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MANAGERIAL SKILLS REQUIRED BY INNOVATIVE AND TECHNOLOGY-BASED FIRMS

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Abstract

This paper aims to investigate the Business Administration professional profile specifically required to manage innovative and high technology-based companies. It is a qualitative study outlined by an exploratory-descriptive research, supported by questionnaires and interviews addressed to a sample of executives of technology-based companies, located in São Paulo metropolitan region, Brazil. Accordingly, modular innovation arises from the existence of an architectural knowledge improved in association with the conceptually destroyed knowledge's component, meaning that architectural innovation arises from an improvement in the knowledge of the parties allied to the architectural knowledge's destruction. Results show that

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managers see innovation as one essential pillar for competitiveness and commonly associate innovation with team expertise related with the structure for this purpose. However, to instill innovation as an organizational discipline, it is necessary to redesign organizational processes, namely those considered critical to innovate. The company must revise its management model aiming to emphasize innovative behavior, which means readiness to respond to external environment change's requirements. Moreover, once it is necessary to change the manager's mindset about innovation, higher education institutions also have to adapt their Business Administration courses according to both changes, essentially concerning a more dynamic and more diffuse business environment in comparison to their curricular contents. The institutional pragmatism generates professionals who reach the job market with a historical and non-managerial overview on innovation. Nevertheless, results highlight that attitude is more appreciated than knowledge, or business management skills, what makes managerial behavior a key element in the innovation process in technology-based firms.

Keywords: Technology-based Firms; Business Administrators; Higher Education; Professional Profile; Managing Innovation

Habilidades gerenciais necessárias para firmas inovadoras e de tecnologia de base

Resumo

Este trabalho tem como objetivo investigar o perfil profissional Administração de Empresas especificamente necessário para gerenciar empresas inovadoras e de alta de base tecnológica. É um estudo qualitativo delineado por uma pesquisa exploratória-descritiva, apoiada por questionários e entrevistas dirigidas a uma amostra de executivos de empresas de base tecnológica, localizadas em São Paulo região metropolitana, Brasil. Assim, a inovação modular decorre da existência de um conhecimento arquitetônico melhorou em associação com a componente do conhecimento conceitualmente destruído, o que significa que a inovação arquitetônica surge de uma melhoria no conhecimento das partes aliada ao conhecimento arquitetônico é a destruição. Os resultados mostram que os gerentes de ver a inovação como um pilar essencial para a competitividade e inovação comumente associado com a experiência da equipe relacionada

com a estrutura para essa finalidade. No entanto, para incutir a inovação como uma disciplina organizacional, é necessário redesenhar os processos organizacionais, ou seja, aqueles considerados críticos para inovar. A empresa deve rever o seu modelo de gestão com o objetivo de enfatizar o comportamento inovador, o que significa prontidão para responder às exigências de mudanças de ambiente externo. Além disso, uma vez que é necessário mudar a mentalidade do gerente sobre a inovação, instituições de ensino superior também têm de adaptar os seus cursos de Administração de acordo com ambas as mudanças, essencialmente relativa a um ambiente de negócios mais dinâmico e mais difusa em comparação com seus conteúdos curriculares. O pragmatismo institucional gera profissionais que chegam ao mercado de trabalho com uma visão histórica e não-gerencial na inovação. No entanto, os resultados destacam que a atitude é mais apreciada do que habilidades de conhecimento, ou de gestão de negócios, o que faz com que o comportamento gerencial um elemento-chave no processo de inovação em empresas de base tecnológica.

Palavras-chave: Empresas de base tecnológica; Administradores de Empresas; Ensino superior; Perfil profissional; Gestão da inovação

Introduction

The sum of knowledge as a set of facts, principles, and theories related to a field of study or occupation practices; such as the ability to apply knowledge and use it to accomplish tasks and solve problems; attitude, seen as the effective ways to accomplish tasks and solve problems in varying degrees of complexity, and in various levels of autonomy and responsibility, extrapolate the general concept of competence (ANQ, 2011).

The outcome of this set will be as more intensely applied, as more complex the type of industry. Thus, one can say that in densely sectors characterized by a demand for new knowledge, especially about technology and technological environments, coupled with the ability to share knowledge, to establish relationships between different actors, perseverance in the search for innovative solutions and the courage to challenge the status quo, underlie the mindset formation of professionals involved in innovation.

It should be added to the described requirements, the complexity that governs the patterns of cooperation and inter-institutional relationships between the actors of the innovation process embracing conditions that go beyond the geographical boundaries. Interestingly, it is considered the geographic boundaries as a much more political and not simply physical reference. The interactions in the development of new knowledge in the so-called state-of-the-art easily corrupt the ordinary notion of time and space (SANTOS & RODRIGUES, 2007). Moreover, what previously would constitute a phenomenon of local characteristics, eventually gains wider dimensions, going beyond the boundaries of the region, state and country.

Thus, when discussing the technological environment and the industries linked to it, it is known in advance that the debate is of global concern, from the point of view of Research & Technological Development, from the point of view of the marketing of innovative products and services. Thus, when the industry's technological base occupies the center of the debate, it is observed that there is an inseparable complementarity between technological environment and the business environment, as discussed by Santos and Amato Neto (2009).

As opposed to the trend observed empirically, to discuss separately the constructs innovation and technological competencies of managerial skills, this article investigates and gathers such constructs, having as its object of study the formation of related skills in the career of Business Administration, from the perspective of entrepreneurs of technology-based companies, this being so, one of the vectors of the proposed analysis. This research seeks to answer the central question: what are the skills required of the Administrator in innovative and technology-based companies?

Once the search problem was defined, the search objective of this working paper is driven to explore the competencies required to the professional graduated in Business Administration in higher education courses to manage innovative and high technology-based companies. Having in perspective that this is a matter of considerable interest, the search field was delimited to Sao Caetano do Sul City, metropolitan area of São Paulo, state of Sao Paulo, Brazil, hopefully, expecting to contribute to call attention to this managerial matter.

The paper is structured in five sections. The first section introduces the investigative context, and establishes the elements of the search, such as central issue, the search problem and objective. In the second, there is an approach of theoretical contributions to organize this search in terms of hypothesis creation and referential model to measure variables Identified through the literature review. In the third section, there is a description of the methodological procedures briefly adopted to perform this search. The fourth section covers the research findings and theoretical discussion, and the fifth section reports the conclusions made, the contributions to the other future researches, and further comments related to the search problem and objective achieved.

Theoretical review

World Economic Forum (WEF) emphasize education, at all levels, as an important factor to measure national innovative capabilities. It is due to the expectations on the higher qualification of human resources as a source of innovation and competitiveness in a certain country. The underlying logic is that in industrial-based economies, driven by production factors, the dexterity with which the worker concluded each piece is a variable to be considered while defining the production cost and also perceived as an absolute and comparative advantage, as primarily discussed by Adam Smith (1723-1790), David Ricardo (1772-1823) and Thomas Robert Malthus (1755-1834) up to contemporary models that highlight technological change within

the new patterns an evolutionary industrial economy (SOLOW, 1956; NELSON & WINTER, 1988; PEREZ, 2009; BESSANT & TIDD, 2007).

Technical and technological progress emerge as a source of scientific progress that enables the new artifacts and new business sectors creation. Thus, the economic imbalance generated by the change in the processes and products calls for manufacturing models restructuration and also creates new business models that, in itm turns, challenges managers skill and companies competetiviness in new sectors (BESSANT & TIDD, 2007).

The contents of professional education, according to Ritter and Gemunden (2004), as the ex-ante of the performance of a professional in the market, requires an analysis that emphasizes the competencies upon which the success of the innovation process is based and, therefore, ultimately impacts innovation. This implies reflecting on the development of a company and the need to make it more competitive and efficient along the time while dealing with the challenges of creating and seizing present conditions and opportunities.

Marzano (2011) stresses that innovation is about change. And it can be positively enhanced by the companies that keep a staff with necessary knowledge, skills and attitudes to leverage the innovation process.

Therefore, it is necessary to converge the managers skills to the organization towards the teambuilding in order to enable teammembers to reach superior performance in the innovation process in a continuous base. So, gathering the most talented and innovative professionals is crucial to achieve success in high competitive environments.

The pulse for innovation cannot be seen as a technical reserve of a few employees directly involved with the Research and Development duties. On the contraire, it is an essential feature of all employees of an innovative company existance. An example of this innovative identity is present in the testimonies of Embraer professionals who, regardless their job position, consider themselves aircraft manufacturers. According to Santos (2004), the mission statement became a identity shared by all employees as a consequence of creating a quality-oriented organizational culture.

Cognitive anthropology deals with the diffusion of knowledge through the meanings of the symbols and its application among members of the groups insertion (SANTOS, 2004). knowledge, in turn, is recognized as a source of innovation.

Along with the development of Social Sciences, in the mid-twentieth century, the knowledge become to be seen as an important companies´asset. Polanyi (1966) conducted a study involving socio-institutional and socio-spatial aspects of innovation, also exploited by Albagli and Maciel (2004) to conclude about the importance of local

production and diffusion of knowledge interactions, marking seven influential factors, which are:

- The processes of generation, dissemination and use of knowledge, especially those derived from the particularities of the local productive culture, as well as knowledge about who cooperate and interact (know who);
- Knowledge and learning resulting from local interactions, particularly those non-intentionally generated;
- Not just the cooperation formally established, but also and especially the various types of informal interaction;
- The systemic nature of learning and innovation, recognizing the role of each local actor to generate collective knowledge and a local intelligence;
- Channels of communication between agents as essential part of the local innovation system, and institutional diversity as a crucial factor of communication opportunities;
- The results not only for the competitiveness of the economic agents, but also and especially to the local socio-economic development;
- The company's ability to interact and cooperate, and, from these relationships, generate knowledge and promote learning and innovation (ALBAGLI & MACIEL, 2004, p. 15).

In addition, it is important to understand how these factors interact. Aiming to contribute to this understanding, L'Abate *et al.*, (2010) argue that it is necessary to have relational competence, a form of interdependent competences, usually associated with a form of intersubjective intelligence, which offers the possibility to operate tasks in cooperative and collaborative arrangements also understood "by the mobilization capacity, (perceived) needs and opportunities for development of self, for group and for the corporation" (SANTOS & VIAGI, 2005, p. 95).

Relational competence expresses the movement of the interactions, determining the degree of interaction between the seven factors and their resulting positive relationships. Prahalad and Hamel (2004) describe how the collaboration among knowledge networks are important and bring many benefits, the provision of information, exchange of resources, access to specialized and inter-active learning. According to the authors, the technological complexity required to develop innovations makes it very difficult for companies to dominate all areas of knowledge they need.

Thus, the hypothesis 1 is based on the following assumption: the interaction between businesses and customers are essential sources of

innovation, as they offer new insights that support achieving and maintaining competitiveness.

Competence in contemporary organizations

According to Durand (1999), competence is integrated into three areas: the functional or technical skills that are necessary for a specific task, career or business, which refer to what is necessary to implement in the business environment, and in the organization processes, and finally; behavioral competences, or independent key competences that the company needs to operate in conformity with a mental and analytical model.

The exercise of a function or performing a task in these three areas of expertise is embedded in a three-dimensional framework of competences comprising: external competences, which produce high value to the organization; interpersonal competences to build effective relationships within the organization, and yet; personal competences that drive leadership and professionalism (BOSCH, LEE & CARDONA, 2013).

As noted earlier, competence as a construct has different meanings for different people and for different companies. However, the literature defines competence as a set of knowledge, skills and attitudes that affect a particular function. Competence is related to performance, and can be measured in relation with to previously established standards.

If measured, competence can also be assessed and improved through training and development, differentiating it from a company in relation to its competitors by the way the company creates and uses these powers and what are the core competencies that create competitive advantage, and in which areas.

Among the many writers on the management of innovation, without confusing it with management of innovative companies, Tidd, Bessant and Pavitt (2005) and Tschirky *et al.*, (2011) explain that the context of the skills are directly linked to the mission and values in organizational culture the company.

In turn, Siguaw, Simpson and Enz (2006) estimate that companies that adopt an orientation towards innovation provide the resources, eg, capital, tools and talented human resources for a wide range of innovations, when they are likely to fund radical innovations are also more likely to hire and retain professionals who advocate new ideas, regardless of the position held by the employee.

Ritter and Gemunden (2004), Simpson and Enz (2006) suggest that the dominant organizational competences necessary to implement the guidance for business to technology, marketing, human resources and

operations are carefully built and accumulated over time. Such skills are predominantly based on the management and allocation of organizational resources, being exposed from the following sets reported in items below:

- Competence in resource allocation: all alone, the resources of a company do not offer competitive advantage. However, careful resource allocation allows the existence of innovative efforts, based on beliefs and understandings about the approach to innovation, and according to the learning philosophy of the company and its strategy,
- Technological competence: the guidance for innovation directly determines the choice of technologies that a company does and how this technology is applied to produce high-quality innovations, upgrading the company's performance;
- Competence of employees: how an organization facilitates interaction among its employees for the diffusion of knowledge and establishes clear top-down communication, can promote or inhibit the ability to invent and therefore innovate. It is essential for innovation that the company select, train and reward employees based on the value of learning and continuous improvement.
- Marketing Competence: market-oriented competences are derived primarily from the guidance for the construction and ongoing market research. Attitudes and expected behaviors should include the creation of superior value for buyers and thus continuous superior performance for the business.
- Operational Competencies: the competencies of business operation refer to all the activities of management and control that affect a form of work organization, its processes and its formal and informal designs. Companies that innovate develop operational competencies that facilitate new learning, thus enabling change and continuous improvement in management and processes.

An environment articulated by these competencies will encourage the pursuit and dissemination of information from a variety of internal and external sources, thus to improve the mechanisms and internal business processes. This theoretical set is the foundation for the construction of the

second hypothesis, i.e: the technology-based companies managers recognize the importance of developing a set of dominant organizational competencies as a key factor to innovate.

Skills in innovation management and management skills to innovate

Understanding the competencies of a company and related knowledge, skills and attitudes, provides an essential system to design and reference a function or position, also serving as a control tool so the various services, products and the operation activities be managed with high performance and quality, thus adding value to the company.

Fleury and Fleury (2001) and Dutra (2004) advocate that, vision, fair translating of company goals, recruitment, identification of needs, the way the company operates it mental model and the mental model itself as driver for innovation are essential. Therefore, companies must have great competence in these skills.

With that said, it is crucial that these assignments be well defined and updated. This is an activity that does not dispense clear records and recognized procedures, after all, without structured data the risk of making decisions based on opinions and discussions whose reasoning is fallible arisen.

The context refers to the essential resources based view, which has gained an important role in organizational studies once it is a key element of competitive advantage and the results of operational and managerial performance.

Prahalad and Hamel (1990) emphasize that the combination of technological capability with other capabilities such as marketing domain, is vital to the creation of the advantages of impact on the management and success of an organization support.

The company that holds critical knowledge for decision making and is empowered to use them efficiently, ultimately joins forces through attitudes that allow the development of products and processes that offer new benefits and value to customers, which in turn creates value for the company itself. In this direction, if the combination arisen from these competencies is also comprehensive and appropriate for understanding the dynamics of innovation in a focused learning and knowledge creation scenario, it is necessary to accurately identify what these competencies are and what are the contributions that arise from their applications practices.

Integrating technological resources, people's knowledge and skills to enable competent attitudes can cause direct effects on the development and success of an organization. In the case of the company that seeks to innovate constantly, this integration influences its performance and positively affects the quality of the production of innovations. In the field of Business Administration, the contribution of experience and knowledge accumulation are essential fundamentals in driving technological developments.

There is an important contribution from Colombo and Gilli´s (2005, p. 795) research on Italian technology-based companies which reinforces the importance of focusing on competencies developed as strategic resources for small businesses in growing process.. The authors state that "in accordance with competence-based theories, the econometric estimates show that the nature of the education and prior work experience of the founders exerts a key Influence on growth". The authors credited a positive effect on growth to the number of years of high education in Economics and Business Management and, lesser extent, to years dedicated in science and technology.

Davenport, Leibold and Voelpel (2006) affirm that the knowledge inserted in an expertise strongly contributes to accelerate the RD process towards the creation of competitive products as well as the domain of related technology, managerial techniques and marketing approaches and all organizational knowledge and skills.

Althoug the topic of innovation has been historically associated with the management of technology, the innovation itself frequently goes beyond technical and technological frontiers (NELSON WINTER 1982). The domain of complex knowledge also involves the nature of the business operations and of the competitive arena, what requires judgement capacity to perceive when and what is important be analysed. An important portion of the innovation features depends on the human resources skills than technology itself.

In the technology-based companies, innovation has a central role in the competitive strategies what includes the proven results in terms of product and process technology aiming to distinguish the dynamic companies from those slower ones, even though their technology can be consider sophisticated and dense (CORTES ET AL., 2005).

Innovation is commonly associated with technological change, and therefore induces the discussion of design-oriented technological innovation to product or manufacturing process. But in his typical typology innovation is also a phenomenon related to organizational changes that impact on the opening of new markets, new organizational arrangements, management

models and the generation or acquisition of new skills, among other possibilities.

Managers at innovative companies must have a set of skills to manage businesses in rapid changes affecting their portfolio of products and services environment, or rebuild productive and service capabilities, demanding increased knowledge of the market, sources of funding and financial management of innovation projects, among others. With this referral comes the assumption for the third hypothesis to be tested in the field research, which is: business Administrator must have competencies of managing innovative environments and its sensitiviness to advances in technology.

Methodological procedures

This paper is based on a qualitative study approach, which according to Denzin and Lincoln (2006), involves the study of a variety of empirical materials that describe routine and problematic moments and the lives of individuals meanings. The authors also report that researchers in this area have used a wide range of interconnected interpretive practices, hoping always to get a better understanding of the subject that is within researcher reach.

The investigation process is guided by an exploratory-descriptive research, since it is designed to discover and describe the characteristics of a population to be studied, permitting to evaluate the specific characteristics of individuals, groups, situations or events by summarizing the commonalities found in discrete observations.

What concerns data collection techniques, semi-structured questionnaires and interviews were applied. Although the invitation to the survey was sent to seventy companies in the Metropolitan Region of São Paulo, consent to the application interview and questionnaires were obtained from a sample of seven companies, which is why it is considered the sample defined by accessibility.

The responses were recorded and its contents were classified into categories for analysis aligned to theoretical constructs presented in the literature review. The field analysis were addressed to verify the hypotheses previously defined along the literature review.

Search results

Data survey was collected from seven companies located in the sector of Great ABC, São Paulo metropolitan region. Companies' identities

were preserved. The data collection was obtained from chief executives and key executives of the companies covered in field research conducted.

The results are presented in Table 1, for each type of competence identified in the literature, using the descriptors: knowledge; skills and attitude.

Table 1: Attributes of Administrator´s competencies, according to the local local managers of technology-based companies

Technical Competencies		
Knowledge	Skills	Attitudes
Knowledge of the market	Accumulation of knowledge	Focus on efficiency and the generation of competitive advantages
Domain professional field info	Vision and systems thinking	Entrepreneurship and response readiness
Mastery of the business	Sistemic reasoning	Curiosity and interest
Applied Mathematics	Analytical	Continuous Self-Development
Processes worflow	Implementation of changes	Critical thinking and innovative mindset
Adequate undergraduation school	Personal Organization	Continuing education
Specialized training	Dosing systematization	Act as a multiplier
Know scenarios and modeling	Linking micro and macro	Excellence as profile performer
Possess concept of innovation	Be structuring	Learn extra school walls
Know how prioritize	Get the most out of the least	Focus on reality
Mastery of cost and pricing	Operate transversely	Do different
	Changing approaches	Do better
	Profiles identifier	Innovation mind set
	Excellence in leading people	Be integrator
	Ability to adapt	To act with pragmatism
	Developer of cultures	Encourage participation
Behavioral competencies		
Knowledge	Skills	Attitudes
	Communicate effectively	Be different
	Create environment	Be proactive
	Ability to lead	Do not be afraid of the new
	Know how to lead as server	Be publisher
	Know how to drive	Be supportive
	Take initiative	Acting for sympathy
	Going solo	Act collectively
	Be participatory	Be committed
	Be outgoing	Be interested
	Be interested	Pursue learning
	Being creative	Pursue growth
	Good on relationship	Complementing the team
	Good on interrelationship	Act with positivism

	Listenner	Act with positivism
	Be intuitive	Be persistent
	SBe balanced	Have innovative spirit
	Ability to adapt himself	Have constant willingness

It was observed a preference over attitudes in Administrator´s profile, more than skills and knowledge of some specific attributes. Concerning 'Competencies for innovation', the attributes related to the attitude are a constant on the approaches of the respondents in the circumstances set out in the interview, followed by attributes for skills. There is less relevance dedicated to the attributes of knowledge as technical skills, and knowledge attributes as behavioral competence are not displayed. his approach may be inferred on the lack of initiative, indulgence, excessive subordination atittude, or even on lack of self-confidence of the approached professionals. All these items were confronted with the management style, which, in association with the business environment dynamics, can influence the professional behavior changing.

Table 2 presents the attributes related to Action for Innovation.

Table 2: Attributes of competencies in the construct - Acting for innovation

Technical Competencies		
Knowledge	**Skills**	**Attitudes**
Informed about the market	Implement changes	Deliver with efficiency
Dominate the playing field	Dosing systematization	Provide competitive advantage
Know the company	Linking micro and macro	Entrepreneurship
Understand processes	Be structuring	Think in new ways
Mastery of costs and pricing	Operate transversely	Be interested
Possess concept of innovation	Changing approaches	Excellence as multiplier
Know how to prioritize	Excellence in managing people	Excellence as performer
	Developer of cultures	Learn extra school walls
		Focus on reality
		Make it different
		Make it better
		Innovation mind set
		Integrator
		Act with pragmatism
		Encourage participation
Behavioural competencies		
Knowledge	Skills	Attitudes
	Build environment	Be different
	Know how to lead	Be proactive
	Take initiative	Don´t be afraid of new
	Go solo	Be publisher

	Be participatory	Be supportive
	Be interested	Look for learning
	Be creative	Have innovative driven spirit
	Be intuitive	Have constant willingness
	Ability to adapt himself	Act collectively

Concerning the general construct 'Acting for innovation', again the attributes related to attitude are constantly present in the approaches of survey respondents. The result for this section prompts alert to the degree of importance these attributes have to produce positive outcomes for innovation.

However, there is a line that divides needs from desires, that needs to be exploited from the point of view of the reality of companies and what the market offers in terms of professionals, especially in connection with education at university. The attributes related to the construct "Acting for innovation", seem to depend on human resources policies, with appropriate long-term training, so, to have steady and productive presence. Table 3 provides a description of mobilizing resources to innovate.

Table 3: Attributes of competence according to construct - Mobilization to innovate

Technical Competencies		
Knowledge	Skills	Attitudes
Know to prioritize	Knowing how to manage	Deliver with efficiency
	Be structuring	Think about new ways
	Get the most out of the least	Excellence as a multiplier
	Profiles identifier	Excellence as executor
	Excellence in managing people	Innovation mindset
	Excellence as performer	Be integrator
		Encourage participation
Behavioural competencies		
Knowledge	Skills	Attitudes
	Creating environment/culture	Be publisher
	Knowing how to lead	Be supportive
	Knowing how to lead as server	Acting for sympathy
	Knowing how to lead people	To act collectively
	Complementing the team	
	Taking part of a team	

For the theoretical construct 'Mobilizing resources to innovate', skills are required as outlined in the theoretical framework evidenced in the literature. Thus, the construct attributes allow us to infer about the possibility of leadership failures and inadequate prioritization of actions by members of senior management of the companies surveyed.

Behaviors resulting from excellence as a multiplier, namely leadership, and know how to drive innovation culture, can come into confrontation with the various possible meanings of the actions related to the guideline of "getting the most out of the least. Table 4 shows the attributes related with Communication competencies.

Table 4: Attributes of competence construct - Communicate to innovate

Technical Competencies		
Knowledge	Skills	Attitudes
Know the company	Have systemic vision	Excellence in profile when multiplying
Have innovation concepts	Excellence in people management	Be inclusive
		Encourage participation
		Do not postpone decisions nor discussions
Behavioural competencies		
Knowledge	Skills	Attitudes
	Communicate effectively	Be publisher
	Create a collaborative environment	Be supportive
	Ability to lead	Acting for sympathy
	Know how to lead as server	Complementing the team
	Know how to drive	
	Be participatory listener	
	Good on relationships	
	Good on interrelationships	
	Be good listener	

Analysis for the construct 'Communicate to innovate', references to skills are crucial. Note also that, in this approach, behavioral skills are more influential than technical skills.

The premises 'know the company' and 'Have innovation concepts' depend on the spread of the strategies of company among its employees, the survey results show that companies have an obvious gap in this matter, as in a common way, managers say they have no tools, policies and controls to collaborate to act accordingly. Table 5 shows competences to innovate

Table 5: Competencies for construct - Learning to innovate

Technical Competencies		
Knowledge	Skills	Attitudes
Be Informed about the market	Accumulating knowledge	Deliver with efficiency
Know the company	Know how to manage	Provide competitive advantage
Mastering applied mathematics	Implement changes	Take an interest
Understand processes	Be organized	Accumulate qualifications
Specialized training/education	Dosing systematization	Focus on reality
Know scenarios and modelling	Linking micro and macro	Make it different
Possess concept to innovate	Get the most out of the least	Make it better
	Operate transversely	Innovation mind set
	Changing approaches	Pragmatist
	Ability to adapt	Do not postpone decisions / discussions
	Developer of cultures	
Behavioural competencies		
Knowledge	Skills	Attitudes
	Know how to drive	Do not be afraid of the new
	Take initiative	Be committed
	Going solo	Be interested
	Be interested	Be persistent
	Ability to adapt	Have innovation spirit
		Be courageous
		Be willing

For the general construct 'Learning to innovate', a polarity in the field of technical skills is established. There are two clashes of ideas revealed in the analysis of the interviews, which are:

a) Respondents understand that companies are responsible for the completion of education, because of insufficient qualification possessed by professionals;
b) The companies that complement the education understand the risk of taking the role of training resources to market needs' and

therefore are subject to losing their investment in human capital, which again leads to the question of companies policies ruling this specific case , namely those relating to retention incentives and rewarding.

Results obtained compared to formulated hypotheses

Firstly, it must be pointed out that the formulation of hypotheses is considered necessary due to the choice of an exploratory study. However, the qualitative approach leaves little margin to hypotheses testing. What should be kept in perspective is that the issues raised are consistent with theoretical support that induced the construction of hypotheses, which may forward the analysis in the direction of its validation.

Verification of hypothesis

Hypothesis 1: “the interaction of networks between businesses and customers are essential sources of innovation, as they offer new insights that support achieving and maintaining competitiveness”.

In relation to the first hypothesis – H1 – "results were not conclusive. In the responses obtained, without intervention or induction by the researcher, the issue of inter organizational networks and relationships with consumers as a source of innovation has not been highlighted. Although, the Table 1 has one identification "domain professional field info”, there was no clarity whether this knowledge refers to the business environment or specifically to the area of expertise of the administrator. In more than one analysis group, a term that identifies each table presented, “know the company” to innovate seems to be seen under the internal focus, separated from the knowledge of the market and consumer segments.

Thus, the absence of evidence that confirm the hypothesis leads to believe that the relational competence is not perceived as typical of the business administrator for technology-based companies. As this assumption is contradictory regarding the theoretical review, should be taken into consideration, the formation of the respondents themselves and the enterprise culture towards innovation. Offering therefore opportunity to exploit in future studies, aiming to examine the hypothesis that the career and the role of the administrator, even in technology-based companies, are bounded by the internal environment, thereby affecting the behavior of the administrator to the mechanistic logic of predictability, controllability and reactivity.

Hypothesis 2: "managers at technology-based companies recognize the importance of developing a set of dominant organizational competencies as the key to innovation”.

Still under Table 1, there was a clear indication that the administrator needs to know and abide by the concept of innovation, have ability in the development of culture, supported also in the ability of reasoning and systemic vision, in addition to highlighting the attitude linked to an innovative mentality. In other groups of analysis, described in further tables, these features are also highlighted. Thus, it is understood that the hypothesis 2 was duly confirmed.

Hypothesis 3: "business administrator must have competencies related to essential aspects of managing innovative environments and also susceptible to advances in technology".

More on grounds of the content of the interviews and of general conclusions on the basis of the practice environment of respondents than for the replies to the questionnaires, it was observed that the contents of the Administrator's education does not distinguish innovative environments, or high technology, from environments with traditional processes, or low technology companies. Therefore, companies must complete the education with training, as seen above, with the risk of preparing future managers and other professionals for the market, being this a gap in education and also an opportunity for high education institutions.

In the following topic, will be presented the Business Administrator profile, which supports the understanding that Hypothesis 3 was validated.

Profile of competences to innovate for the business administration professional

The profile built from the expected competencies and attributes revealed by the managers of the companies investigated in this work, so the graduates from courses in Business Administration, may deliver a satisfactory performance as professionals, back up the configuration of a polarization: the profile described tends to contribute to excellence in innovation processes, as the relevance of the role of administrator is recognized as critical factor to the success of the activities on the theme of innovation.

With the list of attributes obtained for this study, the description of the professional profile linked to role of supporting the complex activities involving innovation, boils down to the following:

a) The professional must possess provocative attitudes that encourage continuous improvement of processes, the search for knowledge, even by his own side, being also necessary to act as a communicator of messages, trainer and team integrator, forming basis of reliable data, about the environment and opportunities for the company;

b) The professional must keep an effective management, recognizing the limitation of resources and limited qualification of personnel, seeking to obtain levels of excellence, even though, dealing with resource scarcity and unavailability of the suitable tools to carry out the tasks he and his team are responsible for;
c) The commitment and involvement with the company and its proposed innovations and innovation model should be obvious, but it has no counterpart nor support with material rewards for the individual or for his team, except the possibilities of professional ascension as the company grows.

There is no clear boundary between the profile built and the ideal one currently referenced for hiring an administrative professional to perform related routine tasks in the management of the company. That is to say, a unique profile for the management of low-tech companies is still to be resolved. However, the opinion of interviewed entrepreneurs outlines the profile for such professional as a key position held by someone that is capable of integrating innovation processes in knowledge intensive activities.

Innovation is not a random action and, on that basis, the innovation process is a concept still in consolidation. However, for the surveyed companies, innovation is seen as a concrete element in determining the competitiveness of the company and achieve excellence, being the innovative administrator someone who understands, organizes and disseminates knowledge of the business, thus targeting their success, spurring innovation.

The innovative environment is a prevalent condition in horizontal relationships, being composed of activities that revolve around agreements and not contracts. From the results observed in this study it can be inferred that the resistance of traditional models of hierarchy directly influences the profile revealed by entrepreneurs, by pointing to 'lack of action' of professionals, as this is mainly due to difficulties in the exercise of autonomy.

To be innovative, an environment must undergo a fundamental change in behavior and relationships at work, as a requirement in some degree, for this, at least greater participation in power by innovative employees is necessary. Anyway, granting more autonomy and creating an environment conducive to trade is already in itself an evolutionary change in management. Thus, improving the process of organizational communication represents another element enabling the transfer of knowledge and to foster the sharing of information and knowledge at all levels of the organization.

As categories of analysis, we observed greater emphasis to behavior oriented towards innovation and innovation-oriented structure. Professionals in these categories can be further evaluated by their attitudes and skills, and less for their knowledge on the subject.

In parallel, the tools, systems and innovation environment are additional to everyday routine activities factors, thus needs to be on the list of businesses priorities, the reason for this is because the ability 'to get the most with the least' is a kind of pressure most businesses and administrative professionals have to face as a direct effect of the pressure that the market conditions creates on business relationships.

As far as this is concerned, this proves an inadequate understanding of the impact of innovation on the economic results of companies. However, it is crucial to consider innovation as an activity that affects short, medium and long term planning. A fair understanding of the innovation process means applying to it the same weight as the concepts and procedures that involve efforts dedicated to problem solving and continuous improvement.

Conclusions

Innovation has answers for the creation of sustainable competitive advantage, respecting the boundaries of exploration companies with maximum effort, which will lead to an innovation model, the type of innovation and the quality and comprehension of appropriate approaches. Nevertheless, the implementation of a process of awareness and behavioral change is needed for employees of all levels, different background and skills, and directed towards a set of effectively operationalized through policies, culture of innovation and results, being this set, the core activities of administrative professionals in the innovation process of companies.

This implies that innovation depends on people who can generate and apply their skills and ideas in the business environment, as well as in the society. But in contrast, the data obtained in this research show that the conditions for the performance of qualified and skilled professionals include facing some very common barriers in companies, namely insufficient resources (technical, financial, corporate culture, organizational climate, and lack of high performance teams), those which professionals will have to deal with, and especially, the immature practices of management and control of the innovation process.

In an apparent contradiction, the managers reveal great concern related to the primary sources of professionals, meaning the knowledge given and absorbed at the universities, that according the their opinions are distant from the current reality of companies and their processes. Such a

context makes clear, that at the end, it is as matter of fact, up to the companies the responsibility for a professional formation, so to cover the minimally satisfactory performance of their staff in performing their duties focused on innovation.

The survey also reveals that the more required expertise is also the one less offered by professionals, attitude. Although there is a limitation of the sample exploited for this research, with eight companies, the disclosure of this potential reality is a contribution of this study, which suggests that a larger sample should allow a better exploration of the phenomenon in different industry segments, thereby seeking to increase the amplitude to macro-regions, and other more meaningful economic sectors and geographic areas.

Finally, as a suggestion for future researches to investigate how innovation can be instilled, relates to the imperative provision of methodologies that facilitate forms of language accessible and understandable by the criterion of colloquial simplicity, a common language for all classes of business, teams of key personnel, decision taker and decision makers, graduates from high education institutions within and outside the field of administration.

Another opportunity for future researches concerns the communication and orientation of public policies that foster innovation. Along this research, a low access to information as well as limited understanding regarding the opportunities to seek financial and technical resources from government agencies was observed. The publication of government and government agencies actions to spur innovation should reach more efficiently, companies and institutions so that they can be fully assessed and possibly implemented, becoming an effective and continuous practice, thus permeating the design of strategies and influencing decision-making about investing in innovation efforts.

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