INNOVATION THROUGH DESIGN FOR EMOTION

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ABSTRACT
Innovation represents a key role in firms success. Though the literature provides much advices and methods, companies sometimes do not know how to proceed when they feel they have exhausted all innovation possibilities or when they are in need of a specific type of evolution. The present paper proposes an overview of product innovation types and emotional design methods to make competitive products, bringing emotional benefits to the final users. Based on the synthesis of existing methods and tools from the literature and on our experience in design for emotion, we propose to illustrate how to design for emotion in the three main types of product innovation: incremental, disruptive and forecasting. We propose a visual tool, a brochure, dedicated to SMEs, to help understanding the differences between these types of innovation and how design for emotion can contribute to each type of innovation. Each case is supplemented with a toolbox of relevant tools, allowing company's design team to understand and to start innovation through design for emotion.

Keywords: Design for emotion, innovation, forecasting tools

1 INTRODUCTION

Although many innovation methods exist, companies have difficulty implementing them, most of the time because of the risk [30]. Design for emotion and its role for innovation, especially in forecasting innovation [1], remains hardly accessible to SMEs even though it has been implemented in big companies [2], research laboratories and universities [3]. Measures taken by the French Ministry of the Economy to increase SMEs awareness of design (www.entreprise-et-design.fr) and the Design Workshops consulting sessions dedicated to SMEs organised by the APCI (French Agency for the Promotion of Industrial Creation) in French regions confirms the need of a pragmatic approach to help SMEs engaging in innovation.

In the book *Developing a new product,* [4] proposes a diagram of an innovative product development process, based on the hypothesis that the efficiency of an innovation process is based on "methods and tools well-tried and transferable from a context to an other", whatever innovation could be, incremental, disruptive or forecasting.

We propose to distinguish and to structure these three innovation processes targeting SMEs according to their needs, articulating the innovation contexts and how design for emotion can contribute to each context.

After an introduction expressing the issue of the paper in the first section, a state of the art on innovation and design for emotion is presented in the section 2. The third section presents three cases of product innovation (incremental innovation, disruptive innovation and forecasting innovation) involving design for emotion, through real cases. The section 4 presents the final contribution, "Emotion Design for Innovation" is a brochure dedicated to SMEs. It synthetizes some adapted methods to innovate through design for emotion. This section is followed by a discussion and conclusion in section 5.

2 STATE OF THE ART

In the first part of the section, we present a state of the art on innovation design methods, then a synthesis map involving the time evolution and the types of innovation, then we present a theoretical background to understand emotional design and its contribution to product innovation.

2.1 Innovation design methods review

As the rationalisation of the industrial design and production means has led to a relative standardisation of the products launched on the market, the sharp competition between companies

exhorts to take into account the perceptive aspects of the user (emotional needs, symbolic values) to get new markets.

Innovation can be achieved in many ways, depending on the context and company strategy. Many authors worked on categorising these methods to simplify the choice based on the type of project.

Steen [5] proposes a map of existing design methods for innovation based on the context and knowledge of the designers and users. The Figure 1/left underlines the importance of including the user when the project concerns a future situation or opportunity. The users can be involved in two manners, inside the designer's working environment (methods mentioned on the left), or directly observed by the designer in his/her usage environment (methods mentioned on the right). The Figure 1/middle represents almost general understanding of innovation classification, from product improvement to forecasting innovation, this framework is proposed by Lee [6] based on Ansoff growth vector, a product/market matrix [7] for firm strategy allowing to chose the methods and tools.

The Methods Lab [8], presented on Figure 1/right, classifies 53 design methods according to «where the information comes from» (designer intuition vs user knowledge) and their qualities (visual vs functional).
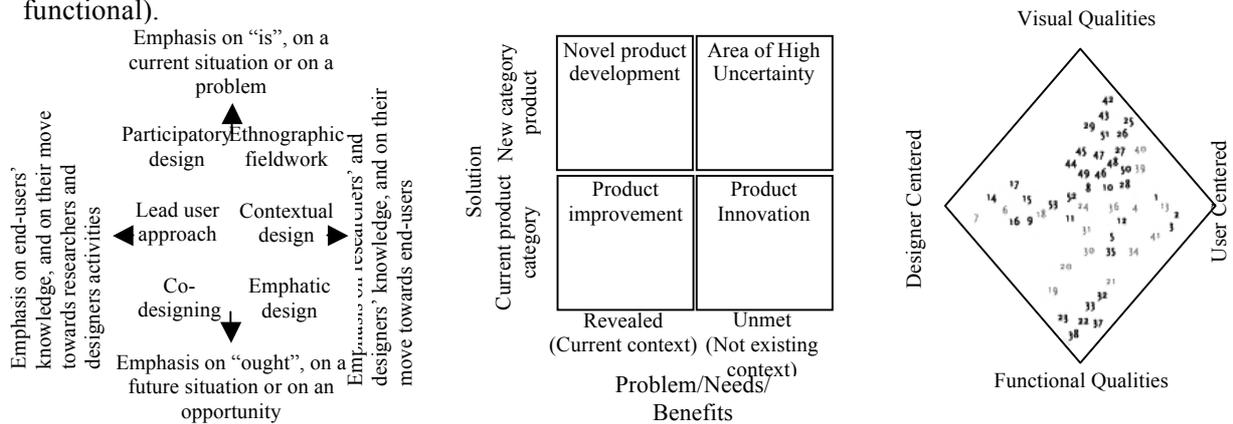

Figure 1. Different human-centered design methods and practices [5]; Area of design types [6]; The Methods Lab Map [8]

2.2 Proposal of a combinatory map

We synthesised the models presented on Figure 1 by analysing and we propose to combine them in a new classification of the design tools (Figure 2). When articulating these 3 models, we obtain a schema dealing with 3 important tools' criteria: the time axis present/future [5], the need of innovation (frame product/needs) [6] and their qualities (functional/visual) [8].

Therefore, this new map focuses on three main innovation objectives, incremental innovation (P. Improve frame), disruptive innovation (NPD and Product Innovation frames) and the forecasting innovation pointing on future situation (AHU frame). The map shows that for a "current situation" study, tools are evaluative whereas they become more generative in "future situations". In the first case, they are functional and are quickly useable; in the second one they are more visual and subjective. This map has been enriched with a review on the design methods presented on both platforms, Engage (www.designandemotion.org) and the method labs.

We keep in mind Sanders's three pyramids [9] model using SAY methods for clarifying needs in incremental innovation, DO methods for observable and tacit needs in disruptive innovation and MAKE methods for latent needs in forecasting innovation with a crossing model of the three types of methods showing that there is a permeability between the tools. Therefore, tools concern not strictly a frame of Lee or Ansoff matrix but the relation between a phase of the innovation process related to these frames. Indeed, it is important to notice the boundaries' permeability (dotted lines) between the different states of innovation (Down slice for incremental, middle slice for disruptive, up slice for forecasting) because methods or tools are not necessarily dedicated for a specific use[1].

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[1] For example, a focus group can be used in the three states. To *determine* the most important attributes of an existing product (state 1), to *discuss* a new usability (state 2), and to *imagine* the future of a product if the it changes the behaviors (state 3).
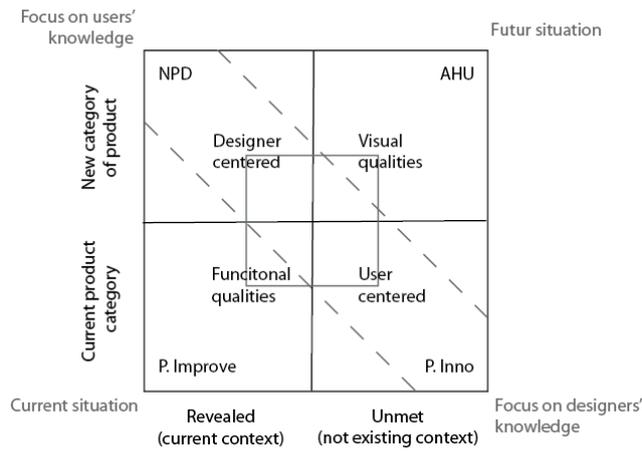
Figure 2. Proposal of a combinatory map

Methods can be combined according to the project, the problem or what has to be observed or designed. However, some methods deal with creativity emulation (Mood Board), useful in forecasting for example, while others are more efficient for the evaluation of existing product attributes (Attribute Rating), used in product improvement. The proposed map below gathered these tools, simplifying the comprehension of their usability and allowing for the transition from one state to another.

2.3 Theoretical background to understand emotional design

Historically, many methods aim at integrating the subjective aspects of the need into the design process. Many laboratories such as the CPI lab [20], [21], IRCCyN Lab [28], the LGI [29] are working on the integration of the subjective values (emotional, semantic and sensorial aspects) of the final user in the early steps of the design process. These approaches are well adapted in the situations of incremental innovation and situations considering the object as "a part of" the environment.

Nevertheless, these methods are less adapted in the situation of disruptive or forecasting innovation, and in the cases considering the product as an extension of the user means of action in the world.

To explain this approach, we propose to consider the theoretical model of existence of the product proposed by Lenay and al. [12], which distinguishes two states of the product, one as being an object within the environment (towards most of which the design methods and theories are addressed), the second one as being a coupling device, allowing the subject to act in the environment through the device. The model is presented on Figure 3 below. This model illustrates the changing state of the product, from a contemplative point of view (product seen as an object in the environment) to an active point of view (product seen as coupling device). We propose to widen the consideration of the emotional aspects linked to the final user, by considering both states "object in the environment" and "coupling device" in the design process.
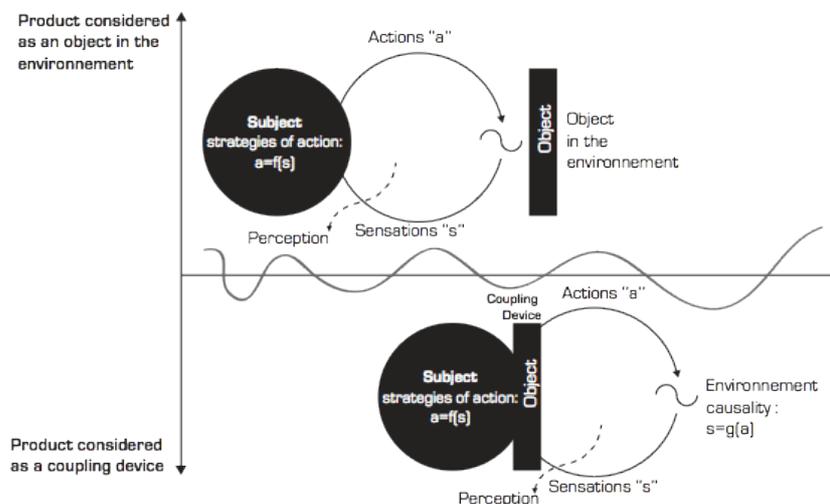

Figure 3. Lenay's model of the 2 states of the product [12]

We propose to examine three cases of innovation through design for emotion (section 3), the first one originates from an industrial demand on incremental innovation using design for emotion to integrate sensorial benefits into new products (mobile-phone maker), the second case presents the emotional design as a mean to express new benefits for the user through form and material disruptive innovation. The third case is based on a recurrent industrial demand for forecasting innovation through emotional design, it concerns the design of a music player through the exploration of the product-user interaction as well as the semantic of form.

3 DESIGN FOR EMOTION IN 3 PRODUCT INNOVATION TYPES

3.1 Incremental product innovation

The frame current product/current context (based on Figure 2, left, below) concerns product improvement. The product and the market are already fixed, the product is familiar to the users. The specific tools are mostly Product-driven and work as
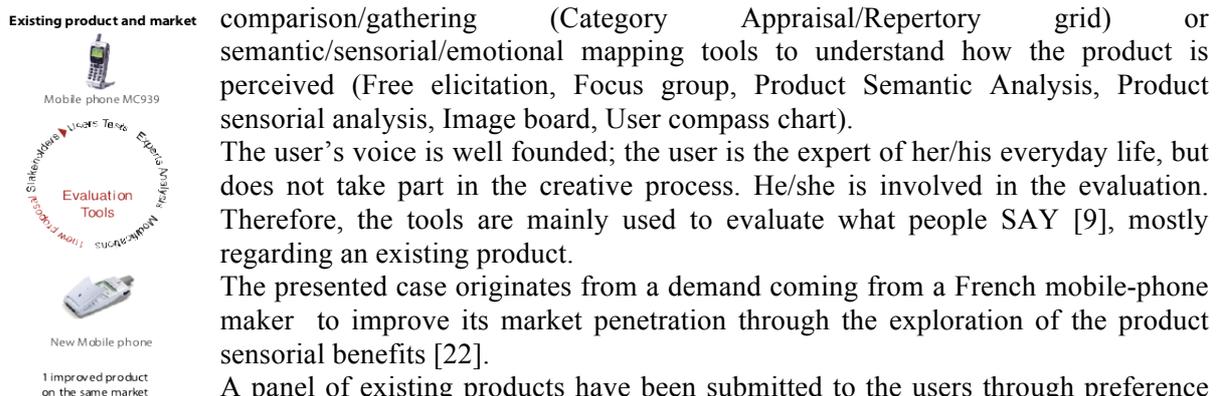

comparison/gathering (Category Appraisal/Repertory grid) or semantic/sensorial/emotional mapping tools to understand how the product is perceived (Free elicitation, Focus group, Product Semantic Analysis, Product sensorial analysis, Image board, User compass chart).

The user's voice is well founded; the user is the expert of her/his everyday life, but does not take part in the creative process. He/she is involved in the evaluation. Therefore, the tools are mainly used to evaluate what people SAY [9], mostly regarding an existing product.

The presented case originates from a demand coming from a French mobile-phone maker to improve its market penetration through the exploration of the product sensorial benefits [22].

A panel of existing products have been submitted to the users through preference tests, and expert evaluation (descriptive analysis) have been processed to understand the factors that structure the preference of the final users. Then, the interpretation of the results allows the company to take the relevant decisions and to formulate recommendations to design new concepts integrating the resulting specifications. The final output could be submitted again for the user's validation.

Figure 4. Incremental product innovation

Then, we can consider the evaluation process as a circular line to improve concepts, representing iterations of users evaluation for validation or modification (See Figure 4/circular scheme). Considering the continuously changing needs, submitting iteratively the concepts to the users allows to avoid the risk of launching a product out of the new market expectations. Incremental product innovation is an important and necessary part of all firm's life. Involving emotional design as a mean of incremental innovation is a quick process that requires few modifications in the industrial processes and helps maintaining a product on its market. The Evaluation Tools are set up in a toolbox that we provide in the booklet to enlarge the choice of the one already used by firms (i.e. Sensorial Analysis, Semantic Differential Methods).
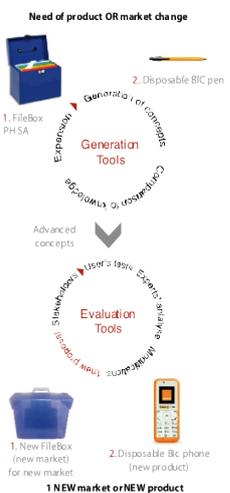

3.2 Disruptive product innovation

As seen on the map presented on the Figure 2 (top and right), there are two types of disruptive innovation: A new product development, often leading to technological breakthrough for an existing market with identified needs, and a product innovation as a transfer of the product category on a different market where needs have to be created. Setting tools for disruptive innovation aim at generating new ideas. Games, manipulations, uses of pictures or scenarios are mobilised in order to allow users needs elicitation (Cultural Probes/ Relabelling / Open ended objects) [13]. Comparing to the earlier case, there is a stronger link between the designers and the users. As the product is unknown, users will express their feelings regarding their past experiences of existing products so that their voice is not an explicit expression of their needs but a basis for reflection, a way to explore possible situations through emotion involvement. In the disruptive case presented on the Figure 5 [31], the company was looking for a more innovative product having a lasting impact. The maker

Figure 5. Disruptive product innovation

decided to get a new market through the improvement of a product: the initial material has been moving from steel to PP, allowing to produce the entire object in an all-in-one injected piece of PP, with better emotional qualities, better look and feel qualities, better strength, light, and cost. The added value of the approach, based on generation and evaluation steps, lies in the idea generation according to internal constraints even if creativity is pushed further. The iterative generation phase is lead by generation tools to understand what people DO. This approach starts with generating new ideas, not with evaluating existing products like in incremental innovation. The resulting ideas are confronted to knowledge (i.e. Market Watch, User Survey, Technological Watch, Lead Users tests) and evolve until they reach an advanced concept state.

The resulting advanced concepts enter the evaluation phase, similar to the incremental one (mentioned as circular on the Figures 4 and 5). Evaluation tools do not serve as an information basis for creation, as it is in incremental innovation, but as a mean to evaluate the new advanced concepts developed[2] (for example PrEmo / ID Tool / Visual scanning methods).

Relevant concepts and recommendations are then gathered in order to develop one final proposal which will be submitted to user's evaluation in order to analyse the emotional benefits and to understand the factors that contribute to the elicited emotion. In the case of a new product development the industrial process might be modified, whereas it would be the communication strategy that would change in the case of a market change.

Generation Tools are also set up in a toolbox provided in the brochure at the end of the paper, the circle on the top represents the iterative process of idea generation, the circle below represents the iterative process of evaluation.

3.3 Forecasting innovation

3.3.1 What is forecasting innovation through design?

Forecasting design uses projection methods and tools helping firms to manage their strategy and to reveal users' latent needs. This approach answers two major questions about the future, what could happen and what could I do as a maker, what to propose to the consumers in the future?

Forecasting has always existed and was mainly used by experts to predict economical evolutions and to help decision makers in their choices. However, the important information about the fundamental evolution[3] it brings suffers from a lack of transferability into usable inputs for the firms concerning their future. Design, well known for its proficiency to visually transmit information, is it a good translator for this scientific information. By doing this, forecasting data feed designers creativity and allow imagining a future based on strong occurrence changes.

Therefore, forecasting design is anticipating instead of being reactive (which means adapting quickly when a change occurs) [15]. It aims at preparing a coming change or provoking it in a way that is profitable [16]. By definition, there is no science of future; future is unknown. However, it is possible to *understand* the past, to *question* the present and to *make hypothesis* on the future.

Literature on the subject proposes 3 forecasting methods.

Jouvenel [15] exposes a five steps method:
1. Definition of the problem and the horizon (i.e. time for the study, targeted point in the future)
2. System definition and key factors identification (i.e. context, constraints and relations in the form of micro scenarios),
3. Collection of the information and hypothesis making (i.e. verifying these micro scenarios with information on the past events),
4. Futures construction (i.e. dendritic tree of plausible futures following a strong guide line)
5. Strategic choices (i.e. discussion of the different futures to choose the one that fits the firm strategy to plan decisions to reach this point in the future).

In *Réenchanter le futur* [18] the authors highlight three variables:
1. Anticipation, to set important questions,

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[2] The same evaluation tools can be used introducing the new products among the existing ones or among the market offer.

[3] Some publications like «Trends Now Shaping The Future» by the World Future Society can be used to design the context. They propose experts' analysis of strong evolutions based on PESTE factors (Politic, Economy, Society, Technology, Environment).

2. Appropriation, to make sure everybody has the same knowledge on the subject and share a common goal,
3. Action, typical workings of the forecasting project.

There are some limits to these methods, which are rather advices than structured methods but the orientations are directly applicable for product development. Therefore we propose to focus on the followings:

Fabriquer le futur 2 [17] exposes another five steps method:
1. Observe, study, watch, analyse clients, markets and trends (contrary to the previous method, this one begins by taking information before setting the problem),
2. Generate offer concepts (creative sessions),
3. Illustrate, prototype, simulate and make scenarios (in order to communicate on the concepts),
4. Test and submit to reality (user tests to improve concepts),
5. Selection and realisation (based on expert selection or internal firm criteria).

The Vip method (Vision in Product design) [14] exposes three main phases:
1. Designing a context (unknown because being in the future). Answering to the question «In which context will the product be and what are the influencing factors?». Find the states, factors that haven't change fundamentally in the past and wont change radically in the future (ie. Transportation), the trends, dynamic phenomena (ie. Interest for bio-products) and principles, values or preferences intrinsic to human nature (ie. Memory capacity),
2. Designing an interaction. When the context and the factors are fixed, set up an interaction scheme between the product and the future user, through rapid prototyping and scenarios. As with disruptive innovation, the goal is to generate a lot of ideas from the scenarios.
3. Designing a product. Shaping one or more products being the last step of all the process.

3.3.2 The forecasting innovation through design process

Figure 6.
Forecasting
product innovation

Referring on Figure 2, one frame remains: the Area of Uncertainty (Upper and right part), where needs and products are unknown. In this frame, the forecasting design process using subjective tools takes place, including the user in all stages of the project. "*Seeing and appreciating what people dream shows how their future could change for the better*" [13]. Sanders proposes, not only user centred design but participatory design, coming up with MAKE Tools in the generation phase.

The first step consists of collecting information from sources as diverse as possible (i.e. consumers, partners, press, trips) using Collection Tools like Archetypes, Trends, and Surveys. This amount of information allows finding weak and strong signals, pointing an occurring change. This brings a personal form of questioning that directly concerns the business of the firm and allows to formulate an initial problem, launching the forecasting design project and the definition of a temporality for a study (3, 10, 20 years).

The example shown on Figure 6 addresses the question of the «evolution of living together». It leads to consider new technologies and the need to save energy. Electronic-goods maker could ask: Will people still use only individual devices? And if not, how will they do? This problem is the starting point of the ideas generation phase including the design of the context (ie. What will be the music habits?) and the design of the interaction (ie. Will people in the future still operate only individual devices?), through the same Generation Tools.

The plausible futures revealed by the ideas generation are then submitted for users evaluation through the same Evaluation Tools as seen before. The analysis of the evaluation results allows to invalidate or to extend some of the strategic concepts/axes to propose relevant finalised concepts.

In the example (see Figure 6), one of the multiple concepts generated, a music player that is controlled by the emotion of the user through the caress on the antennas, make it possible to operate collectively in the same environment, and to generate an ambiance since the collective device is able to interpret the emotional action of the user. In the proof of concept above, each antenna is gathering music titles, when sliding an antenna, the user can chose one title among the playlist, when caressing more than one antenna, depending on the delicacy of the caress, on title will be chosen among the titles

corresponding to the gesture. A soft caress orders slow music while more dynamic caress orders higher rhythm music.

These finalised concepts (Prototypes/detailed scenarios or Proof of Concepts being the usual outputs of such projects) are then submitted to stakeholders for different issues. In the present case, we developed forecasting innovation through design for emotion, focusing on the design of the experience rather on the design of form, as Djajadiningrat addressed the question of the balance to be found between appearance and action [23], [24]. According to the latter, aesthetics and interaction are two interrelated concepts, rather than separated entities, and the design team must design a context for the experience rather than design a product solely. In the same view, we considered Overbeeke's method to design experience, beyond the design of the product itself [25], aiming at building the ground of a design Science based on the consideration of the theory of the active perception [26], [27].

Indeed, this approach does not lead to the development of product as in incremental or disruptive innovation, but offers many possibilities of cases for continuation.

In the present case, the approach leads to legitimate and validate innovative seeds based on the user/product interaction as being a key factor for eliciting emotion. This approach can be used as starting point or as inspiration in the ideas generation step to improve and orient creativity on emotional interaction in other future projects. Also, working on forecasting projects improves creativity and situation analysis skills regarding the studied subjects. Learning by doing instead of learning by failing. This material could be very interesting to give a start to *time to market* projects.

The process can lead to strategic planning as well. Changing brand image, technologies or product range requires an anticipated long term planning (workers formation, infrastructure modifications, mentality changes etc.). The point the firm will target in the future is already fixed by the approach it must plan the steps in reverse from the goal point until the present point. Whereas behaviours and contexts are changing with time, forecasting must be an iterative approach to constantly rectify the planning.

Forecasting approaches allow internal and external communication, for example, communication on the innovative face of the firm to enhance its visibility. By the same way, an internal communication can federate people around the same objective or make them adopting a new technology by showing relevant and tangible applications, resulting from previous forecasting projects. Forecasting projects must have a definite time, few months (nearly 15% of working time), in order to efficiently motivate the team. It can be carried out by only one person, but a team from multiple disciplines is better for the diversity of each own projections for the future using different points of view and taking into account personal information necessary for their success. This diversity feeds the collective creativity [19]. Then, we consider forecasting design, not as an alternative, but as complementary and parallel to the other innovation approaches or classical development methods, in particular because of its operational issue. So, forecasting innovation is not totally different in the process from disruptive innovation. The only differences are the input, a question that does not concern a time to market product but being a personal questioning.

In the last section, we gathered these examples into a unique document and provide toolbox of design for emotion methods that have been used in the different phases of these innovation projects.

4 SYNTHESIS BROCHURE

This work has led to the design of a brochure presenting the three types of innovation and for each type, how the design for emotion can be involved. (Figure 7 and 8, brochure unfolded). On the recto, the brochure presents the three types of innovation (incremental, disruptive and forecasting).

On the verso, a short description of each type of innovation with the explanation based on the previous cases (see section 4) is presented. The recto shows the similar phases commonly found in the three innovation steps (like the presence of Evaluation phase in both disruptive and forecasting innovation). It also gives illustrated examples from the start to the end of each process and calls back to the tools presented on the verso page.
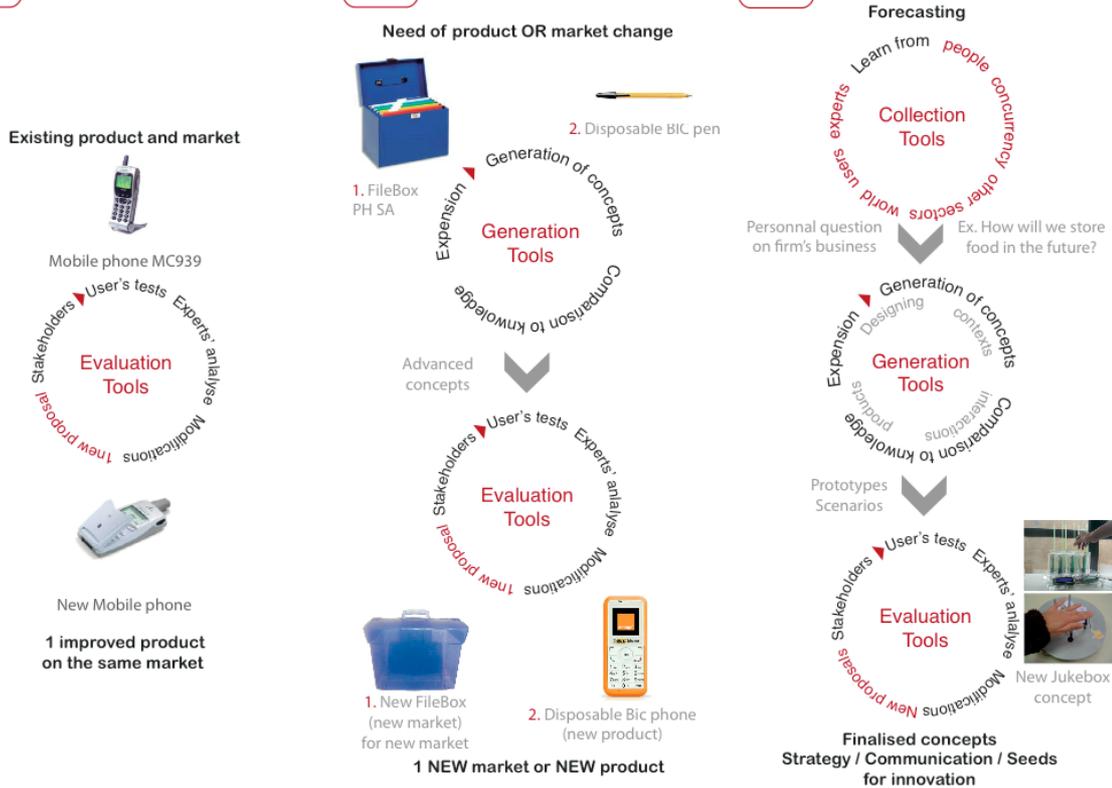
INCREMENTAL   DISRUPTIVE   FORECASTING

Existing product and market

Mobile phone MC939

Evaluation Tools

User's tests · Experts' analyse · Modifications · 1 new proposal · Stakeholders

New Mobile phone

1 improved product on the same market

Need of product OR market change

1. FileBox PH SA

2. Disposable BIC pen

Generation Tools

Expension · Generation of concepts · Comparison to knowledge

Advanced concepts

Evaluation Tools

User's tests · Experts' analyse · Modifications · 1 new proposal · Stakeholders

1. New FileBox (new market) for new market

2. Disposable Bic phone (new product)

1 NEW market or NEW product

Forecasting

Collection Tools

Learn from people · concurrency · other sectors · World users · experts

Personnal question on firm's business   Ex. How will we store food in the future?

Generation Tools

Expension · Designing · Generation of concepts · contexts · interactions · products · Comparison to knowledge

Prototypes Scenarios

Evaluation Tools

User's tests · Experts' analyse · Modifications · New proposals · Stakeholders

New Jukebox concept

Finalised concepts Strategy / Communication / Seeds for innovation

Figure 7. Recto of the brochure «Emotional Design for Innovation

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Find your innovation Tools   What are you looking for ?

DESIGN &INNOVATION

COLLECTION TOOLS

Benchmarking	Human sciences	Showroom
Delphi	Internet/RSS	SWOT
Emphatic design	News/Books	Technology watch
Employee stimulation	Publications	Trends extrapolation
Everyday observation	P. emotion navigator	Workshop

A question about the business of the firm is formulated using intuition and knowledge. The question is then discussed in a participatory way to generate proposals iteratively confronted to knowledge (market, users, experts etc.). Market and needs behing unknown context and interaction have to be designed before shaping the future products. Resulting concepts and scenarios face users' evaluation that bring modifications until leading to relevant advanced concepts rarely exceeding prototypes form. In the example, the end of the process is not 1 product but Proof of Concepts (POC) of collective music playerrage, reflecting on new solutions without today faisability constraints to inform stakeholders on decisions concerning strategic planning, communication, and inputs to launch new projects, bringing new interaction and emotional benefits to the potential final users.
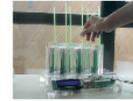
Forecasting Innovation
Anticipate needs&products

GENERATION TOOLS

6-3-5 method	IA Cards(R)	Scenario building
Brain/Bodystorming	Immersive experience	Sensiting packages
Co-designing	Tangible sketching	Storyboards/telling
Context mapping	Lead user	Technical drawing
Contextual design	Open ended objects	Technology probes
Cultural probes	Random words	ViP
Design improv(R)	Relabelling	Visual Research Tools
Extrem characters	Role play	ZMET

Finding a new product for a known market or a new market for a known product. Simulation and observation tools are used to help users involved to uncover tacit needs. The generation phase leads to few proposals compared to knowledge (market or techno watch, users etc.) in order to extend or unvalidate some of them. Finally, advanced concepts are submitted to users for evaluation. Analysed results bring modifications until one final product/market facing stakeholders' decision. This method costs time but brings disruptive product innovation. focused on the emotional sensorial benefits to the users. In the example, a complex metallic file-box becomes a PP one piece file-box feeting needs for sensorial properties (soft touch), lightness and robusteness. These changes brings industrial and commercial changes.

Disruptive Innovation
New product development   Market change

EVALUATION TOOLS

Category appraisal	Kansei engineering(R)	Questionnaire/survey
Conjoint analysis	Kelly repertory grid	Self-assessmt manikin
Context mapping	Kn6 IBV(R)	Sensotact
DES/2DES	Laddering	SUMI(R)
Focus group	MDS interactive(R)	Tabscale
Free elicitation	Mood Matrix	Task analysis
ID Tool(R)	Personas	Time motion studies
Image board	PrEmo/Emo faces(R)	Usability tests
Individual interviews	P. semantic analysis	User Compass chart

(R =Tools under licence)

An existing product is submitted to users evaluation through structured tools, mostly product driven, or through emotion evaluation, in comparison to the market offer. The results of the analysis leads to modifications, synthesized by the designer in a new proposal. This new proposal can be submitted once again to users iteratively until facing stakeholder validation. This method brings quick development launch and little modifications to the existing process, at the cost of a higher rate of innovation. In the example, a mobile phone turned quickely into a more sensorial and aesthetic one with only few modifications in the industrial process.

Incremental Innovation
Product improvement

Find these methods on:
www.designandemotion.org / themethodslab.com /

Synthesis of innovation methods introducing forecasting design

Figure 8. Verso of the brochure Emotional Design for Innovation

5 CONCLUSION

If innovation is a key factor of the success of the companies, then design, acknowledged to bring differentiation and value, should be more employed in innovation strategies, in order to bring new emotional benefits to the final users. The SMEs lack information on what design is, on who the protagonists are, on how to implement product innovation through design, and especially design for emotion, within their strategy and within the set of existing tools and methods.

Based on the observation of emotional design for innovation methods available in literature, and developed in the lab since few years, we have identified a need for the design approach in different types of innovation linked with their related tools. As seen in section 3.1, incremental innovation is based on evaluation tools. The user tells explicitly her/his expectations or difficulties with the considered product, which then leads to a set of specifications that are taken into account in a fast product modification and launch. This process, fast and money-saving in terms of investment, scouts users' explicit needs, on the base of semantic and sensorial attributes (words) through comparison tools, and through the emotional evaluation of the product compared with the competitors. It ends of course with a product development.

Disruptive innovation (section 3.2) starts with a phase of idea generation with iterations of concepts production and validations based on information (survey, researches, user observations). This phase leads to a phase of evaluation similar in terms of process and tools to the incremental one, and ends up with a product development. This process, longer and more costly, scouts tacit needs that are as close as possible to the user, thanks to observation and participatory tools. It brings more radical innovation with lasting impact than incremental innovation.

Forecasting innovation (see section 3.3), carried out in parallel with other innovation processes, starts with a phase of information seeking (harbingers, intuition, experts, etc.) in order to formalise a questioning on the activity of the enterprise. It is followed by a phase of ideas generation and evaluation, similar in terms of processes and tools to the incremental and disruptive ones, that leads, not to the development of a product, but to proposals of advanced concepts. The latter helps throwing light on the vision of the firm and of its managers (R&D strategy, communication) and stimulating upstream future projects tied to time to business. This process explores users' dreams and sheds light on latent needs though graphic tools and manipulation methods. The user is consulted and involved in every step of the process, especially in the design for emotion driven innovation, in which the potential user acts as a partner to co-design the emotionally rich interaction. It does not target the commercialisation of a product but the exploration of what the firm could someday offer to its customers. It takes place as a drip-drip of innovation, upstream from a disruptive innovation project.

Thus, after presenting the three cases of product innovation through emotional design, we have proposed a synthesis in the form of a brochure, which presents design for innovation processes, providing available tools classified in toolboxes ready to be used, as well as the important criteria to distinguish each type from the others.

The aim of this paper is to help SMEs engaging into innovation process, by understanding what innovation is, what design for emotion is, and how to put emotional benefits in their products, whatever the innovation could be (incremental to forecasting), showing that forecasting innovation through emotional design is accessible and does not hardly differ from the innovation processes they already apply. The brochure has been presented to SMEs during a business meeting at the CCI of Rouen in December 2010, and has been using as a guide to present possible strategies for SMEs to innovate using design. Some tools and methods well used in big companies have been presented with a special attention to transferability to SMEs, in order to guide them and to help them on their innovation strategy. In conclusion, this paper emphasises a tool barely explored: forecasting design, and invites the research world and enterprises to collaborate through the integration of a designer capable of bringing information within teams' and managers' reach. The success depends on the enthusiasm of managers and their comprehension of the interest to take time to reflect and explore during the preliminary phases of a project.

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