

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

Fatimaezzahra Fouad, *Fellow, IEEE*

Abstract—the studies on the innovation process and its impact on the commercial performance of an innovative project were quite numerous. The authors see a great interest in finding the best practices responsible for the success of a product through its development process.

In this sense, and due to the low added value offered by the innovative product for fish processing companies in our region of Souss Massa, we turned back to the study of the value chain of the realization of a "a canned product under the "Halieutis" program launched in 2009. This is oriented towards the exploitation of the fishery product through innovative actions and / or improvements from its upstream to its downstream.

On this occasion, we chose to study the possible relationships between the structure of this innovation process and the internal performance of the innovative product in question. The structure here reflects the measurement of the time elapsed for each step and test phase of the innovation process in both cases, namely: sequentiality and parallelism of the steps. The objective of this article is therefore to detect which of these two structures will promote the performance of the innovative product both internally and externally.

Index Terms— Agro-Food Industry, Innovative Product Performance, Innovation Process, Product Innovation, NPD Speed, NPD Performance

I. INTRODUCTION

Understanding the source, nature and dynamics of innovations in the agro-food system is relevant to both researchers and practitioners. From this point of view, in each agro-food subsystem, political institutions define policies and incentives that influence the outcomes of innovation (Levy, & Kuo, 1991).

However, policies will generate different results in each agri-food

This paragraph of the first footnote will contain the date on which you submitted your brief for review.

F. Fatimaezzahra is with Laboratory of Industrial and Computer Engineering at the National School of Applied Sciences of Agadir, Morocco, ENSA, B.P. 1136, Morocco (fatimaezzahra.fouad@edu.uiz.ac.ma).

subsystem and comparable positive outcomes can be achieved with different institutional arrangements for each (Tendler & Amorim, 1996). To better understand these subsystems, firms need to be differentiated in the agro-food industry between 3 main types according to the type of innovation strategy adopted (Miles & Snow, 1978). These types are prospectors, analyzers and defenders.

While a prospector company is looking for opportunities and responding quickly to changes in the external environment, analysts focus on effective and comprehensive analyzes of directional strategies and the best way to compete. Defenders will focus on maintaining existing markets and on price and quality competition rather than being at the forefront of innovation (Laforet & Tann, 2008).

According to our survey of IAA companies in the region of Souss Massa in Morocco, we often found ourselves with "defenders" companies who only react to defend their position vis-à-vis the competition through moderate or weak innovations. It is therefore clear that the difference between a prospecting firm and another defender lies in two things:

- The objective sought through innovation;
- How they manage their innovation activities in order to achieve a certain added value.

This is confirmed by the latest statistics showing that the main agricultural and sea products exported declined between 1998 and 2014. These products are classified as non-performing products due to the world market (Directorate of Studies and Financial Forecasts, Ministry of Economy and Finance (Morocco), 2015). In this sense, the current Moroccan agro-food company has begun a new strategy of non-price competitiveness in recent years. In the canned and semi-preserved sector, this is aimed at controlling the marketing of products, which is a qualitative criterion and is assessed by the type of collaboration existing with the actors of the downstream, the action marketing, product innovation, product quality and consistency, and level of service.

As a result of this new policy, the government launched the "Halieutis" program in 2009. This plan is therefore based on three strategic axes:

- Sustainability: ensuring the sustainability of the sector for future generations;

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

7

- Performance: efficiently manage landing equipment and infrastructure and establish a quality control mechanism to ensure that consumers have access to products with a high level of safety in terms of hygiene and health;

- Competitiveness: offering products that are well valued and competitive, facilitating access to raw materials for industrialists and placing on the most promising markets.

The realization of these three axes implies a fairly modernized value chain in order to meet the various objectives assigned by the program. This value chain will include:

- Prospecting of buoyant markets downstream of the chain in order to adapt to demand before competitors;
- An upstream sub-process facilitating access to the raw material;
- The efficient and effective management of logistics and production equipment;
- Plan rigorous quality and hygiene monitoring at all sub-processes.

We therefore conclude that in order to achieve an improvement in the new agro-food product distinguished from other competitors, the fish processing company must rely on a process that manages its innovation activity. To this end, this article deals with the objective practice (s) to be followed in an innovation process and which would promote the performance of the innovative product.

II. LITERATURE REVIEW

For a very long time, and apart from a few more integrated companies or subsidiaries of multinationals that achieve satisfactory results, the performances of the Moroccan agro-food sector remain overall below its potential. Low investment rates, technological backwardness, under-qualification of human capital, the predominance of precarious work, weak innovation and quality, and shortcomings in the managerial organization of firms, characterize the evolution structure of this industry. However, the imperative of innovation is very important for companies in this sector and plays a key role in maintaining and improving their competitiveness (Capitiano, Coppola, & Pascucci, 2010; Rama, & Von Tunzelmann, 2008). In this regard, and if we refer to some empirical studies of the 1990s, the authors found a U-shaped relationship between the introduction of innovation and profitability indicators such as return on investment (ROI), sales, profit and market share (Kleinschmidt and Cooper, 1991). This relationship reflected the role played by less innovative and highly innovative products in increasing the performance of a company.

To this end, we can assume that in the case of low innovation intensity, good management of the internal development process of an incremental innovative product could lead the company to achieve its economic objectives. This is especially true at a time when R & D remains under-exploited in the Moroccan agro-food sector. Thus, and before going to explore the process that is behind the potential performance of incremental product innovation, we will define the nature of this in the agro-food sector.

A. The nature of incremental product innovation in the agro-food

Whereas in the past, food processors have tended to focus on reducing production costs with little attention to customer service

(Lienhardt, 2004), now the pressures of globalization, ensuring food safety, nutritional quality requirements, and consumer demand for convenience, variety and quality, combined with new opportunities created by the biotechnology revolution, have all led to a change in attitude, through which the industry becomes more oriented to the creation of products that match what is required by consumers.

In a study conducted in 2012 on the types of innovation in agro-food SMEs (Baregheh, Rowley, Sambrook, & Davies, 2012), survey respondents to agro-food companies classified product innovation according to some points:

- Packaging innovation as a product subjected to the change in container volume;
- Innovation-product mixed with that of packaging as a product re-launched in a new packaging to make the product more artisan or more attractive.

Based on a study of the effects of innovation types on the firm's performance in 2011 (Gunday, Ulusoy, Kilpic, & Kalpkan, 2011), the authors identified certain factors that define product innovation. Among these factors we have:

- The development of new products with technical specifications and functionality quite different from those currently in use;
- A new development for current products leading to improved ease of use for customers and improved customer satisfaction;
- The development of new products with components and materials those are totally different from current ones;
- Reduction in the cost of manufacturing components and materials of current products;
- Increasing the quality of manufacturing of components and materials of current products.

In accordance with the above, we can summarize the different sub-types of product innovation as follows:

- Packaging innovation:
 - A new development for current products leading to improved ease of use for customers and improved customer satisfaction;
 - Reduced component manufacturing costs.
 - The use of new components through:
 - The development of new products with completely different components and materials;
 - Reduced component manufacturing costs;
 - Increased manufacturing quality of components.

We can therefore distinguish at this stage two results of product innovation:

- Innovation in terms of content;
- Innovation at the level of the container which is the packaging.

That said, and according to the Moroccan agro-food context, we often talk about a market-driven incremental product innovation. In addition, incremental innovations are "complements" of an earlier innovation, such as modifying materials used to produce a product or improving service operations (Bessant & Tidd, 2007). This sometimes involves integrating improvements at several levels of the

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

development process of a new product besides the innovation-product itself.

B. The position of product innovation in the innovation process

That said, product innovation in this study is defined as a multi-step process by which organizations transform ideas into new or improved products / services or processes in order to progress, compete and differentiate successfully their markets (Baregheh, Rowley, & Sambrook, 2009).

In a study by Dwyer and Mellor on industrial products in the United Kingdom, Australia and Belgium (1991), we find that for each stage of the process there were definite improvements to the innovative product via actions or by introducing equipment or a strategy, all of which affect its performance (see Table I).

TABLE I
 ILLUSTRATION OF THE DIFFERENT TYPES OF INNOVATIONS ACCORDING TO THE POSITION OF THE PRODUCT IN THE INNOVATION PROCESS ACCORDING TO THE DWYER AND MELLOR STUDY IN 1991

Stage of the Innovation Process	Suggested Product Improvements	Probable improvement
Technical evaluation	More attention to product attributes	Improve the nature of product components; Improve product architecture.
Commercial evaluation + Design of new product	More attention to product concept	Improve the nature of product components; Improve product architecture.
Product Development	More attention to technical issues	Process innovation; Organizational innovation.
Test production	More attention to the production system	Process innovation
Commercialization	More attention to promotion	Commercial Innovation

From the above, we come to the conclusion that innovation-product can not detach itself from other innovations or improvements during its process of realization. These innovations can be service and / or process that complement product innovation and support it in the same process of innovation, and consequently interact and influence each other (Baregheh, Rowley, Sambrook, & Davies, 2012b).

The company whose main activity is the manufacture of products often passes through an initial design phase followed by a feasibility test, which eventually leads to a development supported by the introduction of new processes which could also play the role of an antecedent resource upstream of the development process of the new product. As a result, we also identify the main activities likely to contribute to the success of a product innovation, such as the development of the first prototype, test production and marketing, all of which require continuous control and improvement in order to increase the performance of the innovative product.

C. The role of the innovation process in the performance of the innovative product

The main reason for innovation is the desire of the companies to obtain a performance of the company and an increased competitive advantage. Companies gain additional competitive advantage and market share based on the level of importance they place on innovation (Gunday, Ulusoy, Kilic, & Kalpkan, 2011).

In particular, four different performance dimensions are used in the literature to represent company performance (Narver & Slater 1990, Barringer & Bluedorn 1999, Antoncic & Hisrich 2001 Hagedoorn & Cloudt 2003 Yilmaz, Alpkhan, & Ergun, 2005). These dimensions are innovative performance, production performance, market performance and financial performance.

1) Innovative performance

Innovative performance is considered in the literature as one of the main drivers of other aspects of organizational performance. For example, Han, Kim, and Srivastava (1998) emphasized that innovative performance is a synergistic combination of technical and administrative innovations, contributing positively to organizational growth and profitability. They also argue that innovative performance is the missing link between organizational strategic direction and performance.

Innovative performance can then have positive effects on the production, market and financial performance of companies in the long term. That is, once innovative performance improves, production and marketing performance will also improve, and then, through mediation, financial performance will begin to improve (see Fig. 1) (Gunday, Ulusoy, Kilic, & Kalpkan, 2011)

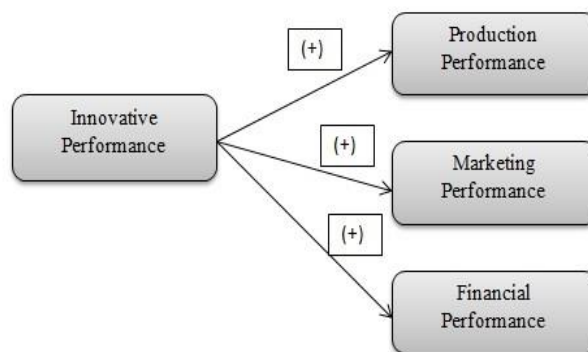


Fig. 1. The impact of innovative performance on other types of performance

We can thus assimilate this performance to technical habits that support the development and production of an innovation that will subsequently generate returns. In this sense, we can talk about the innovation process that plays this support role in production, and therefore in the generation of performance.

2) Production performance

The performance elements of production or operation are mainly

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

speed, quality, flexibility and cost-effectiveness. Successful renewal efforts, particularly in these production processes, can thus greatly contribute to the dissemination of knowledge and the effectiveness of coordination within the organization, necessary for operational flexibility and related costs (Koufteros & Marcoulides, 2006).

The previous empirical literature already confirms that the motivation for implementing these operational objectives is to increase flexibility for external adaptation, quality for customer satisfaction, speed of reliability and cost reduction for profitability (Alpkan, Ceylon, & Aytekin, 2002, 2003). Li (2005) pointed out that manufacturing capabilities - such as productivity, speed of delivery, etc. - contribute to market performance by improving customer satisfaction and improving customer relationships (see Fig. 2).

From these two notions above, namely; innovative performance and production, we present below the interest that the approach based on the process of innovation could bring to our study and with what new contributions on the performances of the production, the market and financial in relation to the old approaches to measuring innovation performance.

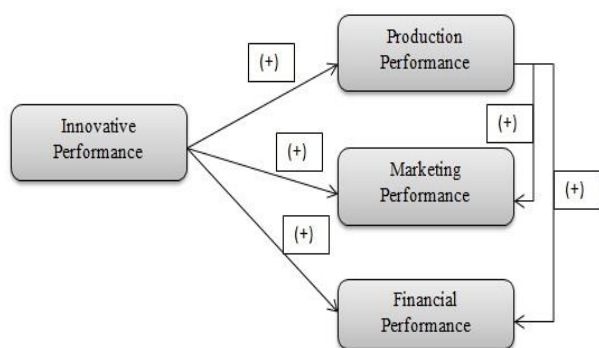


Fig. 2. The relationship between production performance and other types of performance

However, this measurement approach linking innovative performance to other types of performance is based on the literature on innovative technological capabilities, which in turn are subject to a more holistic measurement framework in terms of indicators.

D. The framework for measuring the performance of product innovation in the innovation process

Among the technological innovation capabilities, we find the resource approach (RBV) and the innovation process as dynamic capabilities. The approach (RBV) maintains that resources allow a company to be flexible and improvise, which improves the efficiency of its strategic business processes, including the New Product Development NPD (Cheng & Kesner, 1997, Moorman & Miner, 1997). The new product development process (NPD) is a related, specific dynamic capability that integrates these diverse resources to gain competitive advantage and create products and services (Eisenhardt & Martin, 2000).

From these two notions, Chiesa, Coughlan, and Voss, (1996) based their process audit model on: basic processes and process

facilitators. The basic processes are:

- Identification of new concepts through a generation of concepts;
- Development of the chosen concept into a new prototype;
- Development of innovation through the sub-manufacturing process.
- And technology management. Here we are talking about the acquisition of technology.

For the process facilitators, we have the same study:

- Deployment of human and financial resources;
- Effective use of the right tools and systems;
- Provide leadership to senior management.

The same authors completed their model with another audit called "performance audit". It focuses on the outputs of each basic process, and the whole process of technological innovation in question. For Chiesa, Coughlan, and Voss, (1996) a process audit focuses on issues such as whether the individual processes needed for innovation are in place and the extent to which best practices are implemented effectively. As for the performance audit, it focuses on the results of each core of the individual process and the entire technological innovation process and the impact of this on competitiveness.

Yam, Guan, Pun, and Tang (2004) have tried to test a number of capabilities on the company's performance. These capabilities are: resource allocation capacity, R&D capacity, learning capacity, manufacturing capacity, marketing capacity, organizational capacity, and strategic planning capacity. This set of capabilities was named the "functional approach".

In this sense, the author attempted to measure the impact of these capacities on three types of performance, namely: the performance of innovation measured in terms of the number of new products marketed; the sales performance measured in terms of the average annual growth rate of sales; and the performance of the product measured in terms of the competitiveness of the new product such as the average duration of the concept at launch, product series programming, quality level, cost, analysis of the competitive intensity of the market, market needs and growth potential.

The two theories above are very complementary, since the former focuses on the facilitators and the capacity of the internal process to generate output at the end of each process and the second seeks to measure the impact of each of these outputs referred to as "capabilities" on overall market performance (see Fig. 3). As a result, the process is the pillar on which all capacities are based so that they are accomplished according to a predetermined time, cost and quality as discussed in the relationship between innovative performance and performance production.

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

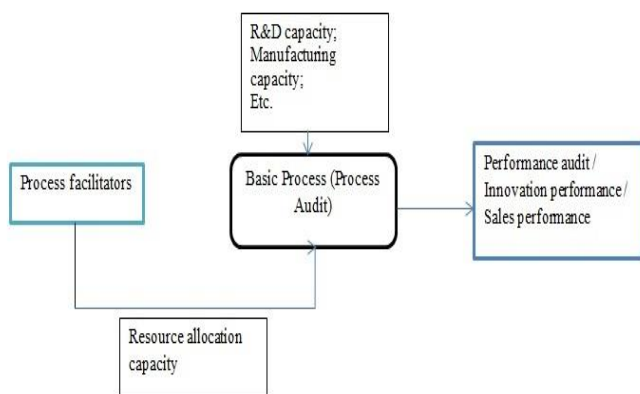


Fig. 3. The location of CITs according to the Chiesa, Coughlan, & Voss process theory (1996) and Yam, Guan, Pun, and Tang (2004)

According to these two studies by Chiesa, Coughlan, and Voss (1996) and Yam, Guan, Pun, and Tang (2004), the concept of innovation capacity comprises three elements:

- (1) The potential for innovation consists of factors that affect the current state of innovation capacity. Factors reflect the potential that organizations have to produce innovations;
- (2) Innovation processes are systems and activities that help organizations use their innovation potential and, therefore, enable innovation. They represent the way systems and activities are conducted;
- (3) The results of innovation activities are, for example, product / service innovations and process innovations (Saunila & Ukko, 2012).

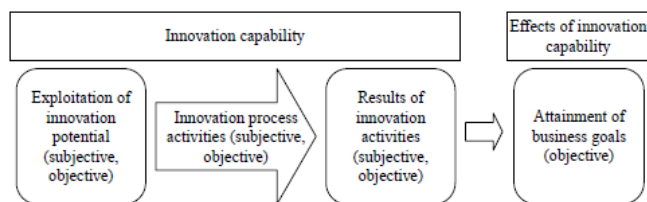


Fig. 4. Measuring innovation capacity and its effects (Source: Saunila & Ukko, 2012)

These three elements, which represent the framework for measuring innovation capacity, are based on the assumption that a positive relationship exists between an organization's innovation and overall performance. However, innovation capacity can not generally be measured directly (see Fig. 4). According to Assink (2006), disruptive innovation capability is a source of energy for generating and exploring new radical ideas and concepts, developing them into marketable and effective innovations, leveraging internal and external resources and skills. It is therefore essential to talk about an innovation that goes through a series of stages of development in order to realize a new, efficient and marketable product or service ranging from the potential of innovation to the result.

1) *The potential of innovation*

The exploitation of innovation potential is necessary to carry out activities related to the innovation process. In this study, the innovation potential refers to the factors that allow the company to create innovations. According to the earlier literature, the factors that constitute the innovation potential of an organization can be divided

into five categories:

- Leadership and decision-making processes;
- Organizational structures and communication;
- Collaboration and external links;
- Organizational culture and climate;
- Individual creativity and know-how.

In terms of CIT, only a few models are particularly targeted at measuring innovation. One of the few models presented by Capaldo, Iandoli, Raffa, & Zollo (2003) proposes a method for assessing innovation capacity with four sets of resources: entrepreneurial resources, human resources, resources external links and economic resources. Each set contains several measures to assess both the degree of innovation capacity of the market and the degree of technological innovation capacity (Saunila & Ukko, 2012).

As for the system for evaluating innovation activities, there are two contexts; that of the European Union, then that of the United States and Japan. But they are not very different from each other. The European system comprises 19 measures divided into 4 groups:

- Human resources;
- The production of new knowledge;
- The transmission and application of knowledge;
- Financing innovation and the results of innovation activities.

It should be mentioned that most indicators of the innovation assessment system coincide with the well-known indicators of the European Innovation Scoreboard, grouped into three groups. The first group of indicators reflects the required resources. In the other groups, the indicators characterize the activities and the results of the innovation. What matters to us in terms of potential is the resources of innovation, namely:

- (1) Facilitators who capture the main drivers of innovation that are external to the company:
 - Human resources measure the availability of highly qualified and educated people.
 - Funding supports measures the availability of funds for innovation projects and government support for innovation activities
 - Public expenditure on R & D (% of GDP);
 - Venture capital (% of GDP);
 - Private credit (relative to GDP);
 - Broadband access by enterprises (% of enterprises).
- (2) The firm's activities capture the innovation efforts that companies undertake by recognizing the fundamental importance of business activities in the innovation process:
 - The firm's investments cover a range of different investments made by companies in order to generate innovations.
 - Business R & D expenditures (% of GDP);
 - IT spending (% of GDP);
 - Innovation expenditure excluding R & D (% of turnover).
 - Connections and entrepreneurship capture entrepreneurial efforts and collaborative efforts between innovative companies and also with the public sector.
 - Innovative SMEs internally (% of SMEs);
 - Innovative SMEs collaborating with others (% of SMEs);

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

- Firm turnover (SME entry and exit) (% of SMEs);
- Co-public-private publications per million inhabitants.

Consequently, these two macroeconomic categories could be grouped into three more distinct micro-economic categories according to common criteria, namely:

- Intangible inputs: which include inputs in R & D (% in annual turnover);
- Material inputs: which include ICT, equipment and equipment in addition to advanced technologies (% in annual turnover);
- And relational inputs: which include the number of human resources in each department in addition to all types of collaboration (degree of internal and external collaboration).

a. Intangible inputs

As part of the contribution of R & D resources to the performance of the innovation process, many innovative ideas are driven by technology resources and knowledge, particularly R & D (Henderson & Cockburn, 1994). Using a meta-analysis of 60 articles, Henard and Szymanski (2001) found that marketing and technological resources greatly improve the NPD, the speed with which the new product is launched, and the market's performance. On the other hand, and according to a study of the impact of resource allocation capacities on the performance of a new product, R & D capacity has had an impact on product competitiveness between medium-large, but not in small enterprises (Yam, Guan, Pun, & Tang, 2004).

This study also shows that R&D capacity significantly affects the innovation rate of the firms studied. That is, at the level of large firms, the standard regression coefficient = 0.288 at the significant level $P < 0.05$ and at the medium-sized level (i.e. mode 2, the standard regression coefficient = 0.469 at the significant level $P < 0.01$). The outputs here are represented by improved prototypes or finished products (Yam, Guan, Pun, & Tang, 2004). As a result, and if we consider ourselves in a large company setting with a low-tech innovation, we expect the minimum R & D spending to contribute to the success of the concept, prototype and new end product.

We propose the following two hypotheses:

Hypothesis 1a: R&D spending significantly enhances the performance of the innovation process in the design and development stages and phases;

Hypothesis 1b: R&D expenditures favor very significantly the performance of a new product.

b. Hardware inputs

According to a study carried out in the sector of the IAA in Morocco in 2013, it turned out that this one requires major investments in innovation and modernization of the production processes. Investments in this area thus provide important opportunities for improving the overall competitiveness of the sector, and are encouraged by several mechanisms, including the Agricultural Development Fund and the Agro-Food and Agro-Industrial Industrial Platforms.

In this context, technical capacities are referred to as "non-R & D technological innovation factors" and are measured by three visual indicators, Technical Renovation Expenditures (TRAs), Technology Import Expenditures (TIEs) and Expenditures technology absorption (TAE) (Guan & Chen, 2010, Chen & Guan, 2011). In our present study, we focus on (TRE) and (TIE).

At the design level, rapid advances in computer technology and software have enabled large-scale complex computer simulations. According to a recent study of food businesses, they have been moderately engaged in the use of information technology to improve product development processes and the application of a standard process for the development of new products (NDP) (mean score: 3.1) (Baregheh, Rowley, Sambrook, & Davies, 2012a). We propose the following two hypotheses:

Hypothesis 2a: ICT spending significantly enhances the performance of the innovation process;

Hypothesis 2b: ICT spending contributes significantly to the performance of a new product.

For materials and equipment, some studies (Cooper, Edgett & Kleinschmidt, 2004a) discussed the importance of these expenditures in the early stages of an innovation process. On average, 12.1% of the total project costs, presented by equipment and equipment costs, are spent before construction begins. According to Cooper, Edgett & Kleinschmidt, (2004b) in their study on the comparison of the performance of companies according to the good practices, it specifies that the more efficient companies spend a higher rate of 13% in the equipment.

We propose the following two hypotheses:

Hypothesis 2c: expenditure on miscellaneous equipment and equipment significantly improves the performance of the innovation process;

Hypothesis 2d: expenditure on miscellaneous equipment and equipment significantly improves the performance of a new product.

As for advanced technologies, Booz, Allen, & Hamilton, (1992) also report that one of the most important incentives for new products in all industries is technological progress. This implies that rapid technological development favors the introduction of new products. These entries are made with the aim of generating incremental innovations to meet the needs of existing customers (Benner & Tushman, 2003; Danneels, 2002).

Thus, these innovative solutions provide newly improved benefits at the production process steps - such as quality of production, value, speed and low cost; which can increase the chances of success for new components, ingredients, new technical specifications, and new features (Gunday, Ulusoy, Kilic, & Kalpkan, 2011). In addition, in this same study by Gunday, Ulusoy, Kilic, & Kalpkan in 2011 on the effects of types of innovation, the model verified that process innovation supports innovative performance that supports production performance and performance of the market, which directly stimulates financial performance.

We propose the following two hypotheses:

Hypothesis 2e: spending on advanced technologies significantly

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

improves the performance of the innovation process;

Hypothesis 2f: Spending on advanced technologies significantly improves the performance of a new product.

c. Relational inputs:

Innovation in an agri-food system refers to changes in the agents involved in the value chain, their actions and interactions, and the policies that govern the system (Humphrey, 1995). Innovations depend on a network of actors working under specific rules to create new ways of dealing with social or economic processes. This concept underlines the importance of the specific relationships between actors and institutions for innovation within the agri-food system (Caiazza, Volpe, & Audretsch, 2014).

Alliances are a dynamic capacity that a company can derive from access to new marketing and technology resources, which in turn create a competitive advantage for the company (Mahoney, 2005). Marketing can therefore contribute to the speed of development of a new product and its market launch by working with technology to ensure that the concepts that are advanced in the development process are those that best meet the needs of the market, which may reduce the need for prototype market testing and post-modification development (Pisano, 1994).

The inclusion of "collaboration" as a determinant is motivated by several studies. Collaboration between members of the chain network is seen as an important factor in improving innovation competence (Gellynck & Kühne, 2010). On the other hand, there is an external alliance through the partnerships that can emerge between the company and the external actors at several levels of the innovation process. In this context, the company generally refers to its customers and suppliers and in some cases to universities, research centers and competitors.

We propose the following two hypotheses:

Hypothesis 3a: relational inputs significantly enhance the performance of the innovation process;

Hypothesis 3b: Relational inputs significantly enhance the performance of a new product.

2) The process of innovation

In the early literature, the authors focused mainly on input and production measures. Input measures include funds used in R & D and education (Tura, Harmaakorpi, & Pekkola, 2008). The input measure is problematic because it indicates how much is spent on innovation, not whether something has been accomplished. Measures of production, on the other hand, assess the effects of innovation capacity. Measures of production mainly include patents and licenses of the organization. Therefore, single measures have been proposed, but comprehensive measurement frameworks have not been developed. Therefore, the performance management perspective is not well incorporated into the current literature. For example, Kaplan and Norton (2004) presented a strategy map that shows how an organization can create value. In this approach, the innovation process is considered one of the important internal processes.

Koen et al. (2001) divide the innovation process into three main

phases: forward-thinking, new product development and commercialization. Herstatt, Verworn, and Nagahira (2004) suggest five phases: the generation and evaluation of ideas, concept development, prototype development and testing, production and introduction and market diffusion.

According to Skarzynski and Gibson (2008), in addition to the inputs and outputs of innovation, it is important to evaluate activities related to innovation processes. In this study, the company's innovation processes help the innovation potential to become a solid asset. Similar to this same approach, Carayannis and Provan, (2008) suggested a 3P framework for measuring innovation processes. The framework contains three categories, which are posture, propensity and performance. These categories include measures on innovation inputs, process capabilities and performance. The measurements are used to form an index, which shows the current state of innovation processes in the organization (Saunila & Ukko, 2012).

We conclude that the innovation process also holds performance indicators at its level before measuring its impact on the outcome of the final innovation. The two above theories provide the innovation process with the capacity to absorb inputs and the generation of performance results at its level, on the one hand, and the impact of this internal result on the performance of the product innovative on the other hand as shown in Figure 4. In this regard, it is important to explore how the innovation process contributes to this dual internal and external performance of the innovative product, mainly in the industrial sector food.

In an agro-food industry, the innovation process is often of the "market pull" type (see Fig. 5), because the agro-food business is rarely a pioneer in the launch of science-only innovations. This proves too risky for her in terms of return on investment. And this is of course to the conservative nature of the agri-food market. As a result, the agro-food enterprise is in most cases a category of value-creating imitators (Schnaars, 1994; Shankar, Carpenter, & Krishnamurthi, 1998).

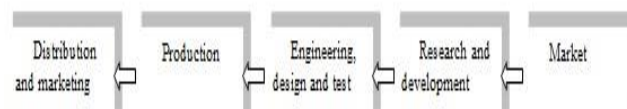


Fig. 5. The market pull process of the agro-food company

Shankar, Carpenter and Krishnamurthi, (1998) find that creatives entering the market late in the market can grow faster, slow down the pioneer's diffusion and, therefore, go beyond it. Moreover, in the case of imitation, the costs are often much lower than the first costs of innovation of a pioneer. In addition, existing products provide valuable information for future development, even if it is minor. On the basis of a meta-analysis of 23 empirical studies, Szymanski, Troy, & Bharadwaj, (1995) find that on average early entry is associated with greater market share and marketing mix more effective. Therefore, the good time control of the development process of a new product is very favorable to the commercial performance of a new product.

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

7

On the other hand, Balachandra and Friar (1997) constructed a contextual model for product innovation projects that offered three contextual dimensions: the type of market, the type of innovation, and the type of technology. Therefore, the contextual nature of the project also determines how the project is managed. For example, if the project is planned for an existing market, and an incremental innovation such as the agri-food industry, the company will need to set up a more organized project management with specific schedules and costs.

In this sense, we find that Cumming (1998) equates the three parameters of cost, quality and time with a business equation, where the performance of each parameter is done in the name of the other parameters. However, one of these three objectives aligns and can control the other objectives. It is "the reduction of the time of the arrival of the new product on the market", which represents for most managers a key of great competitive success (Tatikonda, 2007). This indicator has appeared frequently in various research, because the reduction in NPD cycle time has become a core objective for most firms (Bayus, 1997) and a potential source of a sustainable competitive advantage in markets mature sectors such as the LPN sector in our case (Langerak & Hultink, 2005; Sherman, Souder, & Jenssen, 2000).

This idea is supported by previous studies which argue that the fastest firms waste less resources on peripheral activities, changes and reworking (Clark & Fujimoto, 1991); and that "earlier product introduction improves profitability by extending the life of a product by creating an opportunity to charge a higher price and allowing development and manufacturing cost benefits" (Karagozoglu & Brown, 1993). In recent studies, there are enough studies that have emphasized the time factor of the innovation process from the point of view of its good management, once in terms of productivity of product innovation (Harmancioglu, McNally, & Calantone, 2007), and once in terms of the simultaneity of the stages (Bhuiyan, 2011) in order to be able to offer the customer the product he desires in the shortest possible time.

This characteristic of parallelism is opposed to that of the sequentiality of the steps, which, it increases the delay granted to the development of a new product. Therefore, we will study the impact of speed on introducing a new product to the market on its performance in terms of time, quality and cost. And this, through the two notions of recent time, namely: the sequential structure and the simultaneous or partially parallel structure of the stages of the innovation process.

a. The impact of the sequential innovation process on the performance of the innovative product in the agro-food industry

In this linear / sequential model, financial risks are assumed to be limited. In addition, controls and monitoring of innovation are relatively simplified. It does not, however, allow the rapid development of innovations because the process is long. The duration of the process is equal to the sum of the duration of each activity to which the decision times are added (Tomala, Senechal, & Tahon, 2001). In this sense, Costa and Jongen (2006) list the major obstacles to food innovation. Among them, they discussed the sequential approach of the innovation process and the lack of coordination or

integration of intra- and inter-organizational R & D with marketing activities. Nevertheless, given that the company takes its time in the corresponding changes to the new product at each gate of the process, the total cost of development and production would be reduced. This attitude could also positively influence the quality of the new product. Thus, and following the model of the linear / sequential process, we propose our fourth hypothesis:

Hypothesis 4: The sequential innovation process significantly improves the performance of the new product.

b. The impact of the partially parallel innovation process on the performance of the innovative product in the agro-food industry:

This partially parallel model can be characterized by two so-called active stops put together in order to adapt to technological and / or market changes. The first stop is designed to wait for market developments. Once his knowledge is deepened in the new market, and when this learning leads to reduced future uncertainties, the company is then able to return to the development of its product. Thus, by interrupting the process, the company will be able to allocate resources to strengthen its sales and be able to create a market by prospecting new customers or new needs.

The second stop is usually caused by a bottleneck in the technological development of products or processes. It is often caused by a poorly thought out start in technical terms, resulting in uncertainties in the innovation process. During this period, the company works on the improvement or the research of the technology and could start or intensify the activities of diffusion / of sales.

However, this technological development could also meet demands for new facilities as part of an emergency plan. These may include new instrumentation devices, new methods and tools for design and simulation, new components and / or subsystems with special characteristics or performance, and new methods for process control. This is tantamount to demonstrating the major role that could be played by the potential of innovation in the proper management of time put for the development of a new product.

Therefore and by joining the two types of stop above, some companies launch a first and sometimes primitive version of the product to be the first on the market or to establish an initial market position. The first phase of the process follows until the preliminary dissemination. Before further development, the company continues to seek out new customers and markets, or is simply trying to improve its product through a parallel market test. The development is accelerating, which improves the product and strengthens the sales efforts. This is what gives rise to the "partially parallel" process (see Fig. 6).

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

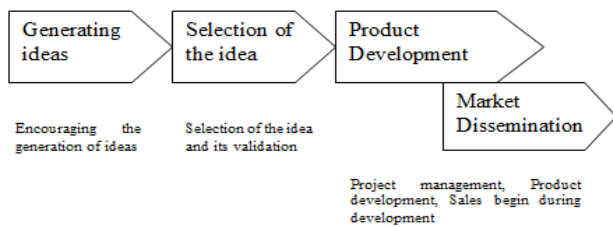


Fig. 6. The partially parallel process joining the two previous stops (Salerno, de Vasconcelos Gomes, da Silva, Bagno, and Freitas, 2015)

At the level of this structure, there are two main advantages:

- The advantage of shortening the response time to the market with a reduction in uncertainties related to the new product launched on the market. In this sense, the final version of the innovative product is launched only after a test in the real market;
- And the advantage that comes through communication between the various departments of the company, which creates a constructive collaboration to carry out the innovation project.

From this we can expect our fifth hypothesis:

Hypothesis 5: The partially parallel process significantly enhances the performance of the new product.

Our objective is therefore to distinguish between the impact of the two sequential and partially parallel structures on the performance of the innovative product, taking into account the potential of the innovation that is responsible for it. In this regard, Davila, Epstein, and Shelton (2006) argue that in order to succeed in a product development process, it must be possible to measure the resulting performance. Assessing performance in the product development process is particularly important for managers and decision-makers to address key management issues such as "what we do", "what we have learned" and "what should we do in the future "(Tatikonda, 2008).

c. The results of the innovative product performance in the innovation process:

The performance measure taken from the general NPD performance literature describes the multiple facets of performance of new products after launch but does not address how evaluation of new product development is oriented toward achievement specific performance results for each stage of the NDP. The development steps and gateways of development of the NDP process include the generation of new product ideas, the development of an initial product concept, an assessment of its attractiveness to businesses, real product development, its testing internally and with its customers, then its production and its actual launch on the market.

However, and following the departments generally present in the Souss Massa agro-food enterprise and dedicated to the innovation activity, we have eliminated the commercialization phase and will be satisfied with the study of the three early stages of the innovation process, namely: design, prototyping and production. According to the PMEX matrix, the preliminary steps of the discovery of the relevant idea in addition to its design belong to the planning activities. Implementation activities are more operational in the

design and construction of a product, usually involving detailed design, development of a first prototype, testing and refinement, and then the ramp-up of production (Cedergren, Wall, & Norstroma, 2010). Therefore, performance in product development as being focused on the effectiveness of subsequent phases of the product development process in terms of time, cost and quality.

Following the theory mentioned above, we are led to distinguish between the internal performance of the product, which generally manifests itself through the cost and the quality and the internal performance of the innovation process which is manifested in our study by the "time "Or the structure of its test steps and phases.

- Performance indicators for the innovative product in the innovation process:

Since the early 2000s, several studies have identified performance indicators according to their perception of the practice carried out by the different stages and phases of the innovation process (see Table II).

TABLE II
 THE MEASUREMENT CRITERIA USED TO EVALUATE THE PERFORMANCE OF THE INNOVATIVE PRODUCT ACCORDING TO THE DIFFERENT STAGES OF THE INNOVATION PROCESS

Author, year	The process step	The criteria used
Tzokas, Hultink, & Hart, 2004	The test of the concept to go to the development of the final concept	Profitability in the market, the financial perspective
	Testing the prototype for the development of the final prototype	Sales targets, margin, profitability targets
Suradi, Omar & Shahabuddin, 2015	The production test gate	Compliance with defined product specifications such as: quality, and performance of the new product
	The market test door: the prototype is made available to potential customers	Performance, product quality, and customer satisfaction
	The phase of the feasibility analysis	Verify the cost of the product and its profitability on the market
	The design stage	Identify requirements for product features and functionality
	The test phase of the prototype	Prove that the product has achieved the minimum targeted characteristics and functionalities
	The final development stage	Improvement of the new product at all levels
	Production stage	Conversion of the prototype into a final product ready to be marketed

According to the summary of the criteria in the table above, the authors were interested in the test phases which, in accordance with their control role, identify the main performance indicators of the new product. We can summarize the two theories above by the innovation process in fig. no 7.

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

▪ Performance indicators for the innovation process

According to this perspective of the innovation process, performance indicators focus mainly on the time elapsed between the stages of implementation and evaluation, as well as the productivity of innovation (see Table III).

TABLE III
 THE MEASUREMENT CRITERIA USED TO EVALUATE "TIME" PERFORMANCE
 ACCORDING TO THE STRUCTURE OF THE DIFFERENT STAGES OF THE
 INNOVATION PROCESS

Author, year	The process step	The criteria used
Harmancioglu, McNally, Calantone, & Durmusoglu, 2007	All stages of the process	The time elapsed between the stages of the generation of ideas until the commercialization
	All stages of the process	The productivity of the innovative product given the amount of time spent on the NDP
Bhuiyan, 2011	The development stage	The time of development as the time elapsed between the beginning and the end of the said phase
	All stages of the process	Simultaneity of the stages so that the company can offer its customer a quality product as soon as possible
	The test phases	Physical, perceptual, performance, and perceived benefits

Particular importance has also been attached to the positive effect of the simultaneous structure of certain stages of the innovation process on the performance of a new product and the testing phases which enable the new product to be validated at the level of its physical, perceptual, patterns of functioning, and perceived benefits. This theory does not prevent that in practice, the sequentiality with short durations of the steps would have the same positive effect on the performance of the innovative product.

In accordance with the table above, we propose in the fig. no 8 the model based on the role of the "time" practice of the innovation process in the performance of the new product according to the previously mentioned theory on the sequentiality and the simultaneity of the steps of the process.

We have thus far succeeded in illustrating the impact of the structure of the innovation process on the internal performance of the innovative product. Thus, and in order to measure the efficiency of the internal innovation activity on its external performance, it is necessary to measure the effect of the management of processes leading to the exit from development on the success of firms in their market (Loch, Stein, & Terwiesch, 1996).

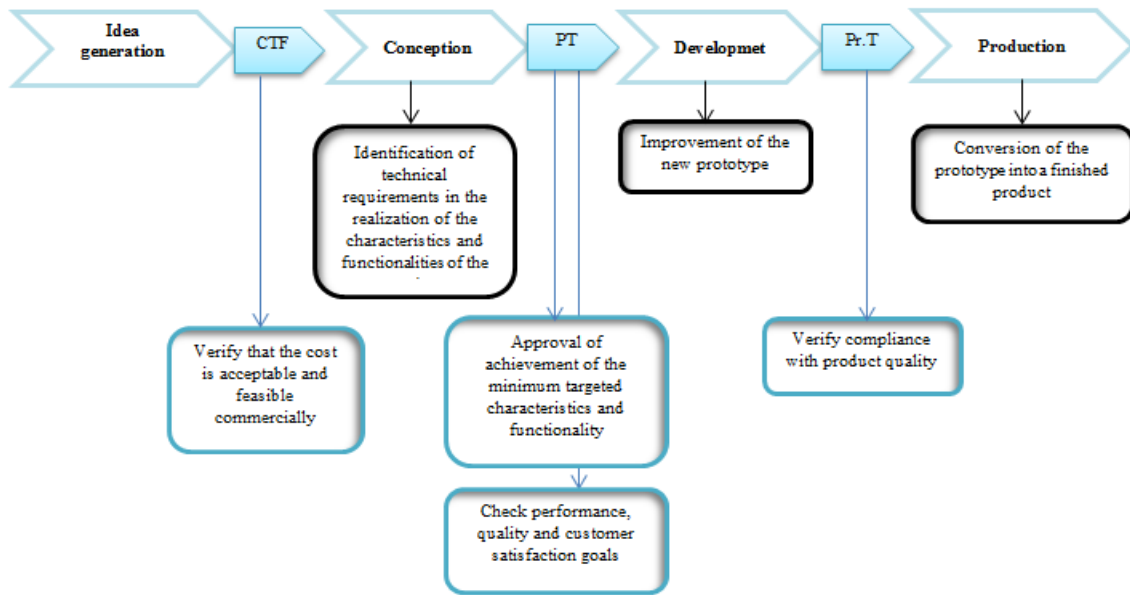


Fig. 7. The process of innovation with the main functions of the stages and phases of testing derived from the theory

We note that:

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

CTF: the technical and commercial feasibility test of the idea generated;
 PT: the prototyping test in the laboratory and on the market;
 Pr.T: the production test

Both arrows \rightarrow and \longrightarrow are indication arrows.

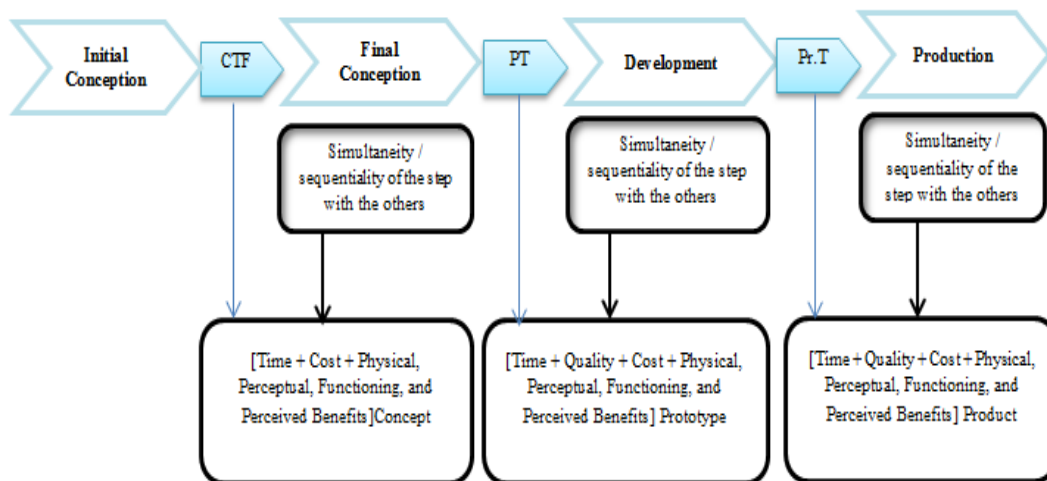


Fig. 8. The impact of the sequentiality and simultaneity of the stages of the innovation process on the performance of the new product

We note that:

The arrow \longrightarrow is an impact arrow; and the arrow \rightarrow is an indication arrow.

In line with the above, the measure of internal success reflects, on the one hand, the effectiveness of an NDP and its process and, on the other hand, it agglutinates indicators traditionally linked to project management, such as (Valle & Avella, 2003), while external success refers to the commercial outcome of a development project and therefore reflects the financial performance and degree of acceptance and perceived consumer satisfaction with a new product (Blindenbach-Driessen, Van Dalen, and Van Den Ende, 2005).

However, in order to establish an impact link between the two types of internal and external measures, attention must be paid to the impact of the structure of the innovation process on external performance on the one hand and the impact of the internal performance of the innovative product on the same external performance on the other hand.

E. The impact of performance in the innovation process on the external performance of the innovative product

Some studies (Baldwin & Johnson, 1996, Han, Kim, & Srivastava, 1998, Ravichandran 2000, Hult & Ketchen Jr. 2001, Guan & Ma 2003, Pett & Wolff, 2009 and Walker 2004) product improvements are positively associated with the growth of the company. Gopalakrishnan (2000) expanded the topic, while stressing that the speed of innovation and the breadth of innovation were also relevant characteristics of innovation, both of which had a positive effect on corporate performance. This further confirms that the speed of the innovation process and the performance of the new product

contribute in the same way to the success of innovation in the market as we can admit that the speed of the innovation process influences the success of the innovation, innovation in the market through the internal performance of the innovative product as shown in the following figure:

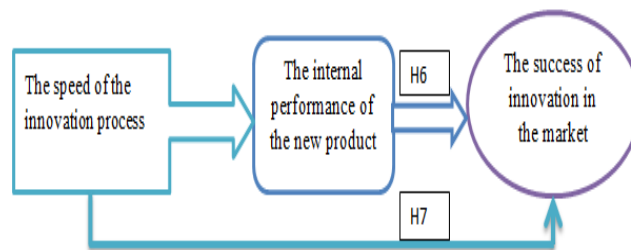


Fig. 9. The impact of the internal speed of development and the internal performance of the new product on its external performance

We propose the following two hypotheses:

Hypothesis 6: the acceleration of the innovation process positively and significantly influences the success of innovation in the market;

Hypothesis 7: internal improvement of the new product according to customer requirements, positively and significantly influence the success of innovation in the market.

Tidd (2001) divides the measures used to prove the relationship between innovation and business performance in two categories. The first group deals with accounting and financial performance. These measures include profitability, return on investment and share price.

ID 4: Fatimaezzahra Fouad: Proposal of a research model based on the role of the structure of the innovation process in the performance of the innovative product in the agro-food industry in Morocco

The second group deals with market or commercial performance, eg market share or growth (Tidd, 2001).

According to a recent study (Gunday, Ulusoy, Kilic, & Kalpkan 2011), the correlation analysis indicated a strong association between product innovation and innovation, production, marketing, and financial performance. In addition, it has been found that innovative production and performance have an indirect positive impact on financial performance through market or commercial performance, which is the main contributor, as shown in the figure below. Nevertheless, innovative performance and production could have a direct impact on financial performance (see Figure 10).

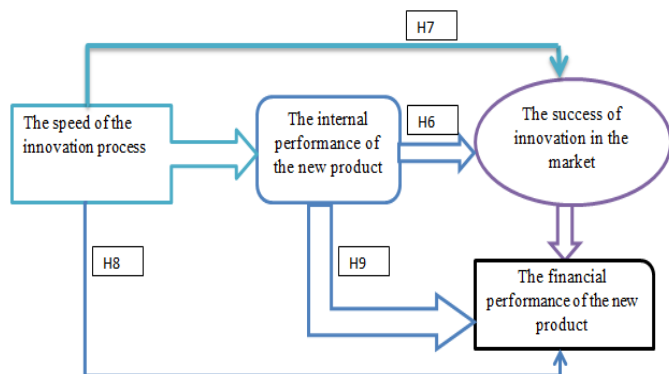


Fig. 10. The impact of internal speed of development and internal performance of the new product on financial performance through business performance

We propose the following two hypotheses:

Hypothesis 8: the acceleration of the innovation process positively and significantly influences the financial performance of the innovative product;

Hypothesis 9: the internal improvement of the new product according to customer requirements, positively and significantly influence the financial performance of the innovative product.

Our theory is based on the idea that the major role of the innovation process in its ability to accelerate the development of a new product and to make the innovative product before its arrival on the market thanks to the control phases which are interleaved between its different stages. We propose, according to our research model, to measure the impact of the innovation process and the internal performance of the innovative product and its commercial and financial performance according to its two sequential and partially parallel structures. This influence could be indirect through the internal performance of the new product as it could be direct.

Given that the speed of development of an innovative product is favorable to its performance, we also expect that the potential of innovation under hypotheses 1a, 2a / 2c / 2e, and 3a will positively and significantly affect acceleration of the innovation process, whether in a sequential or partially parallel structure. Therefore, we propose the following model of our research:

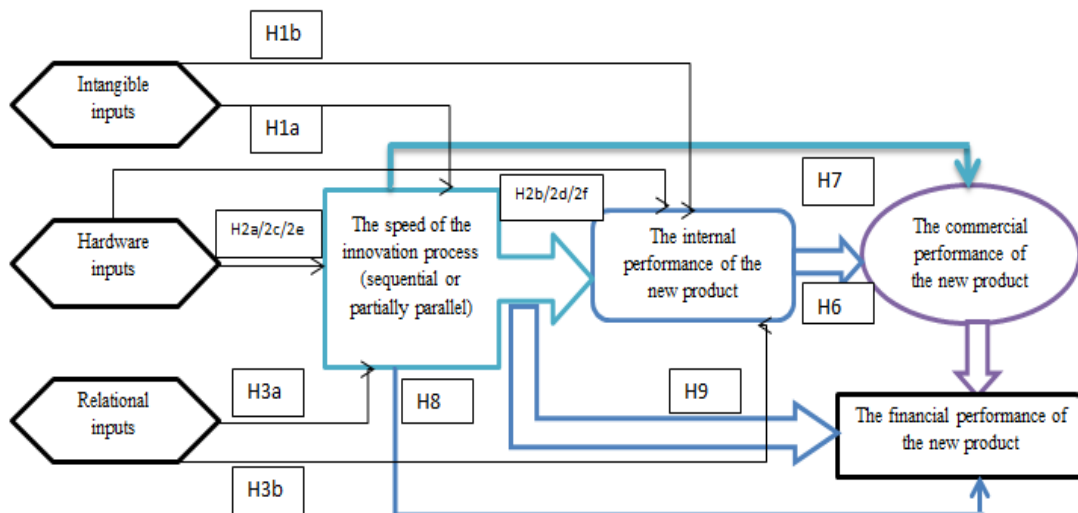


Fig. 11. The research model relating the potential of innovation, the speed of the innovation process and the internal and external performance of the innovative product

In the above model, we assume that in practice the duration of the execution of the innovation activities in a sequential manner could be shortened to the point that the innovation process is accelerated as in the case of a partially parallel structure. In this case, the model will seek to demonstrate two hypotheses:

- If the partially parallel structure will be favorable to the performance of the innovative product compared to the

sequential structure with long durations;

- If the sequential structure with shortening of delay will be favorable to the performance of the innovative product compared to the partially parallel structure.

III. CONCLUSION

Our present article proposes a response to the major problem of the fisheries sector of the agro-food sector; which is the low added

value of the innovative product for export. Given that R & D is under-utilized in the fish processing business, the government launched the "Halieutis" program in order to compensate for this inadequate performance of the national fishery product compared to competition. The "Halieutis" program had proposed to companies to adopt a fairly modernized value chain taking into account the different stages of the development of a valued fishery product, respecting quality and hygiene standards from upstream to downstream. The approach of our model has therefore focused on analyzing this value chain by assimilating it to the innovation process in order to measure its impact on the performance of the new evolutive product.

We have therefore tried to draw up a framework for measuring innovation according to the theory of innovation capacities, whose innovation process constitutes the main dynamic capacity linking the potential of innovation upstream and the results of downstream performance. To this end, we have succeeded in identifying importance through two roles:

- The role of intermediary between the determinants or resources of innovation and the results in terms of process, client and financial objectives;
- The role of time factor affecting the internal and external performance of the new product.

This latter role has emphasized a typology of the innovation process rarely studied in the theory of innovation. This is based on the structure of the process of sequential and partially parallel innovation. This has led researchers to consider the simultaneity of the stages of the innovation process as an important performance criterion.

However, the model we propose also considers the sequentiality of the stages of the innovation process as a factor of its acceleration in the event that the execution times of the tasks have been shortened. The objective of our model is thus to demonstrate which of the structures of the innovation process is favorable to the internal and external performance of the innovative product and with which length of duration.

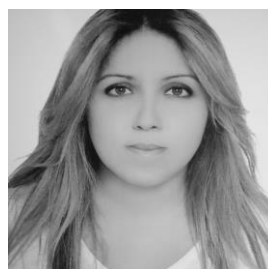
REFERENCES

- [1] A., Baregheh, J., Rowley, and S. Sambrook, (2009). Towards a multidisciplinary definition of innovation. *Management Decision*, vol. 47, no. 8, pp. 1323-39, 2009.
- [2] A., Baregheh, J., Rowley, S., Sambrook, and D. Davies, "Innovation in food sector SME's," *Journal of Small Business and Enterprise Development*, vol. 19, no. 2, pp. 300-321, 2012a.
- [3] A., Baregheh, J., Rowley, S., Sambrook, and D. Davies, "Food sector SMEs and innovation types," *British Food Journal*, vol. 114, no. 11, pp. 1640-1653, 2012b.
- [4] A. I. A., Costa, and W. M. F. Jongen, "New insights into consumer-led food product development," *Trends in Food Science & Technology*, vol. 17, pp. 457-465, 2006.
- [5] B., Antoncic, and R.D. Hisrich, "Intrapreneurship: construct refinement and cross- cultural validation," *Journal of Business Venturing*, vol. 16, pp. 495-527, 2001.
- [6] B.L. Bayus, "Speed-to-market and new product performance tradeoffs," *Journal of Product Innovation Management*, vol. 14, pp. 485-497, 1997.
- [7] B., Levy, and W. J. Kuo, "The strategic orientations of firms and performance of Korea and Taiwan in Frontier industries: Lessons from comparative case studies of keyboard and personal computer assembly" *World development*, vol. 19, no 4, pp. 363-374, 1991.
- [8] B.R., Barringer and A.C. Bluedorn, "The relationship between corporate entre- preneurship and strategic management," *Strategic Management Journal*, vol. 20, pp. 421-444, 1999.
- [9] B. S. Cummings, "Innovation Overview and Future Challenges," *European Journal of Innovation Management*, Vol. 1, no. 1, pp. 21-29, 1998.
- [10] C., Herstatt, B., Verworn, and A. Nagahira, "Reducing project related uncertainty in the 'fuzzy front end' of innovation: a comparison of German and Japanese product innovation projects," *International Journal of Product Development*, vol. 1, no. 1, pp. 45-63, 2004.
- [11] C., Loch, L., Stein, and C. Terwiesch, "Measuring development performance in the electronics industry," *The Journal of Product Innovation Management*, vol. 13, no. 1, pp. 3-21, 1996.
- [12] C., Moorman and A. S. Miner, "The impact of organizational memory on new product performance and creativity" *Journal of Marketing Research*, vol. 34, pp. 91-107, 1997.
- [13] C., Yilmaz, L., Alpkhan, and E., Ergun, "Cultural determinants of customer- and learning-oriented value systems and their joint effects on firm performance," *Journal of Business Research*, vol. 58, pp. 1340-1352, 2005.
- [14] D. H., Henard and D. M. Szymanski, "Why some new products are more successful than others," *Journal of Marketing Research*, vol. 38, no. 3, pp. 362-375, 2001.
- [15] Direction des études et des prévisions financières, Ministère de l'économie et des finances (Maroc), (2015). *Compétitivité hors prix des exportations marocaines : Esquisse de la qualité des produits des secteurs phares*. Repéré à https://www.finances.gov.ma/Docs/depf/2015/competitivite_expo_marocaines.pdf.
- [16] D. M., Szymanski, L. C., Troy and S. G. Bharadwaj, "Order of entry and business performance: An empirical synthesis and reexamination," *Journal of Marketing*, vol. 59, no. 4, pp. 17-33, 1995.
- [17] E., Danneels, "The dynamics of product innovation and firm competences," *Strategic Management Journal*, vol. 23, no. 3, pp. 1095-1121, 2002.
- [18] E.G., Carayannis, and M. Provan, "Measuring firm innovativeness: towards a composite innovation index built on firm innovative posture, propensity and performance attributes," *International Journal of Innovation and Regional Development*, vol. 1, no. 1, pp. 90-107, 2008.
- [19] E. J., Kleinschmidt, and R. G. Cooper, "The impact of product innovativeness on performance," *J. PROD INNOV MANAG*, vol. 8, pp. 240-251, 1991.
- [20] F., Capitanio, A., Coppola, and S. Pascucci, "Product and process innovation in the Italian food industry," *AgriBusiness*, vol. 26, no. 4, pp. 503-518, 2010.
- [21] F.P., Blindenbach-Driessen, J., Van Dalen and J. Van Den Ende, "A critical assessment of performance measurement of NPD Project," In: Proceedings of the 12th International Product Development Management Conference, Copenhagen, Denmark, 2005.
- [22] F., Langerak and E.J., Hultink, "The impact of new product development. Acceleration approaches on speed and profitability: lessons for pioneers and fast followers" *IEEE Transactions on Engineering Management*, vol. 25, no 1, pp. 30-42, 2005.

- [23] F., Tomala, O., Senechal, and C. Tahon, «*Modèle de processus d'innovation, 3e Conférence Francophone de Modélisation et Simulation*,» «Conception, Analyse et Gestion des Systèmes Industriels» MOSIM'01 – du 25 au 27 avril 2001 - Troyes (France), 2001.
- [24] G., Capaldo, L., Iandoli, M., Raffa, and G. Zollo, "The evaluation of innovation capabilities in small software firms: a methodological approach," *Small Business Economics*, vol. 21, no. 4, pp. 343-354, 2003.
- [25] G., Gunday, G., Ulusoy, K., Kilic, and L. Kalpkan, "Effects of innovation types on firm performance," *Int. J. Production Economics*, vol. 133, pp. 662-676, 2011.
- [26] G. P. Pisano, "Knowledge, Integration, and the Locus of Learning: An Empirical Analysis of Process Development," *Strat. Mgmt. J.*, vol. 15, 85-100, 1994.
- [27] G.T., Hult and Jr., D.J. Ketchen, "Does market orientation matter? A test of the relationship between positional advantage and performance," *Strategic Management Journal*, vol. 22, pp. 899-906, 2001.
- [28] J. R., Baldwin, and J. Johnson, "Business strategies in more-and less-innovative firms in Canada," *Research policy*, vol. 25, no. 5, pp. 785-804, 1996.
- [29] J., Bessant and J. Tidd, *Innovation and Entrepreneurship*, Wiley, Chichester, 2007.
- [30] J., Cheng and I. Kesner, "Organizational slack and response to environmental shifts: The impact of resource allocation patterns," *Journal of Management*, vol. 23, pp. 1-18, 1997.
- [31] J., Guan, and N. Ma, "Innovative capability and export performance of Chinese firms," *Technovation*, vol. 23, no. 9, pp. 737-747, 2003.
- [32] J., Guan, and K. Chen, "Measuring the innovation production process: A cross-region empirical study of China's high-tech innovations," *Technovation*, vol. 30, pp. 348-358, 2010.
- [33] J., Hagedoorn and M. Cloudt, "Measuring innovative performance: is there an advantage in using multiple indicators?" *Research Policy*, vol. 32, pp. 1365-1379, 2003.
- [34] J.K., Han, N., Kim, and R.K. Srivastava, "Market orientation and organisational performance: is innovation the missing link?" *Journal of Marketing* vol. 62, no. 4, pp. 30-45, 1998.
- [35] J., Humphrey, "Industrial Reorganization in Developing Countries: from Models to Trajectories," *World Development*, vol. 23, no. 1, pp. 149-162, 1995.
- [36] J.C., Narver and S.F. Slater, "The effect of a market orientation on business profitability" *Journal of Marketing*, vol. 54, pp. 20-35, 1990.
- [37] J.D., Sherman, W.E., Souder, and S.A. Jensen, "Differential effects of the primary forms of cross-functional integration on product development cycle time," *Journal of Product Innovation Management*, vol. 7, 257-267, 2000.
- [38] J. Lienhardt, "The Food Industry in Europe, Statistics in Focus – Industry, Trade and Services, 39/2004" Eurostat, European Communities, Luxembourg, 2004.
- [39] J. T. Mahoney, "Resource-based theory, dynamic capabilities, and real options, in economic foundations of strategy," Thousand Oaks, CA: Sage Publications, 2005.
- [40] J., Tendler and M. Amorim, "Small firms and their helpers: Lessons on demand," *World Development*, vol. 24, no. 3, pp. 407-426, 1996.
- [41] J. Tidd, "Innovation management in context: environment, organization and performance," *International Journal of Management Reviews*, vol. 3, no. 3, pp. 169-183, 2001.
- [42] K.B., Clark and T. Fujimoto, "Product Development Performance: Strategy, Organization, and Management in the World Auto Industry," Harvard Business School Press, Boston, 1991.
- [43] K., Chen and J. Guan, "Mapping the innovation production process from accumulative advantage to economic outcomes: A path modeling approach," *Technovation*, vol. 31, pp. 336-346, 2011.
- [44] K. M., Eisenhardt, and J. Martin, "Dynamic capabilities: What are they?" *Strategic Management Journal*, vol. 21, no. 10, pp. 1105-1121, 2000.
- [45] L., Alpkan, A., Ceylan, and M. Aytekin, "Relationships among environmental factors, manufacturing strategies and performance," *Proceedings of the Second International Conference on Responsive Manufacturing, Gaziantep, Turkey*, 2002, pp. 435-440.
- [46] L., Alpkan, A., Ceylan, and M. Aytekin, "Performance impacts of operations strategies: a study on Turkish manufacturing firms," *International Journal of Agile Manufacturing*, vol. 6, no. 2, pp. 7-65, 2003.
- [47] L., Dwyer, and R. Mellor, "New product process activities and project outcomes," *R&D Management*, vol. 21, pp. 31-42, 1991b.
- [48] L. Li, "Assessing intermediate infrastructural manufacturing decisions that affect a firm's market performance," *International Journal of Production Research*, vol. 43, no. 12, pp. 2537-2551, 2005.
- [49] M., Assink, "Inhibitors of disruptive innovation capability: a conceptual model", *European Journal of Innovation Management*, vol. 9, no. 2, pp. 215-233, 2006.
- [50] M.J., Benner and M.L. Tushman, "Exploitation, exploration, and process management: productivity dilemma revisited," *Academy of Management Review*, vol. 28, no. 2, pp. 238-256, 2003.
- [51] M. S., Salerno, L. A., de Vasconcelos Gomes, D. O., da Silva, R. B., Bagno, and L. S. T. U. Freitas, "Innovation processes: Which process for which project?" *Technovation*, vol. 35, pp. 59-70, 2015.
- [52] M. Saunila and J. Ukko, "A conceptual framework for the measurement of innovation capability and its effects," *Baltic Journal of Management*, vol. 7, no. 4, pp. 355-375, 2012.
- [53] M. V. Tatikonda, "Product Development Performance Measurement," Chapter to appear in *The Handbook of New Product Development*, Indiana University, Kelley School of Business, Indiana University, 2007.
- [54] M. V. Tatikonda, "Product development performance measurement," In: LOCH, C. H. & KAVADIAS, S. (eds.) *Handbook of New Product Development Management*. Oxford: Butterworth- Heinemann, 2008.
- [55] N. Bhuiyan, "A framework for successful new product development," *JTEM*, vol. 4, no. 4, pp. 746-770, 2011.
- [56] N., Harmancioglu, R. C., McNally, R. J., Calantone, and S. S. Durmusoglu, "Your new product development (NPD) is only as good as your process: an exploratory analysis of new NPD process design and implementation," *R&D Management*, vol. 37, no. 5, pp. 399-421, 2007.
- [57] N., Karagozoglu, and W.B. Brown, "Time-Based Management of the New-Product Development Process," *Journal of Product Innovation Management*, vol. 10, pp. 204-215, 1993.
- [58] N. R. M., Suradi, A., Omar, and F. A. Shahabuddin, "The importance of basic factors in innovation processes and their effects on innovation capability of Malaysian-owned manufacturing companies," The 2nd ISM International Statistical Conference 2014 (ISM-II), AIP Conf. Proc., 1643, no. 1, pp. 524-530, 2015.
- [59] N., Tzokas, E. J., Hultink, and S. Hart, "Navigating the new product development process," *Industrial Marketing Management*, vol. 33, pp. 619-626, 2004.
- [60] P., Koen, G., Ajamian, R., Burkart, A., Clamen, J., Davidson, R., D'Amore, (...) and K. Wagner, "Providing clarity and a common language to the fuzzy front end,"

- Research Technology Management*, vol. 44, no. 2, pp. 46-55, 2001.
- [61] P., Skarzynski and R. Gibson, "Innovation to the Core: A Blueprint for Transforming the Way Your Company Innovates," Harvard Business School Press, Boston, MA, 2008.
- [62] R., Balachandra and J. H. Friar, "Factors for Success in R&D Projects and New Product Innovation: A Contextual Framework," *IEEE Transactions on Engineering Management*, vol. 44, no 3, pp. 276-287, 1997.
- [63] R.C.M., Yam, J. C., Guan, K. F., Pun, and E.P.Y. Tang, "An audit of technological innovation capabilities in Chinese firms: some empirical findings in Beijing, China," *Research Policy*, vol. 33, pp. 1123-1140, 2004.
- [64] R., Caiazza, T., Volpe, and D. Audretsch, "Innovation in agro-food chain," *Journal of Enterprising Communities: People and Places in the Global Economy*, vol. 8, no. 3, pp. 180-187, 2014.
- [65] R.E., Miles, and C.C. Snow, "Organizational strategy, structure and process" New York, McGraw-Hill, 1978.
- [66] R. G., Cooper, S. J., Edgett and E. J. Kleinschmidt, "Benchmarking best NPD practicesII," *Research-Technology Management*, vol. 47, no. 3, pp. 50-59, 2004a.
- [67] R. G., Cooper, S. J., Edgett and E. J. Kleinschmidt, "Benchmarking Best NPD practices Part III: Drinving New-Product Projects to Market Success," *Research Technology management*, vol. 47, no. 6, pp. 2-15, 2004b.
- [68] R., Henderson and I. Cockburn, Measuring Competence? Exploring Firm Effects in Pharmaceutical Research," *Strat. Mgmt. J.*, vol. 15, pp. 63-84, 1994.
- [69] R., Rama, and N. Von Tunzelmann, "Empirical studies of innovation in the food and beverage industry," in Rama, R. (Ed.), *Handbook of Innovation in the Food and Drink Industry*, Haworth Press, New York, NY, 2008.
- [70] R.S., Kaplan, and D.P. Norton, "Strategy Maps: Converting Intangible Assets into Tangible Outcomes," Harvard Business School, Boston, MA, 2004.
- [71] S., Booz, S., Allen, and S. Hamilton, "New Product Management for The 1980's" Booz, Allen and Hamilton Inc, New York, 1992.
- [72] S., Cedergren, A., Wall, and K. Norstro"ma, "Evaluation of performance in a product development context," *Business Horizons*, vol. 53, pp. 359-369, 2010.
- [73] S. Gopalakrishnan, "Unraveling the links between dimensions of innovation and organizational performance," *The Journal of High Technology Management Research*, vol. 11, no. 1, pp. 137-153, 2000.
- [74] S., Laforet and J. Tann, "Innovative characteristics of small manufacturing firms," *Journal of Small Business and Enterprise Development*, vol. 13, no 3, pp. 363-380, 2006.
- [75] S. P. Schnaars, "Managing imitation strategies: How late entrants seize marketing from pioneers," New York: The Free Press, 1994.
- [76] S., Valle, and L. Avella, Cross-functionality and leadership of the new product development teams. *European Journal of Innovation Management*, vol. 6, no. 1, 32-47, 2003.
- [77] T., Davila, M. J. Epstein, and R. Shelton, "Making innovation work - How to manage it, measure it and profit from it," New Jersey, Wharton School Publishing, 2006.
- [78] T.L., Pett and J.A. Wolff, "SME opportunity for growth or profit: what is the role of product and process improvement?" *International Journal of Entrepreneurial Venturing*, vol. 1, no. 1, pp. 5-21, 2009.
- [79] T. Ravichandran, "Swiftness and intensity of administrative innovation adoption: an empirical study of TQM in information systems," *Decision Sciences*, vol. 31, no. 3, pp. 691-724, 2000.
- [80] T., Tura, V., Harmaakorpi and S. Pekkola, "Breaking inside the black box: towards a dynamic evaluation framework of regional innovative capability," *Science and Public Policy*, vol. 35, no. 10, 733-44, 2008.
- [81] V., Chiesa, P., Coughlan, and C.A. Voss, "Development of a technical innovation audit," *Journal of Product Innovation Management*, vol. 13, no. 2, pp. 105-136, 1996.
- [82] V., Shankar, G. S., Carpenter, and L. Krishnamurthi, "Late mover advantage: How innovative late entrants outsell pioneers," *Journal of Marketing Research*, vol. 35, no. 1, pp. 54-70, 1998.
- [83] X., Gellynck, and B. Kühne, "Horizontal and Vertical Networks for Innovation in the traditional food sector," *Int. J. Food System Dynamics*, vol. 2, pp. 123-132, 2010.
- [84] X., Koufteros, and G.A. Marcoulides, "Product development practices and performance: a structural equation modeling-based multi-group analysis," *International Journal of Production Economics*, vol. 103, no. 1, pp. 286-307, 2006.

Bios and photos:



Fatimaezzahra F., was born in the city of Tiznit in Morocco in 1986. She obtained her technical baccalaureate in economics in 2006 at the technical school Alidrissi in the city of Agadir in Morocco; then a bachelor's degree in management in 2010 at the Faculty of Legal Economics and Social Sciences of the Ibn Zohr University still in the city of Agadir. Subsequently, she pursued her university course until she obtained a Master's Degree in Business Engineering in 2012 at the National School of Applied Sciences in Agadir, still at the Ibn Zohr University. This diploma conferred on him the status of project engineer. She was also awarded the Certificate of Dynamization of Innovation in 2013 following a one-year training following collaboration between Gran Canaria University in Spain and Ibn Zohr University in Morocco. She joined the doctoral cycle from 2012 until 2017, integrating the laboratory of industrial and computer engineering. His doctoral thesis focuses on studying the impact of the innovation process on the performance of a new product in agro-food companies in the Agadir region.

She has participated in 6 national and international conferences and congresses interested in engineering methods in the management of innovation. It has so far published two articles, namely:

- Fatimaezzahra Fouad, Amina Tourabi, Ghizlane Lakhnati, 2017. The Impact of Tangible and Innovative Activities on the New Product Objectives in Three Phases of the

Innovation Process: Case of the Fish Industry-Morocco,
Technology and Investment, vol. 8, No. 1, p. 11-32;

- Fatimaezzahra Fouad et al., 2015. Measuring innovation in the "Process" approach: the case of agro-food products in Morocco, Int. Journal of Engineering Research, Vol. 5, No. 5, p. 01-07.

Fatimaezzahra Fouad is also an entrepreneurial coach and former vice-president of the association of young researchers at the national school of applied sciences of Agadir.

: