

The management of the innovation: A complex process

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Abstract : In an environment whirlwind, where the company is in front of the imperatives of the globalization, of the consequences of the competitiveness, of the economy of knowledge and in the various questions connected to the strategies of the sustainable development, the management of the innovation became a major concern for companies. According to Nonaka and Takechi (1995), the innovation is a strategic element to the strengthening of the competitiveness and the competitive positioning of the firm of which its main mission is on the market. She also allows to do:

- ✓ Improve key skills
- ✓ Increase the productivity
- ✓ Improve the competitiveness

Micheal porter indicates that the innovation is the key of the competitiveness of companies, because it conditions their capacity to reserve sustainable competitive advantages on evolutionary markets. And this determining indicator of the profitability and the competitiveness of companies and consequently a major component of the strategy of the company.

Keywords - Innovation, management, project management strategy, knowledge management, competitiveness, Environment.

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I. Introduction

Today everybody speaks about the innovation: the politicians, the companies and the economists. The question that arises is why this concept draws more attention? The answer it is because the innovation seems as the tool capable of assuring the development, even the continuity of companies, thus to contain and to create jobs...

Therefore, the definition of the notion of the innovation is an essential stage allowing including the reason why the concept became so important object of management. The following article, handles at first the concept of the innovation and its various typologies to master the constituent elements of the process of management of the innovation.

At present, the innovation affects all the fields of activity. It is at the same time a result (a new product, a new service, a new process, a new technology, a new know-how), and the process followed to reach this result been the object of the management of the innovation. We return in the first section, on the various types of the innovation as well as the forms of innovation.

In industrial companies, the innovation is an effective tool to face the competition which became strong in the national and international channel. And it is a relevant way to assure the sustainable development. Other than these main reasons, Sandrine Fernez-WALCH and François ROMON, confirm in their works of the management of the innovation (2013), as by nature the innovation is a risky action. Thus and the stakes are considerable both at the internal level as that extern of the company.

The innovation is an action scheduled, organized and managed in the internal of the company and in the extern also. For that purpose, the management of the innovation is the key element for the success of the innovation.

At the base of this introduction, the following article allows the readers to understand well the notion of the innovation, and then to understand the complexity of the process of innovation which the manager is supposed to manage.

II. Definition Of The Word "Innovation" And The Typologies

1. DEFINITION OF THE INNOVATION

The term «Innovation» corresponds to a polysemy; its definition depends on the context in which he is used. It can be a global process in the invention, the adoption of a novelty by a company and a novelty itself. (Daltman, Duncan and Holbek, on 1973 and Barreyre, on 1980).

In the first sense, the innovation extends in the creative process by which several entities or notions are coordinated in a new way. This process learns by the conception of a new idea up to the implementation of a solution and, by the use of a new ingredient having an economic and social value.

Secondly, the word "innovation" describes the process by which a new concept becomes an integral part of the culture and the behavior of the individuals or the group which adapts him. The mobile phone and the internet messaging are examples: they are not only new technical tools of communication which are added to the previous ways such as the mail, the fax, the landline telephone, ... but also the innovations which established the possibility of establishing remote real time links.

In the third sense, the word innovation corresponds to the element which was recently invented; whoever are the modalities (methods) of his presence. The case of the innovations based on the renewable energies, allowing to value the green economy.

Three shutters take place on the various domains with a complementarity between them. The first one questions originally, the identification of the innovation, the second the exploitation as well as the practice of the innovation and the third, the innovation as result of the launch of the innovation.

The basic definition of the term innovation indicates mainly the couple process and result of all which is new. According to several dictionaries, such as small Robert (edition 1981): "Innovate: introduce into an established thing something new, of still unknown." And "new: which appears for the first time, which has just appeared; which pulls from its recent character a value of creation, invention."

And thus, the innovation is a notion difficult to limit because she can take multiple forms. We can speak innovations of product (product / service), process (R&D, of organization) of strategy (improvement or of break), etc. It is thus difficult to suggest a only definition and which will take care all these forms.

Always in small Robert, the innovation can set as definition: "the introduction in an established domain of something new" (Thomas and Alberic, on 2013). This definition is very wide and useful. First of all, she allows underlining that we speak about innovation when there is introduction of a novelty in an existing domain. We can here consider it "Established domain" As the activity area in which practices (Or wish to exercise) the company. So, we can speak about innovation that if there is a try of marketing. It is moreover what differentiates the innovation of the invention. The innovation involves a work of economic nature whereas to invent is a work of scientific and technical nature (Thomas and Alberic, on 2013 p 19).

The innovation does not limit itself to the research and development, but also on the introduction to the market, the consumers, the economic models, the design, the marketing, etc. Sometimes the pioneer can be the inventor himself. It is the case when the company decided to apply an activity of basic research either the opposite, when the inventor hopes to realize himself the economic exploitation of his innovation. But in several cases, the company purchases inventions to try "to bring" them on the market through a new offer and an adequate economic model. For example, a producer buys the right to use a patent (certificate) to revise the process of production of his products.

This definition allows seizing well that the innovation can be an offer of a new product/service, a new way of designing or of making, either of a new organization or a new process. We can understand afterward that the degree of the innovation fluctuates from a case to the other one. As an example, the flat-screen television sets or the digital walkman, they are innovations in strong degree of novelty. As well as the putting at disposition of a free WIFI space in "Fast food" and the launch of USB keys with a storage capacity raised can be also concrete examples of the innovation. Thus and we can have two types of innovations: one of the break, the other one incremental or the improvement (relative innovation in some decorates).

Finally, these explanations allow understanding that the innovation is the "result" of an entrepreneurial will aiming at the launch of a new product for example as well as a process which allowed having this result (the various stages for the launch). And thus, the innovation is a result of a process. In that respect, the pioneer (the decision-maker) has to settle generally two questions: what is the desired result? How to affect this result?

We can handle at first the innovation as a result and identify afterward the various forms of innovation which we can meet. And then, indicate the various types of process of the innovation which lead to the result.

2. The forms of the innovation: radical, incremental and of break

The radical innovation is the consequence of a new organized technology (the passage of the analogy in the digital technology), of the implementation of a new way of making, of an original operation collecting for example in a system of the features realized by several existing systems (the example of the first mobile phone of the type Palm, established on diverse technologies connected in a single system, allowing at the same time to phone, to reach Internet and to manage its schedule. An innovation of break allows having a certain transformation and creates a notable change.

And thus, the radical innovation consists in exploiting knowledges and / or new know-how (created for the occasion or transferred by related domains) to improve the attributions of the offer. The effort of innovation consists globally in this case on the development and / or the use of new technologies. The example of the launch of the compact - Disc: corresponds to the integration of the digital technology in the industry of the photography and gave to a radical innovation (digital cameras without film) (Thomas&Alberic,2013, p28).

The incremental innovation, or of improvement, corresponds to a continuous improvement of efficiency (characteristic, costs) of the existing offer, no more requirement regarding novelty of the knowledges and know-how is necessary.

She is presents a set of acts of learning and experience on a given technology. This type of innovation is very frequent. The example of the first USB key which represents a radical innovation, but after the various appearances which succeed consists in incremental innovations with an increase stressed by the storage capacity.

The comparison enters the radical and incremental innovation bases itself in the first place on the support for the integrated technological change. But the introduction of new technologies can invert the value chain of the sector, question the current economic models, remodify the market, and reconfigure the working parameters (the case of a new manufacturing process).

Thus and you should not mix between "the innovation of break"and"the strategy of break". According to Lehmann-Ortega and Roy (on 2006, p121) "the strategy of break consists for a company to revisit in a radical way rules of the game competitive by proposing a new value to the customer to create or spread a market to its advantage"

Certainly, this type of strategy can mainly base him on a technological innovation. It is the case of eBay when he upset the international market of the bids by the use of the NTIC in the development of on-line services.

In certain cases, Strategy of break can rest on an innovation the degree of which of innovation is not important. As an example: the designer of the Cirque of the sun, he Resuscitated the sector which was in decline, by adding a new vision to the customer. For this reason, he voluntarily left the former elements of the circus such as animals, while introducing new aspects such as the theater and also the dance shows choreography, etc. (Kim and Mauborgne, on 2005).

In other works, the incremental innovation is named relative innovation; it presents the result of the improvement of a product, a process, know-how or a technology transfer from an application to another one. Of this day, most of the innovations are relative innovations .example of the iPhone: it is the relative innovation but that was able to attract several users, contrary to the already existing products, thanks to its ergonomics, its ease of use (technologies perfectly mastered by the touch-sensitive screen, by the download) and also thanks to the marketing of Apple, particularly effective (Sandrine&Walch, 2013).

The chip is the result of the implementation of a new technology. The first opportunity to use this innovation was in the banking sector. It is an innovation of break. Other uses of the flea can be considered as incremental / relative innovations.

Finally, the comparison enters radical and incremental innovation is practical to seize the ways that the decision of the innovation in the company can make. Saad and al (1992) explains that we can find this distinction in the activity of R&D. The latter can correspond to a scientific and technological discovery of the unknown. The R&D can be the source of a radical innovation when it manages to produce a new product on the basis of the existing but insufficient scientific and technical knowledge. The works of this action can be the object of a purpose of incremental research. We target in this case the execution of small technological progress engendered by a scientific and technical knowledge bound to technologies enormously communicated.

III. The Management Of The Innovation: A Complex Process

The innovation holds an important place in the decision-making front of competition between companies. And the management of innovation presents an action of management of the processes of a continuation of notions which spreads out of the approval (development project of new products) towards the upstream (research).

Before, the principles of the convergent engineering authorized to surpass the limits of the traditional models of project management, on the other hand today, this "revolution of the conception" questions the organization of the firm in its entirety.

The company cannot take care anymore all the projects which it finds. And thus to market a completely new product, the company has to set up a process of creation, the definition of the strategy and the execution.

In her work " Of the idea to the market, Innovation and product launch, Vuibert, on 2000 ", Bloch A and Manceau defined the process of innovation as all the stages which are going to allow to pass " of ideas " more at least new in products, services or processes were exploited on a market.

The study made by Steven and Burley (1997) explains that are needed 3000 ideas to generate an economically profitable product. It can arrest easily. On one hand, the ideas do not resist in front of tests. The example of the pharmaceutical industry: a molecule on 10 000 identified finally gives birth to a medicine (Schilling, 2006, p17).

somewhere else, the financial, technical and human skills of the company are necessarily limited. What requires procedures of selection, evaluation and negotiation of the action of innovation. (Thomas&Albéric, 2013).

Within the firm, the ideas and the projects are always in competition for the financing. The carrier of the idea has to request the support of numerous actors who are afterward going to help the idea to join several domains allowing his realization (an activity sector, markets) these actors can be colleagues who are going to bring an appreciation to solve the technical problems and develop the potential of the idea, the commercial which are going to detect the opportunities of market, external partners to know about suppliers or about customers who are going to express their interests it is also the managers of the company that have the capacity to assign resources (team, budget). This process can lead the carrier to an adjustment of its first idea. It is for it is difficult to give the paternity of the idea to a single person (Latour, on 1989).

The classic model handles the process of innovation according to a linear plan having her sources in the basic research, which takes the applied research, then the production and finally the distribution.

The models granting of the innovation are for the development given by the science, is for the drive exercised by the market, present the same limits.

It is the reason why these figures made way for representations closer to the reality, as the model of the interconnected chain, proposed by Kline and Rosenberg and opted by an increasing number of researchers.

1) The linear model: the result of a double determinism

The linear model is considered as hierarchical, in the pace where the stages of the process join a determined order and every stage engenders primitive required of the following stage, what leads to estimate, on one hand, that the stages have a likely character and on the other hand that the basic search warns certainly the technical innovation.

The approach by the offer: the technical determinism

The said approach " technological-push " bases itself on the hypothesis according to which the internal development of the techniques establishes(constitutes) the only source of the innovation.

The major problem of the linear model pressed on the innovation is triple: in the first place, he does not allow to assimilate to the analysis the complexity (technical, economic and social) which determines the processes of innovation, later he does not prove the relations of circular causality which often maintain the science and the techniques and finally, he excludes the sartorial diversities as regards the stage of scientific and technical development and the degree of speech in knowledge.

The approach by the demand : the determinism of the market

This approach is adjusted by Schmookler since the publication in 1966 of its work *Invention and Economic Growth*, is conceived on the hypothesis according to which the request can influence the technical progress according to two reasons: on one hand, the capacity to be invented is flexible, practicable for all the properties simultaneously, and answers opportunities of profits. On the other hand, the more the current or potential market is interesting, the more the potentialities of invention are immediately bound with the size of the market, more we find of competent inventors capable of bringing a solution or an invention to the technical difficulties, given that they are incited by the opportunism of the profit.

By omitting the effect of the progress of technical knowledge on the innovation in favor of the request, and by putting the accent on the pace of the level of investment and the number of patents (Patented inventions) Schmookler leads to meditate that the availability of a request is enough for solving any technical problem as far as such a technical solution is advantageous. Golden, although the request exists for a number of problems we have not guessed the technical solution yet. It is the case for example non-polluting sources of energy, cure for the cancer and for all that other human diseases, plants and animals. It is so to neglect the contribution of numerous innovations on the cost price of the manufacturing of existing product.

The approach by the demand provokes, finally, the same fundamental criticism supported on the model based on the offer, as far as it is also about a linear model in which the firm is considered as black box (flight recorder) and consequently numerous elements are arbitrarily moved away.

2) The model of the interconnected chain

The model of the chain interconnected according to Kline and Rosenberg: consider the innovation as a complex process, checked on one hand by the strengths deriving from the market and on the other hand, by the technical and scientific progress. These two classifications being bound by unexpected subtle reflexes. The innovation is characterized, as a consequence, by a high degree of difficulty at the technical levels, economic and social, as well as by a degree of uncertainty immediately correlated to the importance of the innovation, we can observe also the presence of sectorial specificities as regards the sources of innovation, the typology of products and production processes, as well as outlets. This event has an evolutionary character, which sometimes makes even

more competitive the improvements consecutive to a first entrance of the innovation. Moreover, if it is just that the attentions of the technical type are compulsory, the fact remains that they do not form a criterion of easy performance so that the innovation is economically viable and/or profitable and socially suitable. It is the reason why several patented inventions are not marketed.

For reasons of economic order, in terms of cost of the R&D and the perception of market needs, is added the requirement to maintain an organization capable of holding solidly and effectively all the activities bound to the innovation. And, sometimes, the obligation to submit itself to regulatory requirements, as it is the case, for example, pharmaceutical sectors. Let us add, finally, the complication of the appreciation of the results of the innovation, as far as, on one hand, the latter affect as well the sector of origin of the innovation as ruled out sectors and / or sectors bound to the supply of intermediate products and, on the other hand, there is no way of all over the world recognized evaluation. Coordination of the internal technical resources of the company and the externs.

It is also the reason why there is no simple way or no ordinary solution to guarantee the efficiency regarding innovation, but rather a complex of conceptions and possible solutions according to every particular incident.

IV. Conclusion

Through this article, we tried to give the maximum of information to seize the various imperatives of the management of innovation. We also tried to make a review of allowing literature: the definition of the innovation and its various forms and the models.

All the scientific community confirms today that the innovation is essential to the competitiveness and the sustainability of the company, because a company which does not innovate is condemned in the shorter or longer term to the disappearance. And thus the innovation constitutes what we call a competitive advantage for the company, because it contributes to the improvement of its competitiveness and its growth as well as its value in front of all the partners.

She can be an instrument of management of the Humans Resources (HR) when she aims at a development project HR of which the purpose to change the symbolic perception of the company (Belloti and Temri, on 1999).

The notion of the innovation is popularized by Schumpeter, considering the innovation as the act to transform a saleable invention into products, indeed, Schumpeter handled the process " creative destruction ", in which the innovation is the essential impulse which puts in movement the economy both for the consumption (new products) and for the production (new method of production). According to him, the entrepreneur has a central role in the act to innovate. It also handles the concept of cluster of innovation which suits in multiple innovations which engenders following an invention, so every big innovation is a carrier of numerous practices establishing clusters of innovation.

The innovation can have several typologies, according to the nature, the place and according to the degree of radicalism of the innovation. Bellon (1994) explains two typologies: that of Freeman (1982) and the other one on the "place" of the innovation. The first one, makes the distinction between all which is incremental, minor, radical, which draws a break (the example of the technological innovation which results from numerous radical innovations, having an effect on the quite whole economy; the second, particularizes the existing products and the new products, the organization, the processes. Each of these typologies can be united with a distribution according to the degree of uncertainty and risk. According to INGHAM (1995) the innovations of products are a part of a growth strategy, whereas the innovations of process flavor of logic of maximalisation of profit.

To conclude we return to the confirmation of the father of the creative destruction, Joseph Schumpeter, who confirms that the innovation establishes one Strategic will, she allows the company to have a competitive advantage, the latter is translated by the profit and she requires the company to anticipate the evolutions and modify her environment, thing which requires the coordination enter the triptych management-innovation-change!

References

- [1]. Aissaoui Safae , « connaissance et innovation pour un partenariat science-industrie », presse économique du Maroc,2015.
- [2]. BARLATIER Pierre-Jean , « management de l'innovation et nouvelle ère numérique : enjeux et perspectives »,2016.
- [3]. Bassala G.«The Evolution of Technology»,Cambridge University press,1988.
- [4]. BLANCO Syline et LE LOARNE Séverine, , « Management de l'innovation », école Grenoble de management, 2ème édition,2012.
- [5]. BROUSTAIL J.FRERY F.(1993) « Le management stratégique de l'innovation »Paris,Dalloz,Coll.Précis de gestion.
- [6]. Bloch A et Manceau « De l'idée au marché , innovation et lancement de produits », Vuibert,2000.
- [7]. BROUSTAIL J.FRERY F.(1993) Joffre P. et Loillier T.(2008), « Stratégie : à la recherche du bâton de pèlerin (perdu)... »in M.Marchesnay.et M.Payaud(coord.), pouvoirs et stratégies,Vuibert,p189-204.
- [8]. CHIROUZE Yves , « Le marketing études et stratégies, transversales collection dirigée par Alain NONJON »,édition 2003.
- [9]. CHOFFRAY J.-M.,DOREY F.(1983),«Développement et gestion des produits nouveaux,concepts, méthodes et applications »,Paris,Mac Graw Hill.
- [10]. Dougherty D, « Interpretative barriers to successful production innovation in large firms », in Meindl J., Stubbart Ch. Et Porac J. (eds), Cognition within and between organizations,London,SAGE publications,1996.)

- [11]. DURAND Thomas , « le management de la technologie et de l'innovation », 1999.
- [12]. DURAND Thomas , « les déterminants du comportement d'innovation des entreprises : facteurs internes et externes », université de Paris-Nanterre, 2009.
- [13]. Durand T. (2010), « Par-delà la R&D et la technologie : vers d'autres formes d'innovation », in M.Godet,P.Durance et M.Mousli (dir.), Créativité et innovation dans les territoires, Rapport du Conseil d'Analyse Economique,p.143-158.
- [14]. Drucker P, cité par Battini P, « Innover c'est gagner», Paris,Dunod,1991,P45.
- [15]. GORIA Stéphane , « cartographie et processus d'intelligence économique, l'analyse du plateau de jeu comme aide à la décision stratégique », les cahiers du numérique 2009/4 (vol 5) p 111-137.
- [16]. HAKMI Larbi , « Management de l'innovation : théories et méthodes », édition Horizon Pluriel, 2010.
- [17]. Kim,C,et Mauborgne,R « Stratégie océan bleu,Village mondial ».(2005), .
- [18]. Latour B. « La science en action », La Découverte,(1989).
- [19]. Lehmann-Ortega L. et Roy P.(2009), « Les stratégies de rupture. Synthèse et perspectives »,Revue Française de Gestion, N°197,p .113-126.
- [20]. LOILIER Thomas et TELLIER Albéric , « Gestion de l'innovation : comprendre le processus d'innovation pour le piloter », 2ème édition,2013.
- [21]. MAANINO A. , « Les théories économiques de l'entreprise »,2016.
- [22]. MAANINO A,SAAD G , « L'apport du management de l'innovation à la théorie évolutionniste de l'entreprise », 2016.
- [23]. MUSTAR Philippe et Hervé PENAN , « Encyclopédie de l'innovation », édition Economica,2003.
- [24]. MORAND P.et Manceau .D, « Pour une nouvelle vision de l'innovation », Rapport pour le Ministère de l'économie, de l'industrie et de l'emploi, (2009),.
- [25]. ROMON François , Fernez-walch Sandrine , « Management de l'innovation de la stratégie aux projets », vuibert,paris,3ème édition 2013.
- [26]. SCHILLING M. (2006), « Gestion de l'innovation technologique », traduction F.Thérinn,Maxima.
- [27]. TARONDEAU J.C, « Recherche et développement », (1994), Vuibert,Coll.Gestion.
- [28]. [28]TEMRI Laila , « les processus d'innovation : une approche par la complexité, communication à la IXème conférence internationale du management stratégique »,2000.
- [29]. TOURABI Amina, « contribution à la description du comportement d'innovation dans les organisations : cas des PME en industrie agroalimentaire »,2015.
- [30]. VERSTRAETE Thierry et AL , « le business model : une théorie pour des pratiques, Entreprendre & innover » 2012/1 (n°13),p7-26.
- [31]. Weil Thierry , « le management de l'innovation dans l'entreprise », Annales des mines,2003.
- [32]. WOODMAN HELLRIEGEL SLOCUM , « management des organisations », traduction de la 5ème édition américaine par Michèle TRUCHAN ,saporta 1989.
- [33]. Roussel, P. A., Saad, K. N., & Erickson, T. J. << Third generation R&D : managing the link to corporate strategy Boston: Harvard Business School Press>>,(1991).
- [34]. Bellon Bertrand, Niosi Jorge. « Des systèmes nationaux d'innovations ouverts ». In: Revue française d'économie, volume 9, n°1, 1994. pp. 79-130.
- [35]. Nonaka, Ikujiro, and Hirotaka Takeuchi. <<The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation.>> Oxford University Press, 1995.
- [36]. [36]Steven and Burley J (1997),<<300 RAW,ideas=1commercial success"Research Technology Management>> vol,40,n°3,p16-27.
- [37]. DALTMAN. G, DUNCAN. R. and HOLBEK. J, (1973) <<Innovation and organizations>>,ed.John Wiley,New-York.
- [38]. Freeman C.et Perez.C. <<Structural crises of adjustment: Business cycles and investment Behavior>>in Dosi G.,Freeman C.,Nelson R.et al. (eds), Technical change and Economic Theory, London, Pinter,1988,pp38-66.
- [39]. INGHAM, M. (éd.) (1995), <<Management stratégique et compétitivité>>, Bruxelles, De Boeck Université, 549 p.
- [40]. Jacob Schmookler, <<Invention and Economic Growth >> (Harvard University Press, Cambridge, 1966).

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