

Development of an integrated innovation management methodology based on Moroccan Agro-food firms.

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Abstract: This article aims at answering the question: How to innovate? Thus, we adopted the process mapping method to develop an integrated innovation management method. A synthesis of the existing innovation process models was drawn up while respecting the process mapping standards. An integrated innovation process mapping model was developed. This model was validated in two agro-food companies in Morocco. This model could be enhanced by future studies in order to integrate the processes installed by the company to affect the business environment.

Keywords: Innovation methodology, Innovation processes, Agro-Food, Morocco.

1. Introduction

To be innovative becomes imperative because innovation can be a source of competitive advantage for companies [1]. There are a lot of researches on innovation and they relate to several innovation aspects. Some researches have related to the innovation process [2]. Others have focused on the impact of the technological evolutions on innovation [3]. Other researches have focused on the market demand [4]. J Utterback and Abernaty (1975) [5] were interested in the dynamics of innovation by distinguishing the product innovation from the process innovation. Eventually, researches have even shown the inconsistency of the various results on innovation [6]. This article aims at answering the question: how to innovate? The result of this study is an integrated method, which we developed on the basis of the process mapping standards. The developed model was validated according to two firms cases in the agro-food sector in MOROCCO.

In the first section, we will draw up a synthesis of the innovation process models followed by a recall of the process mapping standards. Then, a section will be devoted to the description of the methodology adopted in this research. We will deal afterwards with the results of this study and their discussion. Thereafter, the integrated innovation management method will be presented. Finally, we will conclude by presenting the method's usefulness and development axes by the future studies.

2. Literature analysis

The product development process is designed in the form of sequential steps separated by milestones. H.K.Tang [7] has summarized these steps as follows: generation of ideas, project definition, concept development, detailed development and launching on market. The other linear models suggested in the literature [8] are similar as regards the contents of the steps even if the designation of these steps differs.

The huge number of researches on innovation resulted in the need for an integrated innovation management model. Thus, researches have been carried out: Boaz Bernstein, Prakash J. Singh [9] have highlighted an integrated model. The latter is based on the linear model but integrates the feedbacks of the technological changes and also the needs of the market. Moreover, it points up the factors internal to the company, which support the innovation process. Indeed, the communication plays an important role in the upstream phases, whereas the control is more focused on in the downstream phases of the innovation process.

The majority of the researches relating to the innovation process mapping have focused on the carrying out processes. In return, the support and piloting processes, in spite of their importance, were not sufficiently considered. This did not encourage the development of an integrated method, which considers the various types of process. This study suggests to carry out a mapping of the innovation process (Carrying, support and piloting), by synthesizing the process models existing in the literature and by validating this model developed in real cases. The result is an integrated innovation management method.

3. Methodology

An analysis of the literature was carried out to draw an innovation process mapping model. A systems concept was adopted to integrate all the innovation system components. In order to validate the model, we have adopted the case-study method [10]; [11]. The cases of companies in the agro-food sector in Morocco were selected because it's a sector which, on one hand, shows a strong growth and, on the other hand, the competition is much emphasized [12]; the fact which let the companies to adopt a structured innovation management method. Several new products were developed to meet the growing and evolutionary need of the consumers.

Further to this synthesis, a questionnaire of 114 questions was drawn up and sent to the companies subject of this study. For the extraction of relevant information, the declarations were encoded and categorized [14], [11]. The encoded information was used to document or review the model. Several iterations were performed between the developed model project and the information extracted from the cases of the Moroccan agro-food sector, until this extracted information does not add anymore additional component. The interviews were carried out in workplaces; this allowed us, on one hand, to observe the processes and, on the other hand, to ensure an in situ observation of the company's culture and the employees' aptitudes.

4. Results and discussions

4.1. Carrying out processes

The result analysis allows delimiting the innovation carrying out processes, which are: generation of ideas, Product development, implementation and market launch. These four sub-processes comply with the linear models, which are proposed in the literature [8]. What we find is that each process is submitted to test. The validation of this test allows moving to the next process. This ensures a continuous piloting of the carrying out processes.

4.2. Piloting processes

The tests, which appraise each carrying out process, generate information, which is analyzed by multidisciplinary team called steering committee. It's always chaired by the general manager. The various tests, are as follows:

Generated idea test. A synthesis of ideas is drawn up and the selected ideas are tested against the following criteria: strategic alignment, availability of technology in the company and sales potential.

Developed product test: Once the product is developed in the laboratory of the firm according to the specifications indicated by the process "to generate the ideas", an internal test is carried out by internal trained testers. Before the product reaches the industrial test phase, a validation report is drawn up by the internal testing panel. A declaration of the officer in charge of quality for AG Company explains this test. "A test for the new product in internal panel is carried out. The product is either tested alone when it is new (not existing in the market) or benchmarked compared to the competitive products".

Industrial test: Once the product is validated by the internal test, a test of production of this product is carried out under industrial conditions. This test aims primarily to tuning the technical and technological constraints according to the company's conditions. Once these constraints are tuned, an external test is carried out in the firm's outlets, showrooms or large sales areas. A feedback is returned according to the consumers' reactions. "Once the technical constraints are tuned, the final test of the new developed product is carried out by a panel of consumers either in our showrooms or in large areas".

Product follow-up: Once the product is marketed, a follow-up is performed over a period of six months. This test, aims at satisfying as completely as possible the consumer's needs. Changes can be made according to the consumer's reaction. "The new product's behavior is followed over the six months by a marketing and commercial team. Modifications are planned during this period to adapt the product with the consumer's need".

4.3. Support processes

To ensure the success of the innovation carrying out processes, the company must support them. The results of this study have allowed detecting five support domains. Indeed, the company provides to the employees the *necessary knowledge*, allocates the *necessary resources and competencies*, ensures the reliability of a *physical infrastructure* and *adapts its culture*. The importance of these support domains varies according to the innovation carrying out processes of which the detailed description according to each domain is as follows:

Knowledge management process: In the phase of ideas generation, the necessary information must be collected and provided to the team in charge of ideas generation. "To ensure the availability of the information required for the ideas generation, in addition to the questionnaires managed gathered from the consumers, we inquire close to the suppliers about the new ingredients, on the agro-food sites, the trade organs in addition to the lawful and competitive intelligence". Similarly, the ideas, which were generated and which were not carried out, are maintained so that they will be improved in the future. As far as *development* and *implementation sub-processes* are concerned, the interviewed companies focused on the protection of the intellectual property. "Before starting the investment for a potential idea, I must proceed to the protection of the intellectual property even if the idea has failed. This is less risky than if the successful idea is copied by a competitor" As regards the knowledge management field, three sub-processes are pointed out: to provide relevant information, to maintain the ideas and to proceed to the protection of the intellectual property.

Competency management process: The most important fact arising from the interviews is that the ideas are generated in committee where the various participants (GM, officer in charge of marketing, R&D, quality and production) discuss to ensure a continuous generation of ideas. Thus the company must guarantee the availability of a qualified multidisciplinary team. During the *product development* process, the interviewed companies have confirmed that they have trained their teams to be able to carry out internal tests. Thus company must ensure internal test competencies.

In the same way the teams in charge of marketing, in addition to the marketing task, they shall be trained on supervision, observation and listening of consumers during the external tests of the product.

During the follow-up of the new product launch on the market: In addition to the distribution task, a team is dedicated to the follow-up and the collection of the consumer's reactions towards the new product. For the domain of competencies, it arises that the company must, ensure multidisciplinary competencies to generate ideas, ensure internal test competencies, ensure competencies to carry out the external test, and ensure competencies of follow-up on the market.

Physical infrastructure management process: Ideas generation: During *idea generation process*, the interviewed companies have confirmed the need for maintaining the ideas, which did not receive the necessary support investment. These ideas are documented, and these documents are stored for a later use. A declaration of the AM Company's GM is reported. Any idea generated must be documented. These documents of ideas are stored for a later use. The company must ensure a physical infrastructure, for example computer, for the backup of the documents relating to the ideas generated.

During the *product development process*, the interviewed companies have highlighted the importance of the availability of a laboratory in the company to put the ideas into practice and to carry out the development tests. This laboratory could be supported by external ones, if necessary. During the *implementation process*, the installation of an external test infrastructure is also important. One of the interviewed companies has its own outlets (showroom) to carry out the external tests. The other ensures this infrastructure through a partnership with distribution chains. During the *follow-up on the market*, the interviewed companies have declared that they had an outlet (Retailers) mapping to carry out the follow-up of the consumers' reactions.

The company's top management has confirmed that "The same partner retailers collect to us the consumers' feedback information and, each time, we upload the information and we take into account this information to adapt the product."

The physical infrastructure management must support the carrying out process. Thus, it must ensure the following processes: To ensure a data backup infrastructure, a physical infrastructure to carry out internal and external tests and follow-up of the product on the market.

Resource allocation processes: Each year, the AM Company allocates a budget for research and development which is about 20% of the annual budget. The AM Company's general manager has focused on the fact that: To ensure a growing sales turnover over the last ten years and the successful concretization of more than 50% of the ideas generated is owed to the fact that we ensure a special budget for innovation which is about 20% of our annual total budget".

Culture management process: During our interviews and visits to these companies, we have appreciated that the GM of these firms give a particular importance to the management of the *company's culture*. They endeavor to keep a direct connection with the employees, which allows them to assess the teams' moral and the climate within the company. During *ideas generation* process, the interviewed companies have focused on the reinforcement of the abilities to create by integrate the various available data. "During the planning of the annual objectives, we plan to leave a spare time for the collaborators so that they improve their way of making and generating ideas. During the day, the employee will be able to plan this spare time at his own way. During *Product development process*, the reinforcement of the abilities to resolve problems is more focused on. "In this phase, we do our best so that the employees not only propose ideas but also carry out them. We care for making them responsible". For the technicians and executives in charge of development of test products, what the company is interested in is the result. How to do it, depends on the collaborators and it's up to them to manage it their own way. My role is to ensure the specific training, if necessary. When it comes to *Implementation process*, in addition to the ability to resolve problems, the learning capability is clearly highlighted, by allowing the employees to work on several different tasks; this allows them to see things according to various angles. During the *product launch process*, the capabilities, which the management of two companies tends to reinforce, are the listening and learning capabilities. "We do all our best so that the consumer's need, such as it is expressed, will be transmitted by the collaborators. Thus, we train our personnel on communication and listening techniques and also on the control of the way in which our product is exposed at the distributor".

To synthesize the culture management processes, which support the innovation carrying out processes, the company must, reinforce the creative capabilities when generating ideas, reinforce the capabilities to resolve problems to support the tests and finally reinforce the listening and learning capabilities and the control during the product launch. Moreover, the company must be flexible during the projects planning by giving spare time to the employees to generate ideas or to improve them.

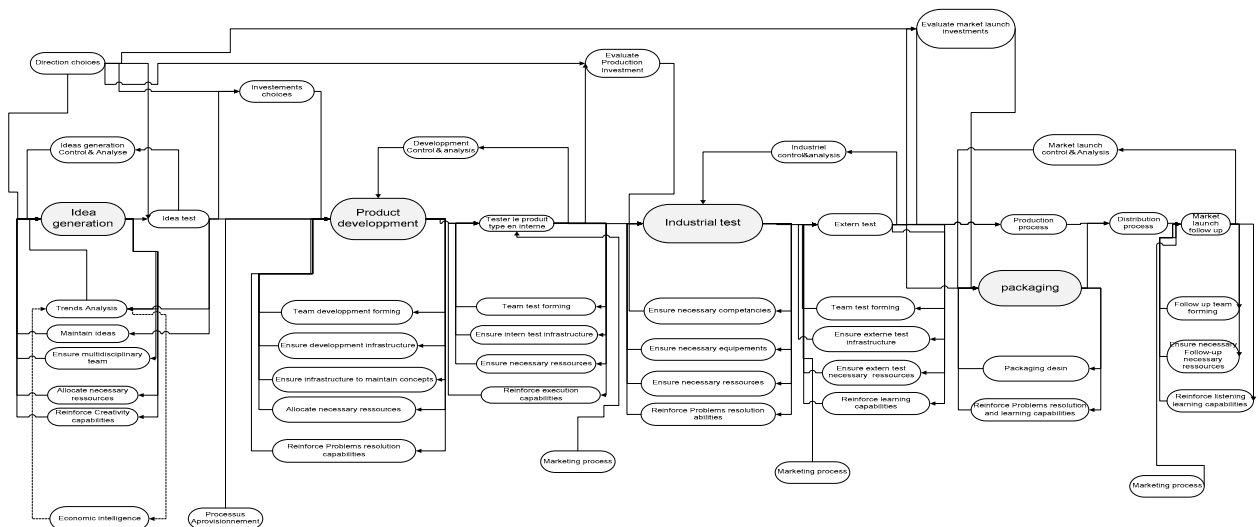


Fig. 1: Innovation process mapping

5. Conclusion

This study aims to answering the question of how to innovate. Thus, a conceptual model of an integrated innovation management method was developed. While focusing on the innovation process models existing in the literature, we have included the other types of process (support and piloting). The developed model was validated in two agro-food companies in Morocco. While considering the process mapping standards as an inspiration source, we have indicated how companies confronted with a strong competitive business environment, could succeed to create new products or improve the products already existing, by adopting a structured innovation management method. The availability of this method will allow reinforcing the company's innovation capability. It will allow the possibility of auditing the company's innovation method for continuous improvement.

Although the model is validated in two agro-food companies, it could be easily adapted to other companies acting in other sectors. This model could be supplemented to integrate, in addition to the processes internal to the company, the processes affecting its external business environment. This aspect has its importance in a globalized business environment where the weaving network is key mean to influence this environment.

6. References

- [1] Schumpeter, J., 1934. *The Theory of Economic Development*. HPS, Cambridge, MA.
- [2] Kline, Rosenberg, Clark, (1986). An overview of innovation appeared in R. Shallar (2004).
- [3] Ettl, J.E., 2000. *Managing Technological Innovation*. Wiley, New York.
- [4] Hargadon, A., Sutton, R., 2000. Building an innovation factory. *HBR*, May–June, 157–166.
- [5] J.Abernaty and J.M.Utterback (1975): “A dynamic model of product and process innovation” *Omega*, Vol.3 N°.6 1975, 99 639-656.
- [6] Wishnevsky, J.D. & Damanpour, F. (Spring 2006). Organizational transformation and Performance: An examination of three perspectives. *Journal of Managerial Issues*, 18(1): pp. 104-128
- [7] H.K. Tang, An integrative model of innovation in organizations. *Technovation*, 18(5) (1998) 297-309.
- [8] Crawford C.M. (1994), *new product management*. 4th ed, Irwin, Burr Ridge, IL
- [9] Boaz Bernstein, Prakash J. Singh, An integrated innovation process model based on practices of Australian biotechnology firms. *Technovation* 26 (2006) 561–572
- [10] R. Yin, 2003. *Case Study Research: Design and Method*, third ed. Sage, Thousand Oaks.
- [11] Eisenhardt, K.M., 1989. Building Theories From Case Study Research. *The Academy of Management Review* 14 (4), 532.
- [12] Aziza Belouas: Les industriels de la charcuterie inquiets : Lavieco : 30-09-2007.
- [13] Glaser, B., Strauss, A., 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine Publishing, Chicago, IL.