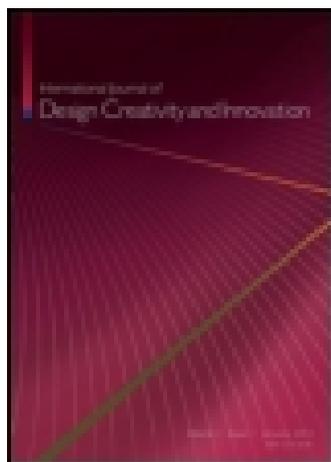


This article was downloaded by: [Stéphanie Buisine]

On: 18 February 2015, At: 13:54

Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



International Journal of Design Creativity and Innovation

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/tdci20>

Encouraging innovation activity: in the specific context of small- and medium-sized retailers

Alexia Delas^a, Nicolas Maranzana^b, Fabrice Mantelet^b & Stéphanie Buisine^b

^a 21 bis rue Villiers de l'Isle-Adam, 60000 Beauvais, France

^b Arts et Métiers ParisTech, LCPI, 151, boulevard de l'Hôpital, 75013 Paris, France

Published online: 16 Feb 2015.



[Click for updates](#)

To cite this article: Alexia Delas, Nicolas Maranzana, Fabrice Mantelet & Stéphanie Buisine (2015): Encouraging innovation activity: in the specific context of small- and medium-sized retailers, International Journal of Design Creativity and Innovation, DOI: [10.1080/21650349.2014.975158](https://doi.org/10.1080/21650349.2014.975158)

To link to this article: <http://dx.doi.org/10.1080/21650349.2014.975158>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms &

Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

Encouraging innovation activity: in the specific context of small- and medium-sized retailers

Alexia Delas^{a,1}, Nicolas Maranzana^{b,*}, Fabrice Mantelet^{b,2} and Stéphanie Buisine^{b,3}

^a21 bis rue Villiers de l'Isle-Adam, 60000 Beauvais, France; ^bArts et Métiers ParisTech, LCPI, 151, boulevard de l'Hôpital, 75013 Paris, France

(Received 30 October 2013; accepted 6 October 2014)

This paper aims at formalizing an innovation process well suited for small- and medium-sized enterprises (SMEs) specialized in retail. The design research consisted in analyzing conceptual models of innovation process from the literature and adapting it to the specific context. Indeed, the research issue deals with encouraging innovation activity in the context of small- and medium-sized retailers that have not yet integrated an intern design department. In the actual financial context, it is essential for SMEs to innovate in order to gain competitive advantage; but how to start a sized innovation activity? The undertaken research results in a plan that sets up a sized innovation activity gradually with a methodology conducting to repeated and regular new product development. Supported with international literature research, the paper contributes to the proposal of an innovation process meeting the two following requirements:

- a retailer lacking knowledge in innovation activity and
- an SME with limited financial means.

From the industrial case studies that have been undertaken, an adapted process has been developed to ensure the success of innovation activity integration in this specific context.

Keywords: innovation activity; design research; innovation process; SMEs; retailer

1. Introduction

Nowadays, innovation – or new product development (NPD) – is a key component to competitive advantage for small- and medium-sized enterprises (SMEs) development (Cormican & O'Sullivan, 2004, pp. 819–829). However, it impacts the enterprises at various levels. SMEs do not necessarily have the human, financial, material and organizational resources essential to set up an innovation activity. Therefore, they call for external teams, whose aim is to propose and initiate a context-adapted innovation method, then to provide the company with the basic skills in order to set it up autonomously.

This article deals with the development of an innovation activity adapted to the context of SMEs, especially in the retail sector. It will be mentioned as: “SME retailer.” A retail enterprise targets differentiation in order to develop business, differentiation by enlarging its skills to design. The practical case study regarding this issue applies to an SME whose primary business is retail in art and creative supplies.

*Corresponding author. Email: nicolas.maranzana@ensam.eu

Indeed, the research issue could be summarized as follows: How to start an innovation activity in an SME retailer – lacking design knowledge – in order to gain a competitive lead?

The research consists in formalizing an innovation process meeting the requirements. First, innovation process models from the literature are analyzed. Then, by confronting this theoretical proposal to context requirements, an adapted process that results in the starting of their own design activity is conducted.

2. Design research in the context

2.1 Innovation activity

2.1.1 Definition and characterization

In order to comprehend the concept of innovation, it is essential to recall the three following axioms described by Perrin and Brown (1977):

- No innovation without a market position. It is first an economic fact.
- No innovation without design.
- No innovation without an innovating enterprise. Continually reviewing the company organization aims to ensure lasting financial stability of the company.

These axioms shall be explained. Among the rich literature on this topic, the term “innovation” means for Morris and Kranzberg (1978) “a process conducting from invention to distribution.” Koriajnova (2009) highlights the process outcome: “Innovation is a result, a novelty and a success; it means a new product manufactured and commercialized in industrial quantities and for which the economic policies reached the threshold of profitability.”

In summary, innovation must be considered with the following three concerns in mind: it must respond to market needs (creditworthiness), it must be an opportunity for social inclusion (acceptability) and must ensure a prevention of risks (security). Its complexity justifies the need to structure it with innovative activity whose “objective is the introduction of a continue flow of product innovations” (Koriajnova, 2009).

2.1.2 Different innovation typologies

Two kinds of innovation exist and interact: innovations with product/process main features and innovations with organizational features (Oslo Manual, 2005). The organizational innovations consist in modifying the enterprise structure and administrative processes (Dougherty, 1996). We will focus on product/process innovation.

In Figure 1, Piat (2005) describes four innovation degrees. The transformational innovation corresponds to a disruptive breakthrough that impacts the way we live and revolutionizes the market sector (Stevenson & Kaafarani, 2011). Freeman (1991) highlights the fact that few companies commit to the resources and risk that allows transformational innovation to succeed. On the contrary, sustaining innovation – often underestimated – deals with minor infrastructure improvements (Oke, 2007). They are less risky and require few resources. In between, there are evolutionary innovation – innovation of the global product design but remaining in the same marketplace – and technological innovation – the outcome for using new materials, components, making processes and packaging.

Considering the interaction between innovation and the research context, the activity of NPD will begin with low-risk innovation in order to develop an in-house innovation

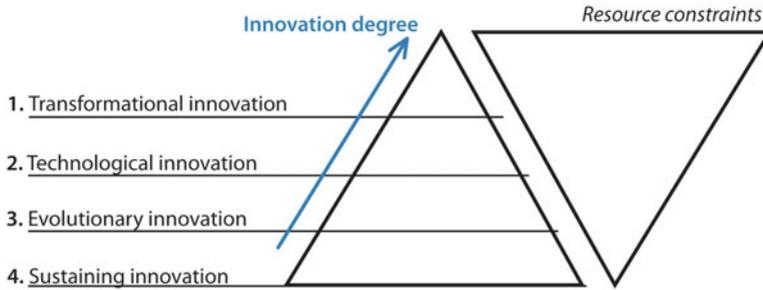


Figure 1. Innovation typologies. Source: Piat (2005) and the authors.

culture. Progressively, it will target higher risk innovation, so as to become an agent of competitive advantage. Indeed, the first stage will not consist in major innovation, but of “true newness” (Griffin & Hauser, 1993). Dwyer and Mellor (1991) enhance links between activity proficiency and NPD project outcomes, which means that the more the personnel is expert in NPD, the more challenging the innovations will become. The company should, however, look at low technology NPD as high-tech NPD requires high specialization, as opposed to cross-functionalization (Harmancioglu, McNally, Calantone, & Durmusoglu, 2007). For that matter, Cross (2004) studied the differences between expert designer performance and novice ones.

2.2 Innovation adapted to the specific context of retailing

The research deals with the context of SME retailers, whose product innovation activity is aimed at boosting their own brand. We will study the concept of “retailer brand” to identify the best process for an SME to integrate an innovation/design activity.

Retail is an activity sector structured in two loops. The design cycle come along upstream (Sheth & Malhotra, 2011). Integrating a design cycle will reinforce expertise and enlarges the in-house culture; Figure 2 illustrates this process diagram.

2.2.1 Different positioning of retailer brands

Retailer brands are divided into two types. The store brands are own brands wearing the retailer trade name. They are easy to identify in the store shelves and help develop consumer loyalty. The French retail chain Monoprix is a good example for its strong consumer-led store brand in the food and household items category.

On the contrary, the own brands do not chant their retailer brands specification and are often taken for national brands. Mark & Spencer, for example, counts a few own brands among which are “Count on us” for diet food, “The cook range” for ready-made multiethnic takeaways, and “Simly kids” for kids snacking. In the sport goods category, Decathlon retail chain targeted a development through 20 specialized brands (Quechua, Tribord, Artengo, etc.).

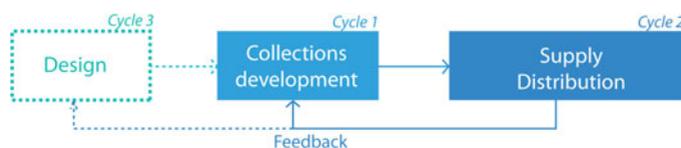


Figure 2. Retail cycle process diagram and where to integrate the design cycle (from the authors).

Retailer brands grow in number and follow a thoughtful marketing positioning. Hillairet, Richard, and Bouchet (2009) lists three different types of positioning:

- an entry-level brand;
- a mid-range brand; and
- a premium brand that deals with a niche positioning.

Whatever may be the type of retailer brands, they are all strategic weapons for retailers. They smooth the progress of profitability (the margin is three times higher than the one of national brands), customer loyalty, communication, negotiation power, as well as marketing watch.

On the contrary, the major constraints of retailer brands development comes from the consumption pattern in buying the usual and well-established brands. Therefore, the product designs for the retailer brands cannot keep up with a me-too strategy – a strategy in which products are obvious copies of the ones from competitors. That is where product innovation strategy is essential to retailers.

2.2.2 From a cost strategy to an innovation strategy

Many retailers are based on a cost strategy. It leads to immediate visible results, but it runs out of steam when competitors proceed with the same strategy. On the other hand, implementing an innovation strategy is a long-term approach whose investment is high but return on investment is long-lasting and at all levels.

The setting up of an innovation approach should follow essential stages. In Figure 3, Piat (2005) presents the overall process to go from a cost strategy to an innovation strategy. It takes place in three stages: Awareness, Acceptance, and then Performance.

Gilliung and Perche (2000) introduces another process composed of a Discovery period, an Adjustment period, followed by a phase of Use.

These processes have communality. Indeed, the Innovation awareness step from Piat's model or the Discovery phase from Gilliung's contributes to the same objective of training and introducing innovation design in the company. The second step of Piat's model lacks detail in going from theory to practice while the Adaptation and Use phases of Gilliung's model distribute this transition into two steps. Before a company can use autonomously an innovation strategy (Use phase), there is an Adaptation phase that involves a low-degree innovation project to ensure that the knowledge is acquired and to avoid any risk for the company. Finally, after the Use phase, a next step is necessary to optimize the innovation strategy and ensure continuous improvement; this is described as the Performance phase in Piat's model.

Hence, to get a complete but gradual innovation development process, it would be beneficial to combine Gilliung and Perche (2000) three phases – Discovery, Adaptation, and Use shown in Figure 4 – with a fourth phase: the Performance stage described in Piat's process (2005).



Figure 3. Towards an innovation strategy. Source: Piat (2005).



Figure 4. Towards an innovation strategy. Source: Gilliung and Perche (2000).

Moving from a cost-driven strategy to a product innovation-driven strategy is not completely new for retailers. Some retail chains – such as Ikea, Decathlon, and Leroy Merlin – are experts in product innovation. Taking the example of Decathlon, after 10 years of development, more than 50% of the sales come from its own brands (Hillairet et al., 2009). From an entry-level store brand, Decathlon has become a product innovation expert. The company observes a mix strategy based on horizontal and vertical differentiation that results in own brands arranged by price range and sector.

In our case, we look at the very beginning of retailer brand development. The design of a first product will deal with short financial resources, so certainly a sustaining innovation. It will initiate an innovation culture and gradually lead to higher investment and higher levels of innovation.

2.3 Innovation adapted to the specific context of SMEs

2.3.1 Strengths and weaknesses of innovation in SMEs

The propensity to innovate in SMEs is supposed to be below large enterprises. However, in an article from Acs and Audretsch (1988), the writers highlight some major advantages of SMEs. First, their flexibility and reactivity makes the decision process faster than in big enterprises. Besides, SMEs often have high skills in their activity field; hence expert employees will be beneficial in the product design and testing stages. Liu and Tsai's (2007) research has shown that corporate scale was not necessarily the major factor for the success of NPD and did not result in significant differences in NPD performance.

Nevertheless, setting up an innovation process in SMEs will undergo various obstacles that should be considered:

- Wrong idea of innovation (confusion between the terms “innovation” and “invention”) curbs SMEs; anxiety about the consequences of potential failure.
- Lack of financial resource limits investment and contribution (Cooper & Edgett, 2003).
- Low human resource leads to a lack of employee turnover. It can limit multidisciplinary knowledge and reduce creativity in teamwork as Luckanicová and Malíková present it in their *Comparative study of innovation capacity from human capital perspective* (2012).
- Refusal to modify traditional working environment and methodology due to the fear of the unknown. Filson and Lewis studied the cultural issues to take into consideration when implementing NPD design process in SMEs (2000).

This analysis enhances the obstacles in starting an innovation activity strategy. Indeed, the small or medium company often shows a strong will to innovate but is resistant to the changes that innovation activity will bring about. A cure for it would be communication and training on continuous knowledge-based innovation, gradual setting up with different

levels of innovation to reach, as well as obtaining institutional funding assistance or shareholders. Experimentation will go through a slow enrichment of routines with the aim of leading to a continued learning organization in a long-term plan.

2.3.2 Innovation approach in SMEs

We will study how to build an innovation approach in SMEs. Nonaka (1994) argues that while individuals develop new knowledge, organizations play a critical role in articulating and amplifying that knowledge. An integrated innovation approach adapted to SMEs requires company reorganization. Bessi re (1993) in Figure 5 suggests a process in six stages.

This diagram illustrates an ideal but theoretical process. Indeed, taking into account poor financial resources and innovation knowledge, the setting up of an intern Research and Development (R&D) department is not adapted to our case neither in short-term or medium-term plans. We will substitute a design cell for R&D department. Indeed, the term “design cell” better describes the context in which it applies by suggesting a short-scale structure.

2.3.3 Flowchart evolution for innovating SMEs

The study has shown that the company reorganization is essential. Bessi re (1993) presents an evolutive flowchart in a 4-year plan. It gradually sets up an innovation strategy with meeting the SMEs constraint (Cooper & Edgett, 2003).

Stage 1 is shown in Figure 6. A research unit has been developed to produce new products for new markets. In our context, product design will not necessarily come from research, as we will first deal with low-degree innovations. We will outsource the research but integrate an innovation manager aware of the company strategy and expertise.

Stage 2 is described in Figure 7. Two years later, the company organization follows a horizontal and cross-functional structure. The integration of quality control department in our case – without any design experience – is not essential at the introduction of the innovation activity.

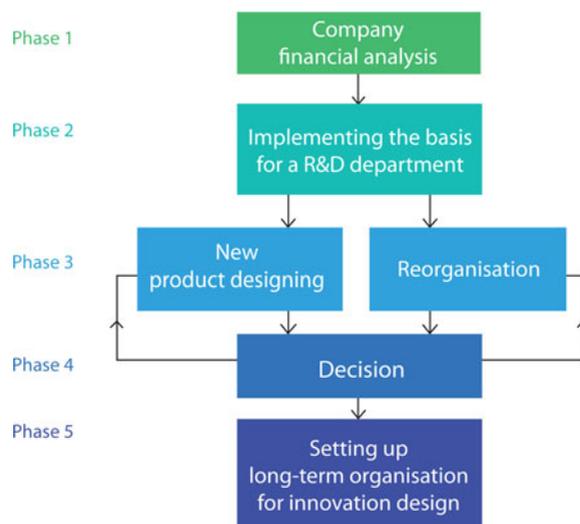


Figure 5. Integrated innovation approach in SMEs. Source: Bessi re (1993).

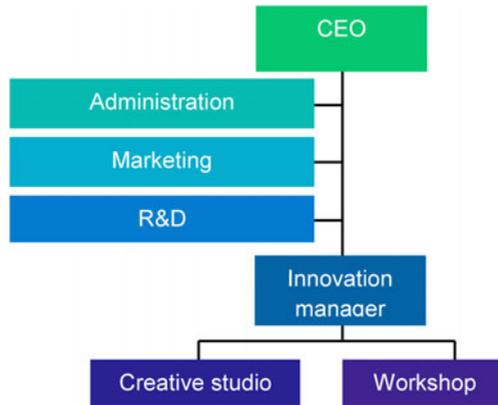


Figure 6. Functional organizational chart. Source: Bessi re (1993).

2.3.4 The concept of innovation cell

From Bessi re (1993)'s paper, on a 4-year basis, the company would expand with four departments: design, workshop, quality control, and R&D. If this suggestion is excessive compared with the financial resources available and the lack of design skills in the context, Delamarre et al. (2005) brings to mind an alternative: the setting up of an innovation cell managed by one designer. The term "innovation cell" better describes a short-scale structure managed by a designer and market-expert or product-expert volunteers who can bring their expertise to develop better suiting products to the context. Roberts and Berry (1985) have noted that internal product development requires the highest degree of involvement by new product developers and their exceptional familiarity with their markets and products technology. Therefore, it is essential that these employees show curiosity toward NPD and volunteer to participate in this cross-department cell, by devoting 5% of their working hours to the innovation project. Besides, Kahn (1996) presents the results of a study exploring how inter-department collaboration and interaction affect product development performance. It requires a flexible organization that will allow gradual growth of the innovation activity and personnel training. The innovation cell responds to these requirements. Indeed, Cusumano and Nobeoka (1992) analyzed that, in NPD, the multifunctional team leads to better performance in terms

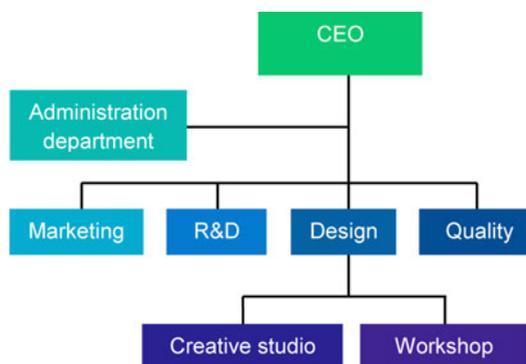


Figure 7. Functional organizational chart 2. Source: Bessi re (1993).

of design productivity, overall quality, and easy-to-make design. Time-to-reach transformational innovation will depend on the progress of process integration and in-house innovation culture. Therefore, Paetzold (2008) developed a method that determines the degree of maturity of product innovation and the adapted reorganization plan by analyzing product’s functionality and customer requirements.

3. Literature review on innovation process models

3.1 Typologies of models

In order to create a regular innovation flow that integrates organizational, human, and cultural changes, we will look at models that suit the flexible organization of SMEs and facilitate the cross-department collaboration on common projects (Dougherty, 1992). NPD process models enable a common language and framework to enhance the communication of NPD process.

As the research question of the project deals with starting an innovation design activity, it puts priority on the company reorganization in order to receive the activity and on how to introduce this change. After a literature review (extract in Figure 8), we will study four innovation process models into depth: Aoussat, Christofol, and Le Coq, Roozenburg and Eekels, Kline and Rosenberg, and Millson and Wilemon that respond best to the research question.

3.2 Aoussat et al.’s model

Aoussat et al.’s (2000) model shown in Figure 9 is a simultaneous model that includes several user-testing stages as well as a strong interaction of cross-section disciplines.

This model highlights the first phases of the process – those that deal with adaptation of product designs to the company and involvement of a team of multidisciplinary actors (Donnellon, 1993). The model is clear and facilitates simultaneity and interaction. However, it does not consider knowledge capitalization and financial feedback loops.

3.3 Roozenburg and Eekels’ model

Roozenburg and Eekels’ (1995) model pay particular attention to the connection between the innovation process and the company organization and evolution. In Figure 10, the model takes into account the design of NPD as well as the consistency with the corporate strategy (marketing and production-development phases).

Innovation process models	Process problem	Organisation problem	Adapting to changes problem	Human resources problem
Linear model	■			
Stage Gate model	■	■		
Ait-El-Hadj model		■		
Aoussat et al. model	■	■	■	■
Roozenburg and Eekels	■	■	■	■
Kline and Rosenberg	■	■	■	■
Akrich et al. model				■

Figure 8. Categorization of innovation process models. Source: Koriajnova (2009) and the authors.

Downloaded by [Stéphanie Buisine] at 13:54 18 February 2015

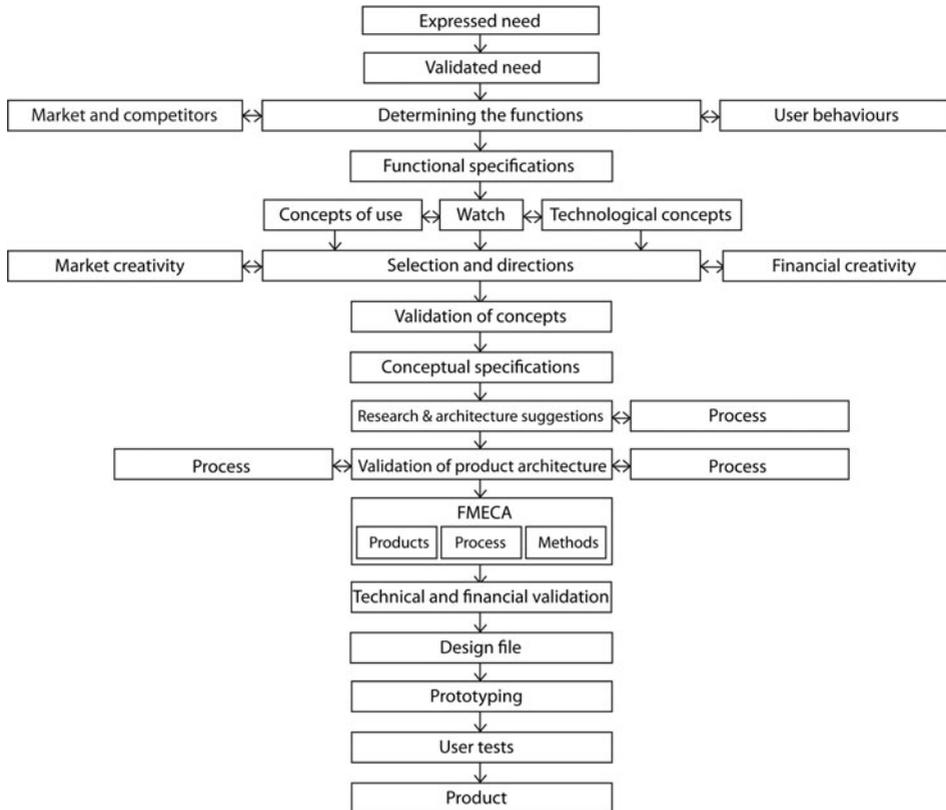


Figure 9. Aoussat et al.'s (2000) design process model.

This model ensures new products to be produced in desired quantity – meeting the delay and cost requirements – as well as to become part of a regular manufacturing plan. For these stages, the company is looking at adapting its organization/strategy to overall innovation activity, and more specifically to every new product developed.

3.4 Kline and Rosenberg's model

For Kline and Rosenberg's (1986) model, design activities are key to innovation, and redesign plays an even major part in the success of innovation process. From that idea, the chain-linked model has been developed.

This specific model shown in Figure 11 introduces several innovation processes in chain:

- The central chain-of-innovation (C) drives a succession of design activities.
- The second process deals with feedback loops between related (f) and nonrelated (F) activities.
- The third process refers to connections between knowledge and innovation (R1 and R2). So, new research (R3) will be conducted or commissioned to fill in unanswered gaps.
- The last innovation process highlights technological innovations.

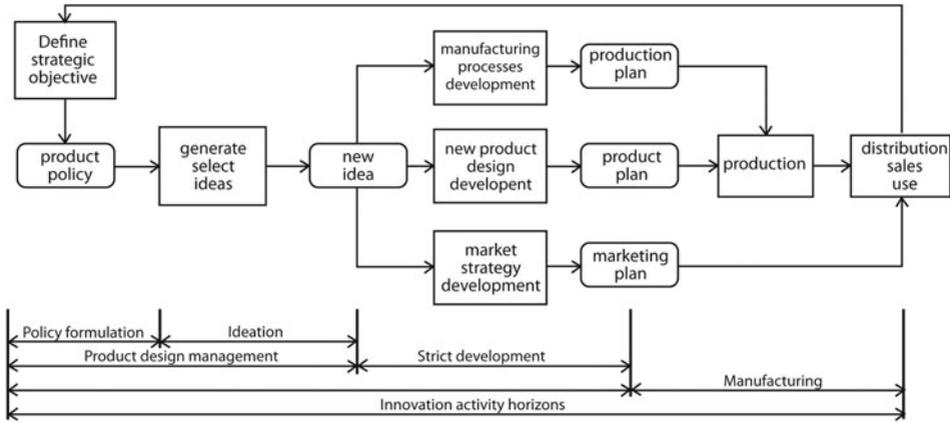


Figure 10. Roozenburg and Eekels's (1995) model.

This model demonstrates that innovation is a continuous interactive process with several ways to reach the same outcome. Although the capitalization of knowledge at every stage of the project is essential, this model is not clear to novices and emphasizes the invention phase – which is not the priority in the context of introducing an innovation strategy in SMEs.

3.5 Harmancioglu et al.'s conceptual framework

Stage-gate process approaches aim at managing risk and increasing efficiency through adherence to a structured NPD process, but innovation process is not limited to this stepwise approach. Indeed, firms nowadays seek for profitable growth through increasing innovation productivity. Harmancioglu et al. (2007) propose a framework adapted to the context of low-tech companies.

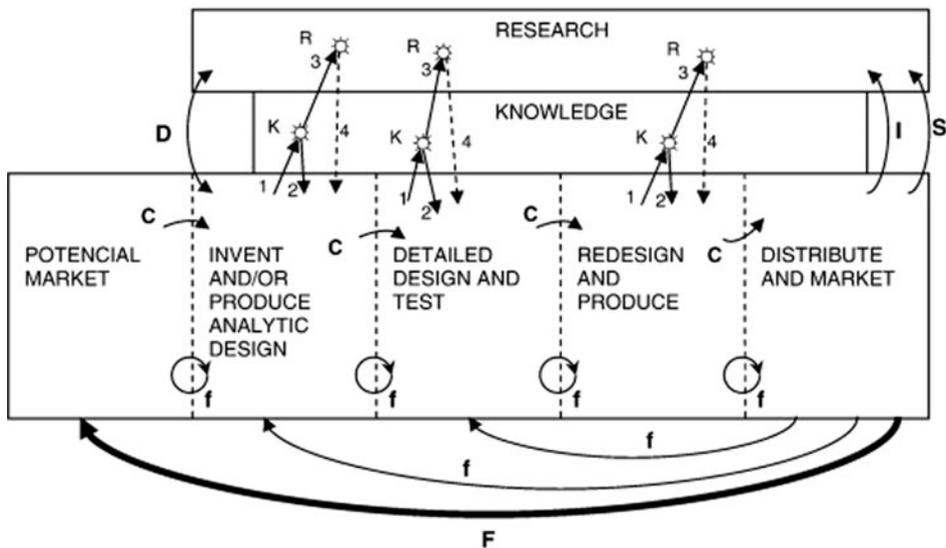


Figure 11. Chain-linked model of innovation. Source: Kline and Rosenberg (1986).

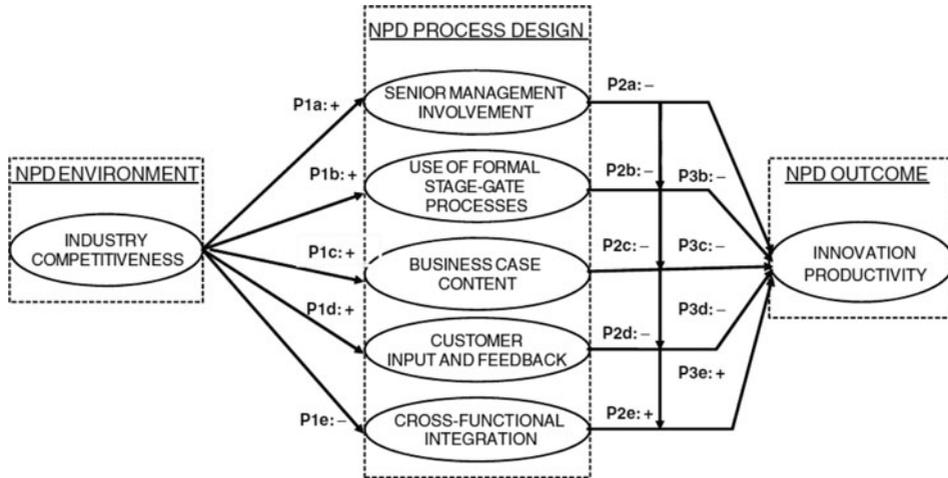


Figure 12. Conceptual framework. Source: Harmancioglu et al. (2007).

Harmancioglu et al.'s (2007) framework not only encompasses an adapted stage-gate process, but also embeds strategic business unit senior management involvement, business case content, customer/salespeople interactions, and cross-functional integration (see Figure 12). All these variables lead to innovation productivity by seeking a good balance between innovation and speed to market given industry competitiveness and available resources.

3.6 Millson and Wilemon's model

Recent innovation processes look at wider influences on the design process, such as innovation productivity (Harmancioglu et al., 2007) or product quality and risk of NPDP. Millson and Wilemon (2008) created a research model that depicts the relationship between NPDP technical/design activity proficiency, NPDP entry strategies, new product quality, and perceived NPDP risk, along with external and internal environmental variables. Millson and Wilemon found that there was a significant correlation between overall organization and familiarity of NPDP on market success and that unlike product quality, NPDP entry strategy selection appears to mediate NPDP risk minimally.

In this overall model (see Figure 13), NPDP entry strategies are the methods and organizational configurations used by internal product developers to develop new products. NPDP technical activities include preliminary design review, preliminary manufacturing process review, development of prototypes and pilot models, in-house product testing, trial production, and full-scale production start-up. The product quality framework encompasses product reliability, product durability, product performance in use, number of product features, product serviceability, degree to which the product conforms to its design, product esthetics, and overall perceived level of quality. Besides, their study shows that the success of new products is affected by environmental factors (market dynamism, market hostility, or market complexity) and by internal factors (degree of decision-making centralization, degree to which management creates and supports a culture of product innovation, and so on).

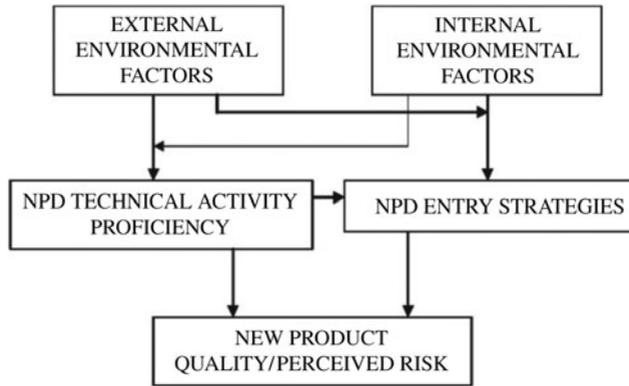


Figure 13. Correlation of new product quality and perceived risk. Source: Model from Millson and Wilemon (2008).

3.7 *Synthesis of innovation process research*

The investigation into innovation processes has been focused on the context-aware elements. These elements will be the base to a new model meeting the context requirements:

- Aoussat et al.'s (2000) model shows a very clear structure that can become a visual common language even for innovation process beginners.
- Roozenburg and Eekels' (1995) model depicts a complete process from conception to retail, enhancing simultaneous tasking.
- Kline and Rosenberg's (1986) model highlights multisectorial interaction, feedback loops, and knowledge development. However, for design beginners, the model lacks guidance.
- Harmancioglu et al.'s (2007) framework presents essential variables for innovation productivity: internal and external environmental variables (firm size, intensity of market competition, and performance before and after the process improvements), importance of senior management role (gatekeeper, energizer, and team-autonomy provider), and business case content (project goals, market projections, and product specifications).
- Millson and Wilemon's (2008) model shows the variables to manage and maintain new product quality throughout the NPD process and the connections between NPD expertise and risk in an in-house environment.

In addition, the result of context-aware innovation integration will complement the new model with a functional organization chart:

- Piat's (2005) and Gilliung and Perche (2000) models meet the requirements of retailers.
- Bessière's (1993) and Delamarre, Christofol, Samier, and Richir (2005) models deal with the context of SMEs.

4. Research question

This literature review questions NPD in the context of SMEs and in the context of retailers or nondesign experts. It conducts the following research question:

How to start a sized innovation activity in an SME retailer – lacking design knowledge – in order to gain competitive lead?

- (1) Start design activity without any enterprise training, in order to educate and convince by practice, and to avoid radical changes (practical thesis).
- (2) Reorganize the company, train the team, and then apply NPD design activity (theoretical thesis).

5. Scientific contribution: new model adapted to the industrial case study

From the preliminary literature review, we set up a plan for innovation activity development in four essential points. Indeed, an innovation process model is not sufficient to perform innovation activity introduction. The plan includes four diagrams to be followed at various stages of the project:

- Diagram showing the progression from a cost-driven strategy to an innovation strategy.
- Integrated innovation approach in SMEs.
- Functional organizational chart.
- Context-aware innovation process model.

This approach will facilitate company evolution at its own pace in accordance with the available resources. From the moment financial resources are effective thanks to a few low-degree innovations, the design cell – then design department, followed by R&D department – must grow in order to establish a genuine project team and apply the entire method of innovative product design. This process toward an innovation strategy is illustrated in Figure 14.

5.1 Diagram: from cost-driven strategy to innovation strategy

5.2 Integrated innovation approach in SMEs

Due to low financial resources, it is impossible to reorganize SMEs upstream of any product design. Reorganization will be progressive project-by-project after a financial analysis loop demonstrating the interest and viability of reorganization. Figure 15 highlights this process.

5.3 Functional organizational chart of the company

This model shown in Figure 16 deals with a short-term reorganization including an innovation design cell made up of one unique full-time designer, assisted by volunteers from other departments. These volunteers would be engaged in the project at 5% of their working hours.



Figure 14. Toward an innovation strategy. Source: Piat (2005) and Gilliung and Perche (2000), and the authors.

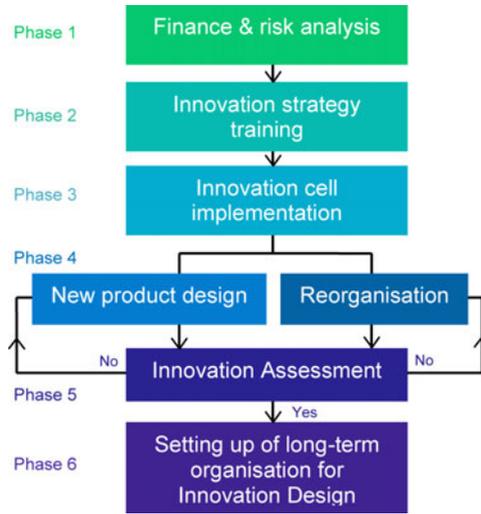


Figure 15. Integrated innovation process. Source: Bessièrè (1993), and optimized by authors.

5.4 Progressive and context-aware innovation process model

A new innovation process model has been formalized, as the literature on this specific context is very poor. Indeed, this process shown in Figure 17 is adapted to the context of retail experts and design/manufacturing novice. Beyond stage-gate models, a simultaneous process model technique has been used to overcome restrictions of a linear approach while being easy to understand and memorize by a novice in innovation process. It structures cross-section activities and knowledge management from the retailer environment to the innovation design environment. It also brings to light a progressive setting up of the innovation design cell – without disrupting work routines for the personnel. While training the employees to innovation strategy, the design innovation activity is gradually introduced in the company.

Based on the literature review, the process is progressive, as strategic objectives are reviewed after each project. This stage is built on the studies from Harmancioglu et al.'s (2007) research that industry competitiveness and firm characteristics highly influence the NPD process. Design work, business case content, customer feedback, and innovation

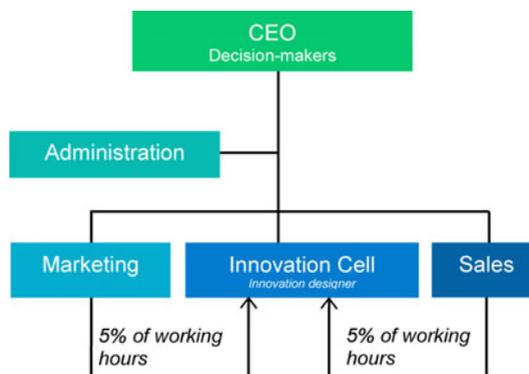


Figure 16. Functional organizational chart. Source: Bessièrè (1993), and optimized by authors.

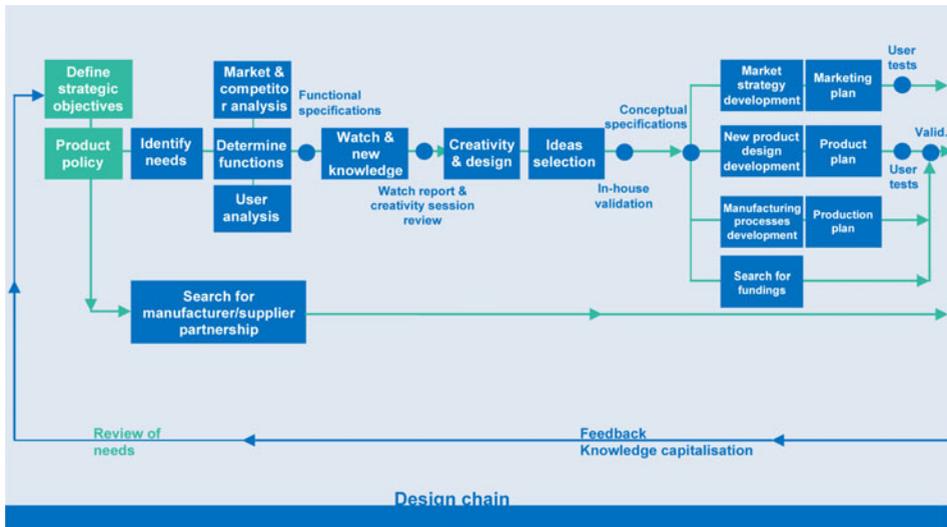


Figure 17. Innovation process, part 1: conception chain. Source: The authors.

management must be shared to ensure the company steady enrichment of experience (feedback loops). Besides, the values embodied by brands are believed to support strategic decision-making in the innovation journey. The research shows that the process of explicating tacit brand values stimulates a strategic discourse that relates to a company's innovation culture, indicating that brands should not simply be imposed on NPD teams, but that the teams have a contribution to make in shaping the brand promise (Keus et al. 2009).

5.5 Progressive innovation process adapted to the context of retailer

Figure 17 shows the overall diagram that will be detailed further. The innovation process is based on the following:

- *Strategic objective definition phase:* This phase is the connection between processes and company organization (Larson & Gobeli, 1988). Regular re-definition of strategic objective will enable the company evolution.
- *Product policy phase:* It guarantees consistency between product design and company strategy.
- *Structure of divergent activities leading to specifications:* It starts with the identification of needs along with market analysis and user analysis; then watch and creativity sessions follow.
- *Convergent design phase:* This phase leads to in-house validation of specifications.
- *Simultaneous execution of three main processes:* Product design, manufacturing processes development, and product market strategy development.
- Integration of the retailer specificity within the design process by an interacting three-chain model: A design chain, a manufacturing chain, and a retail chain.
- *Involvement of interdisciplinary actors:* From marketing team to designers, from salesmen to logistic managers, and so on.
- Capitalization of the retail results in accordance with the design and manufacturing chains: The feedback loops symbolized this interaction.

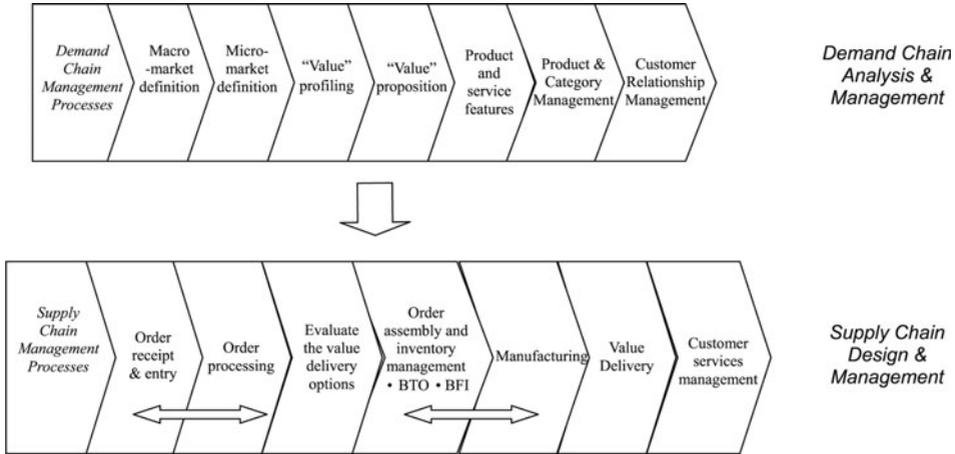


Figure 18. Supply chain management process model. Source: Walters and Rainbird (2007).

In addition, the model is not complete without the integration of manufacturing and supply chain in the process (see the second part of the model in Figure 18). This whole process aims at bridging the gap between the area of expertise – retail – and the realm of innovative design (Figure 18), in order to facilitate the employee acceptance of the innovation cell in the company. As it has been shown previously, the essential elements of the new model are the feedback loops; they are linked between design and retail, bringing to light the interest for retailers to extend to design activities. Their strength is the direct feedback on user needs, thanks to retailer reports. So, design is neither always the starting point of the overall process nor its finality. Henceforth, the supply chain process echoes Walters and Rainbird's (2007) model that dissects the supply chain into two chains in order for every operating worker to feel involved in the process (see Figure 18):

- *Supply chain*: It is the outcome of manufacturing and sourcing products from suppliers and it includes transport and storage phases. It gathers salesmen as well as logistic officers.
- *Demand chain*: It includes marketing workers and client officers.

Besides, this diagram draws a central link between the design of own products and the sourcing of existing products. As we are dealing with innovation strategy, if user needs are identified in one of the supply chain, the appropriate product will be first searched in the market (see Figure 19), and only if it is unsatisfying, it will become a starting point for the design chain (see Figure 17).

Indeed, innovation process adapted to the context of an SME retailer results from the literature along with immersion in an enterprise. The diagram is clear – considering the design novice target – and complete; it highlights the links between the three chains of the process. Thereafter, it would be interesting to analyze the progression from a cost-driven strategy to an innovation strategy on a long-term plan.

6. Experimentation/practice-based design research

6.1 Context of experimentation

Our industrial case study is a retailer of arts and crafts goods and framing items. It counts 57 shops across France, among which are own shops and franchised shops. Their first own

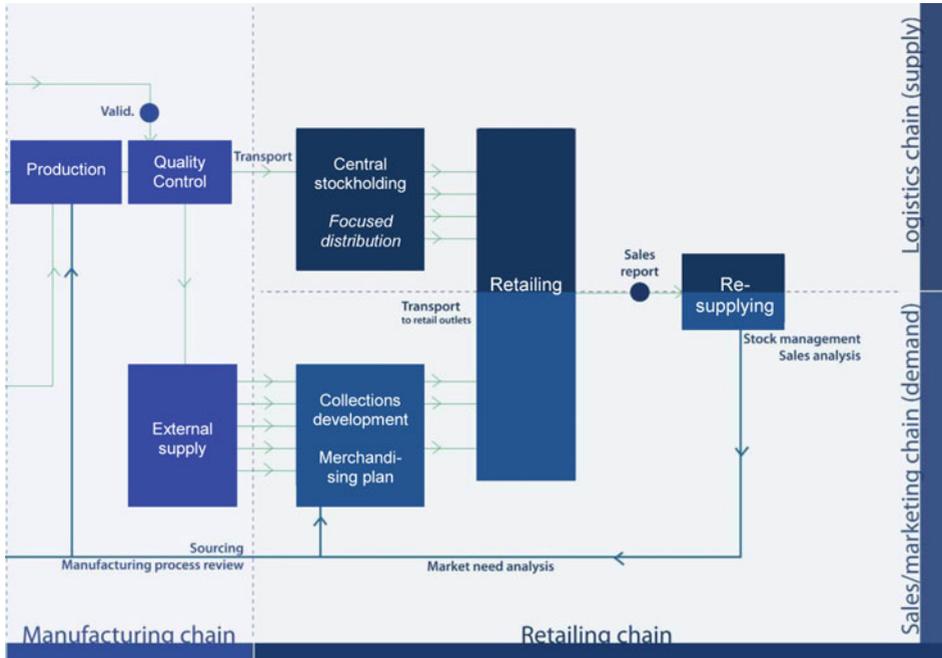


Figure 19. Innovation process, part 2: manufacturing and retail chains. Source: The authors.

brand has been created a year ago with exclusively imported products and no design activity. The marketing strategy created an own brand – as opposed to store brand – as all the shops are not named with the same brand name. Indeed, a store brand could have led to discontentment of shop managers and weakening of the head office.

The brand is defined as a mid-range brand that builds on a balance between quality and price while providing a sufficiently interesting mark-up for the company. Knowing that direct import without any added value would not be a satisfying strategy to ensure competitive lead, the group has targeted to invest in innovation strategy. The underlying aims are to give fresh dynamics to the brand image as well as to durably increase the turnover.

The context for the setting up of innovation strategy is very specific. Indeed, in the realm of arts and crafts, consumers are loyal to national brands as they guarantee consistent quality over the years. Therefore, it is essential to apply a strategy of differentiation created by innovation design to ensure the success of the own brand. The experimentation will deal with the beginning of development of an in-house designed product. The company is not yet organized to receive a design department so the research findings will be tested in the case study.

Indeed, going from a purchase process of selecting products from suppliers to a design process will demand further skills, and consequently a new organization. This will represent a paradigm shift.

6.2 Experimental protocol

The research shows that innovation process involves personnel training and company reorganization. With the case study, we need to figure out how the design process (practice) and the reorganization process (principles) interact. If Feldman and Page (1984) wrote a thesis on *Principles vs. Practice in New Product Planning*, in our context of SME,

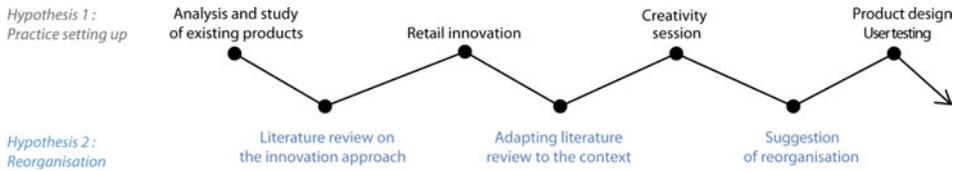


Figure 20. Process of the integration of an innovation activity. Source: The authors.

the theory – or *principles* – on its own is not sufficient. The personnel are not prepared to accept such a change, in an activity they are unfamiliar with.

On the one hand, the setting of an innovation process through a practical approach can conduct the designer to exclusion, as he is in an inferior position and the reliance is not yet established with the personnel. On the other hand, reorganizing the company prior to any product design activity – no proof of success given – can put off decision-makers for financial reasons and personnel for psychologic reasons.

In fact, the two hypotheses overlap and complement each other. This interwoven relationship has been established through a zigzag diagram (Figure 20). Dwyer and Mellor (1991) highlight the links between the elements of firms' organizational environments and new project outcomes. We will present the result of innovation activity by setting up this process and the following experimental protocol.

In order to validate this above process, the innovation activity has been first set up in a pilot field: creative leisure activity. The sector has been chosen for its relevance in the hands of the French market needs (131.7 million euros in 2008 for the creative leisure sector with a growth in the last years), its uniqueness being compared with the competitors and the long-term profit that it can provide to the group.

The purpose of the “practice setting up” experiment is to convince the interest of applying an innovation strategy in a resistant-to-innovation SME. Innovation will go through development of pilot sector retail space (phases 1 and 2) – by starting in the familiar space of retail, it gives a better understanding of innovation value to the personnel. Then, it will gently move to initiate innovation design activity by a creative session (phases 3 and 4).

It will interweave to the reorganization experiment. The purpose is to be convinced of starting a company reorganization based on the innovation strategy plan, in order to develop double skills of retailer and designer connoisseurs. It will comprise three stages:

- (1) literature review on innovation;
- (2) progress report of the research findings to the decision-makers and exchange; and
- (3) presentation of the suggested innovation strategy to the personnel.

The innovation cell will be introduced thanks to an innovation consultant immersed in the company for 6 months and called for the involvement and cooperation of skilled specialists and professionals in different fields. The results extracted from this case study will determinate the continuation – or not – of the innovation project in the company.

6.3 Initiation of the setting up of innovation activity

6.3.1 Retail innovation

In order to introduce innovation activity in the company, the first operation was to change the mindsets. Product innovation was not the priority and curbed the personnel from a lack



Figure 21. Store concept organization plan – Scale 1/200. Source: Delas.

of skills and knowledge of innovation design. As a consequence, a very progressive learning approach has been set up, starting with an innovation in the field of expertise: retail. Two projects marked this phase:

6.3.1.1 Innovation of the retail outlets (interior design and marketing). Previously, the retail outlets freely organized their space, but innovation starts with optimizing existing product categories and surface area. The optimization of the retail space involves the review of surface area allocated to each product category, depending on sales and number of customers per product categories and sub-categories. The input data are market analysis, *Côté Clients* (2010) and *Créaplus* (2009). Besides, the categories have been reorganized in the retail area in order to gather common user activities and to encourage strolling around the related categories.

This project results in the suggestion of a store concept organization plan for an average shop of 600m² (see Figure 21). A store concept provides the group with homogeneity and, consequently, a better visibility for the brand.

6.3.1.2 Merchandizing innovation (merchandizing design). Merchandizing innovation will be applied in a sub-category of creative leisure activities: the child-creative goods. Thanks to regular financial analysis of competitors and adjacent markets, the idea of a creative activity space dedicated to children was born. The financial perspectives are substantial with consolidated annual sales expected to reach 10,000 K€. The development of this sector is not innocent: the underlying idea is to develop customer loyalty at an early age.

In collaboration with a psychologist, the mission consisted in selecting a balanced range of products between width and depth, creating a striking signage design and an innovative merchandizing that facilitates impulse buying, clarifying the offer, and convincing the employees of the interest of innovation activity.

In order to gain knowledge in retail merchandizing, Chadwick (2007) explains how merchandizing can become a lever of increase in shopping basket. Gomez and Rubio (2008) analyze shelves organization to push the customer to buy certain items instead of others.

This 3-month project started the homogenization of the retail outlets and optimized the implantation time of a new product space for retail employees, even inexperienced workers in merchandizing. The signage is shaped as speech bubble as if the shelves were speaking; it makes the children area more human and tempers the consumerist retail atmosphere through an adapted design, in order to trigger impulse buying. One of the child-creative goods zones is particularly innovative for specialized retail stores: the shelves are organized by a column of colors with different shades, shapes, and materials. Indeed, the output of the project is a file of product merchandizing, signage, and interior design adapted to a theoretical retail outlet of 45/55 m² along with a template that details the selected references.

6.3.2 *Participatory design* (creativity)

The creativity session, foreseen at the beginning of the project should have been the very start of the experiment. However, there was a general resistance to design/innovation until trust was built thanks to the success of merchandizing innovation. Then, it was the moment to develop an exchange about NPD with the personnel and initiate them into creative tools and make them aware of the importance of innovation activity in today's hypercompetitive market by an introductive session.

Thus, after theoretical report and a presentation of the research to the decision-makers, the creative session took place. This creative session was a major step of the process. It enables to gather volunteers with different backgrounds, job, and localization for an atypical meeting.

We are now in a design phase in which the objective is to obtain a large panel of ideas that retail experts brought to light thanks to their knowledge on the customer needs. Eleven participants attended the session: decision-makers, store directors, a director of a franchised network, a commercial manager at Sales department, a psychologist, product designers, and an international business student. The session object is to expand the creative goods market by using different creative workshops. Through a KJ-method baseline adapted to the context (see Figure 22), also known as the Affinity Diagram by Jiro Kawakita (1960s), a large number of ideas were distilled to a refined set of related categories.

The three different imagination workshops realized by the participants' team resulted in a hundred of idea cards. They are organized in a Mindmap (see Figure 23) that will become the basis to product design development. Besides, the creative session catches the attention of the participants, they asked for creative sessions to be renewed. As a matter of fact, the decision-holder of the company accepted the full-time intervention of a designer from this moment on.

6.3.3 *New product design suggestions* (product design)

A matrix of selections and multicriteria searches is used to objectively classify the product innovation and to involve the actors in the design process. The decision-holders and the



Figure 22. Baseline to the KJ method in the context of creative goods category. Source: Delas.

creativity session participants along with engineers and ergonomic scientists fulfilled the matrix. Each criterion has a grade weighting that leads the selection toward adapted innovations for the company (see Figure 24).

The top three innovations are as follows:

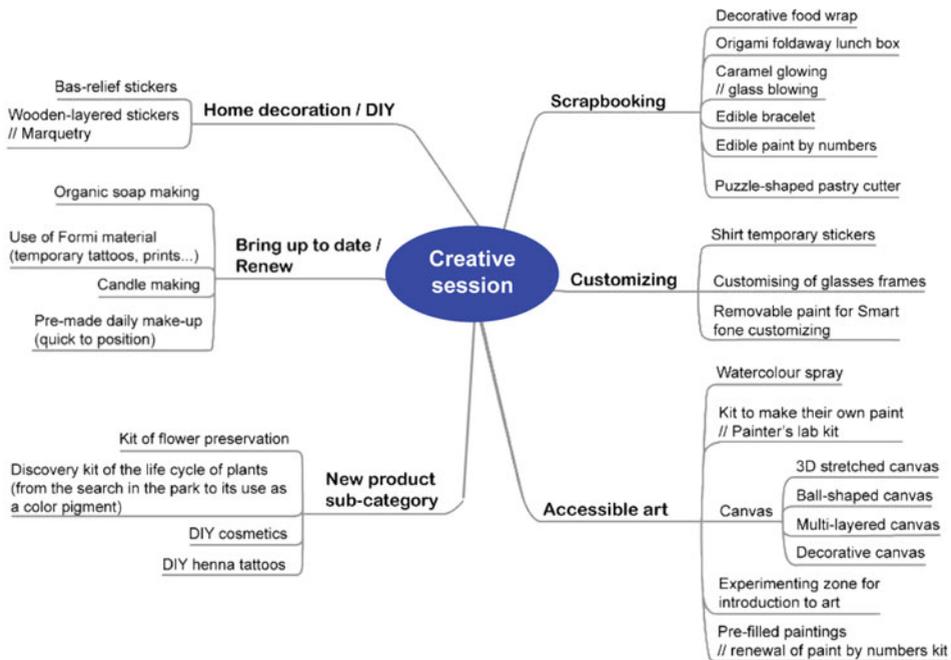


Figure 23. Mindmap showing creative session results. Source: Delas.

		Grades (1 to 5)											
		1 : high 5 : low	1 : difficult 5 : easy	1 : long 5 : short	1 : short target 5 : large target	1 : not original 5 : very original	1 : dangerous 5 : safe	1 : I don't like it 5 : I love it	1 : not innovative 5 : very innovative				
Innovations	//	Criteria	Cost	Technical complexity	Prod. Time	Large target	Uniqueness	Safety	Emotional impact	Perceived innovation	Total	Prioritization	
3D stretched canvas			72	50	48	75	57	30	36	40	408	1	
Multi-layer canvas			69	46	42	45	48	30	26	38	344	6	
Do-it-yourself cosmetics kit			51	34	24	69	72	11	48	60	369	3	
Experimenting zone			66	40	38	63	66	29	44	44	390	2	
Flower life cycle kit			63	38	42	39	60	18	46	40	346	5	
Renewal of paint by numbers			75	52	48	54	51	29	34	26	369	3	
Edible puzzle			60	32	28	57	57	17	38	38	327	7	
Renewal of candle making			75	46	48	48	30	18	40	20	325	8	
Weighting			3	2	2	3	3	1	2	2			

Figure 24. Matrix of selections and multicriteria searches. Source: Delas.

- *A 3D-stretched canvas*: It is a 3D shape that can be painted. Instead of only painting on a flat canvas, this innovation encourages creativity by enlarging the painting area to three dimensions. This is a low investment innovation but has a high-order quantity expectation.
- *An experimenting zone*: It is a table mat adapted to initiate children into arts and crafts activities. It protects the table and comprises storing zones for the tools. It is made of flexible material in order to be easily stored when rolled up. This is a broader innovation with higher risk of failure, especially without any innovation communication on the brand.
- *The do-it-yourself cosmetics*: It is a kit or a range of products to create their own cosmetics following the trends of naturality and do-it-yourself. This is a broader innovation as it would open a new sub-category of products but is more complex as it deals with safety and hygiene compliance.

After evaluation tests for the three innovations, the 3D-stretched canvas has been chosen as the first to be developed toward manufacturing.

6.3.4 Prototyping phase of NPD: 3D-stretched canvas

This phase will initiate the innovation process and determine whether innovation strategy is cost-effective.

6.3.4.1 Context. The idea of 3D canvas comes from the observation of high sales for standard stretched canvas recently produced under the own brand, as well as the success of new stretched canvas shapes. A 3D-stretched canvas is a volume to be painted. It renews the way of painting: from flat canvas to a six-facet volume. Its shape enhances creativity. It can be both contemporary masterpiece – in between painting and sculpture, and a decoration cube (see [Figure 25](#)). For instance, it can become a decorated display, or the basis to depict a children story in six phases...

6.3.4.2 Objective and statement of requirements. The industrial objective of the project is to create visible products with a fairly comfortable margin. The requirement is to convince – by product innovation activity – that the group fosters the creativity of its customer. Indeed, the 3D-stretched canvas renews the space of painting and widens the sphere of possibilities for the artist/amateur.

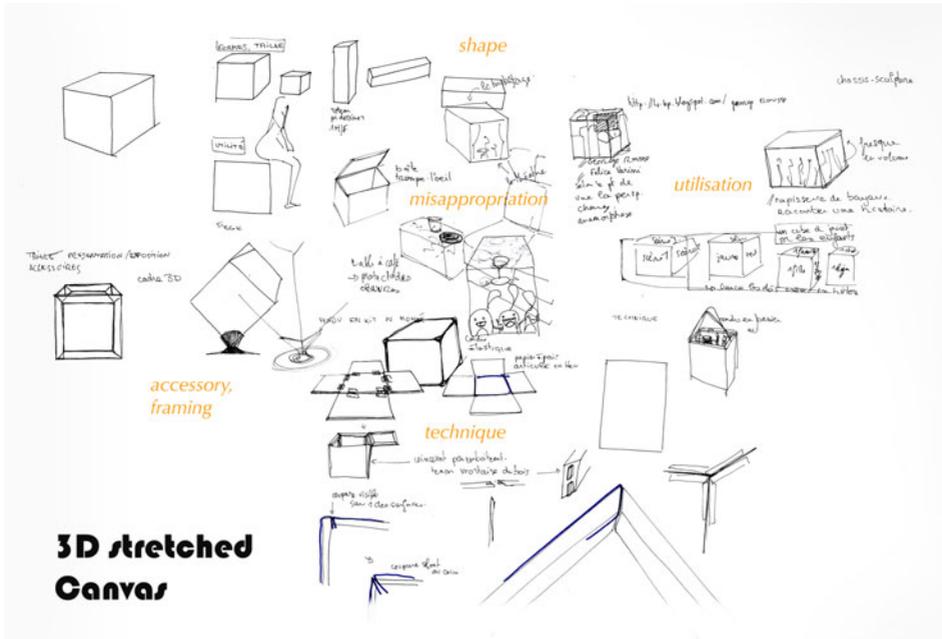


Figure 25. Concept ideation of 3D stretched canvas: shape, function and usage. Source: Delas.

6.3.4.3 Target. For the first product to be designed by the group under its own brand, the objective is to target the largest panel of customer, in order to bring sufficient financial interest for the company and to serve as a brand communication medium. The target goes from children to adults and painters to novices.

6.3.4.4 Concepts.

6.3.4.5 Marketing. Figure 26 shows the advertising poster of the product. It has been designed to appeal both to adults and children through an accumulation of various painting and drawing techniques.

As a conclusion, the use of a decision grid (Figure 24) created by the innovation designer along with the company stakeholders has shown an unbiased argument to develop this new product. Its accessory range was also explored. The 3D canvas could require a special easel to settle the painting space or a base to be displayed. After taking care of the patent protection, it leads to the search of suppliers in order to start the manufacturing phase.

6.4 Experiment result

After this NPD, we will analyze the result of the applied hypothesis.

6.4.1 The setting up of an innovation activity (practice)

The innovation merchandizing has been first set up in the group flagship last June with a budget of more than 5000€ (refurbishment, painting, floor covering, shelves installation,

**PEINDRE,
CREER,
HABILLER,
SON CHÂSSIS 3D**



6 faces à peindre



Figure 26. Advertising poster of the product. Source: Delas.

signage, and merchandizing). In the following months, it has been implemented in seven of the eight own stores and has been suggested to the franchised shops.

As far as the satisfaction of retail experts is concerned, feedback is very positive on the retail innovation. The child-creative goods sub-category merchandizing file optimizes implantation time with shelves empty for a shorter time, avoiding a temporary fall down in the store turnover. The innovative merchandizing file created enthusiasm as the store director asked for automatic deployment of these merchandizing files for every new a sub-category to set up.

This merchandizing innovation led to the release of a budget dedicated to product design and prototyping. Thus, the new product is currently in the prototyping stage. Decision-makers have already recommended to patent protect the innovation. The production will follow.

We will also keep an eye on long-term indicators: sales volume, increase of store visits, and development of new customers, in order to analyze the data and capitalize the information.

6.4.2 *The reorganization (theory)*

Measuring the success of this experiment is arduous, as change in the strategy is an action led on a long-term plan that will not be visible right away. However, it is possible to measure the acceptance of the suggestion with the following indicators:

Stakeholder's satisfaction on the innovation process after report is essential. We first verified the project understanding of stakeholder's. The project paid off and innovation approach caught the attention. Decision-makers are convinced of the interest of reorganization as they propose the project continuation and the setting up of an innovation approach by recruiting an innovative designer. Thus, the experiment objective has been reached.

Indeed, field observation has confirmed the mutual connection between both design practice and innovation process theory. The case study shows that, in the case of SMEs, the change from a retail expert to a retail designer should be very slow with intercalated phases between theory introduction and design practice in order to ensure acceptance of this new activity.

Besides, as innovation process literature dedicated to SME retailers is very poor, this study gathers a suggestion of innovation activity introduction. Indeed, it would be appropriate to set up this experimental protocol in other SME retailers of different product fields in order to ensure its relevance for the world of research.

7. Conclusion and perspective

After a detailed literature review, the research leads to introducing a new innovation strategy in the context of SME retailer by the setting up of an innovation cell. It means a short organization, which involves regular NPD at successive degrees of innovation.

The challenge in terms of research is big for SME retailers across the world. Indeed, only a position of innovation designer can ensure a long-lasting growth and a competitive lead in the global marketplace. But prior to any design activity, it is essential to change people's views on innovation design activity – not only the general manager but also the personnel. Thus, a strategy that integrates the concept of innovation management and corporate reorganization has been formalized in parallel with the introduction of a product design planning approach (Pahl & Beitz, 1988).

The findings show that theory and practice are tightly intertwined in order to ensure the success of innovation strategy introduction in a context of resistance to change.

Over the World, SMEs are the biggest employment-providing sector with over 50% of the employment market; that is why this study will be beneficial to the realm of research.

Acknowledgements

I thank the company that accepted to participate in this research as well as my professors at Arts et Métiers Paris Tech who supported me in writing this article.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes

1. Email: alexia.delas@gmail.com
2. Email: fabrice.mantelet@ensam.eu
3. Email: stephanie.buisine@ensam.eu

References

- Acs, Z. J., & Audretsch, D. B. (1988). Innovation in large and small firms: An empirical analysis. *American Economic Review*, 78, 678–690.
- Aoussat, A., Christofol, H., & Le Coq, M. (2000). The new product design – A transverse approach. *Journal of Engineering*, 11, 399–417.
- Bessière, B. (1993). *La conception de produits nouveaux dans les petites et moyennes entreprises* [Designing new products in small and medium-sized enterprise] (Unpublished doctoral thesis). ENSAM ParisTech, Paris, France.
- Chadwick, C. (2007). Your store is your brand. *Retail Merchandiser*, 47, 38.
- Cooper, R. G., & Edgett, S. J. (2003). Overcoming the crunch in resources for new product development. *Research Technology Management*, 46, 48–59.
- Cormican, K., & O’Sullivan, D. (2004). Auditing best practice for effective product innovation management. *Technovation*, 24, 819–829.
- Côté clients. (2010). *Redynamiser le marché des activités manuelles artistiques* [Boost the market of arts and crafts activities]. Paris: Créaplus.
- Créaplus. (2009). *Le marché des activités manuelles artistiques* [Market of arts and crafts activities]. Paris: Author.
- Cross, N. (2004). Expertise in design: An overview. *Design Studies*, 25, 427–441.
- Cusumano, M. A., & Nobeoka, K. (1992). Strategy, structure and performance in product development: Observation from the auto industry. *Research Policy*, 21, 265–293.
- Delamarre, A., Christofol, H., Samier, H., & Richir, S. (2005, August 15–18). Managing early design phases in sme’s. ICED 2005, Melbourne, Australia.
- Donnellon, A. (1993). Crossfunctional teams in product development: Accommodating the structure to the process. *Journal of Product Innovation Management*, 10, 377–392.
- Dougherty, D. (1992). Interpretive barriers to successful product innovation in large firms. *Organisation Science*, 3, 179–202.
- Dougherty, D. (1996). Organizing for innovation. In *Handbook of organization studies* (pp. 424–439). London: Sage.
- Dwyer, L., & Mellor, R. (1991). Organizational environment, new product process activities, and project outcomes. *Journal of Product Innovation Management*, 8, 39–48.
- Feldman, L. P., & Page, A. L. (1984). Principles vs. practice in new product planning. *Journal of Product Innovation Management*, 1, 43–55.

- Filson, A., & Lewis, A. (2000). Cultural issues in implementing changes to new product development process in a small to medium sized enterprise (SME). *Journal of Engineering Design*, 11, 149–157.
- Freeman, C. (1991). *The nature of innovation and the evolution of the productive system, technology and productivity – The challenge for economic policy*. Paris: OECD.
- Gillung, A., & Perche, S. (2000). *Conception d'un mobilier de cuisine pour le camping et proposition d'une démarche de construction d'un processus d'innovation en PME/PMI* [Design of a camping kitchen cabinet and proposal of an innovation process adapted to SME/SMI] (Unpublished master's thesis). ENSAM ParisTech, Paris, France.
- Gomez, M., & Rubio, N. (2008). Shelf management of store brands: Analysis of manufacturers' perceptions. *International Journal of Retail & Distribution Management*, 36, 50–70.
- Griffin, A., & Hauser, J. R. (1993). The voice of the customer. *Marketing Science*, 12, 1–27.
- Harmancioglu, N., McNally, R. C., Calantone, R. J., & Durmusoglu, S. S. (2007). Your new product development (NPD) is only good as your process: An exploratory analysis of NPD process design and implementation. *R&D Management*, 37, 399–424.
- Hillairet, D., Richard, G., & Bouchet, P. (2009). The dual management of innovation by the Decathlon group. A distinctive strategic system on the sport goods market. *Journal of Innovation Economics*, 1, 189–210.
- Kahn, K. B. (1996). Interdepartmental integration: A definition with implications for product development performance. *Journal of Product Innovation Management*, 13, 137–151.
- Keus, M., Smulders, F., Roscam Abbing, E., & Buijs, J. (2009, August 24–27). *Creating brand-innovation synergy: Towards a practical method of using brands in the new product development process*. International conference on engineering design, ICED'09. Stanford University, CA, USA.
- Kline, S., & Rosenberg, N. (1986). An overview of innovation. In R. Landau, & N. Rosenberg (Eds.), *The positive sum strategy: Harnessing technology for economic growth* (pp. 275–305). Washington, DC: National Academy Press.
- Korajnova, E. (2009). *Aide au management de l'activité d'innovation par l'approche des réseaux de problèmes* (Unpublished doctoral thesis). Université de Strasbourg, France.
- Larson, E. W., & Gobeli, D. H. (1988). Organizing for product development projects. *Journal of Product Innovation Management*, 5, 180–190.
- Liu, P. -L., & Tsai, C. -H. (2007). The influences of R and D management capacity and design/manufacturing integration mechanisms on new product development performance in Taiwans high-tech industries. *Journal of Applied Sciences*, 7, 3628–3638.
- Luckanícová, M., & Malíková, Z. (2012). A comparative study of innovation capacity from human capital perspective on regional level: Study of Slovakia. *Innovative Issues and Approaches in Social Sciences*, 5, 196–219.
- Millson, M. R., & Wilemon, D. (2008). Impact of new product development (NPD) proficiency and NPD entry strategies on product quality and risk. *R&D Management*, 38, 491–509.
- Morris, C., & Kranzberg, M. (1978). *Materials science and engineering: Its evolution, practice and prospects*. Amsterdam: Elsevier.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5, 14–37.
- Oke, A. (2007). Innovation types and innovation management practices in service companies. *International Journal of Operations & Production Management*, 27, 564–587.
- Oslo Manual. (2005). *Guidelines for collecting and interpreting innovation data* (3rd ed.). Paris and Brussels: OECD and The European Commission.
- Paetzold, K. (2008). *On determining a product's process related to the degree of maturity*. International design conference, Dubrovnik, Croatia.
- Pahl, G., & Beitz, W. (1988). *Engineering design: A systematic approach*. Berlin: Springer-Verlag.
- Perrin, J., & Brown, M. (1977). *Engineering and industrial projects: A survey of engineering service organizations*. Paris: OECD Development Center.
- Piat, C. (2005). *De la notion d'apprentissage au cœur de l'innovation* [The learning process at the heart of innovation]. Paris: CNRS Editions.
- Roberts, E. B., & Berry, C. A. (1985). Entering new businesses: Selecting strategies for success. *Sloan Management Review*, 26, 3–17.

- Roozenburg, N. F., & Eekels, J. (1995). *Product design: Fundamentals and methods*. London: John Wiley & Sons.
- Sheth, J., & Malhotra, N. K. (2011). *Wiley international encyclopedia of marketing*. Chichester: John Wiley & Sons.
- Stevenson, J., & Kaafarani, B. (2011). *Breaking away: How great leaders create innovation that drives sustainable growth – And why others fail*. New York, NY: McGraw-Hill.
- Walters, D., & Rainbird, M. (2007). *Strategic operations management: A value chain approach*. Basingstoke: Palgrave Macmillan.