Revolution.



Source: Prepared by the author based on Kuhn (2006)

At this point of the study, there is enough information to build the Framework of People and Paradigm Innovation, main goal of this study. The Framework was divided into ten great organizational movements.

Figure 2 - Framework of Innovation Structure



Structure Source: Prepared by the authors

The 1st Movement refers to the situation of comfort experienced by the company while the dominating paradigm is configured as one of its strengths to respond effectively to the challenges of the group. The 2nd Movement corresponds to the moment in which the group realizes that an inconvenient situation becomes a problem because of the lack of answers or solutions by known ways. It is when a questioning of organizational paradigmatic certainties begins. The leaders, in this Movement, identify that the lived experiences demand a different solution.

The 3rd Movement can be understood as the phase of situational diagnosis, in which one search to identify the problems and its essential causes. The problems are categorized and classified into three groups: problems that demand new resources to be solved; problems caused by mistakes made by employees; special problems that need new strategies, processes or internal policies. For the first group, resources are needed. For the second group, the solution is training or dismissing the employees; for the third group, existing things need to be reformulated and improved.

The 4th Movement is the strengthening of the dominating paradigm as the accumulation of experiences that confirm the importance of keep doing things as always have been done. Somehow, problems are put aside to future analysis or to a moment in which they will be more developed to be treated. The 5th Movement is the evolution of the dominating paradigm with innovation by improvement when one realizes that changes are necessary in order to achieve better results in the manner that things are being done. Answers are in the dominating paradigm, with a new articulation between strategy and operation.

The 6th Movement begins when the leaders clearly realize that it is no longer possible to implement little changes in processes, marketing or organizational structure, nor invest into human, material, technological and financial resources. The company needs to break up with the old way of doing things, what can be interpreted as a questioning of dominating paradigm. The 7th Movement is the establishment of the State of Organizational Crisis. The problem is acknowledged and accepted. It is realized the necessity of discussing new paths, but it is not yet known where to begin. To accept is to begin the process of change.

The 8th Movement is the Management of the State of Crisis, or the Organization Change Management. In this Movement we have the obscuration of paradigmatic certainties, because they are being questioned. There is the relaxation of rules and behavioral standards so that people can recognize the state of crisis and allow themselves to actively participate on deconstruction/reconstruction debates on the manner of thinking and doing things. In the 8th Movement are raised specific individual and group resistances that used to feel comfortable with the dominating paradigm and start reacting to changes with stormy debates, resignations, conflicts, complaints, among other issues.

As advised by Kuhn (2006), it is necessary an open and clear conversation, not a “deaf” dialogue. The debates of this movement are more than operational discussions and strategic scenarios; these debates are mental models of each individual participating in the process. The 9th Movement emerges when the work environment calms down and everybody recognizes the need for changes. It is considered the change of mental model of the participants with an improvement in the level of consciousness regarding previous problems and cultural restructuration needed. People in favor of changes, leaders and their followers emerge in this moment and start to create a new path.

The 10th Movement is when one realizes the replacement of the previous paradigm. This is the moment in which the Paradigm and People innovation emerges. A new way of thinking and make the expected outcomes happen. It is time to break up with the past, deconstructing previous mental models and allowing a new world vision that will allow the

participants to build new explanations to the cause of problems and new ways to the solution. A new perspective emerges! At this moment the company is able to innovate in products, marketing and organizational structures.

3 FINAL CONSIDERATIONS

After presenting the metaphor and identifying the points of agreement, an Innovation Structure Framework can be created, which is the result of this study. As in Science, the organization has a dominating paradigm that determines the path to organizational action and at the same time functions as a milestone to the search for solutions that can solve the experienced problems. In Science, the structure of scientific revolution is influenced by the arbitrariness of the different schools as in the organization. This arbitrariness is exercised by the organizational culture.

With relation to the break of paradigmatic certainties, as in the structure of scientific revolution as in the organization, this causes the necessity for new theories that can solve the realized problems. The prior acknowledgement of the existence of an anomaly and state of crisis can result on the change of category and paradigmatic procedures that can strengthen the organizational innovation – incremental or of rupture. Thus, this study achieved the proposed goal in designing the Innovation Structure Framework.

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The results of this study contributed to the advance of knowledge about innovation in presenting a new look about the concept of *paradigm*, indicating that this construct should be seen as a concrete instrumental basis to identify and promote innovation. The Framework proposed is a useful tool for the understanding of the organizational development and behavior in the processes of incremental, distinctive or radical innovation. Nevertheless, the structure of innovation based on the rebuild of dominant paradigms as per pointed in this study, can be managed when identified, mapped and deconstructed based on new values.

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