

INTERORGANIZATIONAL INNOVATION DYNAMICS

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Cultural realities
Interorganizational connection networks
Practices
Disruptive innovation
Competence
Open Source

JEL classification

M21, O31, O41

Abstract

The directions of research on innovation or on the staging of innovative processes progress have evaluated over time from an innovational perspective constraint within an activity pursued by the entrepreneur (regarded as an entity creating possible and numerous innovative combinations) to an innovational perspective (induced in innovative processes and structures) framed and carried wider within the organizational internal environment, as response triggered and driven by market requirements. Nowadays, innovation is approached from the perspective of development in networks and system organizations.

This latest innovation perspective by relating the areas of knowledge from which to reclaim constituent elements of the process, allowed researchers to focus on the study of the sequencing of actions (from generation to design and then to marketing innovation) as a process generated and conducted in networks, communities of innovation in systems and groups of companies or structures such as double helix or triple helix, in which the collaborative paradigm plays a central role. These structures include companies, individuals, universities and public organizations.

1. THE ACTUAL CORPORATIST VISION

Creative capabilities of the individual, on the first level (Amabile, 1987), creativity approach in a holistic integrated manner of a more complex level (Gardner, 1993; Csikszentmihalyi, 1997) or induced by the organizational culture directed towards collaboration and innovation (Nelson, 1988, Fagerberg, 2005), and on the second level the inter-organizational collaborative structures on the other hand (Von Hippel, 2005), may emerge in business models based on continuous innovation (Bragagge et al., 2007). In an integrating vision, collaborative networks are complex compositions that include communities logically structured, similar to those from classical economic and sociological theories and which determine their cyclical generation and branching into new innovative processes in the form of spiral tree. Such creative communities, based on principles of tradition claimed from sociological theory and instincts of development and accumulation, specific to economic theory, are modelling the interorganizational connection networks on coordinated knowledge, mutual sharing of information and collaborative practices. Negotiation processes in collaborative networks become more complicated at the same time increasing the number of participants (Druckman and Olekalms 2008).

Innovation structures constituted on the collaboration paradigm are functional due to the informal relationships of work between individuals, organizations and institutions. These lines intersect formal subordination relations and communication and induce a modelling of the collaborative space in the form of networks. Moreover, the last approaches extend the cooperation paradigm of mass collaboration, supported by the force of propulsion, processing and structuring information through ITC channels, especially of the Internet's.

In terms of institutional corporatist, it is more openly accepted the idea of producing innovations faster and more efficiently outside the research and development departments or science parks, as well as the fact that most of

today's innovations are not the product of a single organization. In January 2012, General Electric, a company with impressive dimensions and well-known tradition of innovation spectrum, published its second annual study "Global Innovation Barometer" conducted on a sample of 22 countries and 2,800 senior executives directly involved in decisions regarding their corporate innovation strategies. The study, conducted by the research firm Strategy One, examined the external economic data to validate and support the views expressed by the executive. One of the six objectives of the study was to identify new models of innovation. To the question: To what extent do you agree or do not agree with each of the following statements? (% Agree), respondents have cumulated the following rate:

- How companies innovate is totally different from the past: 80%;
- More than ever, IMMs and individuals can be as innovative as large companies: 80%;
- More than ever, innovation must be localized to serve specific market needs: 74%;
- Today, innovation is produced more by individuals' creativity than a high level of scientific research: 73%.

Regarding the forms of organization for stimulating innovation in the next decade, corporate executives have ranked in order of importance, the following options (estimations as global average) - Fig. 1

The obvious advantages of collaborative networks in the traditional organizational structures consist of the decentralized structure created around several leaders, expanding connectivity and facilitating the transmission of information widely, whilst providing flexibility in resource allocation. Organizations' behaviour is increasingly focused on the synergy of elements in the external environment through inter-organizational structures: new knowledge is generated interactively with partner organizations, the knowledge gained is mutually validated, the accumulated knowledge management between partners considers ways of communication and transmission to partners.

2. ENTREPRENEUR AS AN INNOVATOR. INNOVATION AND THE ECONOMIC GROWTH

The first approach of innovation in the economic domain under the spectrum of economic policies has considered innovation as a novelty, as an improvement or something original, an efficiency or modernization of something that is necessary or required, innovations in general being presented as generators of new revenue and direct contribution to economic growth.

The economist who paved the way for this approach was Schumpeter (1911), whose vision of creativity drew attention to the influence of innovation in economic development and on innovation in the economy as an element able to influence both economic theory and political. Later, Schumpeter (1939) clarified and emphasized the innovation process that triggered the economic changes. He argued that innovation enables the creation of new production functions, cost curves shift, causing imbalance and modifying existing industrial structures, generating economic development. But Schumpeter's work has not brought innovation in economists' centre of attention; the supporters and the developers of the neo-classical traditional theory have often considered innovation as a residual factor, suggesting that work and capital stimulate the economic growth.

In fact, innovations have been considered as being background, ready to be picked up and used, few economists are concerned about how they actually arise. Looking back at the beginning of the 20th century, the idea was introduced and subsequently the emphasis was increasingly positioned on individual entrepreneurs as entities that make creative combinations of resources to produce innovations (Schumpeter, 1911). Schumpeter suggested that innovation "pushes economic development forward in a discontinuous manner, introducing the notion of" creative destruction." So for Schumpeter (1911), development is not just about introducing new elements, but rather the combination of resources and economic forces. According to Schumpeter's larger vision on economic development and

innovation, this could include the introduction of a new good (or product), a new method of production, opening to a new market, a new source of supply of raw materials or the new organization of any industry. The economist develops this perspective, arguing that the creation of new combinations is simply a different way of structuring the workforce in an economic system existing on the side of supply or production (Schumpeter, 1911), and this activity is conducted by the individual entrepreneur. In general, the Schumpeterian philosophy suggests that the entrepreneur becomes the innovator or the innovation actor, causing "creative destruction" in the economic balance by introducing innovations and contributing to economic development. But in the last 50 years, research has paid more attention to technological advances as engines of economic growth, thus able to explain the differences between national growth rates (Landau and Rosenberg, 1986; Fagerberg, 1988).

Landau and Rosenberg (1986) in their research have surprised another important aspect of segmentation in the innovative process: the demarcation between the creative process of generating innovation and the need to complement it with the commercial side, the capacity and the possibility of imposing market innovation and its commercialization. To illustrate this view and argue that ingenious technical inventions are not sufficient for economic development (and that trade must be consistent with the market), the authors cite the Concorde supersonic commercial aircraft, more spectacular technologically, but which did not lead to economic growth and lost against the less innovative Boeing 747 Jumbo-Jet.

3. INDUCED INNOVATION AND PRODUCED ORGANIZATIONAL INTERNAL ENVIRONMENT

Several decades later, the focus shifted to the organization seen as scaffolding, space in which innovation is created. The organization becomes producer of innovation, trying to respond to market and engage in research and development to produce new goods and services. This move of accent can be seen as an effect of the fact that commercial

transactions have become increasingly complex in the early 20th century, economic systems extend far beyond the cognitive abilities of an individual-entrepreneur. It is an attempt of the economists and researchers to encompass expanded dimensions of the new economic order that is set up.

Economic transactions take place within organizations constituted by social arrangements (Coase, 1937) and, in fact, the Schumpeterian path is translated within the organization through innovative research that becomes a mode to produce the innovation within organizations time, especially those producing (Nelson, 1988, Fagerberg, 2005).

According to Utterback, who defined innovation as an invention that reached the stage of market introduction and market commercialization (eg, a product innovation) or as "first use" in a production process (eg, process innovation), a technical innovation should be seen as a process structured in three sub-processes: a) generating ideas stage, b) solving phase of dysfunctions and implementation of ideas and c) the distribution phase of innovation on the market. Structuring a first stage of generating ideas practically induces the first structuring possibilities of the innovative process by creating a design or technical proposal concerning synthesis of several pieces of existing information. The stage of resolving failures materializes into a technical solution or an invention. The implementation phase lies in the marketing of the original idea. Diffusion is the mechanism of communication and the increased use through which innovation has a significant economic impact (Utterback, 1971).

4. INNOVATION AS A PROCESS EMANATED FROM INTERORGANIZATIONAL NETWORKS

The two previous approaches, innovation produced by the contractor and that produced in the organizational environment, regarded the innovation process as a linear path performed by the contractor or within such companies through the application of science in a logical and structured approach by applying causal factors to workplace.

Linear innovations ignores feedback loops (innovative process is not induced and is

not necessarily resulting in linear chains of activity, but is more likely to follow more precarious and recursive processes) and, on the other hand, innovation can have unforeseen implications initially and it can be adopted in industries in ways difficult to predict (Kline and Rosenberg, 1986). Klein and Rosenberg also note that it is difficult to measure the impact of any innovation in particular. These approaches provide the traditional view of linear innovation, individual enterprises, of that case where innovations are generated in controlled environments, to a turning point towards a new way of thinking and research.

In the late '80s, researchers have gradually shifted to understanding innovation as a process carried out through interactions as agreements between organizations, falling within organized systems or networks. The reasons for these associations for the purpose of collaboration are numerous and have been analyzed by many researchers, the most significant being the access to greater resource sharing, specialization, knowledge sharing, access to technology, access to larger customer bases and rates market and, not least, a favourable environment for innovation processes. For example, development of a product by the manufacturer becomes in the late 80s an insufficient framework as potential due to resources and the limited access to knowledge. Von Hippel (1988) claimed that the source of innovation lies in the relationship between manufacturing companies and their suppliers, but especially in relationships with their customers.

The analysis field of researchers for innovative processes moves to the relations between organizations, field analysis often designated through the network metaphor (interdependencies among organizations represented by informal links connecting various entities and relationships crosses existing formal organizations). Networks, made up of links or relationships connecting entities, or nodes of the network, are seen at the beginning by researchers in a simplistic manner, but subsequently these become increasingly more complex giving them various features and to network nodes are associated resources, knowledge and various other items (interconnected networks). Firms, organizations are no longer viewed in isolation. The conceptualization of networks is investigated depending on influence factors

and variables that lead to their formation and sustaining according to the cultural context considered by researchers, and in the form of different perceptions (a network actors have different perceptions). Inter-organizational networks increased considerably in importance in recent decades. Networks contribute significantly in a potentiating of innovation capabilities of firms by exposing them to new sources of ideas, by allowing quick access to resources and the possibility of knowledge transfer. Formal networking collaboration can also enable an innovative division of labour that makes it possible for companies to achieve objectives that could not be pursued individually (Powell and Grodal, 2005).

Researchers focus on informal collaborations, favourable environment for innovation's birth through creativity, exemplifies how networks are mainly seen as inter-organizational structures. Another approach is represented by the following strategic alliances.

The idea of the network as an articulation innovation system is not new, similar ideas being supported by earlier precursors of development of innovative theories. **In Schumpeter's later writings, he even extended his own theory of economic development by describing similar processes of broadcast networks.** The author made the following analysis based on observations on the process of innovation: first, innovations do not remain isolated events and are not evenly distributed uniformly over time, on the contrary, they tend to cluster or spread in branches (simply the first few companies, and then more and more will adopt successful innovations) and, secondly, innovations are not distributed at any time during the entire economic system at random, but tend to concentrate in certain sectors and their surroundings (Schumpeter, 1939).

5. FROM DYAD TYPE MODELS TO DISRUPTIVE INNOVATION

Interactions between organizations, known from the classical economic models (based on client-supplier-partner-competitor relationships) are discussed most often in the form of mutual monitoring of actions and behaviours, studying key competitors or imitation of behavioural rules or innovative

results. Their development becomes the founding premise of interorganizational collaboration structures. In such structures, organizations and individuals learn from each other, share their vision and objectives for the creation of new ideas. Involved in the network, the organization may be related to a much broader range of possible alternatives of innovation to the extent of combining knowledge.

Supply chain integration, customer and product innovation product and the life cycle modification.

Collaborative interorganizational structures for innovation of product or service can initiate the most facile:

- **1. Downstream**, in the sales area with different customer groups or expert groups. These structures have as a source of diversification different types of customers, different consumer trends, knowledge platforms mastered by user or consumer organizations, individual customer profile (age, sex, ethnicity, lifestyle) or the involvement of the organization (the office sales as a whole or only certain designated persons) etc.

- **2. Upstream**, in the supply area for accession to different technologies, within circles of experts in various production centres, within companies etc.

Forming collaborative structure is not based on bonding initial intensity (time-consuming and human resources). Those links that prove valuable and potentially generating creative ideas are reinforced on a reasonable timeframe, increasing connectivity between various network nodes.

Basic knowledge, tacit information are easier to run directly (from individual to individual), collaborative engagements. For example, Toyota, at the organizational level, used tacit knowledge, encouraging front lines' workers to become innovators, to engage and communicate their ideas, they being the best connoisseurs of manufacturing operations. Diversity, fundamental factor in the performance of collaborative innovation network, requires the involvement of various departments of the organization and thus a large number of types of employees. Tacit knowledge, situated at the bottom of the organizational pyramid, penetrates inter-organizational network more easily and without a hierarchical structure and

communication barriers, it is spread throughout the system. The inter-organizational collaboration networks, the sense in which information circulates is similar to companies, from user organizations to the manufacturer.

The system of values and objectives of the network are the elements which govern people. Passion or belief in achieving a goal is the one that maintains the network.

The open collaborative innovation model is a new way in which individuals, small businesses, and communities of practice create innovation (Christensen, 2003). Chesbrough (2003) argued that there is a paradigm shift in how companies commercialize knowledge, through the erosion of organizational boundaries. This has been characterized as a step towards 'open innovation' paradigm seen as the antithesis of the traditional model of innovation. Organizations no longer create ideas in research and development laboratories in secret until market launch. The premises of "open innovation" (Chesbrough et al, 2006), involve a systematic multitude of stakeholders in the innovation process (Von Hippel, 2005). *Stakeholders* are defined as those groups or individuals within a sphere of mutual influence with an organization who are affected directly or indirectly to the achievement of organizational goals or who can action so as to affect the achievement of these objectives (Freeman, 1984). *Stakeholders* can also designate the group consisting of shareholders seeking return on capital employed as well as those partners who play an important role towards the organization (Mintzberg, 2004).

Moreover, Internet, open source platforms, facilitated the emergence of cases where individuals are not motivated by any economic benefit (leverage corporate management system) to engage voluntarily in collaborative activities and to co-innovate with other individuals from the community. Examples such as Linux or Wikipedia highlight that collaborative networks between organizations, customers or partners have increasingly more importance in innovative projects. In this dynamic context, systematic communication is essential with various stakeholders in the network.

Viewed from the perspective of stakeholder theory, researches that deepen

interorganizational collaborative innovation focus on communicational interactions or on practice and not on clashes of information and knowledge combining between actors in the network. Latest approaches in which the stakeholder is integrated within a network, define the collaborative structure as a selective interaction context and the organizational agent is viewed dynamically by implication, with the aim to unify and connect, no longer seen as just a third party. (Garriga, 2010).

Through open innovation, companies can explore a wide range of internal and external sources, through multiple channels to exploit opportunities for innovation (West and Gallagher, 2006). In addition, Laursen and Salter (2006) focused on an external measuring through characterized factors, width and depth, for different sources of external knowledge that each firm access in its innovative activities in an analysis of manufacturing firms UK. Unlike the linear model of innovation, open innovation processes ensure a flow of ideas by accessing geographically scattered intelligence and knowledge, beyond organizational boundaries (Dahlander and Gann, 2007). Thus, searches are expanding outside their own companies looking for the best ideas in other entities that include competitors, as well as customers, suppliers and vendors, universities or research centres.

Disruptive innovations are rarely claimed in the research laboratories of large companies. Even if initiation, the first ideas appear in large companies, they leave the formal hierarchy of the organization and register for innovative collaborative networks formed based on natural or free will, which will subsequently form new organizations to harness the innovation in the market (Christensen, 2003; Von Hippel, 1998, 2002).

Research laboratories funded by large corporations were responsible for many innovations disruptive AT & T Bell Labs (now part of Lucent Technologies), laboratories IBM or Xerox Palo Alto Research Centre (PARC). But the closed innovation model, in which companies finance these central laboratories to develop new technologies and products, it is not generally valid, innovation is accelerated by several:

- Development of unprecedented media and, above all, the circulation of information on the Internet;

- The explosive growth of personnel qualification and wage market formation for this type of personal;
- Attracting key employees in new firms research laboratories, of "start-up" that erodes the knowledge bases of large firms;
- Increased mobility of staff and communication opportunities enhance the capitalizing and combining opportunities of individual ideas that do not need to wait for approval of a corporate chief to be analyzed and exploited;
- Disruptive innovations from universities and developed in collaborative networks such as the Internet, Web and Linux did not require big budgets. The main drivers of these innovations were not reward systems of large corporations, but the dedication and commitment of researchers and innovators.
- Enhancing collaboration with scientists and knowledge-based small businesses has allowed new innovations to be brought to market much earlier than in the past.

The innovation value and result of the knowledge combining in the network increases progressively with each new organization engaged in the structure. Level of expertise (knowledge held by each new member) makes the overall level of network knowledge at the same time to be worth more. Through the network effect, the possibilities of combining knowledge from various fields increased substantially for generating innovative effects sometimes surprising or strange at first, but which can become **disruptive innovations**.

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FIGURES AND TABLES:

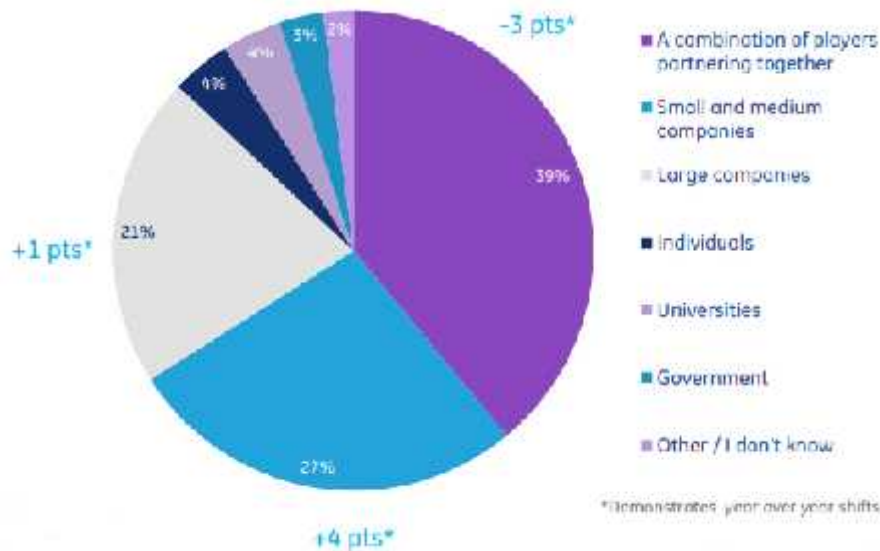


Fig. 1. The importance of organizational forms in the production of innovation (corporate vision)

GE – Global Innovation Barometer, Global Research Report January 2012

http://files.gecompany.com/gecom/innovationbarometer/GE_Global_Innovation_Barometer_Report_January_2012.pdf