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Da Mota de Pina E Cunha, A.M.; Verhallen, T.M.M.

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Organizational innovation: An overview of topics, models and research directions

Miguel Pina e Cunha
Faculdade de Economia, Universidade Nova de Lisboa
Theo M. M. Verhallen
Tilburg University

Abstract. "Ask a consultant on either side of the Atlantic what the hot topics are in the profession today, and before long innovation will come up. It will sometimes be bracketed with strategy, sometimes with change management". This paper, introducing the thematic issue of Comportamento Organizacional e Gestão about innovation and organizations, aims to scan and reflect the centrality and diversity of perspectives about innovation. It starts with a dissection of the innovation concept, proceeds with a discussion of why is innovation such a "hot topic" for practising managers, academics and consultants. Finally, this article briefly presents and discusses major research topics on innovation, models of innovation, and avenues for future research.

Innovation is a major topic of research in the organizational literature since, at least, the introduction of the concept of technical innovation by Joseph Schumpeter in 1939. After the publication of Schumpeter's influential book, the visibility of the concept increased, and it now constitutes a relevant and wide body of research in the field of organizational science. The recognition of the impact of innovation on organizational results is now so widespread and shared that the concept acquired an intrinsically positive meaning.

From Schumpeter to now, innovation became a central field of research to most subdisciplines of organization studies (marketing, management, organizational behavior, organizational sociology, etc.). According to Wolfe (1994), 6244 journal articles and 1336 dissertations on innovation were published between 1970 and 1994.
novation have been published in the five years preceding his article. This huge volume of information is not, however, as tightly connected as it may seem: as we will discuss in this chapter, the innovation label encompasses a wide variety of topics and approaches to related but loosely coupled organizational phenomena.

This article will be built around several goals, namely the definition of the concept of organizational innovation, the discussion of some current and future areas of research on the topic, and a brief presentation of some well-known models studying organizational innovation.

1. The concept of innovation

It is not enough to speak about innovation when the goal is to be clearly understood by an audience. Innovation is a small label for a wide variety of phenomena. The concept of innovation can include things as diverse as adopting new technological solutions or work processes, launching new products, competing in new markets, establishing new agreements with clients or suppliers, etc.

Defining organizational innovation is not an easy task, considering that the definition must be simultaneously broad enough to encompass the diversity of innovation manifestations that occur in organizations, but so specific that the risk of confusion between this and connected concepts (e.g. change, creativity, invention) is avoided.

In this article, organizational innovation will be conceptualized as the introduction of a new transaction flow between the organization and its environment and/or the adoption of new internal means or ends, in order to increase organizational efficiency and/or effectiveness.

This definition views the organization as buyer, user or producer of innovation. It intends, simultaneously, to differentiate but also to reconcile the contrasting perspectives on the innovation concept that pervade the literature and make it a puzzling research field to a reader unfamiliar with the topic.

In this section, we will try: (1) to analyze the concept of organizational innovation according to the above definition, and (2) to differentiate it from the related but conceptually distinct concepts of change, creativity and invention.

1.1. The multiple meanings of the innovation concept

The concept of organizational innovation is a stimulating but ambiguous topic of analysis. This ambiguity arises from taking some part of the concept for the whole. As discussed, organizational innovation can refer to an organization as a client, user or producer of an innovation.

Each of these conceptual orientations depart from different goals and recommends the following of different theoretical directions. The people and processes involved in a reengineering intervention, in the adoption of a new technology or in the development of a new product, are fundamentally different. They are stimulated by different needs and follow different developmental
paths. The processes involved can be complementary but they are diverse. When a distinction is not made, the concept of innovation can assume quite a different meaning. Table 1, presenting some definitions, aims to illustrate the current diversity (and ambiguity) of the innovation concept in the organizational literature.

**Table 1. Some definitions of innovation**

"We will be employing the rather broad, conventional definition of innovation as the adoption of means or ends that are new to the adopting unit" (Downs & Mohr, 1976, p. 701)

"Innovation within organizations can be viewed as the selection and retention of any variation in behavior which will include variation in products, processes, and organizational characteristics" (Butler, 1981, p. 764)

"An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1983, p. 11)

"Innovation includes all activities directed to changing the things that the organization does or the way it does it" (Handy, 1985, p. 207)

"In an essential sense, innovation concerns the search for, and the discovery of, experimentation, development, imitation, and adoption of new products, new production processes and new organizational set-ups" (Dosi, 1988, p.222)

"Innovation here is defined broadly, to include both improvements in technology and better methods or ways of doing things. It can be manifested in product changes, process changes, new approaches to marketing, new forms of distribution, and new conceptions of scope." (Porter, 1990, p. 45)

"(...) innovation means 'creating and marketing or disseminating something new. That 'something' can be a new product or device, a new service, a new process, a new material, or a new organizational form" (Amara, 1990, p.142)

"(...) innovation may be regarded as a new use of pre-existing possibilities and components. (...) Almost all innovations reflect already existing knowledge, combined in new ways" (Lundvall, 1992, p. 8)

"(...) novel changes are organizational innovations, whereas routine changes are not" (Van de Ven, 1993, p. 270)

"Innovation embodies a new idea that is not consistent with the current concept of the organization's business" (Mezias & Glynn, 1993, p. 78)

"The term organizational innovations covers a wide spectrum of innovations; for example, it can mean innovations in management practices, innovations in administrative processes or innovations in the formal organizational structure" (Alange, Jacobsson & Jarnehammar, 1994, p. 12)

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3 This definition draws heavily on earlier work by Fonseca, Cunha and Gonçalves (1996)
Despite the diversity of definitions, a small set of characteristics is generally attributed to innovation. These characteristics, that will be labelled here as core characteristics of the innovation concept, are briefly presented in Table 2: uncertainty, ubiquity, and cumulativeness.

Table 2. Some core characteristics of the innovation concept

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Uncertainty</strong></td>
<td>Uncertainty is one of the essential characteristics of the innovation process. Innovation is, by definition, an uncertain process, in that the existence of problems or opportunities does not clearly show the best solutions to solve or fulfill them (Dosi, 1988).</td>
</tr>
<tr>
<td><strong>Ubiquity</strong></td>
<td>Innovation is an ubiquitous phenomenon in modern economies (Lundvall, 1992). New products, new processes, and new markets are constantly created in all parts of the economy. It is then possible to consider innovation as a primary component of economic systems, and not as the exogenous, disturbing set of events considered in models of standard economics.</td>
</tr>
<tr>
<td><strong>Cumulativeness</strong></td>
<td>Organizational innovation can be conceived as a cumulative process that evolves incrementally and is based upon the existing technological and knowledge base (Dosi, 1988). The cumulative nature of organizational innovation causes the firm to be constrained by past decisions and practices. The cumulative character of organizational innovation does not mean, however, that innovations necessarily produce continuous outputs; as referred by Schumpeter, the combination of existing possibilities may also generate &quot;creative destruction&quot;.</td>
</tr>
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</table>

The core characteristics presented in Table 2, clarify the nature of the innovation concept, but are not sufficient to differentiate it from other, related concepts. Table 3 briefly distinguishes the concept of innovation from the concepts of change, invention, and creativity.

Table 3. Distinguishing the concept of innovation from related concepts

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Change</strong></td>
<td>Innovation and change are often used as synonyms. However, the return to previously prevailing conditions, being a change, can hardly be considered an innovation (Fonseca, Cunha &amp; Gonçalves, 1996).</td>
</tr>
<tr>
<td><strong>Invention</strong></td>
<td>Invention can be defined as the creation or the discovery of a new idea (Rogers, 1983). According to the definition of innovation presented above, innovations are not the same as inventions, as the adoption of an already existing product or process can be considered as an innovation for the focal organization, but cannot be referred to as the invention of that product or process by the organization. Under certain very specific conditions (e.g. modification of shape or use) it seems appropriate, however, to speak about re-invention.</td>
</tr>
<tr>
<td><strong>Creativity</strong></td>
<td>Organizational creativity refers to some new thing (idea, product, process) created by an individual (or individuals) working in an organization. According to Woodman, Sawyer and Griffin (1993), creativity is part of the broader process of organizational innovation that is itself part of the much broader process of organizational change. The main difference between creativity and innovation refers to the fact that innovation can be result of the adaptation of something that already exists outside and does not involve creative behavior from the part of the organization.</td>
</tr>
</tbody>
</table>
1.2. Why is innovation so important for organizations?

There are, at least, three major factors accounting for the importance of innovation to organizations: innovation can be used to increase economic results, to signal innovativeness and to improve organizational adaptation.

**Economic results**

Superior innovative capacity can bring obvious commercial benefits to a firm. The economic benefits of innovation can be approached from a variety of perspectives and levels of analysis. Innovation can be viewed as a key element for economic growth both at the national and organizational levels of analysis:

1. National level. At the national level, the perspective of national systems of innovation (e.g. Lundvall, 1992) tries to relate a nation's innovation characteristics to its economic results. Innovation can be extremely important for national economies. As pointed out by Amara (1990), economists "estimate that 60-80% of US economic growth per capita may be attributed to a residual, undefined factor traceable to innovation or technology" (p. 142).

2. Organizational level. Organizational innovation, if successful, may have a tremendous impact on the economic results of a company. Nayak (1991), for example, illustrated the importance of product innovation for the increase of a company's profits, showing that the management of the product portfolio is of fundamental importance for the competitiveness of the firm. Utterback (1994) showed how process innovation must also be managed to assure long-term competitiveness.

**Fads and fashions**

The pro-innovation bias affecting the innovation literature, tacitly suggests that adoption/diffusion benefits adopters/diffusers. The assumption that innovations are good for organizations adopting them, can serve as a justification for the pro-innovation bias (Kimberly, 1981). This widespread positive attitude towards innovation, stimulates companies to scan the environment in search of opportunities for innovation. As remarked by Abrahamsen (1991, p.587), this assumption led scholars to examine the wrong question (What affects diffusion rates?) instead of the right question (When and by what processes are technically inefficient innovations diffused or efficient innovations rejected?).

According to Abrahamsen (1991), fads or fashions can harm organizations because of two main reasons: (1) they can stimulate organizations to adopt inefficient but fashionable innovations; (2) they can prevent organizations for adopting efficient but less popular innovations. The growing amount of information concerning bright, well-packaged management tools, can work as a stimu-
lus for their generalized adoption, regardless of adequacy and applicability. Management fads like business reengineering, T-groups, downsizing, matrix structures or quality circles, have been frequently adopted by organizations not necessarily because they were the best solutions available to their problems, but because they were trendy and well disseminated by business schools, consulting firms and business mass media. As pointed out by Abrahamson (1991), innovations can be adopted to signal organizational innovativeness and not necessarily to improve economic performance. It is worth noting, however, that fads and fashions can play a beneficial role: the adoption of a faddish innovation may make the organization look as innovative, and this image, in turn, can help the firm to attract customers, capital, and legitimacy.

The analysis of the influence of fads and fashions in organizational innovation, shows that innovation adoption can be a consequence of organizational imitation and not a process guided by the efficient choice perspective. This can be especially true under conditions of uncertainty, where organizations base their decisions on the decisions of their competitors. Institutional theory provides a useful framework for analyzing the imitative behavior of organizations (e.g. Di Maggio & Powell, 1983).

Organizational adaptation

Innovation is a fundamental mechanism for organizational adaptation and renewal. The dynamic nature of competitive environments, makes innovation a necessary condition for organizational survival in the long run. Organizations must evolve in order to maintain a state of fit with the environment, being this evolutionary process partly accomplished through innovation.

Innovation, thus, is a primary form of organizational adaptation: strategic, technological or product innovation, are some of the possible forms by which organizations strive to adapt to the environmental contingencies they face. The assumption that innovation is an important adaptive mechanism is well expressed in the general acceptance that innovation and change represent paths of organizational survival, with their absence leading companies to rigidity, stagnation and eventually to removal.

Several external forces that are propelling organizational innovation may be considered. These driving forces (listed in Table 4) act interdependently and contribute for making environmental scanning a complex but critical activity.

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4 This perspective, as explained by Rogers (1983), states that innovations are adopted by independent and rational adopters following technical efficiency goals. The efficient-choice perspective relies on two assumptions (March, 1978; Abrahamson, 1991): (1) organizations are free and independent to decide to adopt or not to adopt an innovation; and (2) they are certain about their goals and about how to attain them.
Table 4. Some external forces driving organizational innovation

**Technological development.** Technological development is a precursor of organizational innovation in the sense that it can induce changes on the activities of design, manufacturing, marketing and distribution. Technological development can create new industries or provoke the strategic reorientation of the existing ones (Porter, 1990).

**Deregulation.** Changes in governmental regulation open up new areas for competition while devaluing others. Changes on regulations concerning for example product characteristics, environmental protection, and barriers to entry, all can create new business areas while eliminating others.

**Globalization.** Markets and industries are becoming global. This process of globalization assumes a great variety of forms and expressions and is changing the face of business (see Grupo de Lisboa, 1994). Products "made in the world" are becoming more and more common. This worldwide competition is a powerful stimulus for increasing the search for innovation.

**Shortening of innovation cycles.** Knowledge of new products and processes diffuses faster than ever before. As a result, competitive advantage is more transitory and innovation cycles must be compressed (Amara, 1990). Speed is becoming an increasingly central variable to organizational innovation (Kessler & Chakrabarti, 1995).

**New buyer needs.** Consumers have shifting needs that must be satisfied by new products or services. Societal changes create needs that work as a permanent source of opportunities for innovation. Because product characteristics can be a source of competitive advantage, companies are pressured to continuously develop new products (Clark & Fujimoto, 1991).

Given the competitive scenario arising from the drivers presented in Table 4, innovation is now being viewed, not simply as a strategic option, but as an organizational tool of instrumental value for survival (Delbecq, 1994).

### 2. Major research topics on organizational innovation

The widespread interest of academics and practising managers for the topic of innovation is a direct consequence of the social salience of innovation. Entrepreneurs, as well as politicians, journalists, and scientists, tend to advocate its practice throughout the society.

Limiting our interest to the domain of organizational science, and based on the reviews of Kimberly (1981), Daft (1982), Kanter (1983, 1988), Frost and Egri (1991), and Utterback (1994), it is possible to present a brief overview of the major lines of research on organizational innovation at the conceptual, individual, group, organizational, and ecological levels of analysis.
3. Concept

At the conceptual level, the main research issues to consider are: (1) the identification of the stages comprising the innovation process, and (2) the categorization of innovations.

3.1. Stages of the innovation process

The identification of stages of the innovation process is a well documented topic in the marketing and management literatures. Pierce and Delbecq (1977) consider the existence of three stages: (1) initiation, (2) adoption, and (3) implementation. Rogers (1983) divides the process in the (1) invention, (2) development, and (3) adoption/diffusion stages. Kanter (1988) speaks of (1) idea generation, (2) coalition building, (3) idea realization, and (4) transfer or diffusion. Kimberly (1981) conceptualizes the innovation life cycle as being comprised of the (1) adoption, (2) utilization, and (3) exnovation phases (by exnovation the author refers to the disposal of a previously adopted innovation). As the above approaches made clear, there is an implicit general agreement about the underlying structure of the innovation process. Building on previous analyses, the innovation process can be described as being comprised of three main stages (see Figure 1):

(1) Initial phase: at this stage, an opportunity for innovation is recognized and appreciated by the organization (Van de Ven, 1986). There are many possible sources of innovative ideas. As stated by Damanpour (1987), innovations can be internally generated, borrowed from outside the organizational population, or copied from other organizations in the same industry. No matter its degree of newness "to the world", innovations are considered as such when they are new to the adopting organization. According to this point of view, a "me too" product can be considered an innovation by the organization adopting it.

(2) Intermediate phase: after detecting an opportunity for innovation, companies must turn the opportunity into an innovation, transforming the initial idea into a new thing or a new way of doing things. This second phase is crossed by political activity, and is completed when the idea turns into something real (a product, a process).

(3) Final phase: this third and last moment in the innovation process, represents the culmination of the innovative activity. During this stage, new products/processes are commercialized or implemented, i.e. diffused across the organization or the society. Diffusion refers to spreading the innovation in a population of potential adopters. As noted by several marketing researchers, two factors seem to be of special importance in this stage: the attributes of the innovation, and the communicative process (Jacoby, 1976; Czepiel, 1974).

Figure 1. The three phases of organizational innovation

<table>
<thead>
<tr>
<th>Initial phase</th>
<th>Intermediate phase(s)</th>
<th>Final phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pierce and Delbecq</td>
<td>Initiation→</td>
<td>Adoption→</td>
</tr>
<tr>
<td>Rogers</td>
<td>Invention→</td>
<td>Development→</td>
</tr>
<tr>
<td>Kanter</td>
<td>Idea generation→</td>
<td>Coalition building→</td>
</tr>
<tr>
<td>Kimberly</td>
<td>Adoption→</td>
<td>Utilization→</td>
</tr>
</tbody>
</table>

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4.1. Categorization of innovations

Innovations have typically been characterized as divided in the process/product, administrative/technological, and radical/incremental types. Other categorizations, however, suggest diverse approaches to the issue:

1. Current classifications divide innovations in product and process types (e.g. Abernathy & Utterback, 1988). Daft (1983), however, suggests that innovations can be included in the technological, product, administrative, and human categories. Damanpour (1987), in turn, considers technological, administrative, and ancillary innovations.

2. Another well known classification of innovations tends to settle innovations in the radical and incremental categories. Radical innovations are those that introduce discontinuous change in the adopter's functioning, establishing a new dominant design for a product/process. This new dominant design can shake the foundations of the industrial structure: established firms that are not able to accommodate to emergent conditions are removed from the population (Hannan & Freeman, 1984), while other firms, equipped with the capabilities required by the novel environmental conditions, start a period of dominance. Incremental innovations are those that refine/enlarge the dominant product/process, while not threatening its existence. The minor changes introduced by incremental innovations are not enough to threaten the status quo in an industry's structure. On the contrary, it usually contributes to the reinforcement of the industry's structural characteristics (Dewar & Dutton, 1986; Tushman & Anderson, 1986). A refinement of this classification has been proposed by Henderson and Clark (1990), which introduces two new categories to those previously considered: modular innovation, and architectural innovation. These new conceptual innovation types emerge from the empirical observation of the incompleteness of the radical-incremental classification, and from the study of innovations along two dimensions, which are the core concepts (reinforced/overturned) and the linkages between core concepts and components (unchanged/changed). Of central importance for this classification, are the concepts of component knowledge, which refers to each of the "configurations of pieces" that are incorporated in the product, and architectural knowledge, related to the way the components (or pieces) are linked and integrated into a coherent whole. A component is defined by Henderson and Clark as "a physically distinct portion of the product that embodies a core design concept and performs a well-defined function" (1990, p. 11). A configuration of components gives birth to a certain product architecture.

Table 5. Types of innovation (Henderson & Clark, 1990, p.12)

<table>
<thead>
<tr>
<th></th>
<th>reinforced</th>
<th>overturned</th>
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<tr>
<td>unchanged</td>
<td>incremental</td>
<td>modular</td>
</tr>
<tr>
<td>changed</td>
<td>architectural</td>
<td>radical</td>
</tr>
</tbody>
</table>
As we have referred above, in the matrix developed by Henderson and Clark (1990) the radical and incremental types of innovation are at the extremes of a continuum completed by two other types of innovation. In the paragraphs that follow, the several innovation types will be briefly described.

1. **Radical innovations** are those characterized by significant changes both in the core concepts employed, and on the way these concepts are structured. Radical innovations include significant changes in the parts and in the architecture of the whole.

2. **Incremental innovations** presume the maintenance of the core elements, as well as of the structure that links those elements. Improvement occurs at the level of the individual components but not at the level of core design concepts. It does not also involve the restructuring of the whole architecture.

3. **Modular innovations** change the core design of the components, but allow the maintenance of the previous architecture. Henderson and Clark provide an example that helps to understand this type of innovation: the replacement of analogue by digital telephones, let the product architecture unchanged, while changing the components.

4. **Architectural innovations** change a product's architecture, but leave the components and their links untouched. The core design of the product remains the same (even if there could be some changes in individual components, like size), but the architecture is significantly altered. The portable, transistorized radio receiver developed by Sony, represents an architectural innovation developed with existing technology (Henderson & Clark, 1990): the core concepts are the same, but their architecture is different enough to cause a significant quake in the market. Using the language of the science of complexity (e.g. Stacey, 1995), minor causes can lead to major effects. This type of innovation destroys the architectural knowledge of an organization, but, because of its "smallness", it is hard for competitors to detect and difficult to counter. Consequently, their implications can be overwhelming in the long run, maybe eroding some organization's competitive advantage until destruction.

It is important to note that recent models are approaching the typology of radical to incremental innovations in a dynamic way, which suggests that these categories are not in opposition, but that they can be used as complementary courses of action to face market demands. According to these models (e.g. Abernathy & Utterback, 1988) major product innovations are usually followed by countless minor innovations (or improvements, as they are often called). The incremental innovations/improvements, are often responsible for more than half of an organization's economic gains, because they are abundantly spread across the organization. This pattern of incremental change, once achieved, is not easy to match with further introduction of radical innovations: radical innovations are threats to the economies of efficiency obtained from continuous product/process improvement.
4. Level of innovation

Individual level

At this level, research is mainly trying to identify the characteristics of those individuals that play a special role – often a crucial one – in the process of innovation. They have received different names but their relevance in the innovative process is usually recognized. They can be known as product champions (Peters & Waterman, 1982), prime movers (Kanter, 1983) or intrapreneurs (Hisrich, 1990), and are important actors in the process of organizational innovation. Personal values, work history, childhood family environment, and motivational patterns, are among the variables considered at the individual level.

Group level

How do small groups deal with innovation? How do they overcome resistance to change in some occasions, and create pressures for conformity in other occasions? Small group research presents group dynamics as a powerful force that is triggered to increase innovation, but that sometimes harms it. Groups act as micro-contexts for innovation, providing the social support needed to energize the search for innovation. The case of the Eagle Group (at Data General), popularized by Tracy Kidder in his Pulitzer awarded book The soul of a new machine, is a good example of how group dynamics can work for innovation (for a discussion, see Bolman & Deal, 1991). In the opposite side, are the results presented by Katz (1982): according to the author, the recommended longevity for R&D teams is between two and five years: it takes two years to have a "good team", but after five years the group starts loosing its qualities and becomes affected by staleness. The importance of multifunctional, multidisciplinary teams to innovation was highlighted, among others, by Dussauge et al. (1987) who considered teamwork as a key factor to the successful development of new products.

Organizational level

At the organizational level, researchers have tried to identify the structures, processes, and contextual variables relevant to the adoption and implementation of innovations.

Some kinds of structural configurations allow or stimulate innovation more easily than others. Organic, integrative or adhocratic forms are facilitators of innovation, while mechanistic, segmentalist or bureaucratic firms tend to inhibit innovation (Burns & Stalker, 1961; Kanter, 1983; Mintzberg, 1979).

In terms of the relationship between organizational processes and innovation, researchers are mainly interested in the study of the information flow across the organization, and its consequences for the innovative activity developed inside the firm. The consequences of isolation/gate-
keeping, and the free-flowing of information across the organization have been addressed in the innovation literature (e.g. Ebadi & Utterback, 1984; Tushman, 1977; Hauschildt, 1992). The influence of power-holders on the process of innovation, and especially in the decision making process that leads to implementation/rejection of an innovation, is also a major research topic of (Kanter, 1988; Frost & Egri, 1990).

Contextual variables include the characteristics of the organizational environment, the degree of consumer sophistication, and the nature and development of product life cycles (Strebel, 1987; Porter, 1980; Moore & Tushman, 1977). Competitive and dynamic industries, plenty of outstanding competitors and sophisticated buyers, are a significant stimulus for innovation and improvement of products and processes (Porter, 1990). Dynamic industries force organizations to move from occasional innovations to a regular flow of new products. The accelerating rate of product life cycles may also work as a major source of organizational innovation.

**Ecological level**

At the ecological level, most research focused the diffusion of innovations across industries. Rogers (1983), Van de Ven (1993), and Utterback (1994), made important contributions to knowledge on the diffusion process. Innovation feeds innovation that breeds competition. This permanent search for new products and processes, tends to result, from time to time, in innovations radical enough to destroy the whole competitive equilibrium of a population. After radical new products have been introduced in the market, the former industry leaders are frequently removed and substituted by early adopters of the radical innovation (Utterback, 1994). The outstanding effects of radical innovations are the main cause of the lasting interest of academics on breakthrough innovations. During the last years, however, a growing number of scholars are documenting the need for an interplay between radical and incremental innovations all along the product cycle, as well as between process and product innovations (e.g. Tushman & Anderson, 1986, Utterback, 1994). Utterback (1994) suggests that radical product innovations tend to precede incremental process innovations. According to the author, after spreading a radical innovation throughout the market, companies increase product capabilities and try to obtain higher levels of efficiency. Even when faced with another cycle of innovation and threatened by a radical innovation, established companies are not easily able nor willing to adapt to the radical change. Instead, they may respond with a new wave of incremental innovation.

The dynamics of interaction between radical/incremental and product/process innovation stands for future research. Research results like those obtained by Utterback (1994), Abernathy and Utterback (1988), and Ettlie, Bridges and O'Keefe (1984), among other authors, provide evidence for the need to build multilevel and longitudinal as well as cross-sectional research designs, able to illustrate the interplay between organizational and ecological dynamics of innovation.

The points discussed above represent some of the dominant lines of inquiry in the field of innovation. In the section that follows, some models of organizational innovation will be presented.
and discussed. This will serve as a guide for understanding the diversity of approaches available to study organizational innovation. These models will provide an overview of the innovation research landscape.

5. Models of organizational innovation

Many classic textbooks on social science have addressed the importance of innovation for organizations. At the origin of those attempts to understand the reasons that make some organizations more innovative than others, are the growing demands arising from more and more dynamic organizational environments. In this section some of these models will be briefly reviewed. For the purpose of theoretical clarification, the models have been divided in four broad categories:

1. Idiosyncratic
2. Strategic/structural
3. Decision, and
4. Diffusion/adoption models.

The main characteristics of each model are presented in Table 6, at the end of the section.

5.1. Idiosyncratic models

Idiosyncratic models are those that approach the study of innovation from the perspective of the individuals involved. Individual creativity tends to be viewed as a fundamental input to the process, and innovators seen as the fundamental agents and drivers of innovation. According to this perspective, the understanding of innovation depends on the understanding of innovators.

An evolutionary model of creativity (Campbell, 1960)

Campbell applied a Darwinian frame of reference to the study of creativity and innovation at the micro (individual) level, and proposed an evolutionary model, which presents creativity as a result of variation and selection mechanisms.

According to this evolutionary model, creative solutions are a result of the generation of multiple answers to each of the problems the organization is confronted with. Trial and error learning stimulate innovative ideas that approach, in a more or lesser degree, the problems that stimulated those solutions to arise. Better ideas are retained while worst solutions are eliminated. The selection of alternatives is a function of the skills and backgrounds of the people involved in the selection process.
Campbell's (1960) model confronts organizations with the need to encourage diversity and critical capacity, but lacks precise information about the "ideal" amounts of diversity and selectivity. In fact, the exponential growth of diversity and selectivity did not necessarily lead to more and better creative solutions: the focus on quantity may encourage a large number of not well developed solutions, while the potency of selective mechanisms may eliminate potentially valuable solutions in a premature development phase.

Practical implications provided by the model suggest that organizations are more creative when they achieve maximum degrees of variation and retention. Excessive criticism as well as high levels of conformity can account for diminished creative capacity.

Componential model (Amabile, 1988)

The componential model presented by Amabile departs from the analysis of the disposition- al and situational factors that explain individual and organizational creativity and innovation. Amabile divides the process of individual creativity in five successive stages that transform an idea/problem into an innovation: task presentation, preparation, idea generation, idea validation, and outcome assessment.

The evolution of this five-stage model is dependent upon the use of three individual components: individual motivation to accomplish the task, individual skills to do the task, and individual creative skills.

Amabile's model tries to integrate the processes of individual creativity and organizational innovation and appears, consequently, as a rare macro-micro approach. It suggests that one of the ways to enhance organizational innovativeness is through the selection of intrinsically motivated employees: these people are more prone to ignite the creative cycle and to produce more innovations, unless the organization fails in managing the maintenance of high levels of intrinsic motivation.

Evolutionary model of creativity and innovation (Staw, 1990)

In his evolutionary model – that draws heavily on the models of Campbell, Amabile, and Kanter – Barry Staw views the innovative cycle as divided in a series of stages evolving in order to provide the organization with mechanisms of variation and selection that can help it to adopt the innovations best fitted to the market. Staw's perspective can be taken as an extension to the macro level of the assumptions made by Campbell regarding the micro level. Two general mechanisms (variation and selective retention) comprise a set of five phases (problem presentation, idea generation, coalition building, project development, and implementation/production), that require the.
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presence of four determinants of innovative action (motivation to innovate, organizational conditions favoring innovation, protection from domain-relevant practices, and enforcement of domain relevant practices).

As noted by the author, the evolutionary model works as a "funnelling process" (p. 305), filtering quantities of input information that largely exceed the resulting innovative output. This selective process submits new products or processes to high (internal) market pressures, with the organizational environment acting as an analogue of the wider organizational environment surrounding the organization. Internal selective processes isomorphic to a certain degree to those occurring in the market, can be valuable tools to help the company in establishing a successful new product and process development policy.

Of course, these selective processes can never ensure a complete isomorphism between the organization and its environment, nor an "objective" selection of the innovations under analysis. Empirical evidence suggests that people can get committed to losing projects (e.g. Ross & Staw, 1986), and that product champions, in particular, do not easily break the psychological bonds that connect them to the projects they have fought for. That is why product champions can become "escalation-champions" when they become overattached to the wrong innovation. To avoid this problem, people should be committed to problems, not to projects (Staw, 1990): it is easy to start looking at the same problem from a different angle, than abandoning a personal project, because the first behavior shows flexibility and open-mindness, while the later is perceived as a symptom of personal failure.

5.2. Strategic/structural models

Strategic/structural models tend to consider innovation as a context-dependent process, one that can be potentially facilitated but also constrained by the organizational strategy and structure framing the innovative process.

The organic perspective (Burns & Stalker, 1961)

In their study of 20 British firms operating in the electronics and fiber industries, Burns and Stalker have found that a particular type of organization, labelled "organic", outperformed on a systematic basis the mechanistic type's capacity to innovate.

Mechanistic organizations are characterized by formalization, job specialization, hierarchy, and vertical (top down) communication. On the other extreme, organic firms favored commitment instead of loyalty and obedience, stimulate lateral and bottom up communication, value responsibility more than job description, and view hierarchical superiors as performing roles closer to coaches than to bosses.
The valuable managerial consequences of the organic type organization, have to do with the capacity to stimulate and accept new ideas, to promote crossfertilization between departments, to decentralize decisions, and to substitute control by commitment. Some of the key features of the organic type company are still being pursued by today's organizations: participation, responsibility, and commitment are current techniques for the management of organizational behavior. Organic solutions are being implemented in many organizations, in order to allow them to make faster responses to environmental changes.

The dual core perspective (Daft, 1978)

According to Daft's empirical evidence, technical and administrative innovations follow different paths inside organizations. This observation follows from a theoretical framework which postulates that organizations develop dual cores: an administrative core and a technical core. Both cores, acting as integrated subsystems, are of fundamental importance to organizations, even if differentiation forces (Lawrence & Lorsch, 1967) led them to set particular goals, to hire particular people and resources, etc.

The administrative core sets the functioning of the structure and coordination activities, while the technical core serves to transform inputs. Mechanistic structures use to develop when the organization is dominated by the urge to introduce administrative innovations. These structures usually demand top-down implementation processes. Organic structures, on the contrary, tend to occur when there is a high need to implement technical innovations. The implementation of technical innovations is a bottom-up process, with ideas originating at the bottom of the organization and coming up to the top.

The dual core model can be considered as an extension of the Burns and Stalker (1961) typology, and it clearly illustrates the reasons why the referred typology did not lead to an organizational one best way: if organizations have to primarily introduce administrative innovations, they should implement a mechanistic type structure; when they fundamentally pursue technical innovations, then they should look for an organic structure.

The strategic determinant (Miles & Snow, 1978)

The strategy adopted by an organization is a powerful determinant of its willingness and capacity to innovate: this is one of the main conclusions of Miles and Snow's strategic typology regarding organizational innovation.

According to the authors, organizations must solve their adaptive cycle by congruently aligning three internal problems: the entrepreneurial problem, the administrative problem, and the engineering problem.
Different approaches to these problems originate different strategic configurations: prospectors, defenders, analyzers, and reactors. Each of these strategic types leads organizations to the development of different attitudes towards the marketplace, namely in terms of how they feel the need to innovate in order to satisfy customer needs.

Different strategies and market approaches consequently result in distinct innovative profiles. According to the idea of equifinality (presented by Katz & Kahn [1978] as one of the characteristics of organizational systems), none of the viable (i.e. proactive) strategic types (all types but reactors) is better than the others. They all can lead to positive outcomes, which means that one best way solutions will not be found in the study of organizational innovativeness.

The integrative approach (Kanter, 1988)

Organizations tend to develop and reinforce consensual agreement, creating "managerial paradigms" that are usually adopted by workers (Pfeffer, 1981). These paradigms, once established, do not easily stimulate creative and innovative solutions, because they are mainly oriented towards the preservation of the status quo. As a consequence, and considering that innovations do not usually arise from daily administrative procedures (Scott, 1987), organizations need to find alternative solutions to improve innovation.

Opposed to the segmentalist, bureaucratized, business-as-usual organization, Kanter (1983, 1988) presents an integrative mode of organizing: integrative companies create a fertile ground for innovations to blossom, because, among other things, they favor "looser boundaries, crosscutting access, flexible assignments, open communication, and use of multidisciplinary teams" (Kanter, 1988, p.178). All these organizational properties work as an internal market for new ideas, that must be "sold" to internal sponsors, in order to achieve subsequent adoption by the company.

Kanter's model is one of the well known approaches to organizational innovation, possibly because it studies the innovative process from the perspective of the human agents (the change masters) operating in a complex structural and political context and fighting for the survival of their ideas in organizational environments that may constitute either benign or hostile habitats for intrapreneurs' ideas.

The major practical lesson arising from Kanter's work, have to do with the uncovering of the weaknesses associated with the bureaucratic type, for the improvement of quality and quantity of organizational innovation. New ways of organizing and managing are required if large, segmentalist companies are looking for more innovative outputs.

5.3. Decision models

Decisional models analyze innovations as decision processes involving individuals in specific organizational contexts. According to these models, individuals engaged in the innovation process
carry with them personal and functional goals, that are only loosely-coupled with organizational goals. As a consequence, these models describe innovation decisions as politically and rationally bounded cognitive and structural processes, that need to be addressed from a decision-making perspective.

**Garbage can model (Cohen, March & Olsen, 1972)**

In contrast with dominant models of decision-making in organizations, Cohen, March, and Olsen disconnect problems, solutions, choice opportunities, and participants, and assert that the process of organizational decision making does not actually follow a pre-determined, rigid, and rational sequence of events. As pointed out by the authors, the core elements of a decision-making process combine in a more or less independent way. Accordingly, "one can view a choice opportunity as a garbage can, into which various kinds of problems and solutions are dumped" (1972, p.3). This model seems to be a realistic framework for approaching organizational activities that involve high levels of uncertainty, as is the case of innovation decisions.

In order to understand the model, it seems useful to characterize the streams of events involved in organizational choices:

1. **Problems** arise both from the need to improve internal processes (in order to achieve higher levels of efficiency) and to promote better fit with external demands (which presumably leads to higher levels of effectiveness). Problems are expected to trigger the decisional sequence, in response to performance gaps, but they can only be scanned when a solution is available, i.e. without the solution, the problem may not be considered as such.

2. **Solutions** are ideas available to implementation. Usually they are looked for when a problem is discovered, but they can also be answers "actively looking for a question" (p.3). As a consequence, solutions can detect problems, even if the reverse is expected to be the "normal" path to occur. Innovations are often solutions looking for needs to fill in. Independent ideas (ideas not directly attached to actual organizational problems), existing in the minds of individuals (for example under the form of pet projects), are solutions looking for problems and not the other way around.

3. **Participants** are particularly bond to those problems and solutions that they use to carry with them, when moving from one choice to the next. Participants are the members of innovation teams. They have to attach problems and solutions to the choice opportunities in which they are engaged, in order for the innovation process to proceed. This process can be viewed as a mix of goal-orientation and goal interpretation (Weick, 1993a), achieved more by negotiation, learning, sensemaking and trial-and-error, than by a pre-programmed and rational way.

4. **Choice opportunities** are those occasions that demand people to make a decision. These opportunities can be triggered both by problems and solutions, and require a formal response from organizations. Companies are continuously engaged in occasions that demand choices.
The (un)structured decisions model (Mintzberg, Raisingham & Théorét, 1976)

The model provided by Mintzberg, Raisinghani and Théorét, develops a theoretical approach to the structure of the decision process, which can be an helpful instrument to the study of innovation decisions in organizations. Initially conceived to apply for the study of strategic planning, the model can be easily transferred to the study of innovation.

By definition, innovation decisions are unstructured decisions or, in other words, those decisions "that have not been encountered in quite the same form and for which no predetermined and explicit set of ordered responses exist in an organization" (Mintzberg et al., 1976, p.246). Or, metaphorically speaking, an innovation can be described as "a leap into the unknown" (Van de Ven, 1993, p.291), which reinforces its "unstructured" nature.

Normative models of decision-making can be developed to explain and guide the innovation decision process, but the nature of innovation avoids the possibility of developing innovations across a very clear pattern of steps that starts with idea generation and finishes with innovation diffusion.

The model of (un)structured decisions (a descriptive one), considers the existence of 12 decisional steps that may or may not be followed all along a decision process. These 12 steps can be factored in 3 central phases, 3 sets of supporting routines, and 6 sets of dynamic factors. The diverse combinations between these elements and phases are at the origin of 7 emerging types of decisional path configurations.

The Mintzberg et al. model provides a relevant framework for the study of innovation, because it highlights some of the actual (not prescribed or normative) facets of the innovation process in organizational contexts. According to this model, the well known phases of prescriptive approaches should be substituted by decisional models crossed by interference, political activity, and an irregular (although structured) process in progress.

The first condition to help people improve the quality of their decisions, is to know how they actually decide. The comparison between successful and unsuccessful innovation decisions, as well as the search for the possible cognitive, social, and political structures underlying decision processes, will be of significant value for increasing our comprehension of innovation in organizations.

5.4. Diffusion/adoption models

The diffusion/adoption models probably constitute one of the more prominent areas of study of organizational innovation. As stated by Rogers (1983), there is not, perhaps, any other area in the social sciences that has received so much attention as the study of the stages of diffusion and adoption of innovations.

Particularly well-known is Rogers's (1983) model of the process stages in innovation. According to Van de Ven (1993), this model is usually considered the most widely shared among...
both academics and practitioners. The same author (Van de Ven, 1993), however, notes that despite the robustness of Rogers's model in explaining the innovative behavior of individuals, it is not equally useful for the study of innovation adoption/diffusion by organizations. In this section, the basic features of the model presented by Everett Rogers will be briefly reviewed, and the criticisms and suggestions advanced by Van de Ven discussed.

**Stages in the innovation process (Rogers, 1983)**

Rogers presented a classical model of the various stages of the innovation process. According to the author, the process of innovation extends over time and through a sequence of three basic stages, starting with an idea, continuing with the development of such an idea, and ending with the diffusion to/adoption by, its potential users.

This developmental sequence has virtually pervaded the subsequent analysis of the innovation process. The basic elements of the innovative activity are the following:

1. **Idea generation.** An idea can result both from the detection of some kind of need or problem at the user level, or from a research effort of the diffusing organization. This idea, in turn, leads to the development phase.

2. **Development phase.** In this phase, the idea is designed according to the needs and expectations of potential adopters, resulting in a new product or process that will help them satisfy the detected or implicit needs that are at the origin of the innovation process.

3. **Diffusion/adoption.** Once completed, the new idea will be diffused and maybe adopted by those for whom the project has been developed. A large amount of research on the innovation process focused this third stage, and particularly the subphases of marketing, disseminating and transferring the innovation to users. As noted by Van de Ven (1993), less research has turned to the implementation of the innovation by its adopters. Such a comment is congruent with the remark made by Pfeffer (1992), about the gap between attention directed toward the decision to adopt and actual implementation of innovations by organizations: many innovations are adopted but, because of internal contingencies of diverse types (e.g. intraorganizational distribution of power, existing structure, management and leadership styles, compatibility with previous work processes, etc.) they are not actually implemented.

The diffusion stage involves marketing and distributing/promoting an innovation, with the goal of making potential adopters aware of the innovation's existence. After this moment, the adoption stage will be triggered if the client has been persuaded about the expected utility of this alternative for its own sake. Persuaded adopters are prone to make a cognitive evaluation of the innovation. If it is compatible with prior expectations, and viewed as a potentially good solution to some organizational problem, the innovation will be submitted to a trial. In case of potentially positive outcomes, the innovation will be used and, consequently, institutionalized. If the results obtained perform negatively or under expectation, the innovation will be rejected and terminated.
Departing from Rogers's model, Van de Ven achieved conclusions similar to those obtained in fields related to innovation, namely those obtained by Mintzberg et al. (1976) in the area of decision making: the actual process of organizational innovation does not conform to the linear sequence of phases presented by Rogers.

The empirical research conducted by Van de Ven and his associates in the Minnesota Innovation Research Program (MIRP), showed a messier and complex progression of elements over time. The combination between those elements is not as linear or predictable as considered by Rogers; the process is performed by a variety of actors whose interests and behaviors are sometimes loosely coupled. As stated by the author, the process of innovation-in-progress triggers innovative activities pursued by numerous actors, and demands different, although presumably interdependent, paths of activities. Contextualized approaches to organizational innovation show a complex path, made of several intertwined components that, under current research, tend to become artificially isolated and retrospectively articulated. Innovation is a technical as well as a cognitive, social, political, structural and economic process. The contextualization of innovation, requires the analysis of this amalgam of components in an integrative perspective, that appears as less "lean and clean" but that is probably a more realistic and adequate description of what actually happens in organizations.

This picture of the innovation process is quite different from that proposed by Rogers. Van de Ven argues that Rogers's model is able to explain individual innovation but not organizational innovation. The explanation for this proposition lies in the complex, political, and interdependent nature of organizations, whose activities hardly conform to the rational and orderly patterns anticipated by Rogers's model.

Based on the concepts of momentum and quantum (Miller & Friesen, 1980), one alternative explanation can be advanced: Rogers's linear model may easily apply to incremental than to radical innovations. Incremental innovations are not so visible and thus can be "quietly" developed, while Van de Ven's model best fits the development of radical innovations. This comment does not intend to deny the political nature of incremental innovations nor the setbacks and interrupts that constrain it, but to propose that their lower visibility and significance may not be stimulating enough to convince those not directly related to it, to erode their power bases in such a process.

Consequently, incremental innovations do no threat organizational momentum, while radical innovations can lead the organization to a state of quantum change. In a state of quantum, the "shocks" referred by Van de Ven (1993, p. 275) are more willing to exist and to have repercussions all over the company.

Van de Ven’s major contribution is consequently related to the more realistic – although less elegant – conceptualization of organizational innovation as an emerging process (Schroeder, Van de Ven, Scudder & Polley, 1986).
<table>
<thead>
<tr>
<th>Model</th>
<th>Author(s)</th>
<th>Type</th>
<th>Main assumption</th>
<th>Managerial implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolutionary</td>
<td>Campbell (1960)</td>
<td>Idiosyncratic</td>
<td>Creativity results from combining high variety and high selectivity</td>
<td>Avoidance of conformity and early criticisms, development of selective mechanisms</td>
</tr>
<tr>
<td>Componential</td>
<td>Amabile (1988)</td>
<td>Idiosyncratic</td>
<td>Creative problem solving as a function of skills and motivation</td>
<td>Manage motivation (especially intrinsic), enlarge people’s skills</td>
</tr>
<tr>
<td>Evolutionary</td>
<td>Staw (1990)</td>
<td>Idiosyncratic</td>
<td>Innovation management should be made through a funnelling process, with a high amount of input and successive increasing constraints</td>
<td>Build commitment to problems not to projects, apply universal performance standards for project evaluation</td>
</tr>
<tr>
<td>Organic</td>
<td>Burns &amp; Stalker (1961)</td>
<td>Strategic/structural</td>
<td>Organizations pursuing innovation should adopt organic structures</td>
<td>Stimulate commitment instead of obedience, favor lateral and bottom up communication, value initiative instead of conformity</td>
</tr>
<tr>
<td>Dual core</td>
<td>Daft (1978)</td>
<td>Strategic/structural</td>
<td>Technical and administrative innovations follow different paths. Organizations, then, should develop two cores to manage these two paths</td>
<td>Mechanistic type structures are best suited to organizations that primarily introduce administrative innovations, while organic structures are best suited to technologically innovative firms</td>
</tr>
<tr>
<td>Strategic determinant</td>
<td>Miles &amp; Snow (1978)</td>
<td>Strategic/structural</td>
<td>Different ways of approaching the entrepreneurial, administrative, and technological problems, results in four different strategic types</td>
<td>Adopt a configurational approach to solve organizational problems, so that a consistent, proactive approach, may emerge</td>
</tr>
<tr>
<td>Integrative</td>
<td>Kanter (1983)</td>
<td>Strategic/structural</td>
<td>Individuals are potential generators of innovation in systems designed to reduce variation</td>
<td>Design structures that facilitate the creative contribution of individuals, i.e. nurture potential change masters</td>
</tr>
<tr>
<td>Garbage can</td>
<td>Cohen, March &amp; Olsen (1972)</td>
<td>Decisional</td>
<td>The major elements of organizational decisions combine themselves in a more or less integrated, loose coupling way</td>
<td>Supplement a technology of reason with a technology of foolishness, play with foolish alternatives and inconsistent possibilities</td>
</tr>
<tr>
<td>(Un)structured decisions</td>
<td>Mintzberg, Ransmgham &amp; Theorell (1976)</td>
<td>Decisional</td>
<td>Most decisions are made under conditions of ambiguity, and crossed by interferences, politicking, and irregularity</td>
<td>Determine the best decisional path, depending on the type of problem and on the nature of the dynamic factors encountered</td>
</tr>
<tr>
<td>Diffusion of innovations</td>
<td>Rogers (1983)</td>
<td>Diffusion</td>
<td>Innovation is a linear, sequential succession of three stages, namely idea generation, development, and adoption/ diffusion</td>
<td>Create awareness, stimulate the arousal of interest, develop products that may be positively evaluated when compared with competitor’s products</td>
</tr>
<tr>
<td>Organizational diffusion</td>
<td>Van de Ven (1993)</td>
<td>Diffusion</td>
<td>Organizational innovation is a probabilistic, messier, complex, and interdependent process than presumed by Rogers</td>
<td>Allow trial-and-error, allow innovation managers to practice in relatively safe environments</td>
</tr>
</tbody>
</table>
6. Avenues for future research

The cumulated research is enlightening about several aspects of the innovation process. A revision of the literature, however, illustrates the need to further investigate some seldom studied aspects of the relationship between innovations and organizations. In this last section, some of the shortcomings of the investigation on this topic will be presented and briefly discussed. For analytic purposes, the discussion will be divided according to the levels of analysis considered in the previous section.

Concept

The rational view of the innovation process, often stimulates authors to look for linear, "clean", and a-theoretical models of innovation. Cooper's (1990) stage-gate process is a good example of such a perspective applied to the management of product innovation. Serving as a decision-guide for managers, this model is a template where each gate helps people decide to go, kill or hold, the new product development process. This model provides a helpful tool for product managers' decisions, but ignores the barriers, the contradictions and the political interests involved in innovation. As a consequence, most of the available models depict formal and incomplete views of innovation. They ignore such things as: (1) the organizational (strategic, structural, cultural) context of innovation, which creates both opportunities and constraints to innovative action; (2) the bounded rationality of the human agents involved (March & Simon, 1958) which, combined with informational ambiguity, leads managers to give meaning to a mess (i.e. to make interpretations, cf. Daft & Weick, 1984); and (3) the political, socially constructed nature of organizational phenomena (Frost & Egri, 1991; Weick, 1979), including the innovation process (Kimberly, 1981; Van de Ven, 1993; Cunha & Fonseca, 1997).

The quantitative approach used in most research, provides enriching correlational conclusions, mostly obtained from cross-sectional data, but limits our knowledge of the process of innovation (Frost & Egri, 1991, p. 234). More qualitative approaches should also be used to better illustrate the dynamics as well as the temporal and contextual nature of the innovation process.  

Organizations tend to live much longer time with the consequences of their decisions (e.g. the results of innovativeness or non-innovativeness) than the time they spend in deciding. However, as noted by Pfeffer (1992), there is a comparatively more abundant literature pool on the decision making process than on the implementation process. Researchers and practitioners seem to be more concerned with the process they follow to make a decision, than with the management and the consequences of implementation. Considering that decisions are instrumental tools for

5 For a notable exception, see the workings of Eisenhardt and her associates (Eisenhardt & Tabrizi, 1995; Brown & Eisenhardt, 1997)
implementation (or non-implementation), one can conclude that researchers may be more worried with the management of means than with the management of ends.

Because of the state of "balkanization" (Staw, 1990) characterizing innovation studies, it is important to stimulate and promote the crossfertilization between the currently dispersed areas of research on the topic. This kind of approach will significantly contribute to an integrated and multifaceted understanding of the innovation process, up to now closed inside the disciplinary boundaries of marketing, management, engineering, psychology, sociology, etc.

**Individual factors**

The impact of dispositional factors on an individual's orientation toward innovation is an important subject of analysis in the social sciences, and particularly in the field of psychology. Understanding the concept of creativity helps to comprehend the reasons why this variable is so often considered as an input to innovation. According to the definitions of Amabile (1988), creativity and innovation can be viewed as two complementary processes: creativity refers to the production of novel ideas, while innovation refers to the successful implementation of those ideas in an organizational context. Even if one considers that the attempts to isolate the personality and cognitive constellations of attributes that can explain why some individuals are more innovation-oriented than others, researchers apparently need to substitute dispositional by interactional models (Schneider, 1983), models that account for the close ties between individual and situational/contextual variables and therefore provide a better articulation between individual creativity and organizational innovation. In fact, those characteristics commonly associated with creativity – like moderate intelligence, self-criticism and high standards, among others (Barren & Harrington, 1981) – are not enough, per se, to explain the innovation process. They need to be situated and contextualized.

**Group factors**

On the one hand, and at the intragroup level, it is necessary to uncover the dimensions that influence the functioning of multidisciplinary teams involved in the development of innovations. Competitive and collaborative features, dependent on the composition and dynamics of those groups, will probably shed some light on their innovative outcomes.

On the other hand, and at the intergroup level, it will be important to study the relationships between groups that are expected to collaborate. Phenomena like the us/them (ingroup/outgroup) effects (Tajfel, 1982), mainly studied by social psychologists, can be at the origin of such dysfunctional processes as the "Not Invented Here" syndrome. Insights from the social psychological field can thus help to manage intergroup conflicts, to increase the innovative performance of teams, to help information flow freely across interdepartmental boundaries, and to avoid the premature criticism that emanates from groupthink situations (Janis, 1971) and acts as a powerful barrier against innovation. The study of coalition formation in innovative groups (Murnighan, 1985), as well as
the political dynamics of small R&D teams, are also relevant lines for future research. The study of social dynamics can be useful to assess the impact of group factors on the process and outcomes of innovation, considering that, as pointed out by Weick (1993b, p.360), "interpretations determine effectiveness", in this case, of innovations.

Organizational factors

The organizational context of innovation must be taken into account in a more systematic and rigorous manner. Despite the existence of abundant research linking organizational characteristics to innovation outcomes, future researchers should try to adapt the work on organizational systematics (McKelvey, 1982) to the study of innovation. It will be important to investigate not only the existing types of innovations, but the types of innovations best suited for/searched by particular types of organizations (e.g. for-profit or not-for-profit, service or industrial, public or private organizations). As noted by Damanpour (1987), studies of organizational innovation need to cover a wide range of organizational populations. The differences between these types of organizations should not be neglected.

Ecological factors

At the ecological or industrial level, it will be important to systematically compare the findings obtained from research in multiple industries, and from various types of organizations. Issues of organization, technology, and competitive and market dynamics, should be taken into account and compared on a systematic basis. Until a reasonable amount of comparative research exists, it is difficult if not impossible to extrapolate results from one field to another. The levels of comparison and synthesis required to theory cumulating and refinement (Wolfe, 1994), need to start at the macro (ecological)-level and to cross lower levels of analysis, in order to facilitate the emergence of a meso-organizational research paradigm on innovation. Another important topic of research at the ecological level, is on how organizations from the same (e.g. competitors) or neighbor populations (e.g. technology adopters and suppliers) influence a firms' decision to adopt or reject innovations. Research on this topic would make it easier to answer the question made by Abrahamson (1991): why do organizations sometimes adopt inefficient innovations, and reject efficient ones?
conceito de inovação, continua com a discussão das razões pelas quais é a inovação um tema quente para gestores, acadêmicos e consultores e finalmente apresenta e discute de forma breve as principais áreas de investigação sobre inovação, modelos de inovação e direções para a investigação futura.

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