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Firm value creation and viability between product and process innovation

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Abstract

The role and characteristics of the innovation process have undergone changes throughout the history of industrial capitalism. In the contest of an emerging systemic complexity, technological innovation is able to generate a positive impact on the economic performances of companies by improving their internal efficiency, which allows to increase the market competitiveness. Innovation is, in fact, the leverage to gain competitive advantages that are the source of value creation and sustainable growth, to preserve and celebrate as one of the key components of the intangible assets of companies. Starting from Schumpeter's process of creative destruction, which considers innovation as "the engine of economic development" and "a continuous process of change and accumulation of knowledge". The paper analyzes the variables at the center of innovation studies, the innovative approach and the impact of technological positioning as early-mover or follower in the market. Peculiarities will be described related to the definition of the project portfolio mix, the process of designing and developing of a new product, as well as the relationship between innovation and competitive advantage.

Further attention will be placed on the targets of innovation and on the factors, objective and context, which hinder the willingness by the entrepreneur to 'break' the stationary balance by introducing new combinations production factors as an essential condition for the maintenance of competitive advantage and the creation of value. The research approach is based on a qualitative methodology. The data retrieval was carried out through secondary sources.

Key words: Technological innovation, Radical innovation, Incremental innovation, Architectural innovation, Modular innovation, Demand pull, Technology push.

Introduction

The crucial function carried out by technological innovation on productivity, economic growth and the standard of living of an economic system, is widely recognized by economists, corporatists and institutions. This topic has always been at the center of economic theories starting from the studies of Schumpeter (1942), who pointed out how innovations have revolutionized the economic structure over time through the drastic selective process by which many companies disappear, were born or reinforced. The ability to innovate is, in fact, the key driver of competition that creates not only a competitive advantage for the enterprise, but also contributes to annihilate the competition. Schumpeter (1942), in this sense, considers "this process of creative destruction" as a fatal event which is "the cornerstone of capitalism", that will take effect for decades or centuries.

Product innovation and process is considered "the winning of the competition between the industrial enterprises" which contribute to its growth directly and indirectly (Pininfarina, 2008). What emerges at the heart of this vision is the crucial role played by the entrepreneur who, favoring technological innovation, organizational change of the production structure, changing the basis of the resources and competencies of the enterprise, the conquest of new sources of supply, the diffusion of new products, the exploitation of new areas / markets, promotes the "creative destruction" without which the firm would be bound to succumb (Schumpeter, 2010).
The objective of the research is, therefore, based on the strengths and weaknesses emerging from the analysis of the international literature on the topic under analysis.

The article has the following structure. After the introduction, section two provides a literature review about innovation. Section three describes the research approach. Section four presents findings and discussion. Section five presents the conclusions, limitations of the study and suggests future research.

Literature Review

The Schumpeterian theory, evolving over time, gave birth to two strands of thought: paleo- Schumpeterian and neo-Schumpeterian that differ according to the interpretation given to the concept of technological change. If in the mainstream paleo-Schumpeterian technological change is still considered an exogenous variable to the business system, within the neo-Schumpeterian strand, however, there seems to be an endogenous phenomenon and therefore predictable and manageable (Ciappei, 2010).

The variables that are the focus of studies about innovation and that firms have an incentive to learn and manage in order to benefit from are:

- the object of change;
- the dimension of innovation;
- the source of innovation, here understood as the "organizational place" in which a new idea is also formed on the basis of the relationship between those who give life to innovation and those who benefit economically from it.

One of the first variables at the center of innovation studies is the object of the innovation itself. Starting from 60's, the hypothesis that innovation evolves in relation to the stage of development (in terms of size) and industry made its way in the world (Utterback and Abernathy, 1975). As proposed by Joseph Schumpeter in the Theory of Economic Development of 1934, product innovations include the introduction of a new good or a service on the market, or the qualitative development of an existing product, while process innovations consists in the introduction of a new method of production or distribution to improve its efficiency and effectiveness.

Another variable included in the innovations studies is about its dimension, which, depending on the intensity and extent of innovativeness, induces to distinguish between incremental and radical innovations in technology (Cafferata, 1995).

Incremental innovations, which tend to characterize the low and medium technology sectors, consist of frequent and continuous improvement or adaptation of existing products or processes to changing consumer tastes in order to create value. The process of incremental innovation stops when the marginal cost of the development potential exceeds the marginal revenue that can be expected. The radical innovations, in contrast, resulting in a significant change in the business model, require new resources and new skills (marketing, organizational and technological) (Silvestrelli, 2004; Schilling, 2009). Often they lead to the creation of new firms, especially in the form of spin-offs, or develop new market segments. They stem from a deliberate as well as irregular research and development implemented by businesses and / or research institutions outside (Burgelman, 1983; Ettlie *et al*., 1984; Dewar and Dutto, 1986). They are often stimulated by technological progress and therefore are more frequent in highly dynamic sectors. Considering its radical nature, this type of innovation is strictly linked to risk propensity by the entrepreneur, requiring investments and resources whose expected return depends on the risk of the project of a new product, in terms of technology and market (Ferrata, 1989).

Alongside the traditional distinction, Henderson and Clark (1990), in classifying the types of product innovations, introduce the categories of innovation and modular architectural innovation.

The modular innovation involves changes of one or more components of the product, without substantial changes to the general configuration of the system, to the procedure of integration of the same components and to the logics of use of the product.

An architectural innovation consists of making changes to the overall structure of the system or the way in which the components interact with each other (Schilling, 2009). The intensity of the change depends on the level of creativity and knowledge that management has in being able to perceive and satisfy the latent and disregarded needs of the market.

Nevertheless, to redesign the architecture of a product is very complex because it must be supported by significant (substantial) investments having to reconfigure the production process. However, business and industry, in becoming mature, tend to fossilize around specific product architectures (Verganti, 2004). The introduction of architectural innovations is particularly common in firms that use Internet-based technologies, as changes are stimulated especially in the bonds (links) between the component parts of the product, rather than on each of them (Henderson and Clark, 1990).

While the modular innovations are mainly related to the knowledge and referable to the specific component object of the change, the use of architectural innovations requires a broad knowledge of the system and the mechanisms that govern the interactions between its components (Parente, 2008). Privileging the cognitive aspect, the innovations can finally be divided into competence enhancing and competence destroying. In the first case, the system of pre-existing knowledge, resources and expertise of an enterprise is strengthened, while in the second case innovations make them inadequate, obsolete or even destroy them (Tushman and Anderson, 1986; Schilling, 2009).

The last variable in the center of innovation studies, is the pursuit of its sources whose knowledge allows to better understand the dynamics and those involved in its process of innovation, as

well as to manage privileged relationships with owners of strategic resources for innovation. The literature (Schmookler, 1966; Mansfield, 1968; Pavitt, 1971), offered two different models to explain the origin of innovation: the approach "demand pull" and the "technology push".

According to the first approach, the main cause of a technological change is given by the recognition given by firms of unmet needs in the market. To meet these demands, businesses plan a process of research and development of a new product or a new technology, which will lead to the creation of an innovation. Consequently, the variables that determine the development rate and the direction of the technological innovation are the expected level of demand and profitability.

This approach has been challenged by those who support the approach "technology push" (Dosi, 1982; Nelson and Winter, 1982). It is said that sometimes some technological changes are in no way related to changes in the market and the strategies of firms, but they rather determine them. Therefore, the scientific-technological environment creates new technologies in an autonomous and independent way from the trend of the market. It is important to highlight that in the event technology push, typical of radical innovations, the risk associated with the creation of the market that will absorb the innovation falls on the innovative company, while in "demand pull", peculiar example of incremental innovation, this risk is borne by the user undertaking (Buttà, 2004).

Over time, the dichotomy between the two models has diminished considering the interdependencies that link the scientific and economic world (Guatri *et al*., 1999).
A further contribution to the understanding of the sources of innovation is given by the model of Von Hippel (1988) who sees the process of innovation as an activity performed by different actors: not only the manufacturer but also the user and the supplier. This line of research reflects the evolution of the industrial system towards forms of cooperation between firms.

The company that innovates needs to access various sources of new knowledge generated through different learning processes:

- learning by doing. It is the knowledge, skills and production techniques that developed by the manufacturer or supplier of components during the implementation of design and manufacturing, both allow to reduce the cost of labor per unit of product and to improve the quality of the output (Arrow, 1962);
- learning by using: accumulated knowledge in the use of plants, equipment or products. The relevance of this mode of learning grows by stressing the phenomena of division of innovative labor between economic entities. The benefits and productivity deriving from "learning by doing" and "learning by using" are meaningful only when considered cumulatively;
- learning by searching: knowledge developed through the deliberate search for new solutions to product or process (Cohen and Levinthal, 1990);
- learning by interacting: the knowledge developed through the systemic interactions between a multitude of actors, public and private, involved in the process of innovation and diffusion, which in addition to being sources of information are equipped with skills, knowledge, abilities, and different resources (Lundvall, 1985; 1988).

Although for years the technology has been regarded as subsidiary to the business strategy, many companies have gradually redefined their priorities by integrating business strategy and technology strategy. Formulating a technological strategy means to identify, as part of its business areas, the degree of strategic importance to each product-market combination, the role played by technological leverage in the competition,

the degree of maturity of the technology and the future trend.

In relation to the current competitive and technological market environment, it is necessary to evaluate each product-market combination, its own wealth of know-how, scientific-technological, and to define its strategic objectives with regard to the following factors:

- technological positioning, depth and breadth of the portfolio projects: Choosing a technological positioning strategy as early-mover or follower;
- mode of innovation: innovation is less and less the result of activities completely within the company. The transition from being self-sufficient to the use of external sources, makes the company face decisions about which sources to activate and how to adjust and use relationships with the outside world.

Adopting a leadership strategy is to attribute an offensive role to technological innovation. A technology leader or first-mover is that company which profits from an innovation first (Lieberman and Montgomery, 1988).

Being able to launch first an innovation requires massive investments in research and development and the inclusion in its own portfolio of breakthrough projects, i.e. researches on technologies that are at the technological frontier. It also means establishing relationships and communication with the scientific system and the lead users. It is also necessary that this commitment is ongoing, as the research is time-consuming and a complex system of skills, not acquirable in the short term.

The high cost and the high risk, for highly uncertain outcomes of the research, that this type of strategy involves, is compensated in part by the opportunity to exploit, in the case of launch of a radical innovation, a period of monopoly power. The pioneer enjoys the benefits of learning in advance about the product, and the possibility of exploiting, in terms of production, experience curves before imitators. He may enjoy the reputation as an innovator in the eyes of the customer and occupy the first distribution channels. The choice of a leadership strategy requires organizational skills and management of complex research and development activity. Often only large companies, well positioned for competitiveness on an international level are able to bear the burden of the “pioneer”. Moreover, this strategy is typically adopted by companies operating in science – based sectors, in which the primary competitive leverage is given by the scientific-technological innovation (Pavitt, 1984).

However, following a strategy of fast second, which is that of an imitator, may have some advantages, whether it is adopted by small businesses or it is intentionally undertaken by large firms.

In the case of small firms, adopting a strategy of follower is often an obvious choice because of the lack of financial resources or professional, however, in large organizations can be the result of a deliberate choice.

If the concept “early- mover” is related to technological positioning, to the advanced research projects and product innovation, the Time Based Competition shifts the focus to all kinds of project and also innovation process. Unlike the strategy of technological leadership, the Time based Competition involves the design and all the functions, and affects the scientific, technological and organizational competences. Finding the “time to market” as a competitive factor has helped to reduce the life cycle of the products and thus increase the number of new models on the market. Then the time has become a new and forceful metric to evaluate the performance of the company.

The advantages of reduction of the “time to market” are both economic and technological:

- quick patent coverage for its innovative products;

- possibility of a late entry to the market;
- ability to seize opportunities and reduce risks;
- increase in productivity.

A decision that companies need to take, in relation to internal technological assets, concerns the extent of the commitment to innovation, defining strategic areas in terms of combinations of products / markets and the competitive modes, deepening two themes: the specification of the strategic areas in order to focus the financial and human resources on related and synergistic initiatives, and the choice of the number as well as the type of innovation projects of the product and / or process to be kept in the portfolio (Cooper and Edgett, 2010). So it is viable to manage the portfolio in order to: avoid an inefficient allocation of resources, enhance the business strategy, balance risks and innovative efforts (Cooper *et al*., 1999).

The differentiation of the demand, the internationalization of supply and the need to respond to different market segments, customizing its supply, have led many companies to expand its product range. In addition, changes in the buying patterns or lifestyles of customers, the fast technological changes and the continued pursuit of competition lead firms to constantly renew the product range. From the point of view of design, this strategic choice involves the management of a technology portfolio consisting of a large number and a wide mix of projects that are classified, according to their degree of complexity in (Wheelwright and Clark, 1992; Schilling, 2009):

- research projects or advanced development projects;
- breakthrough;
- projects 'platform' or the new generation;
- derivative projects.

The definition of the mix of project portfolio requires a careful analysis of the impact on the competitive advantage from each of them. The company must be able to balance the portfolio in order to ensure the fulfillment of the demand in the short term, with the development of incremental innovations, maintaining the market position in the long term, through the introduction of new generations of products. This choice can have different strategic goals: improving the quality of the product in respect to the previous generation, adapting to new regulations, seizing the opportunity to incorporate materials or innovative components, responding to the moves of the competition or to enter new markets. The inherent complexity in innovation is becoming less and less approachable on the basis of the available resources of a single firm. Therefore, a choice that is part of the technological strategy depends on the degree of outsourcing of innovative design activity considering three important dimensions:

- type of entities which the exchange takes place with;
- content of the interaction with the outside world;
- type of mechanism governing the transaction.

The choice to seek outside resources must be based on evaluation of cost-effectiveness or the recognition of the superiority of the supplier in a given domain of expertise of the product or process. The partnership between manufacturer and supplier can provide different degrees of involvement in the design process:

- the design, considered strategic and therefore not decentralized remains within the company producing the final product but the supplier is involved in the preliminary stages;
- the design is done through a process of collaborative creation that involves a structured client and suppliers (co-design) incorporated in a context of “division of innovative labor”, in which “learning processes by interaction” are activated (Lipparini, 1998);

- the design of a component is fully entrusted to the supplier.

Most of the innovative ideas do not always turn into successful innovations, and among those that succeed, only a few yield a return of an appropriate market to investments (Schilling, 2009). Management for the evaluation and selection of projects to be funded uses a combination of qualitative and quantitative methods . The most common quantitative used methods are the net present value (NPV), the internal rate of return (IRR) or real options. The first two allow both to calculate the returns of a project, taking into account the loss of value of money over time, and the risk. The quality of results is affected, however, by the reliability of the initial estimates of the cash flows that are often unreliable. Both of them provide financial estimates that can facilitate strategic planning and support decision makers in choosing among alternative investment options. They tend, however, to penalize high-risk projects or long-term, and not to seize the strategic importance of the project of which it is difficult to make an estimate of the cash flows.

For the evaluation of projects the method of real options is widely spread among companies. It considers the strategic implications in the long term even though many decisions do not reflect the strict assumptions of the mechanisms of financial markets from which the model derives.

Since many projects cannot be assessed in quantitative terms, it is necessary to use quality evaluation tools. These tools can range from brainstorming to informal discussions, up to very structured approaches. The qualitative method commonly used, consists of the preparation of a screening – question which acts as a guide the function of guide for a complete analysis of the project. Management can build also a map of the projects on the basis of two variables, the intensity change of the product and the intensity change of the process, to build a balanced portfolio and establish an appropriate allocation of resources.
With the technique of Q-sort, that is, qualitative selection, projects are classified according to a predetermined set of parameters.

Finally, there are evaluation techniques that translate qualitative assessments into quantitative parameters such as the method of conjoint analysis that allows us to estimate the value that customers give to certain factors of choice (Schilling, 2009).

Research Approach

The qualitative research approach is in nature Myers (2013) based on an analysis of the literature on the topic of innovation acquired Yin (1994) through the following secondary sources as below written:

- scientific books;
- articles (international literature);
- documents;
- databases (particularly, EBSCO and Google scholar);
- websites.

Findings and discussion

The paper provides a theoretical framework of systematized innovation.

The literature provides many opportunities for discussion on the reasons why firms tend to innovate. The current global context characterized by a continuous and rapid evolution , in which the timing margins tend to shrink more and more, attributed to innovative processes and their diffusion, a crucial role in determining the competitive advantage of the enterprise. Although most of the innovative ideas that may result from the creativity of one or more actors in the system, it turns into innovative products, businesses that show a high propensity to do so, by introducing new products or innovating the production process have suffered to a lesser extent

the crisis in perspective and show a greater ability to deal with the growing competitive challenges. As a working paper, the research about such subject is going ahead the conceptualization of strengths and weaknesses of the literature analyzed. In such a direction, the research work is aimed to provide an empirical analysis in order to obtain empirical evidences supporting the theoretical analysis.

Such analysis will explore the enterprises operating in the sector of plastic material that, although long-term neglected and under-evaluated in the current context, marked by a heavy economic-financial crisis, is able to offer a relevant contribute to raise not only the manufacturing industry but also the Italian and European economic system. Such sector presents, in fact, an elevated innovation rate allowing to the entire chain to face the challenges of the present economies and societies.

Conclusion

The innovation, through the combination of creative ideas, resources and skills is able to generate greater prosperity for the market by developing new products and services, a higher level of quality of output, and lower procurement costs, as well as more and complete information on the products and services available. So it is considered important to involve different stakeholders in this process, such as universities, laboratories and public research institutions, private foundations and research centers, producers of complementary goods, competitors, and in particular both customers in order to effectively respond to their expectations in terms of priority of needs, and suppliers through forms of collaboration that enable to reduce the cost of designing new products, a high level of quality and adequate development in time. Unfortunately, due to the severe economic conditions seen in terms of levels of growth content and low propensity for public investment, innovation within SMEs, which made up the vast majority of the Italian production, is constrained by the inability to dispose of adequate resources. It is important, therefore, to do "team" through forms of interaction between public research facilities and SMEs towards applied research topics that are of real interest to manufacturing companies. The theoretical relevance of the subject is confirmed by the importance that innovation, which manifests itself in a growing number of sectors that make up the current economic environment. In light of the considerations made, what has emerged in paper is that, in order to be a successful innovator is not enough to have a technology but needing to have key complementary resources and be able to defend itself from its competitors through the use of a strategy to protect innovation.

In the present case of examination, however, by dealing with the topic only from the point of life quality has an obvious limitation since that is not supported by an adequate quantitative analysis. Therefore, a future research and complement the analysis of the literature through the empirical evidence.

References

Arrow, K.J. (1962), “The economic implication of learning by doing”, in Review of Economic Studies, No. 29, 155-73.

Burgelman, R.A. (1983), “Corporate entrepreneurship and strategic management: insights from a process study”, Management Science, Vol. 29, No. 12, 1349-1364.

Cafferata, R. (1995), *Sistemi ambiente e innovazione. Come s’integrano la continuità e il mutamento nel sistema impresa*, Giappichelli, Torino.

Ciappei, C. (2010), *(a cura di), Innovazione e brokeraggio tecnologico,* Firenze University Press.

Chesbrough H. (2003), *Open Innovation. The New Imperative for Creating and Profiting from Technology*, Boston: Harvard Business School Press.

Cohen, M. and Levinthal, D. (1990), "Absorptive capacity: a new perspective on learning and innovation", Administrative Science Quarterly, Vol. 35, No. 1.

Cooper, R. G. and Edgett, S. J. (2010), "Portfolio Management for New Products: Picking the Winners", working paper, Product Development Institute.

Cooper, R. G., Edgett, S. J. and Kleinschmidt, E. J. (1999), "New Product Portfolio Management: Practices and Performance", Journal of Product Innovation Management, Vol. 16, No.4, 333-351.

Ettlie, J. E., Bridges, W. P. and O'Keefe, R. D. (1984), "Organization strategy and structural differences for radical versus incremental innovation", Management Science, Vol. 30, No. 6, 682-695.

Dewar, R.D. and Dutton, J.E. (1986), "The adoption of radical and incremental innovations: an empirical-analysis", Management Science, Vol. 32, No. 11,1422-1433.

Dosi, G. (1982), "Technological paradigms and technological trajectories: a suggested interpretation of the determinants and directions of technical change", Reseach Policy, Vol 11, No.3, 147-162.

Ferrata, R. (1989), *Innovazione tecnologica. Politica di prodotto e strategia di diffusione*, Egea, Milano.

Guatri, L., Vicari, S. e Fiocca, R. (1999), *Marketing*, McGraw-Hill, Milano.

Gollin M.A (2008), *Driving Innovation. Intellectual Property Strategies for a Dynamic World*. New York: Cambridge University Press.

Henderson, R.M. and Clark, K.B. (1990), "Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms", in Administrative Science Quaterly, No. 35, 9-30.

Lieberman, M. B. and Montgomery, D. B. (1988), "First-mover advantages", Strategic Management Journal, vol. 19, 41-58.

Lipparini, A. (1998), *Assetti relazionali per lo sviluppo e l'integrazione delle competenze*, in Lipparini A., (a cura di), *Le competenze organizzative*, Carocci Editore, Roma.

Lundvall, B.A. (1985), *Production Innovation and User-Producer Interaction*, Industrial Development Research Series, No. 31, Aalborg University Press, Aalborg.

Lundvall, B.A. (1988), *Innovation as an Interactive Process: from User-Producer Interaction to the National System of Innovation*, in Dosi, G. *et al*. (ed.), *Technical Change and Economic Theory*, Pinter Publisher, London.

Mansfield, E. (1968), *Industrial Research and Technological Innovation: An Econometric Analysis*, W.W. Norton & Company, New York.

Myers, M.D. (2013), (2013), *Qualitative Research in Business & Management*, Sage, London.

Nelson, R. and Winter, S. (1982), *An Evolutionary Theory Of Economic Change*, The Belknap Press of Harvard University Press, Cambridge, MA.

Parente, R. (2008), *Co-Evoluzione e Cluster Tecnologici*, Aracne Editrice, Roma.

Pavitt, K. (1971), *The conditions for success in technological innovations*, OECD, Paris.

Pavitt, K. (1984), "Sectoral patterns of technical change: towards a taxonomy and a theory", Research Policy, Vol. 13, No. 6, 343-373.

Pininfarina, A. (2008), "La conoscenza come fattore competitivo nell'impresa industriale", Sinergie, No. 76, 15-20.

Schilling, M. A. (2009), *Gestione dell'innovazione*, McGraw-Hill, Milano.

Schmookler, J. (1966), *Invention and Economic Growth*, Harvard University Press, Cambridge.

Schumpeter, J.A. (1942), *Capitalism, socialism, and democracy*, Harper & Row, New York.

Schumpeter, J.A. (2010), *Il capitalismo può sopravvivere? La distruzione creatrice e il futuro dell'economia globale*, ETAS, Milano.

Silvestrelli, S. (2004), "L'innovazione nei settori industriali: implicazioni di mercato e nuove logiche concorrenziali", Sinergie, No. 64-65, 25-64.

Tushman, M. and Anderson, P. (1986), "Technological discontinuities and organizational environments", Administrative Science Quarterly, 439-465.

Utterback, J.M. and Abernathy, W.J. (1975), "A dinamic model of process and product innovation", Omega, Vol. 3, no 6, 639-656.

Verganti, R. (2004), *Innovazione di prodotto e sviluppo delle imprese*, in MUNARI, F. e SOBRERO M., (a cura di), *Innovazione tecnologica e gestione d'impresa. La gestione dello sviluppo prodotto,* Il Mulino, Bologna.

Von Hippel E. (1988), *The Sources of Innovation*. Oxford: Oxford Press University.

Yin, R.K. (1994), *Case Study Research, Applied Social Research Methods Series*, Vol. 5, Sage Publications, Thousand Oaks, London New Delhi.

Wheelwright, S. and Clark, K.B. (1992), *Revolutionizing Product Development*, New York, The Free Press, Boston.