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**Nimble Execution: how to execute innovation projects with
flexibility and efficiency**

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1. Introduction

The management of innovation project is one of the major challenges of today's firms. In particular, when focusing on how firms can manage their innovation activities, many questions arise on the way to work in order to combine operational excellence with the building of a bright future (Magnusson, Boccardelli, & Börjesson, 2009). The idea of a tradeoff between a certain level of efficiency and a certain level of flexibility is a topic that has occupied organizational theory for decades (Adler, Goldoftas, & Levine, 1999).

The combination of efficiency with flexibility is also certainly linked with the exploration and exploitation of knowledge (March, 1991). Exploitation is defined as *"refinement, choice, production, efficiency, selection, implementation and execution"* whereas exploration is defined as *"search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation"* (March, 1991). However, as Lavie, Stettner, and Tushman (2010) noted, there is a long lasting debate in the literature about those concepts. The main issue is that the two types of activities are difficult to combine as they require different skills and structures but also focus on opposite values (Greve, 2007). Organizations trade off their short-term productivity for long-term innovation by supporting the search of new knowledge and prospective opportunities instead of leveraging currently available knowledge to address immediate needs (March, 1991). The question that is still occupying many researchers is whether organization should specialize or try to balance exploration and exploitation (Lavie et al., 2010). And, even in the latter case, questions about how to combine exploration and exploitation are still relevant (Greve, 2007).

As mentioned above, some argue that firms need to simultaneously do exploration and exploitation (O'Reilly III & Tushman, 2004) whereas some others stipulate that organization must specialize in one or the other type of activity in order to thrive on the markets. Supporting evidences have been found in both directions because studies tend to use different definitions of exploration and exploitation, resulting in inconsistent findings that cannot be synthesized (Lavie et al., 2010).

What we can say over the theory alone is that arguments against the combination point to the difficulties of making the two attitudes coexist, arguing there is a tradeoff and that optimal

positions are in the extremes (specialization in exploration or exploitation) (Adler et al., 1999). Whereas arguments for the balancing are that, when a firm engages to exploitation to the exclusion of exploration, it becomes trapped in doing the same things. This results in the firm failing to renew itself and even exposing itself to the decline of its industry (Gailly, 2011; March, 1991; O'Reilly III & Tushman, 2004). And when the firm engages in exploration to the exclusion of exploitation, they may build a bright future but may not live long enough to see it because they don't have the benefits of short-term exploitation projects to support the costs of experimentations (Gailly, 2011; March, 1991; O'Reilly III & Tushman, 2004). The emerging paradox is that firms must do both exploration and exploitation to achieve desirable performance but that those activities are contradictory and difficult to combine (Lavie et al., 2010).

Surprisingly, although the theoretical debate is very animated, there have been few attempts to come up with guidelines for managers about how to build organizations that are able to combine flexibility and efficiency (Magnusson et al., 2009).

The goal of this master thesis will be to provide managers with tools, mechanisms, and guidelines that may help decision makers in the execution of innovation projects. We have found quite early that such execution will require a combination of flexibility and efficiency on many different levels. Our framework will be built around this main principle.

Since there is little literature around recommendations over this specific subject, we have decided to expand our research toward related concepts in the literature. Those concepts somehow describe the execution of projects with high level of uncertainty, in contexts that are close to our topic. Those are contexts such as the entrepreneurial field, new product development, software development, etc.

1.1. Research question

Our initial research question was *"how can firms implement innovation effectively?"* which was a broad topic. We progressively refined our question to the more specific *"what are the ways of working that allow established firms to combine efficiency and flexibility in the execution of innovation projects?"*. The research question is decomposed below.

We search for the **“ways of working”**, i.e. the tools, mechanisms and management structures that can be used by managers. In other words, whereas most of the literature focuses on *“what firms should do”*, we take interest in *“how they should do it”*.

We look at **“established firms”**, i.e. organizations existing for several years and having a significant number of employees (1000+ employees). We found that smaller organizations wouldn't need such complex mechanisms and we found it more interesting to try to tackle the organizational inertia that are typical of those firms.

“Combine efficiency and flexibility” refers to the fact that, because of the inherent uncertainties and ambiguities of innovation projects, firms need to combine operational excellence (efficiency) with the ability to deal with unexpected events (flexibility) to achieve desirable results in a consistent way. Indeed, our research is based on an early finding that firms need to find ways to optimize the use of time and resources while being able to adjust to the way the events are unfolding through the execution of the project. This is closely related to the exploitation-exploration concept.

“The execution of innovation projects” means that we are dealing with the management of innovation projects, starting with an idea until its realization into a business product. This is not mere project management, as the uncertain and ambiguous nature of innovation projects makes some aspects of classic project management a bit obsolete.

“Innovation” is a broad concept with multiple definitions. We chose to use the definition proposed by Gailly (2011) as it is very synthetic and captures the essence of many definitions we have come across: “innovation is newness and change”. “Newness” refers to anything that is new, from the point of view of the firm or the market, whether it is a completely new technology, a simple increment of an existing technology or a combination of previously existing technologies. “Change” refers to the adoption process by the customer, this means that an innovation needs to bring enough value to convince a customer to adopt it. In other words, innovation is about new inventions that have a business potential because they provide additional value to some customers. In our research, we decided to narrow the innovation concept to product innovation as several models used a “new product development” perspective. Service and process innovations are therefore out of our scope. Additional concepts linked to innovation, such as radical innovation, discontinuous innovation,

incremental innovation may be used in our paper. Those terms will usually be explained in the text. However, a list of definitions is available in the appendixes in case it is needed (see Appendix 1: List of tables and figures).

1.2. Structure & methods

After the introduction of our subject, the definition of our research question and our underlying assumptions, we will now describe the structure of this paper.

First, in the next chapter, we will review several theories and concepts that are related to our topic. Each theory will be presented through fundamental and relevant papers. We selected those papers based on different criteria such as the number of citations credited, their fundamental aspect, their relevance toward our specific topic or the relevance filter on Google Scholar. We tried to have a couple of synthetic and fundamental papers and additionally a more recent paper for each theory. Our goal is not to give a comprehensive review of those theories but simply to introduce their main insights and ideas. Then, we will proceed to compare them to each other in order to find similarities and divergences. We will derive some common underlying principles such as the combination of flexibility and efficiency but also demonstrate some form of complementarity between those theories. The presentation and the comparative analysis will be the main pillars of the following chapter.

In the third chapter, we will define the concept of nimble execution. This concept will be based on the specific literature over the execution of innovation projects and the findings on the related theories exposed in the previous chapter. “Nimble execution” will be the name of our framework, based on the combination of efficiency and flexibility at different levels. This framework will be built around five key success factors that will be discussed in a dedicated section. The following section will summarize how our framework will allow managers to shift beyond the tradeoff between efficiency and flexibility at different levels. Then, we will take a step back to draw the limitations and the domain of application of our framework along with its main risks and drawbacks. Finally, we will briefly conclude on this chapter.

The fourth chapter will take a form similar to a conclusion of the previous chapter but with a managerial point of view. It will feature a section dedicated to recommendations toward managers. Then, an analysis of the advantages and disadvantages linked to each key success

factors. Those points will be summarized in a table. Finally, we will conclude with the lessons learned with our framework.

The fifth chapter will feature a humble empirical confrontation. There, we seek to have a critical look on our proposition by confronting our findings with the opinions of practitioners. The methodology will be discussed first. Then, we will explain the results and synthesize them by systematically confronting the theoretical findings with the empirical findings.

Finally, we will finish this paper with a conclusion that will summarize our research. This last chapter will also discuss the contribution and limitations of our work.

This concludes our introduction chapter in which we have exposed our research question, our general methodology and the structure of this document. The next chapter will be dedicated to the literature review of concepts related to the execution of innovation projects.

2. Theory review

In this chapter, we intend to explore related concepts to the execution of innovation project, in theories close to innovation management (namely organizational theory and entrepreneurial theory). Our intention is not to give a comprehensive list of theories linked to our subject, it is rather to introduce to the reader some concepts with insights that will be useful for our research in the following chapters.

In the first section, we will briefly introduce each theory and focus on the key ideas of those theories. It should be noted that those theories are not presented in any particular order.

In the second section, we will proceed to compare those theories to identify similarities and divergences.

2.1. Theories presentation

As explained above, we will now give a brief introduction to several theoretical models. They range from Organizational theory to New Product Development literature but they each approach the question of how projects with various levels of uncertainties should be handled. Those theories are: the Ambidextrous Organization, Effectuation, Entrepreneurial Bricolage, Agile, and the Adaptive management (which is a combination of a portfolio approach with a Stage-Gate process).

2.1.1. Ambidextrous Organization

We will begin with the presentation of the Ambidextrous Organization concept, which is part of the organizational theory. Tushman, although not the one who introduced the term “Ambidextrous Organization”, is one of the most cited researcher for this topic.

In the field of management, it is commonly accepted that the forces of inertia are strong when it comes to change. In addition to the uncertainty linked to change by nature, there are shifts of power within the organization (O'Reilly III & Tushman, 2004). It is not irrational to assume that those left with less power and influence may show discontent and support the forces of inertia. Of course, managers have to deal with those issues and support the emergence of the innovation. But they must also find sources of incomes to support the growth of innovative activities. According to Tushman (2004), “[managers] must constantly look backward,

attending to the products and processes of the past, while also gazing forward, preparing for the innovations that will define the future.”

The main idea of Tushman is this mental balance between two conflicting objectives. On the one hand, a wise manager shouldn't disregard a profitable activity that was part of the organization's core business for several years. On the other hand, he must also give an outstanding support to the new activities that may disrupt the market and create tremendous value in the future. And he must do so with resources that would usually go to the traditional core business, creating some discontent from this unit's managers (O'Reilly III & Tushman, 2004). “Often, innovation's only friend is the CEO” (Tushman, Smith, & Binns, 2011).

According to the ambidextrous organization model, organizations should be managed in an ambidextrous fashion in order to foster innovation. This means that they should combine two conflicting mindsets: “explorer” and “exploiter”. Indeed, the organization should keep its performance measures, risk level and management style for its core activities. But they should overlook those boundaries for innovative activities because it needs a much more entrepreneurial focus. In other words, the organization must be an “exploiter” for its traditional activities but an “explorer” for the new ones (O'Reilly III & Tushman, 2004).

“Although most executives acknowledge the need to explore new businesses and markets, they almost always bow to the more pressing claims of the core business, especially when times are hard. Innovations [...] face an uphill battle to secure a share of the firm's capital. They lack scale and resources and are usually underrepresented at the top table. At best, the leaders of the established business units ignore such projects. At worst, they see them as threats to the firm's core identity and values.” (Tushman et al., 2011) In practice, the organization should separate the new activities from the traditional ones. By giving it more independency, the new unit is allowed a chance to grow (Tushman et al., 2011). This organizational separation is the key idea of Tushman. The innovative unit will compete for resources at the same level as the other business units in the organization and it will suffer less from their repression.

And although there should be a clear separation between those units, the senior team should be tightly integrated. Ambidextrous organization needs ambidextrous CEO and senior managers. If the senior managers aren't ambidextrous themselves, they must at least be

committed to operate ambidextrously. “Resistance at the top level can’t be tolerated” for we need a relentless effort from there (O'Reilly III & Tushman, 2004).

The nature of this relentless effort expected from the senior team is explained by Tushman: they need to communicate a clear and compelling vision. This vision is crucial to build ambidextrous entities as they allow the exploitation and exploration to coexist. It should emphasize the strategic need of this ambidexterity and the reasons why it will be beneficial for all members of the organizations (both in the traditional and in the new activity) (O'Reilly III & Tushman, 2004).

To become ambidextrous, an organization needs to combine the organizational separation with an integrated management. In other words, it needs ambidextrous senior teams and managers, constantly supporting a compelling vision, tightly integrated in the traditional and new business units (O'Reilly III & Tushman, 2004).

Although Tushman findings are interesting, they stay rather abstract and theoretical. Being ambidextrous seems indeed an interesting way to manage innovation but little is said about how to become ambidextrous. For example, Tushman observes that new activities tend to be seen as a threat by the managers and employees of traditional activities. Consequently, he recommends to clearly separate new and traditional business units, which makes sense in order to avoid suppression of conservative managers. But Tushman still recommends to encourage cooperation between those units, as it is vital for the growth of the innovation. In other words, an ambidextrous manager should encourage cooperation between the two units but still keep them well separated. Therefore, the nature of this relations seems ambiguous. Tushman advises to address this issue with the compelling vision. But we lack information about the ways those two separate units should work together and how it should be managed (monitoring, incentives, etc.).

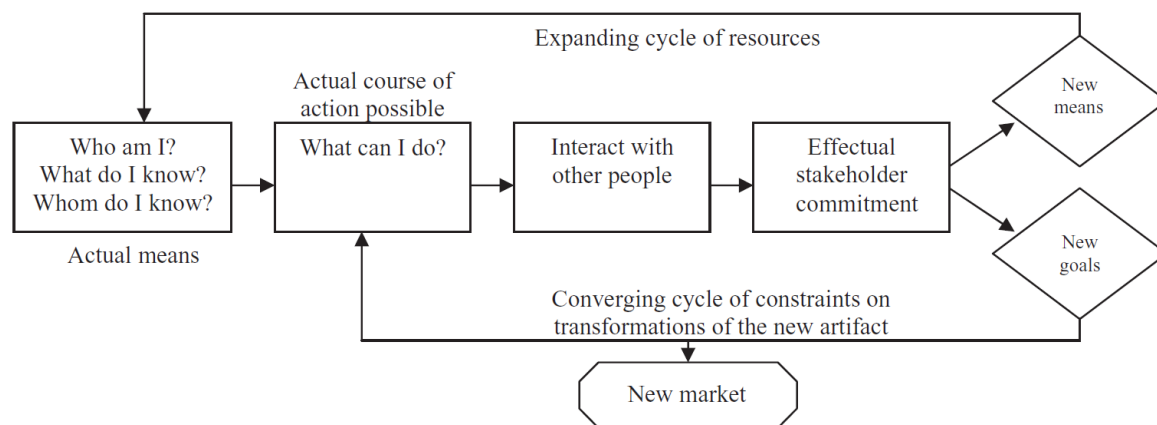
We have now introduced some insights about the Ambidextrous Organization: how this concept applies in organizations, the main key success factors but also an interesting limitation. Now, we can move on to the next theoretical concept.

2.1.2. Effectuation

We will now present the Effectuation concept. Effectuation has been theorized by Sarasvathy (2001), in contrast with the causation approach, to describe entrepreneurial behaviors. It is therefore part of the entrepreneurial theory.

Causation, a traditional and more rational model, suggests that entrepreneurs decide their goals and then proceed to select means to achieve those goals. "If decision makers believe they are dealing with a measurable or relatively predictable future, they will tend to do some systematic information gathering and analysis within certain bounds" (Sarasvathy, 2001). We are here in a purely rational process of assessment, resources allocation and exploitation. This supposes the market for the product or service exists *a priori* (therefore, the entrepreneur would be a second entrant or follower). Information must be available in order to evaluate opportunities and select the appropriate means. But, in reality, in an entrepreneurial context, future outcomes tend to be unpredictable and ambiguous. Sarasvathy (2001) introduces the effectuation theory to explain entrepreneurial behaviors in such conditions.

Effectuation theory argues that "in highly uncertain and dynamic environments, target customers can only be defined *ex post* through whoever buys the product or service. Goals change, are shaped and constructed over time, and are sometimes formed by chance. Instead of focusing on goals, the entrepreneur exerts control over the available set of means (the things over which the entrepreneur has control)" (Fisher, 2012; Sarasvathy, 2001). In other words, the effectual thinking process starts with defining the available means instead of end goals. Sarasvathy (2008) illustrates this starting point with three fundamental questions the entrepreneur asks himself: "Who am I?", "What do I know?" and "Whom do I know to uncover opportunities?". This allows them to frame what their actual means to achieve something are: "What can I do?". Then, they interact with other people to discover and assess opportunities. They either build new means out of those interactions or they set new goals. Those new goals match the means and allow the entrepreneur to create a new market. This is what Sarasvathy (2008) refer as "a dynamic and interactive process of creating new artifacts in the world". The effectuation process described above is schematized in Figure 1.

Figure 1: Effectual approach to entrepreneurship

Source: from Fisher (2012)

Another interesting finding of Sarasvathy (2008) is that effectual entrepreneurs don't focus on competition or profits. They don't think about the expected returns when evaluating options but rather focus on the affordable loss: "the amount of resources one is committing to an endeavor with the understanding and acceptance that such resources may be lost" (Fisher, 2012). They make decisions based on what they are willing to lose instead of probabilities and expected returns, which is particularly relevant under the high uncertainty condition.

In addition, effectual entrepreneurs focus their attention on building relationships and partnerships with other entities, rather than doing systematic competitive analyses. Such analyses were traditionally seen as a key input in strategy formulation but it seems of a lesser importance for effectual entrepreneurs (Fisher, 2012).

Moreover, effectuation is preferable when preexisting knowledge is not a source of competitive advantage (Sarasvathy, 2001). For example, this can occur when this knowledge doesn't exist because the domain is new. In this situation, rather than exploiting knowledge, effectual entrepreneurs will exploit contingencies to develop their business.

Furthermore, the logic of effectuation toward the future is that *"to the extent we can control the future, we do not need to predict it"* (Sarasvathy, 2001). That is to say that effectual entrepreneurs focus on the controllable aspects of a future that they judge unpredictable. In contrast with the causation approach which focuses on the predictable aspects of a future

judged as uncertain (but not unpredictable) (Sarasvathy, 2001). Effectual entrepreneurs, instead of looking at the market as something given, recognize that the future is shaped by human actions (on individual or aggregated level). They create “their” market by bringing on board stakeholders willing to “buy into” their ideas (Sarasvathy, 2001).

To sum up, Sarasvathy (2001) “embodies” her effectuation theory into four principles:

1. Affordable loss instead of expected returns
2. Strategic alliances instead of competitive analyses
3. Exploitation of contingencies instead of preexisting knowledge
4. Control of an unpredictable future instead of prediction of an uncertain one

Effectuation is about discovering and exploiting opportunities in new markets with high levels of uncertainty (Sarasvathy, 2001). Effectuation is more relevant in those situations than causation processes because there are few preexisting knowledge and few predictable elements in the outcomes (Fisher, 2012). This is why Sarasvathy argues that successful early entrants in a new industry are more likely to have used effectuation processes than causation processes. Furthermore, she argues that if new firms created through processes of effectuation fail, they will fail early and/or at lower levels of investments than those created through processes of causation (Fisher, 2012).

We have now introduced Effectuation by explaining its main assumptions, the mechanisms of the effectual decision making, how it applies to small organizations, its domain of application, and the main benefits of an effectual approach. We can now move to the next concept.

2.1.3. Entrepreneurial Bricolage

We will now introduce the entrepreneurial bricolage concept. After a few words over its origins, we will present the mechanisms underlying this decision process, the main assumptions linked to this process, the domain of application, and the main risks when “acting bricolage”.

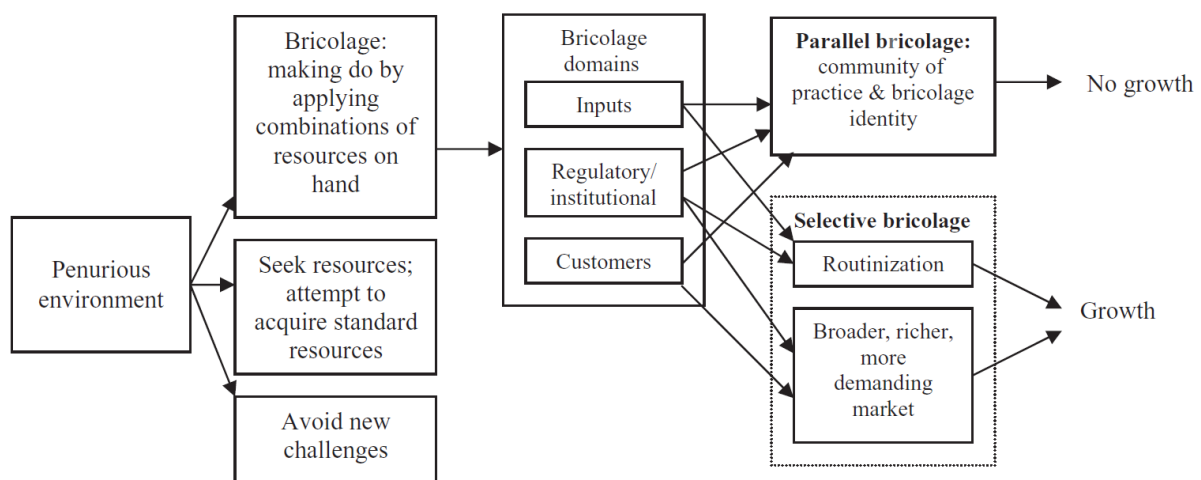
Since its introduction by Levi-Strauss (1966), the concept of “bricolage” has been applied in a range of different domains and to a variety of phenomena, including explanations of the formative processes in teaching, lawmaking, and institution building (Fisher, 2012). Baker & Nelson (2005) recently applied the “bricolage” concept to the entrepreneurial field. They

define the term as “making do by applying combinations of resources at hand to new problems and opportunities” (Baker, Miner, & Eesley, 2003).

Entrepreneurial bricoleurs combine resources at hand to solve problems and uncover opportunities. It’s an action-oriented approach, characterized by a refusal to enact limitations on the way existing resources are used (Fisher, 2012). “Bricoleurs use resources in ways for which they were not originally designed” (Baker & Nelson, 2005).

The authors, Baker and Nelson (2005), suggest this approach is particularly relevant when entrepreneurs are confronted with penurious environments: environments that present new challenges without providing new resources. In such situations, entrepreneurs have only access to a limited set of resources. They have three choices: they can try to *seek resources* outside of the firm, they can *avoid new challenges* by remaining passive or they can try to *enact bricolage* (making do by applying combinations of resources at hand to new problems). The entrepreneurial bricolage process described above is schematized in Figure 2.

Figure 2: Entrepreneurial bricolage approach to entrepreneurship



Source: Fisher (2012)

This third option allows the entrepreneurs to choose among different domains to enact bricolage on (Fisher, 2012):

- (1) *physical inputs*—imbuing forgotten, discarded, worn, or presumed single-application materials with new use-value;

- (2) *labor inputs*—involving customers, suppliers, and hangers-on in providing work on projects;
- (3) *skills inputs*—permitting and encouraging the use of amateur and self-taught skills that would otherwise go unapplied;
- (4) *customers/markets*—providing products or services that would otherwise be unavailable;
- (5) *institutional and regulatory environment*—refusing to enact limitations with regard to many “standards” and regulations, and by actively trying things in a variety of areas in which entrepreneurs either do not know the rules or do not see them as constraining.

Bricolage activities can therefore help a firm to overcome resources constraints. But they can lead the organization to stay too narrow-minded and engage in a self-reinforcing cycle of activities that will limit its growth (Fisher, 2012). “Bricolage across multiple domains generates mutually reinforcing patterns and, in some cases, a firm identity and community of practice that cement firms into the practice of parallel bricolage and stalled growth . . . In contrast, firms that engaged in selective bricolage created something from nothing in fewer domains. Evidently because they escaped the self-reinforcing dynamics of the parallel bricolage identity and organizational form, these firms often preserved the ability to leverage the unique services created through bricolage to generate growth” (Baker & Nelson, 2005). This effect is represented in Figure 2.

Finally, the theory of entrepreneurial bricolage relies on the concept of social construction of resources (Fisher, 2012). Given similar resources constraints, entrepreneurs will differ in the way they interpret their environment and in their ability to make their firm thrive. In other words, “resources environments” are *socially constructed* and this allows specific social and organization mechanisms to favor the creation of something new from scratches (Baker & Nelson, 2005).

We have now introduced the entrepreneurial bricolage concept by presenting its main assumptions, the domain of application, the mechanisms of the bricolage process and the main risks associated to its application. We can now move on to the next concept.

2.1.4. Agile

We will now introduce our fourth concept, the Agile method. After a few words over its origins, we will present the concept's main principles, the change needed in the organization, what differentiates Agile from other famous manufacturing methods, and why Agile is more interesting for our research than those methods.

In order to offer additional value to its customers, a firm needs to do more than “fine-tuning the value chain for the existing portfolio of products and services” (Denning, 2013). Solving customers' problems involves being able to respond to unexpected or evolving shifts in the expectations or the needs of those customers. Firms should be able to adjust what they sell and how they sell it accordingly. The compelling observation is that this “degree of nimbleness” can't be reached by hierarchical bureaucracies, the most prominent model in large organizations today (Denning, 2013).

Researchers claim that firm must become “Agile” in order to meet those shifts and prosper in a modern economy. Some researchers pointed the need of a revolution in manufacturing paradigms (Yusuf, Sarhadi, & Gunusekaran, 1999). And although researches focused initially on the manufacturing sector, it is the software development sector which “hosted” the widest implementation of the Agile concept (Denning, 2013). The Agile Manifesto of 2001 (Beck et al., 2001) outlines a process for developing software in an Agile fashion. In this sector, Agile represents a major managerial shift that has enabled developer teams to combine disciplined execution with continuous innovation (Denning, 2013). In the last decades, “agility” has been described as a set of management practices. Under the label of Agile, Scrum or Kanban, those practices have been used by many organizations in the world. According to Denning (2013), the Agile concept can be broken into ten major principles (see Table 1).

Table 1: Principles of Scrum

Principles of Scrum	
The leading variant of Agile is scrum, a set of management practices that facilitate agility. Its major principles are:	
• Work is organized in short cycles. • Management doesn't interrupt the team during a work cycle. • The team reports to the customer, not the manager.	

- The team estimates how much time work will take.
- The team decides how much work it can do in an iteration.
- The team decides how to do the work in the iteration.
- The team measures its own performance.
- Work goals are defined before each cycle starts.
- Work goals are defined through user stories.
- Impediments to getting the work done are systematically removed.

Source: Robert (2014) adapted from Denning (2013)

However, shifting to Agile is not just adopting a couple of particular management tactics. Agile requires a radical redefinition of the management. It involves a different goal (delighting the customer), a different role for managers (enabling self-organizing teams), a different way of coordinating work (dynamic linking), different values (continuous improvement and radical transparency) and different communications (horizontal conversations) (Denning, 2010).

Agile is interesting in our research because it focuses on “a central management conundrum – how to combine disciplined execution with creativity and innovation” (Denning, 2013) and because of its complementarity. Indeed, Agile was not intended to solve all management issues by its own. Instead, it obviously needs to be combined with other processes and ways of working for the daily management (Denning, 2013).

Although the switch to the Agile paradigm was prescribed by some researchers, most manufacturers turned to “Lean” manufacturing (focused on reducing wastes) and Six Sigma (focused on quality control). Although these approaches share some common principles with Agile, including small batch sizes, increased flexibility and reduced cycle times, the scope is different. Lean and Six Sigma aim at enhancing production efficiency and cutting costs. Whereas agile is a more customer-oriented approach, aiming at creating added value for them (Denning, 2013).

We have now presented the Agile method by presenting its origins, the main principles of the method, the change needed in the organization, and a few words about the difference with other close concepts. We can now move to the next concept.

2.1.5.Adaptative management: Stage-gate & portfolio

Now, we will present another popular practice in the innovation management field, to which Gailly (2011) refers as “Adaptative Management”. This approach is a combination of a portfolio perspective with a systematic review process (stage-gate) for each individual project or innovation opportunity. One could not be explained without the other because the decisions made during the review process are done within a portfolio management perspective.

In many firms, chief executives know the importance of innovation. But they struggle to actually manage streams of new opportunities. According to Nagji and Tuff (2012), “many [chief executives] admit to being unsure and frustrated” because they know a vast number of innovative projects are going on inside their companies but they don’t feel they have control on all those fragmented projects. “Adaptative management” addresses this issue by proposing tools to manage the innovative projects as a whole (portfolio management) and tools to adequately review each project (stage-gate process).

There are a lot of variations of those models, as they originate from managerial best practices, but we intend here to introduce what seems to be the essential idea.

2.1.5.1. Portfolio Approach

First, we will explore the main insights of a portfolio approach: the organizational issues addressed, the mechanisms of this approach (namely the importance of balancing the portfolio and multiple balance criteria), and the main risks managers should control.

Adopting a portfolio perspective is a way to address the unpredictability of innovation opportunities. Instead of focusing on a single project, firms should consider a set of different projects launched in parallel. In such context, “[the firm] should care about the quality, performance, and strategic contribution of the portfolio as a whole, not only of individual projects” (Gailly, 2011). This implies that the firm has to assess the quality of the portfolio but also have to prioritize resources across the projects to maximize this quality (Gailly, 2011).

In order to join the portfolio, an opportunity will be assessed not only on its “intrinsic qualities” but also on the way it fits in and contributes to the portfolio (Gailly, 2011). This means that the attractiveness and accessibility of the candidate project alone are not sufficient. This

needs to be put in perspective with the firm strategy and with the other opportunities available in the portfolio.

Similarly to a financial portfolio, a good innovation opportunities portfolio should be diversified to minimize the average risk while maximizing the overall performance (Gailly, 2011). It can be balanced through several dimensions: time horizons, levels of ambition, and sources of ideas.

The first dimension, time horizon, is declined in three levels by Gailly (2011):

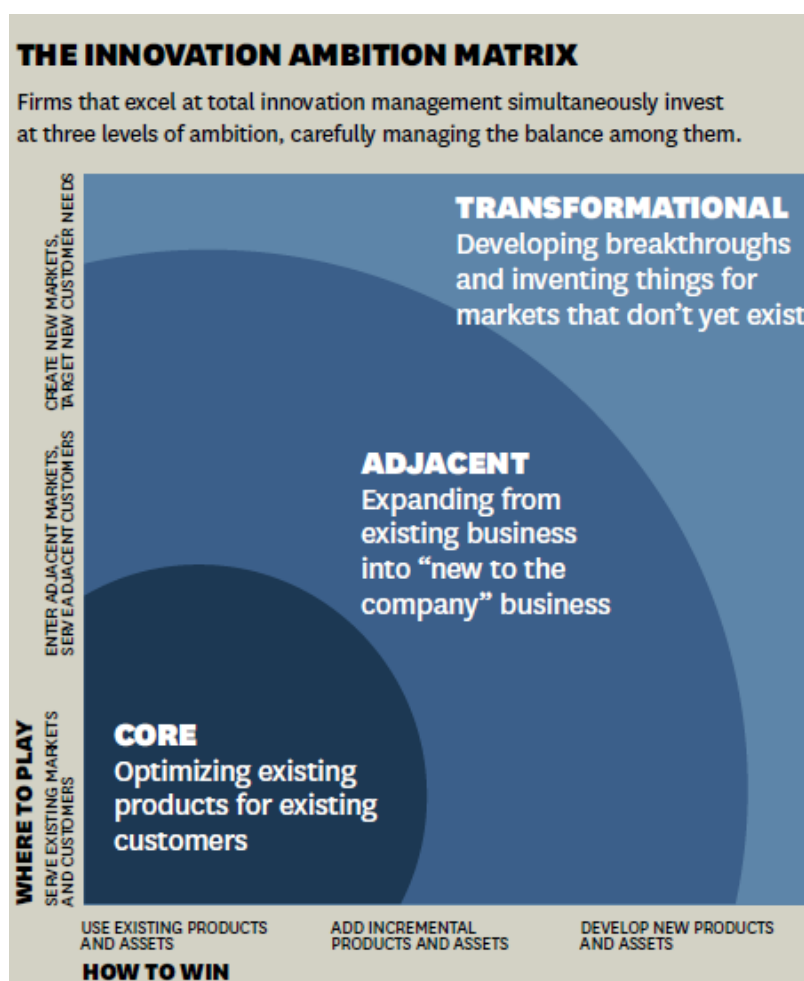
- “Investments in short-term projects aimed at extending and defending existing businesses – for example, technical assistance and engineering projects, product and process improvements or line extensions.”
- “Strategic positions in mid-term projects aimed at developing emerging business opportunities – for example, partnerships, new ventures or new developments.”
- “Long-term knowledge/competence building initiatives aimed at creating viable future options – for example, corporate research, competence platforms or seed investments.”

Keeping a balance in those different time horizons is important for firms. On the one hand, the risks of favoring short-term projects are exposures to the decline of their industries and to the obsolescence of their business models (Gailly, 2011). Indeed, firms are less likely to anticipate and to adapt to radical shifts in their markets. On the other hand, focusing too much on long-term projects could lead to an enviable future but firms which do so “might not be able to survive long enough to see it” (Gailly, 2011).

As for the source of innovation, Gailly (2011) stresses the importance of balance between internal (e.g. R&D-driven process improvements/product development) and external (e.g. partnerships, market-driven) sources of innovations. Neglecting external projects would lead to lost opportunities to create new business models and value propositions. Whereas neglecting internal projects would lead to lost opportunities to improve a firm’s processes and value chains (Gailly, 2011). “Whether and how much of these types and sources are tapped must be reviewed regularly in line with the strategy” (Gailly, 2011).

Another way to address this balancing issue is to use the “Innovation Ambition Matrix” proposed by Nagji and Tuff (2012) (see Figure 3). This matrix is defined by its authors as a refinement of the classic Ansoff Matrix which was used to help companies allocate funds between growth opportunities. Here, as the name suggests, the matrix is intended to help companies allocate their resources between innovation opportunities. This matrix compares two dimensions with three different levels. The first dimension (x axis) is the novelty of the company’s offering while the second axis (y axis) is the novelty of its customer markets (Nagji & Tuff, 2012).

Figure 3: The Innovation Ambition Matrix



Source: Nagji and Tuff (2012)

According to their position along those two dimensions, projects can be categorized in three “realms” (Nagji & Tuff, 2012).

The first realm, labelled as the “core innovations”, regroups the efforts to make incremental changes to existing products or assets and incremental expansions to adjacent or known market. Such innovations rely on established assets (Nagji & Tuff, 2012). The second realm is labelled as the “adjacent innovations”. The projects here involve “leveraging something the company already does well into a new space” (Nagji & Tuff, 2012). This realm is a bit in-between the first and the third realm. The third realm is labeled as the “transformational innovations” and regroups projects creating new offers or new businesses while serving new markets and new customer needs (Nagji & Tuff, 2012).

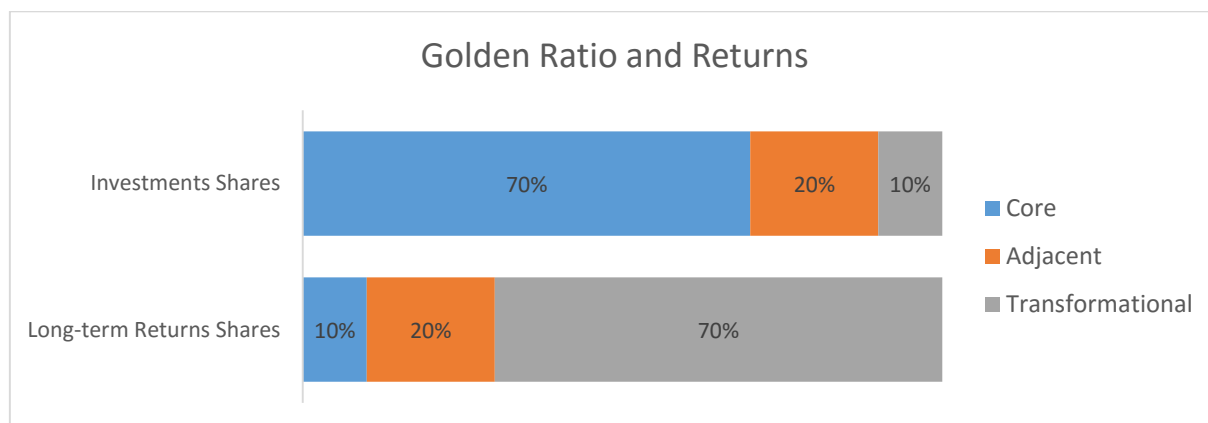
This matrix is useful because it provides a framework to apprehend the complexity brought by the sheer number of innovative projects on track inside the company. It facilitates mainly two exercises. First, reviewing all initiatives the business has on track (“how much is invested in each realm and in each type of innovation?”). Second, it allows managers to discuss what the right “overall ambition” for the company’s innovation portfolio is (Nagji & Tuff, 2012).

One of the key idea of this ambition matrix is to find and maintain the right balance (ratio) between those different realms. Data analyses seems to prove that a certain allocation of investments is correlated with meaningfully higher share price performances. The ideal ratio suggested would be a 70-20-10 (core, adjacent, transformational) allocation. Of course, the authors are realistic and don’t suggest a magic formula for every firm. This “golden ratio” seems to be a relevant rule of thumb only for industrial companies. They suggest that several factors could affect this ratio: the industry, the company’s competitive position within this industry and the company’s stage of development. Instead, the authors simply want to stress the importance of managing this ratio deliberately and closely. “The point is that a management team should arrive at a ratio that it believes will deliver better ROI in the form of revenue growth and market capitalization, should discover how far its current allocation is from that ideal, and should come up with a plan to close the gap [between ideal and real ratio]” (Nagji & Tuff, 2012).

Another interesting finding is that the return ratio is roughly the inverse of the “golden” 70-20-10 ratio (see Figure 4). Core innovation projects contribute 10% of the long-term, cumulative return on investments while adjacent projects contribute 20%. Leaving us with transformational efforts which contribute 70% of those revenues (Nagji & Tuff, 2012). This is

not surprising when we consider that innovations of this type are typically high-risk and high-reward projects.

Figure 4: Golden Ratio and Returns



Source: adapted from Nagji and Tuff (2012)

Finally, it can be noted that each type of innovation in this matrix should be managed differently. This is particularly the case for the transformational realm. Nagji and Tuff (2012) state that, although it is never the dominant activity, the efforts in this category are essential for firms. But firms must recognize they need a different management approach. This is another useful aspect of this matrix: recognizing that some projects cannot be evaluated with traditional criteria or that those projects need people with different skills than the traditional core business. The identification of those projects combined with a clear definition of what is expected from that category is essential.

To come back to the balancing problem in general, it must not be forgotten that the diversification in terms of risks, sources of innovation, time horizons, or ambition should be balanced with a search for scale and scope economies (Gailly, 2011). Actively pursuing too many projects could cause resources to be spread so thinly that they become useless (e.g. in terms of management attention). Such large portfolio would also impede the ability to capture synergies between projects. To avoid this issue, another key imperative of a good portfolio management is the ability to “kill” early underperforming projects (Gailly, 2011). To sum up about the balancing issue, the portfolio should be rationalized and coherent enough to be effective and generate synergies. But it should reach a sufficient level of diversification to mitigate risks and to address both short-term and long-term strategies of the firm (Gailly, 2011).

As mentioned above, the firm should be able to quickly identify and accelerate the most successful projects and “kill” the projects that don’t perform adequately. Some of those stopped projects may be viable on their own (not necessarily underperforming) but don’t represent the best use of resources (e.g. other projects perform better, have more synergies, etc.) (Nagji & Tuff, 2012). It is often very difficult as teams tend to take ownership of their project and stopping a project is regarded as a failure rather than a learning opportunity (Gailly, 2011; Nagji & Tuff, 2012). This will be mainly addressed by the stage-gate approach that we will describe further. But it is important to mention the ability to “kill” underperforming projects in the “big picture” level. Indeed, those projects are managed in a portfolio perspective. There are many projects at bay and managers must focus their attention on the most promising ones rather than spending a lot of time keeping every project afloat (even the ones performing less well). This is often counterintuitive for managers used to the corporate portfolio approach where every project is expected to reach an acceptable level of returns and where stopped projects are seen as failures (Gailly, 2011). To summarize with Gailly’s words (2011): “A successful innovation portfolio is a portfolio where a few big gold nuggets were uncovered and polished to become beautiful jewels, not a portfolio with many average stones”.

We have now introduced the first part of the “Adaptative Management”, the portfolio approach. We have done so by thoroughly discussing the main mechanism of such portfolio: the balancing issue. Namely, firms should find several adequate balance criteria and deliberately manage the ratios associated to those criteria. Indeed, those ratios reflect the “innovation ambition” of the firm, which should be aligned with the strategy of the firm. We also stress the difference between a classic portfolio and an innovation portfolio, particularly the different management involved. Now, we can move to the next part of the “Adaptative Management”.

2.1.5.2. Stage-gate processes

We will present here the second part of the “Adaptative management”: the stage-gate process. We will do so by presenting the origins of the concept, the main advantages, the mechanisms of the process, and the main risks and disadvantages linked to stage-gate processes.

Usually, as an innovation project progresses, some part of the “unknown” will be revealed, and key parameters and context may change as well. Therefore, it is important to step back regularly and reconsider with the relevant stakeholders whether the firm is pursuing this opportunity in the right way or not (Gailly, 2011). A stage-gate process is a tool that helps addressing those issues in a systematic way.

The stage-gate process is a model that emerged from managerial best practices in new product development (Cooper, Edgett, & Kleinschmidt, 2002). A stage-gate approach consists in separating a project in multiple phases (stages) closed by decision points (gates). The key idea is to improve the classic single upfront green/red light investment decision (in other words, the project is launched or not, with no further review) (Gailly, 2011) which is a wrong approach with innovation opportunities as they are typically associated with a great part of uncertainty. For this kind of investment, committing all the resources in advance based on a single decision isn't a wise move. Instead, managers can define in advance a sequence of more informed decisions (with growingly less uncertainty) to commit more resources or not (Gailly, 2011).

Indeed, the real value of this approach is that it allows reorienting or stopping projects quite early. Managers can increase the committed resources only after the most recent learnings and developments have been taken into account (Gailly, 2011). Typically, during each stage, the team will focus on a certain activity. At the end of this stage, a formal review of the innovation opportunity is organized in order to integrate their latest learning. During this review, it is decided whether the project should be stopped, suspended, redefined, or pursued. And, of course, resources should be reallocated accordingly (Gailly, 2011). The stages should be defined in order to deal with critical uncertainties as early as possible, thus decreasing them as much as possible while allowing managers more flexibility to make more informed decisions and maximizing the “learning over investment” ratio (Gailly, 2011).

A stage-gate approach means more than organizing regular reviews for each individual project. As a reminder, those projects are managed as a portfolio. Therefore, multiple projects are reviewed regularly and the amounts of information (and knowledge) to manage will quickly increase. To be effective, those milestones must be carefully organized (Gailly, 2011). The management teams should pay close attention to the following points.

In terms of timing, the organization should balance two issues against each other. On the one hand, having too frequent gates could spread managerial attention so thinly that it would result in an ineffective allocation. And it would increase the preparation costs of the teams in terms of time and human resources. On the other hand, having few gates increases the risks of letting an inadequate project drift for too long (Gailly, 2011). Typically, three to five gates are organized every few weeks or months (depending on the project's speed of evolution and strategic importance) (Gailly, 2011).

In terms of content, as mentioned above, the management should define in advance which key issues must be addressed at each gate. They should also think about training the project teams in order to be able to gather and present the relevant information (Gailly, 2011).

In terms of portfolio (the big picture), it is important to reconsider to which point those presentations should be standardized. Standardization facilitates prioritizations in the portfolio across projects but it could lead to too much *a priori* framing (Gailly, 2011), which is exactly what we want to avoid with the management of innovations. It must also be noted that at each gate, managers should not only review the individual projects but also the portfolio as a whole. Decisions taken for each project should take into consideration what happened to the other projects, how it generates learning and synergies across projects, how it affects the general balance of the portfolio, and how it affects shared resources (Gailly, 2011).

In terms of decision making, managers must ensure that the decisions made at each stage are communicated clearly and unambiguously (Gailly, 2011). All stakeholders involved should be committed to those decisions, whatever they are.

Despite the bright aspects, stage-gate processes suffer from several issues. We will underline some of them in the next paragraphs.

Organizations gain experience over the years using this approach. They have learned which issues need to be tackled first in order to decrease uncertainties. And those organizations will apply the same routine for every project (Gailly, 2011). The risk is that all those deliberate or implicit choices regarding the designs of the stages can become rigidities. Indeed, the dominant stage design may not be adequate when dealing with new types of business

opportunities and lead to too much *a priori* framing of the projects (in the same way as standardization of the gates tended to) (Gailly, 2011).

Another important issue is the ability to sustain motivation to submit proposals and identify them. Many organizations see their pipelines “dry-up” after the initial launch, although it can be influenced by training, rewards and feedback (Gailly, 2011).

There is also the practical organization of the gates review, knowledge management, virtual collaboration, and the paperwork overflow, leading sometimes to “analysis paralysis” (inability to make any decisions without searching for more data) (Gailly, 2011). The problem here is that more time is spent on organizational tasks than on actual value adding tasks.

And finally, there are the decision making biases. A stage-gate process can’t completely remove uncertainties. Its efficacy relies heavily on the decision made on the designs of the stages and the gates (what is expected at those points from the project teams) (Gailly, 2011).

This illustrates that the stage-gate approach’s implementation must be carefully managed. It cannot be simply based on existing template. “Its legitimacy across the organization and its integration within the corporate culture, routines, and values are key success factors which are more important than deciding if software X or template Y should be used” (Gailly, 2011). This underlines the role of training and motivation within the organization.

We have now introduced the second part of the “Adaptative management”: the stage-gate process. We have presented the origins, the main advantages, and the mechanisms of this process. But we have also discussed many risks and pitfalls of such model. Therefore, this also concludes our introduction of the “Adaptative management” concept, which is the combination of a portfolio approach and a stage-gate process. The next section will conclude this section dedicated to the introduction of concepts related to the execution of innovation projects.

2.1.6. Conclusion of the section

We have now introduced to the reader six theories related to the execution of innovation projects: The Ambidextrous Organization, Effectuation, Entrepreneurial Bricolage, Agile, the Portfolio approach, and the Stage-gate process. The two latter were grouped under the label “Adaptative management” as they are traditionally implemented together in organizations.

Now that we have a general overview of those models, in the next section, we will compare their insights and their implications in order to gain a better understanding of the mechanisms linked to the execution of innovation projects.

2.2. Theories comparison

Now that we have introduced some theoretical models to guide our reflections, we will proceed to compare those models in this section. With this exercise, we aim at increasing our understanding of the mechanisms underlying the execution of innovation projects. In particular, we will explore to which extent the tools mentioned in those theories present similarities and to which extent they can complement each other.

In order to do so, we will structure our comparison in a classic “similarities” and “divergences” partition, which will be covered in the next two sub-sections. It should be noted that the reader can find an additional comparative table in the appendixes, summarizing our points in this section but also comparing key success factors and other aspects (see Appendix 3: Table of theories comparison).

2.2.1.Similarities

2.2.1.1. Flexibility and Efficiency

When confronted to the management theories we have depicted in the previous section, we can clearly identify a certain pattern in the ideas exposed: it seems that managers need to strike a balance between a certain form of flexibility and a certain form of efficiency to be able to implement innovation effectively.

For innovation theories, it is quite straightforward. In the Agile theory for example, the short work cycles ensure a certain flexibility because projects don't drift for too long. They can be reoriented at any time while ensuring a certain efficiency. This is because this is done within a disciplined framework with set rules and because results are checked according to what was defined in advance (Denning, 2013). In the Ambidextrous theory, it is clearly stated that the managers should look for a balance between “explorer” (flexibility) and “exploiter” (efficiency) activities (O'Reilly III & Tushman, 2004). In the portfolio perspective, an “ideal ratio” between core-business improvements (efficiency) and long-term business-transforming projects

(flexibility) should be decided and managed on purpose by decision makers (Nagji & Tuff, 2012). In the stage-gate approach, as in the agile theory, projects are managed in short cycles (stages) and checked regularly (gates) in order to be able to quickly reorient or stop some projects (flexibility) within a disciplined and clear framework (efficiency) (Gailly, 2011).

For entrepreneurial bricolage, the very idea of reusing existing resources at hand is a form of efficiency (instead of spending time and money looking for external resources) while the aim of reacting to new challenges and new customer needs is clearly a form of flexibility (Fisher, 2012). In the effectuation theory, entrepreneurs don't "stay in love" with their first idea. Instead, they are able to adapt their goals in function of the way events unfold (Jacquemin, 2016), which is a form of flexibility. They are also efficient in the sense that they focus on time and resource-efficient activities such as the affordable loss pledge instead of the expected returns computations or the partnerships building instead of producing competition analysis (Fisher, 2012).

In other words, "nimble execution" is clearly about being able to combine those two mindsets of efficiency and flexibility. But this is something that O'Reilly III and Tushman (2004) and many other organizational theorists have suggested years ago (Greve, 2007). The real question that is preoccupying us is *how* to do so: the ways of working that are adequate to achieve this balance. Surprisingly, few attempts have been made to come up with guidelines and principles that can help managers build an organization able to combine flexibility and efficiency (Magnusson et al., 2009).

2.2.1.2. "Fail early and learn quickly" principle

Another similarity in many of those theories is the presence of a "fail early and learn quickly" principle. There is a recurring idea that part of the flexibility needed to be nimble is about recognizing underperforming projects (failures or simply unfit projects) and quickly terminate them while being able to learn from it (instead of considering it as a pure loss).

Sarasvathy (2001) argues that successful early entrants into a new industry are more likely to have effectuation processes. And if those firms fail, they are more likely to fail early and at lower levels of investments (than firms created with causation processes) because effectuation doesn't involve elaborate planning and costs predictions. Sarasvathy (2001) introduced this argument to prove that effectuation would "allow the economy to experiment

with more numbers of new idea at lower costs". That argument could also be relevant in a company (instead of economy) perspective.

In the portfolio approach, an organization should be able to quickly identify and terminate projects that don't perform adequately (Nagji & Tuff, 2012). Managers should focus on the most promising ones (Gailly, 2011).

In the stage-gate approach, the stages should be defined in order to deal with critical uncertainties as early as possible (Gailly, 2011). This allows the managers to make more informed decisions at early gates (projects can be stopped, suspended, redefined or pursued) and maximizes the "learning over investment" ratio (Gailly, 2011).

This "fail early and learn quickly" principle is important as it helps to limit losses of resources. A project kept alive for too long can waste precious resources (human resources, managerial attention, time, equipment, etc.) for no real benefits. Nimble managers must be able to recognize when a project is not the best use of their resources and to terminate such projects. However, an ended project must not be seen as a complete failure and some value can still be extracted in the form of knowledge and tacit learning.

2.2.2.Divergences

An interesting difference that we would like the reader to note is the origin of the models. On the one hand, Agile, the portfolio management and the stage-gate process have been developed by practitioners on the field and later theorized. This is exactly how Cooper et al. (2002) describe the birth of the stage-gate process: based on new product development's best practices. The portfolio approach is based on a typical corporate approach to handle large numbers of projects and is described as a best practice by Nagji and Tuff (2012). Finally, Agile is often described as a mindset that can be translated into a set of managerial practices (Scrum, Kanban, etc.) (Denning, 2013). To sum up, those models are based on best practices and field experience or, at least, are very close to practices and can be easily translated into managerial actions.

On the other hand, the ambidextrous organization, entrepreneurial bricolage and effectuation are more theoretical. Although they are based on observations and facts, they have been generated by academicians and rely on more assumptions. Entrepreneurial bricolage found

its origin in a field study performed by two researchers (Baker & Nelson, 2005). Ambidextrous organization theory is based on a field research also performed by researchers (O'Reilly III & Tushman, 2004). Finally, Sarasvathy took part in the creation of five start-ups before starting her thesis about Effectuation with the Professor Herbert Simon. Therefore she had a solid entrepreneurial experience beforehand (Jacquemin, 2016). However, her methodology was to interview 27 “expert” entrepreneurs and to find underlying decision logics (Jacquemin, 2016). She used a researcher approach that was more rigorous than what practitioners usually display. Therefore, we consider it to be more of a theory-based model.

Furthermore, theoretical models tend to be more descriptive than the practice-based ones and propose to describe how things *are* and why it works. The latter models, on the opposite, tend to be more prescriptive and propose a view on how things *should be* without spreading much on why it works well. This inclination results in the practice-based models being “bolder” and more oriented toward action and recommendations. Nevertheless, the theoretical models give us important insights and allow us to have a better understanding of some overarching principles.

This is well depicted if we compare Agile with Effectuation. On the one hand, Agile is a set of management practices about how the work should be organized within a project, starting with customer needs and not with the firm’s own value chain (Denning, 2013). It can be translated into a set of management principles which can be readily applied (along with a new managerial and work culture). Although the change may not be easy, we can define this model as strongly prescriptive.

On the other hand, Effectuation is a decision theory looking at explaining how entrepreneurs think and solve their problem. What really sets it apart from practice-based models is that this theoretical model draws its own boundary and recognizes the opposite mindset (which is Causation) (Fisher, 2012). For example, Effectuation is defined as more appropriate when the future is unpredictable and reliable forecasts are very costly or unavailable, which would typically be the case for more “transformational” innovation projects (in the Innovation Ambition Matrix framework (Nagji & Tuff, 2012)). Whereas Causation is more appropriate when forecasts and information about the future are available which would typically be the

case for more “incremental” innovation projects, closer to what the firm is used to do (Fisher, 2012).

Agile, by essence, is a Causation process because it starts with end goals (consumers’ needs) and then looks at the best way to achieve this goal. Therefore, thanks to the Effectuation theory, we can suppose that Agile may be less fit for developing transformational projects because they typically involve a greater share of uncertainty about the future. This limitation toward more “breakthrough” innovations didn’t seem to be explicitly proposed in the literature we have reviewed over Agile. However, in the Agile framework, it makes sense because the team would be less able to predict its own outcome at the end of each work cycle due to the great share of uncertainties and the lack of experience of the team members on this new matter (since transformational projects are usually far from what the firm is used to do). This is an example of how a more theory-based model helped us draw some limitations on a more practice-based model.

Therefore, we conclude that even if the practice-based theories may be more seducing because of their orientation toward solutions, they need to be put in perspective. To really understand the mechanisms at work, a good lecture of theory-based models is a necessary complement. Both type of models should be combined in our research.

2.2.3. Conclusion of the section

We have now presented a couple of comparison points between the theoretical concepts related to the execution of innovation projects. As a reminder, a table in appendix (see Appendix 3: Table of theories comparison) gives a summary of this section and features some additional comparison elements (such as key success factors, types of innovation addressed, type of organization addressed, etc.). We can proceed to the conclusion of the chapter.

2.3. Conclusion of the chapter

In this chapter, we have aimed at increasing our understanding of the mechanisms underlying the execution of innovation projects by studying related concepts in the literature. This appeared as an interesting approach since little literature addresses the issue of providing guidelines for managers about implementing ways of working that enable an effective execution. This literature review allowed us, namely, to find that the related theories

emphasize the need to combine a certain level of flexibility and a certain level of efficiency. We have also found that those theories can be seen as complementarities, to some extent.

In the next chapter, we will suggest how the tools and mechanisms proposed in each theory could be combined.

3. Nimble Execution

In this chapter, we intend to present a more precise definition of the nimble execution, based on the theories comparison and on more specific researches. Then, we will discuss some key success factors when applying the nimble execution concept. As it will be revealed below, the combination of efficiency and flexibility is crucial for the execution of innovation projects. Therefore, a dedicated section will consist in a summary of the levels at which efficiency and flexibility are combined in our model. In the next section, we will propose the domain of application of our model. Finally, the last section will draw the risks and disadvantages of its application.

3.1. Definition of the concept

In this first section, we will propose a first explanation of what is the nimble execution, based on our literature review and the comparison of those concepts.

The nimble execution is a theoretical concept about how firms can implement innovation effectively or, in other words, execute their innovation ambition. We assume other important dynamic capabilities to be already present and well-functioning. Namely, the abilities to generate new ideas, to communicate a shared strategic vision, and to provide entrepreneurial resources are necessary complements to the nimble execution. We strictly focus on the management of innovation projects so as to execute the organization's innovation ambition.

Anything can be achieved with the proper amount of resources. However, in reality, they are often quite limited and companies must choose how to best allocate them. Nimble managers must be managers before anything and they must be efficient. Efficiency is optimizing the use of the limited stock of resources they can use.

But innovative projects are much more uncertain than most projects, making all kind of *a priori* optimization a bit inadequate. Those projects are characterized by the unknown. The chance that any initial design will "win" in the end is very thin. Indeed, those initial project designs are thought at early stages, when a great share of important information may still be unknown. This is why nimble managers must ensure an adequate level of flexibility. Flexibility is the ability to redesign a project while it is running: shifting the objectives, redefining priorities, and actively allocating resources on the go.

Nimbleness is about being able to react to unexpected events (changes in the environments, contingencies, etc.) while optimizing the use of available resources by ensuring a certain level of efficiency and flexibility. Therefore, nimbleness is about combining efficiency and flexibility in the execution of innovation projects.

The idea that firms must combine flexibility and efficiency is not new in organizational theory (Adler et al., 1999). A significant part of the literature around the link between flexibility and efficiency was devoted to the debate of specializing the organization in one of the two attitudes (flexibility or efficiency) against balancing both attitudes in the same organization (Greve, 2007). Arguments for the balancing are very similar to the arguments for balancing long-term and short-term projects in the portfolio approach (see 2.1.5.1 Portfolio Approach). Arguments against the balancing mainly underline the difficulties of maintaining a combination of efficiency and flexibility. In the end, the key idea can be summarized with the following: “Efficiency requires a bureaucratic form of organization with high levels of standardization, formalization, specialization, hierarchy, and staffs; but these features of bureaucracy impede the fluid process of mutual adjustments required for flexibility; and organization therefore confront a tradeoff between efficiency and flexibility” (Adler et al., 1999). Therefore, many researchers argue there is a tradeoff between the two attitudes (Greve, 2007). Nimble execution can be understood as a way to manage innovation projects so as to “shift beyond the tradeoff” (Adler et al., 1999).

This flexibility-efficiency tension can be compared to a parallel argument in organizational learning: organization must choose between structures that facilitate exploration (the search of new knowledge) and those facilitating exploitation (the use of existing knowledge) (March, 1991). Instead of choosing, O'Reilly III and Tushman (2004) proposed that organizational separation (a physical separation) should allow both structures to coexist. In addition to this concept of decoupling by creating separate structures (also referred as “partitioning” in organizational theory (Adler et al., 1999)), the concept of temporal decoupling (referred as “switching”) has been introduced, suggesting that firms may switch from one behavior to another along time (Greve, 2007).

Those theoretical perspectives show that to be able to realize their innovation ambitions, firms need to combine flexibility and efficiency in their execution. Surprisingly, few explicit

attempts have been made to suggest guidelines to help managers build an organization able to combine flexibility and efficiency (Magnusson et al., 2009). With our research, we propose to define nimble execution as a way of working that allows to combine the (sometimes conflicting) attitudes of efficiency and flexibility.

As few explicit attempts have been made, our research was partly based on similar concepts in the literature. By comparing those concepts with the existing organizational literature dedicated to innovation project management, we extracted some key ideas that allow us to emit a proposition about how to implement innovation effectively. Or, in other words, to work efficiently while staying quite flexible.

3.2. Key success factors

The combination mentioned above between efficiency and flexibility will be achieved through several principles (or key success factors). The present section will be dedicated to the definition of the key success factors of the nimble execution. Those five key success factors are named according to the area of interest in the execution process they are linked with: project classification, maintain an ideal ratio, manage explorative projects, manage exploitative projects, and manage ambiguity.

The next five sub-sections are dedicated to their presentation.

3.2.1. Project classification

The first key success factor is to identify the type of project and to classify the project in a category in order to be managed appropriately. This key success factor is derived from a common distinction in the literature, explained in the following: *“Much product development hews closely to the current knowledge of the firm. However, it is important to distinguish explorative innovations from those that exploit current knowledge. One point of departure is the distinction between incremental innovations, which advance existing technology, and radical innovations, which develop new technology.”* (Greve, 2007).

We will work in a portfolio context. We propose to use the Innovation Ambition Matrix (see Figure 5) as portfolio framework because it is visually explicit and a good fit with the following key success factors. It should be noted that each project in the pipeline should be carefully

analyzed and classified in one of the realms. As the realm chosen will change the way the project will be managed afterwards.

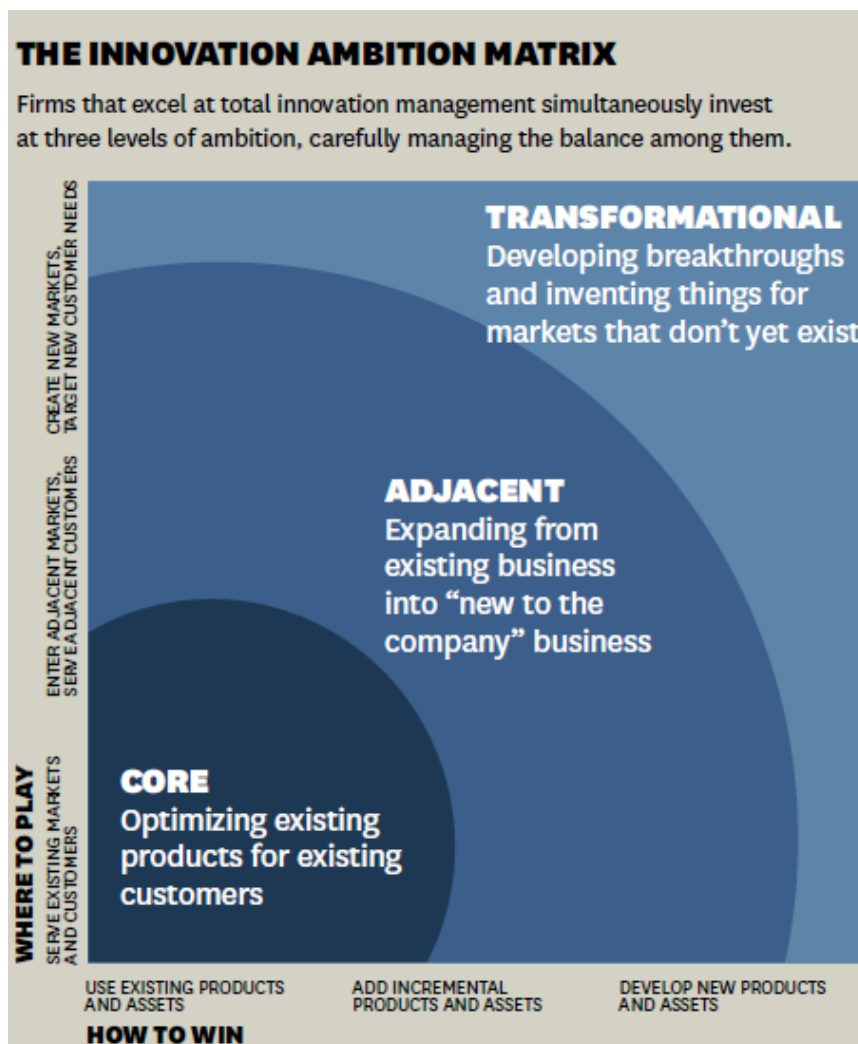
The idea that projects should be classified and separated in different management structures fit with the organizational separation between “exploration” and “exploitation” in organizational theory (O'Reilly III & Tushman, 2004). The idea is that the organization, by partitioning itself into subunits, will allow those subunits to specialize in executing either routine or non-routine tasks (Adler et al., 1999). In other words, projects will be divided into two broad categories with different management structures. One will specialize in projects that are close to the traditional business activities of the organization while the other will specialize in activities distant to those traditional activities.

As a reminder, the Ambition matrix (Figure 5) is composed of two axes: novelty of customer markets and novelty of company's mobilized assets. Along those axes, the space is divided in three realms: incremental (or core), adjacent and transformational projects (by growing order of novelty or distance from the company core assets and current customers).

We classify those three realms in two broad categories for the needs of our model (see Figure 6). The exploitative category will encompass the adjacent and the incremental realms. Whereas the exploratory category will contain only the transformational projects.

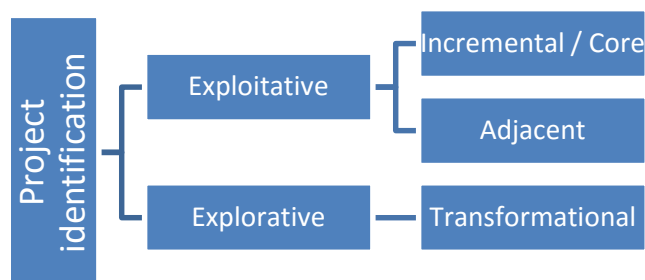
Obviously, this division is not innocent and it must be carefully conducted. The classification of the candidate projects in one or the other category will greatly influence the way the project will be managed.

Figure 5: Innovation Ambition Matrix



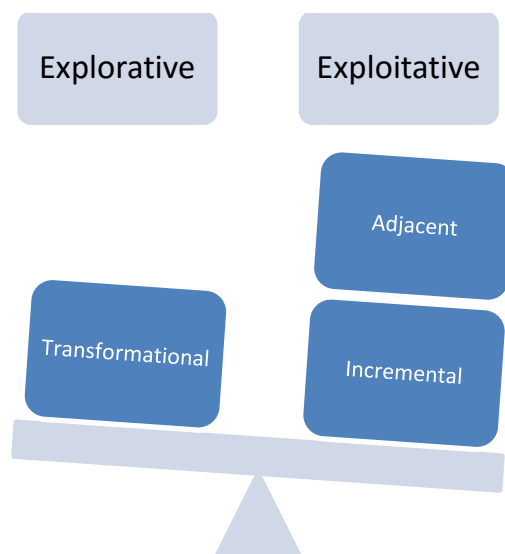
Source: Nagji and Tuff (2012)

Indeed, careful planning and process management are good predictors for the success of the development of a new product but this relation is unclear when *"the situation is highly innovative"* (Salomo, Weise, & Gemünden, 2007). In other words, when we treat with technologies and markets distant from what the firm is used to, some activities linked to planning could become rigidities and have negative effects, although a certain level of planning is still desirable (Salomo et al., 2007). In addition, Reid and De Brentani (2004) criticized the fact that *"even when the focus of discussion is discontinuous innovation [comparable to explorative projects], researchers have tended to invoke NPD processes, which are relevant for incremental projects"*. They propose that discontinuous innovations (in opposition to incremental innovations) move into the organization in a different way than classic NPD processes such as the Stage-gate.

Figure 6: Project classification

3.2.2. Maintain an ideal ratio

The second key success factor is to manage the overall balance between the different types of projects. Balancing different types of projects is also part of the nimble execution, as it helps to maintain a certain level of efficiency and flexibility in the execution of innovation projects. As a matter of fact, the ratio between the different types of projects (see Figure 7) should be managed deliberately as it is a first concretization of the firm's innovation ambition (Nagji & Tuff, 2012). This "ideal" ratio can be compared to the tradeoff between flexibility and efficiency in organizational theory (Adler et al., 1999). The exact value of the ratio depends on numerous factors such as the industry, where the company is in its life cycle, its size, etc. It should be determined accordingly by managers.

Figure 7: Maintain an ideal ratio

Innovative projects are risky and uncertain by nature. It is not rational to expect every project to reach some minimal level of revenues (Gailly, 2011). There is simply too much variability

and possible contingencies. This is why we work in a portfolio framework: to ensure a certain level of efficiency on the portfolio as a whole. To compare with a financial portfolio, transformational projects are the most likely to fail and are high-risks assets, balanced by lower-risk assets such as incremental projects. Balancing the firm's innovation portfolio is a critical factor to execute its innovation ambition (Nagji & Tuff, 2012).

As mentioned previously (2.1.5.1 Portfolio Approach), many balancing criteria are possible:

- **Source of innovation:** "internal" versus "external"
- **Time horizon:** "short-term" versus "long-term"
- **Type of project:** "core/incremental" versus "adjacent" versus "transformational"

Each criterion adds a relevant insight to the discussion. For example, an organization excessively focused on internal sources of innovations will be less aware of its environment and more likely to be "victim" of a discontinuous innovation from a competitor (Gailly, 2011). We could also compare this situation to the "bricolage trap" (Baker & Nelson, 2005) in which a company falls in a self-reinforcing cycle of activities that narrows its perspectives and harms its innovativeness. An excessive external focus would, on the contrary, lead the firm to ignore many brilliant opportunities available inside the company (Gailly, 2011). Our point is that all those criteria are relevant and managers should select carefully their balance criterion. For the rest of the discussion, we will assume the "type of project" criterion has been selected to preserve the coherence with previous assumptions (the innovation ambition matrix).

The ideal ratio should be carefully thought through. Indeed, an excessive or insufficient balance could be detrimental. On one hand, part of the flexibility in the nimble execution is in the diversity of the projects (i.e. the level of differentiation between projects). A high level of diversity would translate into a portfolio composed with more differentiated projects, with relatively more adjacent (and transformational) projects, thus more explorative-oriented. Having something going on in many fields allows to react effectively to contingencies. Indeed, it is easier to reallocate resources and to reprioritize projects than to start a new project from scratch and lagging behind your competitors. On the other hand, part of the efficiency in the nimble execution is in the search for scale and scope economies and for synergies between projects. Such objectives drive toward less differentiated projects, resulting in a portfolio that

is more exploitative-oriented. Projects should not be too disparate and resources should not be spread too much.

In the end, as mentioned above, this balance depends on the company's innovation ambition. It should be aligned with its vision and various other strategic factors (industry, lifetime of the company, etc.) (Nagji & Tuff, 2012).

3.2.3. Manage explorative projects

As mentioned in the first principle, innovation projects should be managed differently according to their type. We will describe here the third success factor: what we propose to be an adequate way to manage explorative projects.

Transformational projects should be managed in an effectual fashion. Indeed, an effectual approach is a good way to explore new business ideas without involving too much resources (Fisher, 2012). Transformational ideas often explore markets and needs that consumers may not yet be aware of (Nagji & Tuff, 2012). Therefore, clients are likely to be defined only *ex post*. Such conditions make the effectual approach more appropriate as it doesn't rely on complex planning and forecasting (Fisher, 2012). Instead, information is gathered in an iterative and experimental fashion.

Furthermore, Effectuation provides other advantages such as more adaptability (because ideas evolve as time passes and contingencies are leveraged) and a much more relevant evaluation criteria: the affordable loss (Sarasvathy, 2001). The "expected returns" criterion is often misleading for transformational projects as forecasting returns is quite hazardous in the first stages of such projects. A typical stage-gate process tends to kill those projects too early because usual evaluation criteria fail to reflect all the value of these projects (Nagji & Tuff, 2012). The "affordable loss" criterion is much more reasonable to evaluate such projects. Deciding in advance what the firm can afford to lose on this project is a rational way to allow the project a chance to grow without creating a resource black hole.

This effectual approach, as the management of transformational projects, should involve talents with different set of skills than what is usually expected in the traditional core business (Nagji & Tuff, 2012). Whereas analytical skills are paramount in exploitative projects, entrepreneurial mind and creative thinking skills take the supremacy in the requirement for

explorative project team members. We need talents that will, as the popular saying goes, “think outside the box”.

In addition, the organizational separation (proposed in the ambidextrous organization theory (O'Reilly III & Tushman, 2004)) should be respected. Indeed, whatever the culture and the attitude toward innovation are inside the company, there is always a risk that actors inside the traditional core activities perceive this exploratory project as a threat for their business (Tushman et al., 2011). Also, the entrepreneur-like talents are more likely to escape the gravitational pull of the core business if they are clearly separated (Nagji & Tuff, 2012). Therefore, those activities should be separated from the rest of the business (O'Reilly III & Tushman, 2004) and report directly to the CEO or a dedicated innovation senior manager (Tushman et al., 2011).

Applying an effectual approach could expose to a risk: failing to actually renew firm's competencies and activities. The goal of transformational projects is to expand the business toward new horizons (new markets, new customers, etc.). However, Effectuation starts with the things the firm is already able to do (“What can I do?”). One could argue that this would impede the search for new capabilities in a similar fashion than the bricolage trap. The bricolage trap is a self-reinforcing cycle of activities that locks the firms and limits growth because entrepreneurs keep using the same resources and enact bricolage in every domain (Baker & Nelson, 2005). Which is exactly the opposite of what we are trying to achieve with transformational projects. However, this is not a fatality. Such traps can be avoided by a good understanding of what the effectual process is. Effectuation is not about constantly using the same resources in every domain. It is about uncovering new possibilities by starting with what we know, who we know, and who we are and, then, by expanding from it (Sarasvathy, 2001). The effectual process we need in nimble execution should look outwards for new capabilities by creating strategic alliances, using smartly existing resources and embracing contingencies. Being aware that such traps exist and must be avoided is likely to help preventing them to happen.

Of course, those projects are still managed in a portfolio perspective and its rules still apply. The management should still try to “kill” early inadequately performing projects (projects that are underperforming or don't represent the best use of the portfolio's resources). Managerial

attention should be focused on the most promising projects (Gailly, 2011). However, it is important to consider other factors than money when evaluating those projects (Nagji & Tuff, 2012).

Returns (in the form of money and cash-flows) are highly uncertain for the projects in this category. Therefore, judgements based solely on returns would highly decrease the chances of growth of such projects, which would be detrimental on a strategic perspective. It has been stressed enough that a company needs to combine projects with a short-term perspective and projects with a more long-term perspective. This is why other factors should be considered when making decisions about those projects. For example, instead of asking the teams what the company is likely to *earn* with this project, managers should ask what the company is likely to *learn* (Nagji & Tuff, 2012).

It is also important that every decision made about the continuity or the discontinuity of the project must be communicated unambiguously (Gailly, 2011). Teams working on those projects should understand the risky nature of these projects. They should be trained to overcome “failures” and incentivized based on other factors than success.

Finally, as discussed, the effectual approach’s domain of application fits well with the conditions of explorative projects. It could be argued, however, that such an approach was designed for start-ups and small firms since it is part of the entrepreneurial theory. And that, therefore, effectuation would not be “transferable” to larger organizations. We believe that effectuation theory is not strictly bounded to the entrepreneurial field as it is presented more as a decision process used by entrepreneurs. Therefore, we believe some of its insights may be relevant in other fields as well. As a matter of fact, an effectual approach has already been applied in the literature toward management issues linked to large established firms by Dew, Sarasvathy, Read, and Wiltbank (2008), suggesting that established firms should expand their markets instead of trying to build “immortal firms in mortal markets”.

3.2.4. Manage exploitative projects

Now, we will describe the fourth key success factor: what we propose to be an adequate way to manage explorative projects.

Projects that are classified in the incremental or adjacent type of projects should be managed in a systematic framework. In this regard, models such as the stage-gate and Agile seem more appropriate.

Such projects present lower levels of uncertainty because the firm already has some experience in those domains and information about the future is more available (Nagji & Tuff, 2012). In this context, systematic review processes are relevant because they can rely on classic evaluation criterion and rather precise forecast. Whether the agile or the stage-gate process is chosen, parameters (such as the timing of the decision points, the standardization of the presentations, the issues that are expected to be tackled first, etc.) should be fine-tuned to the company's strategy and culture (Gailly, 2011).

Although both the agile and the stage-gate process are valid approaches, we will assume a stage-gate process was selected in the following. Many important dilemmas and balancing problems regarding this approach have been mentioned previously (2.1.5.2 Stage-gate processes) such as the level of standardization of the gates, the timing of the gates, the task prioritization in the stages, the focus on promising projects, the importance of clear and unambiguous communication, and the decision biases. We will briefly discuss those specific key factors, along with other insights, in the following.

Although we consider the projects in the present category to be more on the exploitative side (due to their relative proximity with the firm's core business compared to transformational projects), we must not forget that they remain innovation projects. Even if the evaluation criterion, capabilities, and skills involved are closer to the firm's core activities, we don't expect those projects to be treated like "business as usual" projects. Managerial attention should not be spread across too many projects and particularly not toward less performing projects. The rules of a successful innovation portfolio still apply, such as "A successful innovation portfolio is a portfolio where a few big gold nuggets were uncovered and polished to become beautiful jewels, not a portfolio with many average stones" (Gailly, 2011).

This brings us to another important point: the ability to quickly "kill" projects that don't perform adequately. As seen in Nagji and Tuff (2012), in most cases, projects in the incremental and adjacent realms should represent the majority of the company's investments in innovative projects. It is therefore important not to be drown by the sheer number of

projects in those categories. Projects that are kept alive should represent the best use of those resources. Therefore, at each gate, projects should be evaluated on their individual performances but also on their contribution to the portfolio and their effect on other projects.

In addition, the stages and the gates should be organized in order to deal with critical uncertainties first. This will allow the management to commit resources as time passes and uncertainties decrease. This is the true strength of such an approach: the gradual commitment of resources instead of simple green or red light for every project. This allows the firm to be efficient in the way it distributes its resources without impeding too much the flexibility of those projects. Indeed, the projects, instead of being simply stopped or pursued, can be salvaged, redesigned or simply put on stand-by (Gailly, 2011).

Of course, managers should not overlook the issues linked with “killing” a project. Every project is attached to people who take pride and ownership of them (Nagji & Tuff, 2012). If not properly managed, the stopping decision will be seen as a failure rather than a learning opportunity (Gailly, 2011). The managers should ensure that their decision is clearly communicated and motivated to every stakeholder. In particular, managers should look to justify decisions in terms of how this is going to be beneficial for stakeholders in short- and long-term (Nagji & Tuff, 2012). Otherwise, trust in the system in place and the motivation to submit ideas or to develop projects could decrease, resulting in the project pipeline “drying-up”. In addition, incentives system, training and feedback can influence this effect (Gailly, 2011).

3.2.5. Manage ambiguity

Many researchers claim that managers in charge of innovation must be able to deal with ambiguity, inconsistencies or ambiguous data (Gailly, 2011; Nagji & Tuff, 2012; Tushman et al., 2011). With this fifth key success factor, we propose to explore the management of ambiguity so as to better understand its nature and its effects on the execution of an innovation project. We will also propose a tool to manage ambiguity.

The management of innovation project is inherently linked with uncertainties and ambiguities. First, we will explain the difference between those two concepts. In organizational theory, a classic definition of uncertainty was proposed by Daft and Lengel (1986): the absence of information. In other words, the degree of uncertainty can be seen as the difference between

the amount of information needed to perform a task and the amount of information the organization already possesses. Uncertainty is generally a negative aspect from a managerial point of view. Ambiguity, on the other hand, is a different concept. Many researchers have proposed their definition but they generally agree on the principle of equivocality, also introduced by Daft and Lengel (1986): “the existence of two or more cues to a single cue” (Brun, Saetre, & Gjelsvik, 2009).

Brun and Saetre (2009) suggest in another paper that the notion of ambiguity captures much of the essence of the “fuzzy front end” in new product development. The problem is not only a lack of information to achieve the task of developing the product (uncertainty), it is also that many different interpretations are open regarding this development (ambiguities). Indeed, methods to manage new product development, such as the Stage-Gate process (Cooper et al., 2002), assume an upfront gathering of information followed by a sequential process. But the early stages of this method are characterized by uncertainties and ambiguities, especially in dynamic environment and this is known as the “fuzzy front end” (Koen et al., 2001). Although the idea generation processes are out of scope of our research, we must mention that “fuzziness” that is not corrected in the early phases of the process may lead to excessive costs in the form of corrective actions and time overruns later in the project (Reid & De Brentani, 2004).

As we mentioned, the notion of ambiguity may capture some part of the fuzzy front end. But it is probably present in the project throughout the NPD (New Product Development) process (Brun & Saetre, 2009). An interesting idea is that, contrary to the uncertainty, ambiguity is not systematically something negative for an innovation project. It may promote a form of flexibility called “interpretative flexibility”, engaging the firm to progress in the NPD process with multiple interpretations left open (Brun & Saetre, 2009).

This acceptance of a certain level of ambiguity indeed allows for a certain flexibility. For example, as the project’s life goes on, contingencies may happen. The interpretation that was selected as the main interpretation may become obsolete and, if the organization has turned down all other interpretations, the project risks to fall in a costly dead-end. Along with the flexibility in the choices of options, organization could accept a certain level of ambiguity to save costs (fully reducing ambiguity may not be cost-efficient as the measures involved are

typically expensive) or to save time and ensure progress (those measures often take time to perform) (Brun & Saetre, 2009).

This is why Brun and Saetre (2009) proposed a framework to better understand the nature of ambiguity and how it can be managed according to the need of the organization for clarity or flexibility (see Figure 8). We will briefly introduce the model to the reader. In this framework, ambiguity is classified along two dimensions (Brun et al., 2009). The first dimension is the *subject* of the ambiguity. There are four possible subjects:

- *product* ambiguity – the product in itself, its functionalities and performance;
- *market* ambiguity – the external environment, who the stakeholders are and what are their needs and interests;
- *process* ambiguity – how the product will be developed and produced throughout the NPD;
- and *organizational resources* ambiguity – resources that the organization assigns to the realization of the project (financial or human resources).

The second dimension is the source of the ambiguity, i.e. the reason why there are multiple interpretations of the same cue:

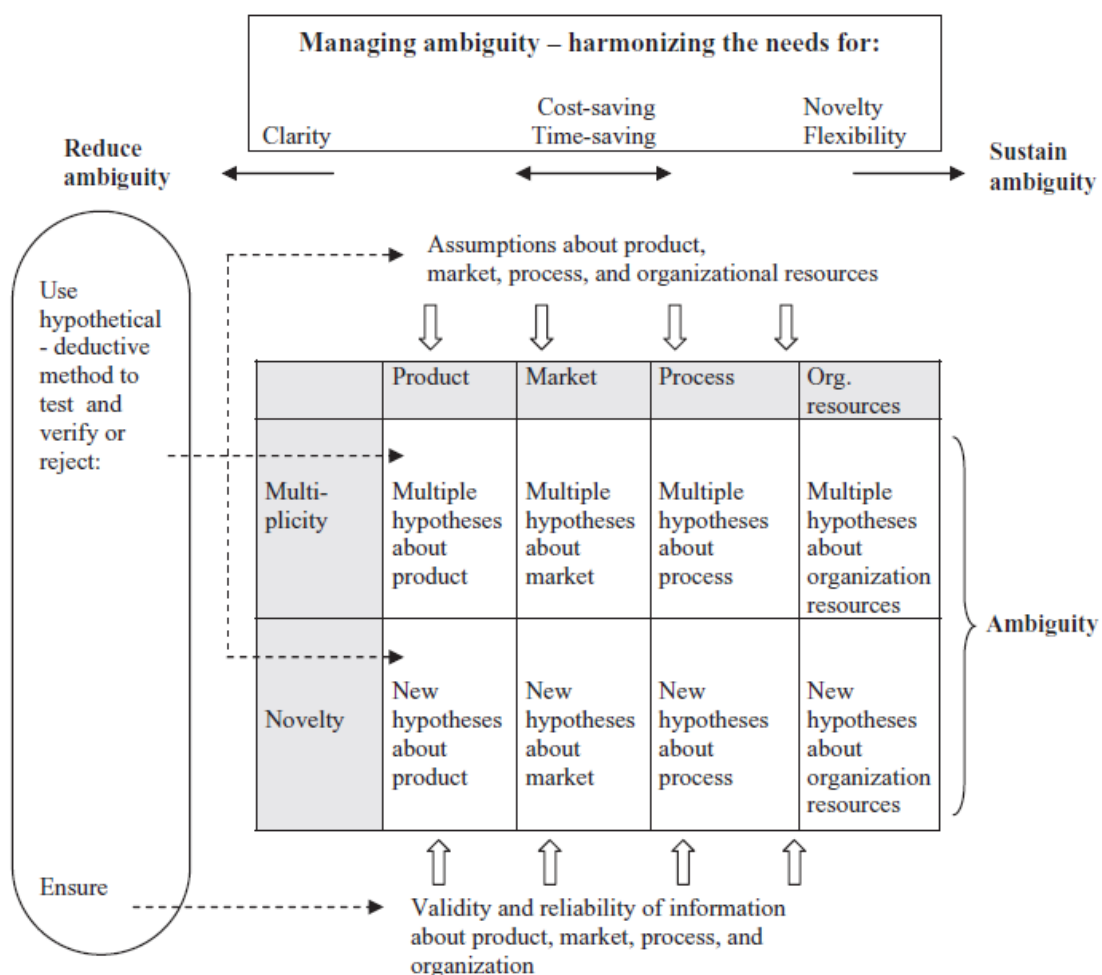
- the *multiplicity of the subject* – ambiguity arises from the existence of multiple interpretations come from different perspectives and points of view inside the organization
- the *novelty of the subject* – ambiguity arises from the emergence of a new interpretation (dynamic, time-variance aspect)
- *Validity and reliability of information* – ambiguity arises from interpretations based on unrepresentative information (low validity) or inconsistent information (low reliability)

Besides the classification of the ambiguity, what is really interesting in this model for our research is the affirmation that “managing ambiguity means *harmonizing* the need for clarity to achieve operational efficiency in the NPD project (for this purpose ambiguity should be reduced) and the need for novelty and flexibility to achieve innovation (for this purpose ambiguity may be temporarily sustained)” (Brun & Saetre, 2009). In other words, it is about balancing efficiency and flexibility (or exploration and exploitation).

To answer the need for clarity of the organization, ambiguity can be *reduced* using hypothetical-deductive methods to test, strengthen or reject hypotheses (Brun & Saetre, 2009). To reduce ambiguity, project teams should test the interpretations themselves, their underlying assumptions, and the validity and reliability of their assumptions.

On the opposite, ambiguity can be *sustained* for various reasons (already mentioned above): retaining a certain flexibility in options, saving costs, or saving time and ensuring progress. The measures taken in order to reduce ambiguity are not necessarily cost-efficient, nor necessarily desirable in every situation as ambiguity grants a certain type of flexibility.

Figure 8: Managing Ambiguity



3.2.1. Conclusions

We have now presented the five key success factors of the nimble execution framework we propose. Those key success factors are actually linked to decisive principles in our model: project classification, maintain an ideal ratio, manage explorative projects, manage exploitative projects, and manage ambiguity.

The next section will review how the principles of our proposition should allow an organization to combine flexibility and efficiency at various levels.

3.3. Flexible and Efficient

Nimble execution aims at ensuring both flexibility and efficiency in the ways of working around innovation projects. This section exposes how our proposition was designed to use this combination at multiple levels.

First, at the firm-wide level, the portfolio approach allows managers to be both efficient and flexible. It is efficient in the sense that risks linked to every individual project are mitigated by the balancing in terms of types of project, origin of the projects and time horizons. But it also gives managers a common tool to properly track projects. They should also decide their innovation ambition (a vision about innovation in their company) and decide what kind of ratio between each type of project should be reached and maintained. It is also flexible in the sense that the balancing mentioned above also allows managers to choose from different growing opportunities in the future and therefore increase their chances to react appropriately to any market change.

Second, at the level of individual explorative projects, the effectual approach we suggest also allows to be flexible and efficient. The flexibility comes from the essence of an effectual thinking process: it's an iterative process in which the project design is constantly adapted according to the contingencies. Effectual entrepreneurs don't stay in love with their first idea and are ready to change their project according to the new information they have. The efficiency comes from the refusal to engage in activities that are not time and resources efficient. Effectuation doesn't rely on complex planning and forecasts which would be quite costly to make and rather imprecise in the case of explorative projects. Instead, they prefer to

focus on activities that represent the best use of their time and resources such as seeking partnerships, influencing the future, and deciding what is their affordable loss.

Third, at the level of individual exploitative projects, the stage-gate approach described above enables a certain level of efficiency and flexibility. The management of the project is made efficient because resources are committed as the stages pass. Managers can increase their commitment as uncertainties decrease. Also, the clear and standardized framework helps them to compare projects between each other and to maximize the overall performance of the portfolio. Finally, projects that perform inadequately won't risk to drift too long, wasting precious resources. Instead, as projects are reviewed regularly, the management selection of the best project to support is eased. The flexibility comes mainly through this final point. Having frequent gates implies multiple decision points in the process. At each gate, the management has a chance to redesign, salvage, stop or pursue the project. Each meeting is therefore an opportunity to adapt the project to different contingencies, granting a fair level of flexibility to this approach.

Finally, at the level of individual projects, whatever their type, efficiency and flexibility must also be combine through the management of ambiguity. Sustaining a certain level of ambiguity can, in some situations, increases flexibility and efficiency. Flexibility is increased by the diversity of options in interpretations, addressing the risk that the main interpretation becomes obsolete and preventing the project to fall in a dead-end. Efficiency is increased because measures to reduce ambiguity may not always be cost-efficient. Although developing multiple interpretations simultaneously is costly in terms of resources, fully reducing the ambiguities will probably be even costlier, not only in terms of financial resources but also in human resources and time. To ensure the progress and avoid wasting resources, it is sometimes preferable to accept some level of ambiguity during the development process of the project. Understanding the dual nature of ambiguity and recognizing its effects is important to combine flexibility and efficiency in the execution of innovation projects.

We have now emphasized how nimble execution combines flexibility and efficiency during the execution process: at firm-wide level through the portfolio mechanisms but also at the level of individual projects thanks to the management structures we suggested.

3.4. Domain of application

In this section, we will present to the reader the domain of application of our proposition. We will draw this domain by setting two main limitations.

The literature around innovation management is complex. The simple word “Innovation” covers actually a broad concept that encompasses products, processes, and services innovation. In the present document, we must observe that some of the concepts we used were developed with a new product development (NPD) perspective (Agile, Stage-Gate process and others). We must therefore recognize that our proposition of nimble execution may only be adequate for product innovation and may not be so for processes or services innovation. Further researches and on-the-field experiments could investigate to which extent nimble execution can be expanded to those domains.

Another limitation is that our proposition assumes that the firm is a large company with many projects ongoing. We look for tools and methods that can allow managers to execute their innovation ambitions within “large” and established firms. We looked at the entrepreneurial literature to find a way for established companies to enact the same flexibility as entrepreneurs do. We do not believe that smaller firms (such as SMEs and start-ups) should follow our proposition as it is unnecessarily complex for them. For example, the systematic review process suggested for exploitative project could be burdensome for those firms. Such companies should turn themselves to the entrepreneurial literature to find some much more relevant advice for them, considering their size.

3.5. Risks and drawbacks

We are now going to present some key areas at risk that managers should keep in mind if they decide to apply our proposition of the nimble execution.

When identifying the type of a project, there is a grey area between exploitative and explorative projects. When does a project stop to be considered as an adjacent project and start to be considered as a transformational one? The lines are blurred and depend on the judgement of the decision makers. We must recognize this as a weakness of our model as a misclassification error would lead to an inappropriate style of management for this project.

In addition, if the above mentioned error is repeatedly made, the ratio between each type of project would be biased. For example, some projects that are actually exploitative would be considered explorative. This would result in a gap between the “real” ratio and the ideal ratio that the management may not even realize. As we propose that this ratio must be consciously managed, this could seriously harm the chances of the portfolio to be successful.

Furthermore, the determination of the ideal ratio is a bit problematic. Indeed, there is no rigorous methodology to decide such ratios. Although it depends on some factors that the literature has mentioned, the definition of this ratio relies on heuristics and judgement. Again, as we suggest that the deliberate management of this ratio is important, failing to define a relevant ratio could harm the chances of the portfolio to be successful. In the same fashion, an incorrect balancing along any type of dimension (such as time horizon or origin of the project) would be harmful as well.

When considering the management of explorative projects, we argue that adopting an effectual approach is the most relevant. However, even if somewhat efficient as we explained in a previous section (see 3.3 Flexible and Efficient), our suggested approach will consume a considerable share of resources. In particular, managerial attention will be heavily solicited by this category of projects (exploitative). As we do not propose any systematic review system for those projects, senior management will have to follow them closely to check their progression and ensure they have the resources needed.

When considering the management of exploitative projects, we have to remind that we assume there are proper capabilities in place to foster new ideas and “fuel the pipeline”. The problem is that the sheer number of projects killed in early stages could have a dramatic effect on the staff motivation to propose new ideas and to develop them into projects. This would result in the pipeline of projects “drying-up”, leaving the management with a fancy system to manage a great number of projects but with nothing to be managed, like an abandoned factory. Gailly (2011) suggests that this risk can be mitigated through training and reward systems.

Moreover, the level of formality and the intensity of the control in the organization of the gates is crucial (Gailly, 2011). Indeed, an overly strong level of standardization would result in a lot of *a priori* framing of the projects, reducing their chances to be correctly assessed and

increasing the chances of the company to fail to renew itself. And it would also result in a lot of unnecessary burden for the teams. Whereas a level of standardization that is too low would impede the ability of the management to compare projects inside the portfolio and to achieve the best allocation of resources. Similarly, if the timing of the gates is too frequent, teams will have to spend a more significant part of their resources in the preparation of the meetings (thus less resources in the project development). And if the timing is not frequent enough, the management will lose its grasp on the projects, allowing them to drift too long without reconsideration. Whether for timing or standardization, a poor organization of the gates would result in a considerable loss of efficiency and flexibility. The problem is again that there is no precise methodology to determine if the current organization is excessive. It relies on heuristics and judgement.

Finally, we must observe that many of the risks we mentioned involve decision making. Indeed, our system cannot replace managerial decisions, it can only help management to make them. This is why our proposition is still sensible to decision bias. Many famous decision biases have been uncovered in the literature. Those biases are namely (not an exhaustive list): the confirmation bias, the sunk cost fallacy, the “boiling frog” process, and the “anchoring process” (Gailly, 2011).

3.6. Conclusion of the chapter

In this chapter, we have defined the concept of nimble execution (implementing innovation effectively), along with key success factors regarding its implementation. Those key success factors were: the project classification, maintaining an ideal ratio, managing explorative projects, managing exploitative projects, and managing ambiguity. We have then proceeded to demonstrate at which level and to which extent flexibility and efficiency were combined and how nimble execution could allow to shift beyond the tradeoff between those two attitudes. Finally, we took a step back and drew some first boundaries for our concept with the definition its domain of application. In the same line, we pursued by underlying major risks and disadvantages we could identify with our proposition of the nimble execution.

In the next chapter, we will explore the conclusions of our research from a managerial perspective and propose a recapitulative table.

4. Managerial implications

In this chapter, we will reformulate the theoretical concept developed in the previous chapter with a managerial perspective. Our objective is to provide some recommendations to put nimble execution into practice. We will also underline the advantages and the disadvantages of our concept from a managerial point of view. Finally, we will explore some lessons learned with this research.

4.1. Recommendations

“Innovation project management” is not “project management”. With innovation projects, it is difficult to predict the timing of the result delivery or even if there will be a delivery at all. Managers should acknowledge that this uncertain nature needs a different type of management.

We proposed our concept, nimble execution, to be adequate for the management of innovation project. The key idea is to move beyond the tradeoff between flexibility and efficiency. In other words, through several principles, nimble execution may allow an organization to achieve higher level of combinations of those two mindsets. Those principles will be presented below and will be summarized later in this chapter (see Table 2: Nimble execution summary, p. 56).

- **Project classification**

Project classification is about recognizing there are several types of innovation projects, according to their distance from the company’s core assets, markets and products. This is sometimes roughly defined as “the degree of innovativeness” (Salomo et al., 2007). Some projects fall under the exploitative category (lower distance or degree of innovativeness) and some fall under the explorative category (higher distance or degree of innovativeness).

The recognition of this difference is important as it leads to a key insight: those projects cannot be managed in the same way. Different management tools and mechanisms have to be used. This will be developed further.

Projects must be classified in one or the other category, within a portfolio framework. The portfolio framework must be carefully chosen as it will give a firm-wide classification tool.

The coexistence of those two categories, with different management structures and within the same organization, are made possible thanks to “partitioning” (a.k.a. “organizational separation”). The idea is that explorative projects must escape the gravitational pull of the core business to be able to achieve this type of innovation, whereas exploitative projects will benefit from a certain proximity with the core business because such projects can capitalize on existing knowledge, experience, and assets.

- **Manage your ideal balance**

As mentioned above, we work within a portfolio framework. As in a financial portfolio, an important key success factor is to achieve some balance so as to mitigate risks.

In order to do so, the management must select some balancing criteria. There exists many different criteria. For example, the time horizon (long-term versus short-term) or the source of innovation (internal versus external). We argue for the category of project (explorative versus exploitative) being one adequate criterion as it captures multiple dimensions (degree of innovativeness, level of risk, time horizons, etc.). The important part is not really what exact criterion is used, it is rather to realize the implications in terms of flexibility and efficiency. For example, highly diversified portfolio (high flexibility) are better to face contingencies as it is easier to reallocate resources between existing projects than to launch new ones. But excessively diversified portfolio will fail to capture economies of scope and scale (poor efficiency).

We also stress the importance of managing deliberately the ratio of this balance. The “ideal ratio” should be decided according to the firm’s strategy and its innovation ambition. As a rule of thumb, there is usually an emphasis in investments on exploitative projects, as they are typically less risky and considered as “quick wins”. But exploitative projects tend to bring the larger part of the returns, even if less dominant inside the portfolio. The value of this ratio, of course, depends on the sector and many other strategic factors.

- **Manage explorative projects**

We will now explain the tools and mechanisms to manage projects with longer distance from the company’s core assets and markets. Globally, we suggest to use a rather flexible approach. To illustrate our case, we will continue with an effectual approach in mind.

As those projects deal with much more uncertainty and ambiguities, this approach do not rely on complex forecasting and planning methods in the early development phases of the project. Those tools are very costly in terms of resources (financial and human) and not so reliable under a high uncertainty condition. At the very least, they are not efficient in terms of resources used against the information quality gained.

Since we cannot rely on planning, we cannot rely on expected returns as an evaluation criterion when reviewing explorative projects. However, those project still need to receive some resources from the organization. This is why other evaluation criteria will be used, such as the “affordable loss” (the amount of resources the organization is ready to commit without expecting any certain returns) and the “opportunity to learn” (what the organization will have a chance to learn, what knowledge will be created). Those criteria are more relevant for explorative projects as they recognize the strategic nature of such projects and do not systematically harm their chances against explorative projects.

The effectual approach is based on an iterative process between available means (“What can I do?”) and feedbacks from stakeholders. Those stakeholders are to be involved quickly so as to build alliances and partnerships, creating a common interest in the project and appealing for additional resources. The idea is that after each feedback, the available means and the project design are updated until it is ready to be launched. Instead of trying to *predict* the future, the teams should try to *shape* the future with their partners and available means.

There is also a “fail early” principle: if those projects are to fail, they will fail quickly and at lower level of investments because less resources have been involved in planning. If the project is not feasible, it will appear quickly in the iterations. The teams on those projects have to be entrepreneurial and well aware of their risky nature. They should be trained and rewarded in order to overcome those failures.

- **Manage exploitative projects**

We will now explain the tools to manage innovation projects with shorter distance from core assets and markets.

In opposition to explorative projects, we suggest here to use systematic review processes with reliance on forecasts and planning, such as the stage-gate process. In brief, a systematic

review process such as the stage-gate process consists in a cycle of information gathering (stage) followed by a formal review (gate). The project of this category have less uncertainty and forecasting should be less expensive and more accurate. The systematic review process allows for a gradual commitment of resources, as uncertainty decreases throughout the stages (i.e. risks decrease). In addition, as suggested in the second key success factor, exploitative projects are in sheer number in the portfolio. A systematic review process is a formal and uniform tool to manage those projects.

Moreover, systematic review processes allow for multiple decisions points. At each of those points, the project is evaluated with the most up-to-date information the team managed to gather. The decision can be to stop the project, put it in stand-by, redesign it or pursue it. Management has therefore an increased flexibility to dynamically reallocate available resources between projects.

Furthermore, the stages should be organized with a clear definition of what is expected in terms of objectives. Critical uncertainties and hypothesis should be treated first to minimize investment losses in case the teams cannot resolve such uncertainties.

Finally, an important principle is to “kill quickly” projects that don’t represent the best use of resources. This is done in order to focus on the most promising projects. Contrary to classic project management, it is not rational to expect a minimal level of returns on every project. Managerial attention should not be wasted on projects in difficulties, it should be spent on the support of the best projects.

- **Manage ambiguity**

Innovation management goes hand in hand with the management of uncertainties and ambiguities. Although uncertainties (lack of information) are always negative, it is important to understand the dual nature of ambiguity (multiple interpretations of the same cue).

Ambiguity is certainly a negative aspect in some cases. Indeed, developing simultaneously multiple interpretations is more expensive than developing a single one in terms of resources (financial and human). But in some other cases, it can be better to sustain a certain level of ambiguity. Indeed, it promotes a certain form of flexibility as multiple interpretations allow to bounce back in case the main selected interpretation becomes obsolete. It can also be more

efficient if the cost of fully reducing ambiguity is higher than simply pursuing the project with a pair of interpretations.

The management of ambiguity is about *harmonizing* the needs for clarity and flexibility of the organization. Understanding those needs and how they can be answered (reducing or sustaining ambiguity) may allow an organization to achieve higher level of flexibility and efficiency. Concretely, it means that, in some cases, tolerating a certain level of ambiguity is beneficial for the organization.

4.2. Advantages and disadvantages

Now that we have carefully explained our recommendations toward managers, we should underline the key advantages and disadvantages of those recommendations. In fact, most of those points have been implied in the recommendations. This is why, so as to avoid repeating ourselves, we only summarize them (see Table 2: Nimble execution summary, p. 56). However, the complete details of those advantages and disadvantages can be found in appendix (see Appendix 4: Advantages and disadvantages of Nimble Execution).

4.3. Chapter conclusion and lessons learned

Using the findings summarized above, managers will be able to better understand some mechanisms underlying the execution of innovation projects. Such mechanisms are namely (but not exhaustively): the combination of flexibility and efficiency, the separation between explorative and exploitative activities, how those two types of management structure can coexist, the management of ambiguities, etc. By learning the importance of those mechanisms, managers will be able to make more informed decisions in innovation project management in general.

In addition, we provided managers with a suggestion on how to work on those mechanisms. The framework discussed above, that we named nimble execution, should help managers to implement innovation projects effectively.

Table 2: Nimble execution summary

KSF	Characteristics	Advantages	Disadvantages and risks
Project classification	• Recognition of the existence of an “exploitation” type and an “exploration” type of innovation (depending on the distance from company’s core assets and markets) with different management styles involved • Classification of each project in one of the categories of project within a portfolio perspective • Co-existence made possible by partitioning (organizational separation)	• Common tool firm-wide to track projects and identify their type • Partitioning allows explorative projects to escape the gravitational pull of core business	• Misclassification error (no precise methodology developed to classify projects, reliance on managers)
Maintain an ideal ratio	• Balancing criterion (type of project, time horizon, source of innovation) • Balance managed deliberately in line with the company’s strategy and innovation ambition	• Mitigation of risks • Diversity of projects enables greater flexibility against contingencies.	• Determination of the ideal ratio is problematic since there is no precise methodology
Manage explorative projects	• Projects with longer distance from core assets and markets • No reliance on complex forecasting and planning methods in the early development of the project. • “Affordable loss” & “opportunity to learn” criteria • Iterative process between available means (“What can I do?”) and feedbacks to polish the idea • “Fail early” principle & entrepreneurial spirit • Involve stakeholders and search for alliances	• Focus on effective activities under uncertainty condition • Great to deal with contingencies thanks to the constant iterative process • If failing, will fail early and at a lower level of investment (or at least at a given affordable level)	• Costly in terms of managerial attention (management must follow closely the projects)

Manage exploitative projects	• Projects with shorter distance from core assets and markets • Systematic review processes with reliance on forecasts and planning • “Kill quickly” and focus resources on promising projects • Multiple decisions points (kill, go, redesign, stand-by) • Short stages with clear objectives, treating critical uncertainties first	• Gradual commitment of resources as uncertainty decreases • Effective to compare projects in a portfolio perspective and optimize the allocation of resources • Decreases the amount of “drifting” projects • Multiplicity of decision points enables a better reaction to contingencies	• Inadequate determination of the level of formalization can lead to several issues (<i>a priori</i> framing, administrative burden, etc.) • Quickly killing underperforming projects may lead to the pipeline “dry-up” • Decision biases
Manage ambiguity	• Dual nature of ambiguity • Harmonizing the needs for clarity and flexibility • Tolerate a certain level of ambiguity in some cases	• Better understanding of the sources of ambiguities and how to reduce them • Sustaining ambiguity may result in an increase of flexibility against contingencies on interpretations	• No precise methodology to harmonize the needs

5. Empirical confrontation

Now that we have clearly specified our framework and its implications, it seemed important to us to search for some empirical validation. We believe that a confrontation with concrete examples and experiences will help us to take a critical perspective on our proposition. Thus, our objective in this confrontation is to verify the validity and the pertinence of our framework, to some extent. This chapter will describe the methodology used, the results and the way they compare with our theoretical findings.

5.1. Methodology

We will dedicate the first section of this chapter to the description of the methodology we used for the empirical part of our research. We have decided to conduct interviews with experienced practitioners as a way to verify empirically our findings. We will justify the choice of the type of interviews we made, then we will explain the selection process of the interviewees and finally, we will give some details about the way those interviews were conducted.

5.1.1.Type of interviews

Those interviews were conducted under the form of semi-directive interviews, with the help of an interview guide (available in Appendix 6: Interview guide). We believe the semi-directive form was the most appropriate as it allowed us to check specific findings through a more open talk, without influencing the interviewee by asking directed questions.

The themes and sub-themes in the interview guide are based on our findings. The strategy was to use the “funnel” technique wherein our interrogations started with general ideas and opinions then went into more specific and detailed aspects. In practice, the interviewee may cover multiple topics on the guide by himself, without the need of an intervention of the interviewer.

5.1.2.The selection process of the respondents

The selection of the interviewees was based on an online research, taking advantage of the power of the modern social media LinkedIn. Profiles were selected on the basis of three main criteria: a certain “seniority”, as several years of experience (ten years or more) in the field of innovation; a current position linked closely to the management of innovation, such as

“innovation manager”, “R&D director”, “board member in charge of change & innovation”, etc.; and a significant part of the career in a large and established company, i.e. with more than a thousand employees. The profiles selected were eventually contacted, depending on the availability of their contact information. In total, 12 mails were sent. Four of them have been positively answered: Claude Mancel, Fabrice Renard, John van der Heyden, and Frank Dethier.

Mr. Claude Mancel is the former vice president of R&D Europe, Middle-East & Africa in Procter & Gamble and is currently member of the innovation board of Solvay. He has an extensive experience in the development of new products for consumers.

Mr. Fabrice Renard is chief innovation officer at Prayon, a Belgian group based near Liège. Prayon produces an extensive range of phosphate and fluorine products (chemical) used in various sectors: food, fertilizer, industrial and pharmaceuticals.

John van der Heyden is member of the Innovation and Group Projects domain in the Retail Banking section of BNP Paribas. He has an extensive experience with the developments of new payments methods such as mobile or internet payments (with more than 15 years of experience).

Frank Dethier is Change & Program manager at the international brewer Anheuser-Busch InBev (ABInBev). He is a consultant specialized in innovation management advices and training, with an experience of more than twenty years in innovation.

5.1.3.Interviews

The interviews were conducted through Skype, with the consent of the interviewees to record those calls. Although not perfectly equivalent to face-to-face interviews, modern communication technology provides satisfactory audio and visual contact between the interviewer and the interviewee. Therefore, we believe the loss of information caused by choosing to conduct the interview through a VoIP software was not significant.

The first interview, conducted with Claude Mancel on the 4th of July 2016, lasted 81 minutes. The transcription is available in the appendixes (see Appendix 7: Interview 1).

The second interview, conducted with Fabrice Renard on the 5th of July 2016, lasted 41 minutes. It was conducted in French. The transcription is available in the appendixes (see Appendix 8: Interview 2).

The third interview, conducted with John van der Heyden on the 26th of July 2016, lasted 40 minutes and was also conducted in French. The transcription is available in the appendixes (see Appendix 9: Interview 3).

The fourth interview, conducted with Frank Dethier on the 26th of July 2016, lasted 47 minutes. The transcription is available in the appendixes (see Appendix 10: Interview 4).

Now that we have exposed our methodology in this empirical part of our research, we can move on to the content of the interviews.

5.2. Results

We will now expose the results of our empirical confrontation, based on the content of the interviews. As stated in the previous section, our goal was to discuss the topic of the management of innovation projects with experienced practitioners. In their stories and their opinions, we hoped to find some supporting evidence for our model, without directly asking their opinion about our proposition. This section will be dedicated to the main findings that we draw from the interviews. In particular, we will look at how those empirical findings support, nuance or deter our theoretical proposition. We decided to divide this section in topics, related to the key success factors of nimble execution, so as to structure the discussion in a clear way for the reader.

5.2.1. General approach: the separation between types of projects

The first things we wanted to check were the perceived challenges when it comes to the management of innovation projects. From those challenges, we moved on to the management tools, structure and methods put in place to answer those challenges. We looked primarily at confirming the fundamental idea of our proposition: the existence of two types of projects and how they should co-exist in the organization.

“They [business management] know that investing in R&D is an uncertain business.

They never know if the investment they are making is justified or not.

They rely on you to tell them if it is a good investment or not.”

- Claude Mancel, interview 1

Claude Mancel, in his interview, mentioned several times (see quote above) that a key skill is the ability to gather resources from the management. He referred multiple times to the trust innovation managers must inspire to general managers. Because, as those managers are not involved in the innovation process, they have only the word of the innovation manager. And it takes a lot of trust to engage large amounts of money on projects based solely on the word of one person.

“As soon as you are spending some money for whatever reasons (but R&D is a good reason), you need to justify how the money has been spent.

That is an exercise that is common and universal to all companies.”

- Claude Mancel, interview 1

This is why Mr. Mancel argued later that systematic review processes were somewhat useful: they bring discipline in the process and ease the task of bringing stakeholders and financial resources on board. According to Mr. Mancel, all projects should follow a stage-gate process. However, Mr. Mancel's stories about Swiffer and the Euro brand (see Appendix 7: Interview 1) demonstrated that what we call explorative projects (projects that are more distant to what the company is used to do) followed a different way than exploitative projects. However, there were very few projects concerned. And most projects, whatever their degree of exploration, were thrown in the stage-gate process in the end.

Mr. Dethier shared with us an interesting opinion: *“As long as you don't know what you are going to deliver and how you are going to deliver it, then work agile. The moment you have defined the value proposition and you know how to do it, immediately start working in a linear stage gate process.”* For him, innovation should be managed in a “two-speed” model. The first step is not mandatory but will help projects that are more “innovative”, i.e. more distant to what the organization is used to do (what we call explorative projects). He argues that such projects are often not a good fit with linear approaches such as the stage-gate, due to the great uncertainties present in the early life of those projects. But as soon as those uncertainties are cleared, the project should enter in the linear stage-gate process, because it's simply a very effective and efficient way to deal with projects with few uncertainties. And

according to him, not every project needs the “agile” phase. If the team has a clear idea about how they will achieve the projects and the value proposition (which will typically be the case of incremental innovation projects), they should go immediately in the stage-gate process.

Mr. Renard didn’t mention the existence of separate management structures for explorative projects. However, he did refer to the concept of “switching” (as explained in the quotation below).

« Même si c’était non-dit, il y avait des retournements de situation pas clairement exprimés ou annoncés par le management. Je veux dire par là que suivant le climat et les évènements récents, comme les résultats de l’année financière, la rentabilité des derniers projets, il y a une tendance à favoriser certains projets plutôt que d’autres. En gros, si la situation est un peu plus tendue, on va favoriser des quick-wins et des projets avec peu de risques et des gains à court terme. En revanche, quand ça va un peu mieux, on s’autorise à rêver. Tout le monde a envie de supporter ce genre de projet mais c’est un risque et l’envie de prendre des risques dépend de ces facteurs. »

- Fabrice Renard, interview 2

This could imply that Trion (Mr. Renard’s company) uses this mechanism, instead of partitioning, to deal with the contradiction of the coexistence of the exploration and the exploitation mentality in the same business unit. This is a mechanism that we didn’t consider in our framework. Mr. Dethier mentioned what he called the “risk appetite” of a firm, which is very similar to what Mr. Renard described, but rather as a portfolio balancing mechanism than a way to cope with the combination of exploration and exploitation mentalities in the same organization.

Mr. Dethier, when asked about whether the explorative activities should be conducted within a separate part of the organization, explained that he had worked in many different “decoupling” models. The first one is the model we suggest, separating the organization in an explorative part, specialized in flexibility, and an exploitative part, specialized in efficiency. According to Mr. Dethier, the main advantage of this method is that it allows each part to specialize in its activities (optimizing processes, hiring the right people, etc.). However, one major disadvantage is that anything that the explorative part creates needs to be transferred to the exploitative part of the organization. And this “transfer” process takes time, it can

“cause a lot of delays, uncertainties and a lot of re-questioning things, etc.” (Dethier, interview 4).

The second model Mr. Dethier mentioned was the “switching” in organizational theory (Adler et al., 1999): e.g. employees work 80% of their time on their projects for delivering results and 20% of their time on innovation. This allows to eliminate the “transfer” problem because the same people work on innovation and delivery. But the big disadvantage is that it only works for incremental or “improvement” innovations, not for “big” disruptive innovations. That is, because those innovations need much more dedication from the people concerned with it, far more than 20% of their time.

The third model Mr. Dethier mentioned was another form of switching, in the context of an app development start-up, wherein the whole team switched from an innovation mindset in the early phase of development of a project and then switched to delivery and implementation.

The main point of Mr. Dethier was that each of those models had its pros and cons. According to him, no model is the best fit for all organizations. It depends on a lot of factors such as the type of industry, the size of the firm, etc. Therefore, it nuances our proposition as the organizational separation between the explorative and exploitative structures may not be an option adequate for every case. However, the idea of some form of decoupling between the two seems to stay appropriate.

In this first sub-section, we have found supporting evidence that there exists different types of innovation projects and that those types of projects need to be managed differently. However, we have found some nuances in the way the two management structures should coexist: the partitioning that we proposed, i.e. having two distinct organizational sub-entities with physical separation, seems not to be the best option in all cases. Therefore, when applying our proposition, managers should pay attention to the particular situation of their organization and use alternative decoupling mechanisms if relevant, such as “switching” for example.

5.2.2. Portfolio management

Now that the fundamental idea of our proposition has been cleared, we will move on to another key success factor: the portfolio management and the importance of managing the balance of this portfolio deliberately.

At the level of portfolio management, Mr. Mancel confirmed that projects were managed in a portfolio perspective. That some projects may indeed receive resources taken from other projects, confirming our finding about the optimization of the allocation of resources inside the portfolio (efficiency). In fact, all four respondents were using a form of portfolio structure to manage innovation projects in their respective organization. We also found a lot of explicit evidence that the balance in the portfolio was managed deliberately. Mr. Dethier suggested that *“a typical (and I really use ‘typical’ because every company is different) partitioning was 70/20/10. Which means 70% for short-term and low risks, 20% for medium terms and medium risks and 10 for long-term and high risks”*, which is clearly similar to the maintenance of an ideal ratio that we suggested in the second key success factor of our proposition.

This finding has also been confirmed by Mr. Renard when he evoked the “robot”, a custom management tool he designed to prioritize projects inside the portfolio. It used information such as cash-flows forecast at different time horizons, a matrix of risks and the cost involved. Basically, Mr. Renard and his company are working in a stage-gate process that is slightly modified to their needs.

« Comme je l’ai dit, nous travaillons avec un portefeuille d’une vingtaine de projets. Les projets dedans sont choisis en fonction du score qu’ils ont obtenu avec le robot par exemple.

Mais ils sont aussi choisis selon d’autres critères. Par exemple, il y a des sujets prioritaires pour nous, que ce soit parce que des actionnaires l’ont demandé ou parce qu’on pense que c’est un marché intéressant à développer pour le futur »

- Fabrice Renard, interview 2

Over the balancing of the portfolio, as the quote above illustrates, Mr. Renard confirmed to us that it was managed deliberately in line with the company’s strategy. There is a balance between exploitative projects (approved by the “robot” tool so with good cash-flows, moderate costs and moderate risks) and explorative projects (projects that are put in the portfolio for strategic reasons, not for cash returns only).

Another interesting finding is the effect of the “risk appetite” of the firm on the portfolio balance. The idea proposed by Mr. Dethier and Mr. Renard was that a firm is willing to take more risks based on various strategic factors: macro-environment conditions, past results, etc. This can be seen as an alignment between the firm’s strategy (based on those strategic factors) and the innovation ambition (reflected in the portfolio balance).

“There is a conflict between business management who wants fast innovation and a R&D organization who is working in a much longer time frame than them. So being able to combine short-term developments with long-term developments is another issue in the management of R&D”

- Claude Mancel, interview 1

Although Mr. Mancel agreed on the need of balancing the portfolio, he evoked something interesting: the fact that “business management” have a shorter lifetime in the industry. Usually, they will stay three or four years in the same position then move on to another unit or another company. This creates a conflict between R&D people who wants to work on long-term, breakthrough innovations and business managers who wants quick-wins and short-term gains. In other words, although preferable for the organization, some managers may ignore the balancing requirement in order to pursue personal interests. This conflict of interest is an issue we did not foresee in our analysis of the risks and disadvantages of our proposition and could seriously harm the flexibility and long-term viability of an organization if not addressed properly by some management mechanisms (such as the reward system for example).

Another pitfall, evoked by Mr. van der Heyden, was that a global firm-wide portfolio could cause ineffectiveness in the discussions. Because of the sheer number of projects to review, the persons around the table cannot know all the details of all innovation projects. That reduces their ability to compare and review those projects. Instead, in BNP Paribas, they decided to bring down the discussion, closer to the field. Projects are divided between “domains”. Domains are organized around key topics in the bank (card payments, savings accounts, etc.) In each domain, people are in charge of “translating the organization strategy” into the domain strategy: big priorities, concrete ideas and organizing those ideas in steps.

(Over the domains in BNP Paribas) *“Ça se pose de manière transversale, par-dessus ou même en supplément de l’organisation verticale traditionnelle où les gens de l’IT ont un chef IT et*

les gens en marketing ont un chef en marketing. Ça veut dire que la vision stratégique reste dans l'organisation traditionnelle mais l'exécution a été confiée à des groupes positionnés de manière plus transverses. Ça fait qu'il y a plus de gens autour de la table au moment où on discute. Et évidemment, ça accélère le processus par rapport à ce qu'on faisait avant."

- John van der Heyden, interview 3

As the quote above illustrates, the domains are a transversal part of the organization, across departments. This way of working allows to gather around the table different types of stakeholders within the organization (marketing, sales, IT, lawyer, etc.) that bring different inputs of expertise but are specialized on the topic of this domain. The effect is that people around the table can learn the details of the projects of their domain and can make more informed decisions about the "portfolio" of their domain.

Again, we found supporting evidences for our proposition. That is that innovation projects should be managed in a portfolio perspective, paying a special attention to the balancing between different types of projects (explorative versus exploitative), time horizons (long-term versus short-term), etc. However, we noted two pitfalls. First, we noted that a global firm-wide portfolio may be oversized and prevent the ability of management to make informed decisions about the content of the portfolio. Second, we noted that other factors, not related to the firm's innovation ambition, may impact the balance in the portfolio. Now that the overarching principles of our model have been covered, we can move to the specifics of how should explorative and exploitative projects be managed.

5.2.3. Exploitative projects: stage-gate and its limitations

Now, we will check how exploitative projects should be managed according to the interviewees. In particular, we will find the limitations of a stage-gate process.

Claude Mancel, during the interview, argued the idea that stage-gate approach brought some discipline that was desirable but this discipline is not always effective.

(Over a Stage-Gate process) "I think it is a good discipline to have. But it is far from proven that this will allow you to succeed in the end. Having some discipline is important, it's critical. But at the same time, if you talk big innovations, you don't really know which directions the project is going to take and all these gates may prove useless"

- Claude Mancel, interview 1

He mentioned the fact that some innovations, called “big” or “breakthrough”, that can be compared to what we called “explorative projects”, often didn’t fit in those gates because there is too much uncertainties and possibilities (i.e. ambiguities): *“When it comes to what we call breakthrough innovations, innovation with totally new technologies, usually these gates are not really effective”*. On those projects, Mr. Mancel argues that it is a nonsense to try to force too much discipline on them. You cannot force the discovery of a technological solution, it takes time and no one can really predict when it will happen.

“The linear way of working [stage-gate process and funnel approach] we had in the past, that works great if you know what you have to deliver, what you have to do”

– Frank Dethier, interview 4

Mr. Dethier, with the idea of the two-speed model explained above, also underlines the weakness of a stage-gate process when confronted to explorative projects. As the quote above illustrates, stage-gate approaches work great once most of the uncertainties have been tackled. According to Mr. Dethier, some projects may need a first step, an “agile” phase, very close to the explorative management structure we have suggested. But then, as soon as the uncertainty is cleared, the project should enter the second step which should be a stage-gate process or a similar linear approach.

An interesting finding was that Mr. Renard disagreed with the effectiveness of stage-gate processes. He agreed that they bring some level of efficiency but he stated that: *« [le stage-gate] limite énormément l’innovation intuitive, l’audace et la prise de risques. Pour que ça marche, à un moment, il faut y croire. Et le stage-gate a tendance à effacer cet aspect »*. Mr. Renard insisted on the fact that stage-gate processes impede forms of innovations that are bolder and that are more subject to risks. He also underlined another issue, as the quote below illustrates.

« Si nous et nos concurrents réfléchissons aux mêmes idées, avec des gens qui ont une certaine éducation et un certain bon sens, au travers des mêmes processus, fatalement on ressortira tous avec plus ou moins la même chose. Et les moyennes boîtes seront perdantes car, comme je l’ai dit tout à l’heure, les plus grosses boîtes ont beaucoup plus de moyens pour soudainement accélérer leur développement. Ils nous battront en vitesse. »

- Fabrice Renard, interview 2

Mr. Renard, as the quote above illustrates, also noted that many companies are using those processes and this tends to bring some form of consensus to the innovation in a sector. It decreases a form of differentiation between competitors. This is a losing game for medium companies, according to him, because large organizations are able to accelerate their development by buying smaller companies that have made progress to stay ahead.

To make a quick summary, we have found some supporting evidence that the management should recognize the existence of different types of innovation projects and that those types of projects should be managed differently. However, we have also found some criticism against stage-gate process. Part of this criticism is actually supporting our proposition, as it suggests that stage-gate process tend to be harmful for explorative projects. But there is also criticism regarding the effect on the competitiveness of a firm, arguing it may decrease the differentiation in terms of innovation in a sector. In the next sub-section, we will check how explorative projects should be managed according to the interviewees.

5.2.4.Explorative projects management

In this final sub-section, we will review the findings brought by the interviews over the management of explorative project.

Over the management of explorative projects, the example of the creation of the brand “Swiffer” (see Appendix 7: Interview 1) is very close to the effectual approach we advised in our proposition. There were 56 categories of products in P&G at that time. The people working in one category had no idea of what was happening in other categories. Confronted to the silo mentalities in the different units, Mr. Mancel realized he was the only one having access to all the technologies in Procter & Gamble. He started something that had never been done in P&G: he gathered R&D people from all the categories of products and exposed them to all the technologies and patents that the company was using on a daily basis, so nothing new for the company. Then, having been exposed to all those technologies (which most of those people didn’t know the half), they were asked to come up with new combinations and ideas of products. Many new product ideas were created that day and one of them ended up becoming the well-known and successful brand “Swiffer”.

The similarities with an effectual approach are the following. First, it started with available means, the technologies currently used daily by P&G. There was really nothing “new” on the

technology side. It was the very fact of taking a step back and reconsidering all those technologies, asking themselves “What can we do?” that allowed the emergence of the new ideas. Second, the organization of this event didn’t rely on planning and forecasting, they simply looked at the expenses (traveling costs of technologists from the 56 categories, the opportunity cost of not having them working on their usual project, etc.) and judged it as something affordable, whatever the outcome would be, given the potential opportunity to learn something. This is exactly the evaluation criterion used in an effectual approach.

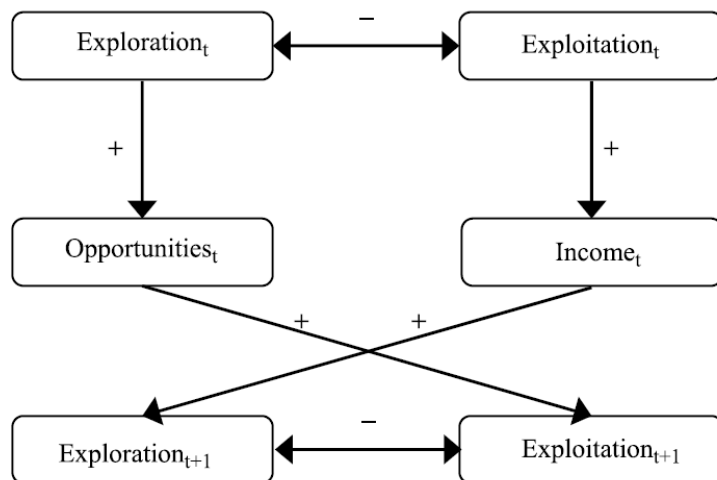
Of course, after the generation of the idea and the first step of the development, the project probably fell in the stage-gate process, as much of the initial uncertainties and ambiguities had been uncovered. It became possible to use a more disciplined approach.

“In principle, it [an innovation project] follows the same pattern whether it’s a breakthrough idea or a small innovation. It would have to be cleared by consumers, we have to mature the idea and check if consumers are satisfied by the idea, the price structure that we plan to have and so on. That is covered, whatever the type of innovation. But in fact, there are challenges for big innovations that are far more important. Usually, a breakthrough innovation would require significantly more means to put in the marketplace. There is also significantly more uncertainty because it’s totally new so we don’t know how consumers are going to react. [...]

Many more challenges: The acceptance of this breakthrough technology, the cost of it.”

-Claude Mancel, interview 1

As Mr. Mancel explained in the quote above, in the end, explorative projects have to go to the same “gates” than exploitative projects. However, explorative projects are still different and present other challenges, at least in the first stages. This can be made consistent with our findings by recognizing that “exploration fuels exploitation” (see Figure 9) in the sense that explorative projects create opportunities for exploitative projects (Lavie et al., 2010). Concretely, it would mean that the effectual approach is adequate for the first stages of development of the project. Then, once most ambiguities and uncertainties have been uncovered, it can fall in the systematic review process.

Figure 9: Associations between Exploration and Exploitations

Source: Lavie et al. (2010)

Interestingly, this is indeed what Mr. Dethier suggested with the two-speed model. Once most of the uncertainties in an explorative project (project distant from what the company is used to do) have been cleared, the project should immediately fall from the flexible “agile” structure to the efficient stage-gate process. Although this method seems to combine the best of all worlds, Mr. Dethier underlines the problem of the transfer between the two parts of the organization. Usually, those working in the delivery/exploitative part of the organization have their own objectives and tend to pay less attention to those projects, because they are different from what they are used to do. Something he illustrated with the following example:

“Let me take for example ABInBev: we are selling beer. All the sales people are selling beer.

Suppose, I am not saying it is, the innovation team is making beer ice cream. I am just making a ridiculous example. Your innovation team identified how to do a great beer ice cream. For the sales people, used to selling beer, this is something really strange. They don’t know how to do it. Even if you demonstrated the value proposition and how to do it, this stays something strange for them. It lies outside their comfort zone. Therefore, they typically won’t do it very well and even won’t like to do it. This means that the organization is killing the innovation internally.”

- Frank Dethier, interview 4

According to Mr. Dethier, the best way to avoid those transfer issues is that the same people that dealt with first stages should develop the final stages of the project and bring the idea to

the market. Of course, the organization must be really careful in the selection of the projects that will follow this paths because it is very expensive. The organization will have to create whole new structures supporting the newly created business unit (sales, marketing, etc.) that will be parallel to those already existing.

5.3. Confrontation with theory

In this section, we will summarize the findings exposed in the previous section by putting them in perspective with the theoretical findings. Of course, our main interest is the divergences between theory and practice and the nuances brought by this confrontation. A first sub-section will explore which theoretical elements have not found supporting evidences in the interview. The second sub-section will emphasize the nuances brought by the interviewees.

In addition, an adapted version of Table 2, based on the content of the interviews and our theoretical research, can be found in appendixes (see Appendix 5: Table of confrontation between practice and theory). This table emphasizes which elements of our findings have found support in the statements of the interviewees.

5.3.1.Unconfirmed theoretical findings

Globally, most of our findings have found some level of supporting evidence. However, this confrontation makes us question two elements: the “fail early” principle and the “management of ambiguity” key success factor.

Indeed, the importance of the “fail early” principle found no supporting evidence in our interviews. As a reminder, this principle emphasized the need to quickly recognize its failures in order to reduce potential waste of resources (efficiency concern). The absence of supporting evidences in the interviews may be due to a lack of “push” of the interviewer in this direction, as it was a rather specific topic.

In addition, the fifth key success factor, the management of ambiguity, found little supporting evidence. This is not surprising as ambiguities are often mixed with uncertainties. Therefore, they are both seen as undesirable aspects of an innovation project. Based on our small sample, it is difficult to tell whether this key success factor is flawed, the interviewer failed at pushing questions in this direction, or the sample of interviewees didn’t recognize the management of ambiguity as relevant. Anyway, although the idea of the management of ambiguities seemed

important to us, we must recognize it should be seriously questioned in further empirical research.

5.3.2.Nuances brought by the interviews

Besides, except the two questionable elements in our proposition, the interviews shed some light on some aspects that we didn't consider and brought some nuances in our recommendations.

Indeed, the second interview (Mr. Renard) brought in the light another way of combining explorative and exploitative projects. That is, switching from one behavior to another through time. This is something that the literature calls "switching" (Adler et al., 1999). As partitioning is a decoupling over places, switching can be seen as a decoupling over time (Lavie et al., 2010). It was initially not part of our framework since most of the literature we have reviewed points toward partitioning. But further research and a more extensive empirical confrontation should help to unveil under which conditions managers should choose one decoupling model over another.

Besides, in the fourth interview, Mr. Dethier argued that several different models of decoupling exist and that none of them is the "jack of all trade". Each model (partitioning, individual switching, and organizational switching) has its pros and cons. The main issue linked to partitioning is the transfer issue. As a reminder, Mr. Dethier's experience in organizations was that each project created by the exploratory part of the organization needs to be transferred to the delivery/exploitation part. This transfer is costly in terms of time but can also "kill" innovation projects as the people from the exploitation part of the organization usually won't support the explorative ideas. One way to address this issue is to empower the exploration part of the organization and allow them to create parallel structures to bring their ideas to the market. Of course, this is a costly exercise and the projects should be carefully selected.

On the balance ratio within the portfolio, the first interview (Mr. Mancel) uncovered a new risk: that is the conflict of interest that may impede the maintenance of the ideal ratio. Under some circumstances, some managers may favor some projects for their personal interest and against the interest of the organization. Further research could search the factors that would cause such conflicts to happen and the adequate ways to prevent their realization.

Another problematic, shared by Mr. van der Heyden (third interview), is the aggregation level of the portfolio. A global firm-wide portfolio can be counter-productive if the sheer number of projects is excessive. The people in charge of the portfolio decisions would not be able to know the details of each project. This would decrease their ability to make informed decisions, find synergies and leverage opportunities across projects. The solution proposed by Mr. van der Heyden was to work on a lower aggregation level, closer to the field. Projects are attributed to “domains” which regroup projects around the same key topic. Each domain is a sort of sub-portfolio. This allows to bring around the table people from different departments and specialized in the topic of the domain. The organization in domains could be especially useful for the exploitative projects, which typically account for a great majority of the number of projects and can quickly overwhelm the top management. The top management will only have to manage a simpler portfolio of domains and explorative projects. The sub-portfolios will be managed by middle management, more specialized in the concerned topics.

Over the same topic, the balance ratio within the portfolio, the fourth and second interview (Mr. Dethier & Renard), referred to a form of opportunistic behavior of the firms, that Mr. Dethier calls the “risk appetite”. Based on past results and current economic conditions, companies may increase the portfolio balance in favor of risky (explorative) projects if the conditions are positive. This suggests that the ideal ratio firms should maintain is impacted by dynamic contextual factors, in addition to the “static” contextual factors such as the type of industry, the size of the firm, the lifetime of the firm, etc. A conciliation with our theoretical findings is possible by considering that the ratio in the portfolio reflects the organization’s innovation ambition. This ambition should be aligned with the strategy of the firm. And finally the strategy of the firm is influenced by all the factors mentioned above (static and dynamic).

Finally, some nuances were brought concerning the stage-gate process (in the management of exploitative projects). According to Mr. Dethier, every project should fall in the stage-gate process once the project team has a clear idea of the value proposition and how they will bring this idea to the market, i.e. once major uncertainties have been cleared. This would mean that explorative projects should follow the effectual approach we suggested only in the first stages of the idea. The latter stages should be similar to our suggestion of the management of exploitative projects. The transfer issue between the two management structures can be solved by letting the explorative project team develops the idea in the late stages as well.

According to Mr. Renard, stage-gate processes are more of a background mechanism that needs to be customized. For him, stage-gate processes reduce the differentiation in terms of innovation between organizations since they all use the same process. Mr. Renard argues that it brings conformity in the innovation of a sector and that they impede bolder and more intuitive forms of innovation (i.e. explorative projects). Although the harm to the differentiation of a firm is concerning, the impediment of explorative innovation can be made partially resolved by considering the two-speed model suggested by Mr. Dethier. In the first steps, explorative projects will be developed within a more flexible management structure, avoiding that the organization kills internally the more “innovative” ideas. And in the last steps, those projects will be developed within a more efficient stage-gate process.

We have now presented some nuances brought by the interviewers regarding the way exploration and exploitation can be combined, additional factors influencing the balance ratio in a portfolio, issues related to the aggregation level of a portfolio, and additional insights about stage-gate processes (how they can be used with explorative projects and how they impact a firm’s competitiveness). The next sub-section will summarize the findings of our section dedicated to the confrontation of practice with theory.

5.3.3.Conclusions

This concludes our section dedicated to the confrontation with theory. We have discussed which elements have found empirical supporting evidences and some nuances brought during the interviews. All those elements are summarized in the following table (see Table 3).

Table 3: Validation and nuances brought by the interviews

KSF	Characteristics	Nuances
Project classification	Existence of an “exploitation” type and an “exploration” type of innovation with different management structures needed	All elements confirmed but ... - Different models of decoupling are possible, other than “partitioning” (managers need to evaluate which one is best for the case of their organization).
	Classification of each project in one of the categories within a portfolio perspective	
	Co-existence made possible by partitioning	

Maintain an ideal ratio	Search for some balance	All elements confirmed but ... - Additional influencing factors for the balancing (risk appetite and managers' personal interests) - Excessive aggregation is not desirable
	Balance managed deliberately in line with the company's strategy and innovation ambition	
Manage explorative projects	Projects with longer distance from core assets and markets	Except for the "fail early" principle, most elements are confirmed but ... - Need for a flexible approach acknowledged but with different models (the emerging agile methodology is often mentioned) - Once uncertainties are cleared (last stages of development), explorative projects should be managed with more efficient approaches
	No reliance on complex forecasting and planning methods in the early development of the project	
	"Affordable loss" & "opportunity to learn" criteria	
	Iterative process between available means ("What can I do?") and feedbacks to polish the idea	
	"Fail early" principle	
	Involve stakeholders and search for alliances	
Manage exploitative projects	Projects with shorter distance from core assets and markets	All elements confirmed but ... - Stage-gate process can reduce the firm's differentiation in terms of innovation if the sector is too consensual - Stage-gate process should be accessible to the explorative teams as well, at a certain point of development
	Systematic review processes with reliance on forecasts and planning	
	"Kill quickly" and focus resources on promising projects	
	Multiple decisions points (kill, go, redesign, stand by)	
	Short stages with clear objectives, treating critical uncertainties first	
Manage ambiguity	Dual nature of ambiguity	Few supporting evidences found for this key success factor.
	Harmonizing the needs for clarity and flexibility	
	Tolerate a certain level of ambiguity in some cases	

5.4. Chapter conclusions

We have discussed the methodology and the results of our empirical confrontation. Our main findings have been discussed in the last section. We can now move on to the chapter dedicated to the conclusions of our research.

6. Conclusions

The management of innovation projects is different from classic project management. The main causes are the inherent uncertainties and ambiguities. The purpose of this master thesis is to help managers understand mechanisms underlying the execution of innovation projects and to provide guidelines and tools in order to manage them accordingly.

Our first step, the analysis of related concepts in the literature, allowed us to gain insight from fields close to the management of innovation. One of our main findings was the common principle of combining flexibility and efficiency.

Our second step was, based on a literature review and the related concepts reviewed in the first step, to provide a framework, the nimble execution, in order to combine flexibility and efficiency at multiple levels in the execution of innovation projects. The tools and guidelines were structured around five key success factors: performing a classification of the projects, maintaining an ideal ratio, managing explorative projects, managing exploitative projects, and managing ambiguity. Those key success factors combine efficiency and flexibility in a particular way. This particular combination should make an organization shift beyond the tradeoff usually associated with those attitudes. Then, we noted the limitations and the main risks linked to the adoption of the nimble execution.

Our third step was to summarize the nimble execution from a managerial point of view: with recommendations, a detailed explanation of the advantages and disadvantages linked to each key success factor, and the lessons learned. A recapitulative table (see Table 2, p. 56) summarizes our recommendations and the advantages and disadvantages linked to them.

Finally, as a fourth step, we conducted a modest empirical confrontation in order to have a critical look on our framework. The interviews were conducted with experienced practitioners and were aimed at finding evidence supporting our framework. A recapitulative table (see Table 3, p. 74) summarizes which elements have been supported by the results of the interviews and which nuances have been brought.

6.1. Contribution

The purpose of our research was to help managers in their endeavor to execute innovation projects. To do so, we have looked at understanding some key mechanisms underlying the

management of innovation projects. Many of them are linked to the uncertainties and ambiguities that make forecasts and plans harder to achieve. Since *a priori* planning is not reliable, we propose other ways to manage such projects. However, some projects present higher levels of uncertainties and ambiguities for various reasons (lack of experience in this field, new market, distance from core competencies): those we call explorative projects, in opposition to the exploitative projects.

Since they present different levels of uncertainties, those types of projects need different management structures. We have proposed a framework that provides some guidelines and tools in order to manage such projects. First, by identifying and classifying projects into one or the other type. Then, by managing each type with the adequate management structure. Also, we proposed some guidelines for the balancing of the portfolio of innovation projects (maintaining an ideal ratio) and a framework to manage ambiguities throughout the execution of those projects. The combination of those managerial tools and structures forms the framework of the nimble execution.

Therefore, our contribution is to provide managers with some insights toward the mechanisms underlying the management of innovation projects and to provide a framework that will assist them in the execution of the projects by taking those mechanisms into account.

6.2. Limitations

A first limitation is the scope of our research. We mainly focused on product innovation in the context of established firms. Therefore, we have no guarantee that our framework is relevant for other types of innovation, namely process and service innovation, and in other contexts (start-ups, small firms, etc.).

Our research was based on a literature review that was not comprehensive. The selection of other papers for the related concepts in the second chapter was based on criteria such as the number of citations credited, the fundamental aspect of the article, their relevance toward our specific topic or the relevance filter on Google Scholar. Other criteria could have led to different results and led our research in different directions. This is why our claim is only to propose one adequate way of managing innovation.

In addition, since our research was rather theoretical, we conducted a humble empirical confrontation with a small number of participants. Larger scale studies would be useful to check the validity of our findings.

Another concern we have is the relevance of using a single model in all cases and situations. Our theory review and empirical confrontation showed us that, for many elements, “one size cannot fit all”. With that in mind, we tried to provide a framework that was designed with general and modular recommendations. We must stress the importance of a critical perspective when applying our proposition. The management of innovation is a complex topic and we do not think that one precise practical solution can be applied to every case. This is why we propose our framework to be seen as reflection guidelines, drawing attention on key success factors in the execution of innovation projects, instead of a plug-and-go solution.

Finally, this research is a synthetic work about a very broad subject that is meant to bring some tools to managers. While performing our work, we tried to stay as objective as possible and to use rigorous steps to come up with our proposition. We have based ourselves on a large amount of existing literature and on the opinions of practitioners. But we recognize that other approaches may have been undertaken by other persons and that they may have yield different results. However, we are convinced that our work was a serious academic research and that it can help practitioners in their endeavor to execute innovation projects with flexibility and efficiency.

6.3. Further research

There have been few attempts so far to propose guidelines and tools to help managers to execute innovation projects. We suggest that other researchers should investigate ways to translate the vast theoretical literature about “*what* an organization should do” into “*how* an organization should do it”. Other approaches may be used, such as using different related concepts in the literature, the study of practical cases in order to induce ways of working that are adequate with the current literature, etc.

Although we have tried to verify the validity of our model, our empirical study was qualitative and rather modest in scale. Quantitative or larger scale qualitative approaches may be useful to strengthen the validity of our proposition.

Finally, some researches could be conducted to find ways to integrate our proposition with other aspects of the management of innovation. Such aspects are namely (but not exhaustively) the generation of ideas and the management of the “fuzzy front end”, the formulation of a strategic vision about innovation, the mobilization of entrepreneurial resources, etc.

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8. Appendixes

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Appendix 2: Innovation definitions

The terms below may be encountered during the lecture of our research or in the transcription of the interviews. The reader can find below the associated definition if needed.

Innovation – Innovation is newness and change. Newness refers to anything that is new, from the point of view of the firm or the market, whether it is a completely new technology, a simple increment of an existing technology or a combination of previously existing technologies. The change refers to the adoption process by the customer, this means that it needs to bring enough value to convince a customer to adopt it. In other words, innovation is about new inventions that have a business potential because they provide additional value to some customers (Gailly, 2011).

Disruptive innovation – “Disruptive innovation, a term of art coined by Clayton Christensen, describes a process by which a product or service takes root initially in simple applications at

the bottom of a market and then relentlessly moves up market, eventually displacing established competitors” (Christensen, n.d.).

Incremental innovation – From Schumpeter theory, incremental innovation is opposed to radical innovation. Incremental innovation results from linear progression where each innovation can be to some extent predicted from innovations that precede it (The OpenLearn Team, 2006).

Radical (or discontinuous) innovation – From Schumpeter theory, radical innovation is opposed to incremental innovation. Radical innovation results from discontinuous change and cannot result from linear progression. Radical innovation results from fundamental changes to practices or market. A radical innovation can completely replace the previous technology (The OpenLearn Team, 2006).

Appendix 3: Table of theories comparison

The following table summarizes the complete comparison of the related concepts. Section 2.2 was based on this comparison.

	Ambidextrous	Effectuation	Bricolage	Agile	Portfolio	Stage-gate
Limitations and assumptions	Exploration and exploitation can be combined within the organization	Future is unknowable and not measurable	Resources environment are socially constructed; resources are heavily constrained	New product development practices, existence of major shifts in customer expectations	Large number of projects to handle	New product development practices
Size of the firms addressed	Large organizations	Start-ups, SME	Start-ups, SME	Start-ups, large organizations or SME	Large organizations	Large organizations
Type of innovation addressed	Incremental and disruptive innovations	New technologies and new markets (from the entrepreneur point of view)	Existing technologies on new markets; or new combinations of technologies on known market	Incremental innovations or disruptive "big" innovations broken down in smaller deliverables	Incremental to transformational (disruptive)	According to Cooper, all types ... but a bit inadequate for transformational (disruptive) projects
Origin of theory	Theoretical model	Theoretical model	Theoretical model	Based on managerial best practices	Based on managerial best practices	Based on managerial best practices
Balance between flexibility and efficiency	Yes	Yes	Yes	Yes	Yes	Yes
Key evaluation criterion		Affordable loss principle				
"Fail quickly & learn" principle	Not mentioned	Yes	Not mentioned	Yes	Yes	Yes

	Ambidextrous	Effectuation	Bricolage	Agile	Portfolio	Stage-gate
Key success factors	Organizational separation	Start with the available set of means instead of the goal	Making do	Focus on the customer's needs	Quality, performance and strategic contribution of the portfolio as a whole	Establish a firm-wide innovation project management framework
	Tightly integrated senior team (ambidextrous executives)	Affordable loss principle	Combining resources for new purposes	Management role is to enable self-organizing teams	Overall ambition - manage an optimal balance between different types of projects	Decide to commit resources as uncertainty decreases
	Clear and compelling vision	Establishing and leveraging relationships (partners)	Using resources at hand	Dynamic linking	Framework to classify projects and manage/evaluate them accordingly	Carefully organized the milestones (deal with critical issues first, timing, level of standardization, etc.)
	Specialization of the subunits into exploration or exploitation activities	Leveraging contingencies (embrace the random aspect)	Social construction instead of decision theory	Continuous improvement and radical transparency	Diversity but also scale and scope economies	Clear and unambiguous communication of decision
		Gather useful information about the future through experimental and iterative learning processes		Horizontal conversations	Focus on the jewels and don't expect every project to reach a minimal level of returns	Decision based on the portfolio perspective, not solely on the individual performance
		Iterative definition of means and possible courses of action through interactions with stakeholders		Set of management practices (Scrum, Kanban, etc.)		

Appendix 3: Table of theories comparison

Appendix 4: Advantages and disadvantages of Nimble Execution

This Appendix lists all the advantages and disadvantages linked to the key success factors of Nimble Execution from a managerial point of view. Table 2: Nimble execution summary (p. 56) is partly based on this list.

- **Project classification**

- *Advantages*

The classification rule offers a common tool firm-wide to identify the type of projects and to track them. The distinction between explorative and exploitative projects is the pillar of our proposition.

The separation (partitioning) allows for both category of project to coexist within the same organization. It allows each management structure to specialize in their tasks. In addition, it allows also explorative project to escape the gravitational pull of the core business while allowing exploitative project to keep capitalizing on it.

- *Disadvantages*

There is a possibility of misclassification errors. Indeed, the methodology to classify projects in one or the other category is not formal. This is more of a decision process, left to the judgement of the managers. Therefore, it is vulnerable to decision bias. A single misclassification error would result in a project falling in an inadequate management structure, decreasing the combination of efficiency and flexibility for this particular project. Systematic misclassification errors would also falsify the balance and decrease the combination for the whole portfolio. However, the classification does not seem like an insurmountable task and the risks can be mitigated by a good understanding of the underlying mechanisms.

- **Maintain an ideal ratio**

- *Advantages*

The main advantages of balancing projects in a portfolio is to mitigate risks while ensuring good performance on the portfolio as a whole. This is a way to ensure efficiency: performance over the total amount of resources used in the portfolio.

The second advantage is that working with a portfolio allows to search for diversity in the project, thus allowing a greater flexibility against contingencies. Indeed, in case some

previously minor area become a key strategic field, it is preferable to reallocate resources and redesign projects close to this field than launching a whole new project (and lagging behind competitors). The search for diversity (flexibility enabler) is to balance against the search for synergies and economies of scale and scope (efficiency enabler).

- *Disadvantages*

The determination of the ideal ratio is problematic, again because there is no precise methodology on how to do so. Although some influencing factors have been mentioned (sector, firm's lifetime, size, etc.), this exercise still largely depends on managers' judgement. Thus, it is vulnerable to decision bias.

- **Manage explorative projects**

- *Advantages*

Using an effectual approach allows to focus on truly effective activities in the management of projects with high uncertainty and nearly unpredictable future, i.e. value creating activities instead of ineffective planning and forecasting.

In addition, the constant iterative process is an effective way to deal with contingencies and unexpected events, adapting the goals and the objectives according to those events. Thus, it increases immensely the flexibility on such projects.

If projects are not viable and fail, they will fail early after some iterations and at lower level of investments (or at least at a level of investment that was recognized as affordable). This is the way this approach ensures a certain level of efficiency.

- *Disadvantages*

The main disadvantage that arises from this approach is that it is more expensive in terms of managerial attention. Since there is no systematic review system for this category of project, managers have to follow closely the development of those projects. However, those projects are particular and represent a minority of the projects in the portfolio. Given their typical strategic importance, managers should anyway follow them with attention and give them support.

- **Manage exploitative projects**

- *Advantages*

The main advantage of a systematic review process is the gradual commitment of resources, as time passes and uncertainties decrease. Thus limiting the loss of resources in case of a failure (efficiency).

The systematic review process also eases the exercise of comparing projects inside the portfolio, simplifying the task of optimizing the allocation of resources between the projects. This is another form of efficiency.

The adoption of multiple decision points decreases the time during which “dead” projects can drift, decreasing the amount of resources inappropriately allocated. Again, this is another form of efficiency. But they also allow a greater flexibility as each decision point is a chance to adapt to contingencies by stopping, putting on stand-by, redesigning or pursuing the project.

- *Disadvantages*

The determination of the appropriate level of formalization of the stages and gates is critical for the success of a systematic review process. However, this is an exercise for which there is no precise methodology. It relies on the managers’ judgement. An inappropriate level of standardization would result in problems such as *a priori* framing of the projects, insufficient control, etc. Thus, it would decrease flexibility and efficiency.

In addition, quickly killing projects that do not represent the best use of resources could lead to motivation problems with the teams. Indeed, they tend to take ownership and pride in their project. If not managed accordingly, this may result in a lack of motivation to develop new projects or to submit new ideas. This could result in the pipeline of projects “drying-up”.

Finally, the decision made at each decision point can be influenced by decision bias.

- **Manage ambiguity**

- *Advantages*

A better understanding of the nature of ambiguity and its dual effect allows to make more informed choices so as to sustain or reduce ambiguities, i.e. harmonize the needs for clarity and flexibility. In addition, some mechanisms to reduce ambiguities are provided.

Furthermore, sustaining a certain level of ambiguity can be seen as a source of flexibility and even a source of efficiency in some cases.

- Disadvantages

There is still some blurred area toward the exact way managers should harmonize the needs of an organization. That is, the factors influencing a manager's decision to prioritize the need for clarity or the need for flexibility.

Appendix 5: Table of confrontation between practice and theory

This table systematically compare our theoretical findings with the statements of the interviewees in 5.3 Confrontation with theory. Based on this table, we drew the general conclusions of this chapter about which elements of our recommendations were confirmed by our empirical confrontation.

KSF	Characteristics	Mancel	Renard	Heyden	Dethier
Project classification	• Existence of an “exploitation” type and an “exploration” type of innovation	++	+	?	++
	○ with different management structures needed	++	+	?	++
	• Classification of each project in one of the categories	+	+	?	++
	○ within a portfolio perspective	++	++	+	++
	• Co-existence made possible partitioning	++	-	?	+
Maintain an ideal ratio	• Search for some balance	++	++	++	++
	• Balance managed deliberately in line with the company’s strategy and innovation ambition	+	+	++	+
Manage explorative projects	• Projects with longer distance from core assets and markets	++	++	++	++
	• No reliance on complex forecasting and planning methods in the early development of the project	++	+	++	?
	• “Affordable loss” & “opportunity to learn” criteria	++	+	?	?
	• Iterative process between available means (“What can I do?”) and feedback to polish the idea	++	?	?	+
	• “Fail early” principle	?	?	?	?
	• Involve stakeholders and search for alliances	++	+	++	?

KSF	Characteristics	Mancel	Renard	Heyden	Dethier
Manage exploitative projects	Projects with shorter distance from core assets and markets	++	++	++	++
	Systematic review processes with reliance on forecasts and planning	++	++	++	++
	“Kill quickly” and focus resources on promising projects	++	+	++	?
	Multiple decisions points (kill, go, redesign, stand by)	++	++	++	++
	Short stages with clear objectives, treating critical uncertainties first	++	?	++	++
Manage ambiguity	Dual nature of ambiguity	++	?	?	?
	Harmonizing the needs for clarity and flexibility	+	++	?	?
	Tolerate a certain level of ambiguity in some cases	?	+	?	?

Legend:

++ support the idea

+ support but nuance the idea

- nuance or deter the idea, suggesting the model is insufficient

? not mentioned

Appendix 6: Interview guide

Introduction

- Present ourselves (name, UCL master thesis)
- Objectives of the interview: gather insight about the execution of innovation projects
- Present the meeting layout
- Confidentiality?
- Permission to record?

Theme 1: formal presentation of the interviewee

- Presentation of himself (name, professional background)
- Position in the company
- Link with innovation management

Theme 2: innovation in interviewee's company

- Uncertainty in innovation project
 - How is it dealt with? Tools, structure, risk accepted?
- Management tools/mechanisms used for innovation projects
 - Systematic review process? Details ...
 - Project tracking and big picture view? Details ...
 - “Entrepreneur attitude” inside the company? Details ...
- Balancing in the project portfolio managed deliberately?
 - Type of project, time horizon, source of innovation
- Project type lead to different management?
 - Organizational separation
 - Different incentives, training, feedback
 - Profile of the talents
 - Formality of the review process
 - Key Performance Indicators

Theme 3: Personal opinion toward innovation management

- Main risks for the management of innovation projects

Appendix 7: Interview 1

Duration: 81 minutes

Date: 4th of July 2016

Interviewer: Thomas Busschot (T)

Interviewee: Claude Mancel (C)

T: First, for the record, can you present yourself a little bit? Your position right now and the link with innovation management?

C: I spent most of my career at Procter & Gamble. Where I was for 14 years the VP of R&D for Europe, Middle East and Africa. Then I had global responsibilities for subcategory called homecare. After that, in 2001, I started a new life as a consultant around innovation, strategy of growth and the like. I have been on the Innovation board of Solvay and the board of scientific council of a number of smaller companies. For several years, I was at the board of ASE (European soap and detergent association). For the last years, I was chairman of this association. That explains that I have a lot of connections in this industry as many companies are involved in this association. While I was in P&G, I made a number of innovations and the CEO said when I retired that I created a business of 5 billion dollars for P&G. That was generous of him. But that was true that at P&G, I was the father of liquid detergents. This is a business that is about 3+ billions dollars today. I have led also a number of innovations. The last one was Swiffer. Swiffer turned out to be the fastest P&G new brand to reach a billion dollars of sales (it was in 18 months). Because of that, I have built pretty good reputation within P&G. And I am still connected with P&G, although I retired 15 years ago. I have contact with the current CEO, CTO and the like for advices on changes. What else? I am in the innovation board of Solvay. Before that I was in the scientific council of Rhodia, a French company which was acquired by Solvay in 2011. As a matter of fact, I am a chemical engineer with a degree from an engineering school in France and I have a PhD in the US. And ... where else? Oh, I was a champion in Rugby with Anderlecht, champion of Belgium two years in a row in '75 & '76. I was running fast.

T: It's very complete, thank you. Indeed, it's a quite impressive career. You mentioned your current position at Solvay. Could you explain a little bit more about it?

C: Solvay and Rhodia have a number of external and internal members in this board. We are four on this innovation board. Two academic people (1 from university of Chicago and the other one from university of Valencia in Spain) and a Belgian guy who is partner in a capital venture company called Capricorn and based in Leuven. And me, which represent the fast moving consumer goods sector, which is a key interest for Solvay. We discuss various subjects and give our points of view on those subjects. Usually trends about the future of innovation or technology. I also consult with some business units of Solvay, depending on the nature of the projects they are working on. Of course, I also have a lot of contact with Novcare, the business unit which is dealing with detergents, shampoos and fast moving consumer products.

T: So, you are linked with the strategic management of innovation projects. But you also assist from times to times individual projects.

C: Correct.

T: To move on ... In general, how do you deal with the uncertainty of innovation projects? When it comes to innovation, those projects usually have much more uncertainty. And their management can be different because of that. How do you do that in Solvay?

C: I am not sure that Solvay is doing it very well. But I can give you some background on this. The job of a manager of R&D is exactly what you mentioned. It is to manage uncertainty. This is something that is difficult because it requires managerial qualities and it is not something for which a good scientist

will be necessarily suited. The management of innovation requires a good feel for what is possible and what is not. It requires a very good sense of communication. You need to be able to communicate with the whole organization to encourage them to go ahead despite the uncertainty. You also need to have a good connection link with your management. They know that investing in R&D is an uncertain business. They never know if the investment they are making is justified or not. They rely on you to tell them if it is a good investment or not. There is also uncertainty on the delivery of the project and there is also an uncertainty around the timing of the delivery. The project is never a straight line. It is always full of surprises, unexpected difficulties. Sometimes, not at all connected to science or technology but to legal or other aspects. And it requires from a manager in R&D the capacity to deal with this.

Very often, a R&D organization, whatever the type of industry, is thrilling themselves as second class citizens. They are the one coming with inventions but they don't decide whether this invention is good to be developed in the marketplace, how they are going to be developed, what will be the budget, and so on. They feel like they are bringing the meat if you want. But they are not part of the decision process. This is also something you need to have. You need an organization that is totally committed to projects and the like.

Another difficulty of R&D and innovation in general is the management of projects. I have consulted with a number of companies. Very few are well equipped to manage projects. Project management is a part of management and when it comes to technical projects, this projects can only be managed by R&D people but R&D people are not necessarily well equipped to be project managers. That's another organizational difficulty if you want around innovation. Being able to develop and conduct a project, to keep a timing, to keep the expenses, to feed management with improvements as they mature. It's a difficult process. And usually, the technical people are not necessarily equipped to do that. It requires some skills that you don't learn at school or in an engineering schools.

T: That's very interesting. When you say "equipped", you mean "knowledge and skills" or actual equipment?

C: No, I mean ... "means" as opposed to lab equipment and similar. You need that of course but you need money as well. A major rule of R&D is to make sure they will have the financial resources to be able to carry out innovation programs. As I mentioned, top management doesn't know whether the investment they are making is justified. At times, it's tempting to say you need to make savings on R&D ... usually it's a deadly mistake. But that's a problem. I've seen this problem at Solvay in particular. The head of R&D at Solvay, no longer at Solvay, he didn't get the trust and confidence from his management. Consequently, his organization's R&D suffered because they didn't get the budget that was needed. Simply because management didn't trust they will get the return on this R&D expense.

T: So for you, one of the key aspect of innovation management is to be able to gather resources from your management?

C: Not only ... you need to get resources from your management. But you also need to equip yourself once you have this money. You need to equip yourself with an organization that is capable of delivering against the challenges of an R&D organization. That is another skill which is important to have or to develop. When I say skills, I mean as well technical skills (get people familiar with the technology or a given scientific field) and bringing on board people with business sense and management talent to be

able to understand the business implication of the thing you are working on. So that they can truly contribute and be a true business partner of the organization. That is not easy.

T: Can you think of management tools and mechanisms put in place in your organization that help to manage innovation projects? For example, once a project is launched, the management has accepted to invest. Is there some review process, something like that?

C: Yes, true, all companies have review processes. And the managing with review process is also an interesting challenge for R&D. We started all of that with the notion of uncertainty. With the management of uncertainty, clearly, especially at the beginning of the project, you don't know if there is a technical solution to the problem. You don't know, if there is a technical solution, if this technical solution is acceptable from a business point of view. For example, you may have your solution but it is so costly that it would not have any future. And there is a whole area of uncertainty around the timing of delivery. So you definitely will have review with management (at least on key project). And when presenting such key projects, you need to be careful not to oversell what you are doing.

There are many things that, when you talk about a project, you don't know or don't know yet. And make sure you don't undersell your project so that it gives the impression that they are so many obstacles that we will never succeed in overcoming them. So it's another skill that you need to develop in being able to manage your management and hold their hand throughout the project. I don't want to say that you will lie. But there are some truths that you may not be prepared to share. Because it may be premature, it may scare the management. Or simply because you simply don't really know for sure that this is correct or not. So having review is essential because it keeps the management informed and confident about what you are doing. But it requires some skills as to how you are going to handle that element of communication with management. Many times, especially the early days, a number of projects that I was pushing, I was keeping them underground. And not even talking to management about it. Because that was too premature, we didn't know if we would be able to deliver, if there would be a technology for it, etc. So rather than excite management around something and then disappoint this management because you can't deliver on time or not at all, you just don't talk about it. You can surface it once you have something to talk about.

T: So that was your experience in P&G, right?

C: You know... I have consulted with many firms. Basically, with all of them, this is an issue.

T: When you mention presenting to management, you mean to the innovation board and to the top management.

C: It depends. In a business unit, it could be presented to the boss of the business unit. It could be presenting to the CEO, depending of the importance of the project. I mean, there is a whole hierarchy of people who will be interested. And, by the way, they will react differently to this uncertainty. So you need to adjust to this people. But as soon as you are spending some money for whatever reasons (but R&D is a good reason), you need to justify how the money has been spent. That is an exercise that is common and universal to all companies. Any project that requires some money will be presented to the business management at some level to make sure this is some well invested money.

T: This review process, is it systematic? Are there rules in the organization?

C: Yes, there are situations like that. The most common example is the funnel. You start with ideas, not project but ideas, and then you have some gates where the ideas pass. Has the idea mature? Is there some technology that allows to develop the idea? So you pass a gate. The next one is whether economically the project is feasible. And there is another gate about whether the project can go into a start phase or plant phase. Usually, you have this concept of a funnel with raw ideas at the beginning and investments in plants at the end to develop the innovation in real life. And there are 4-5 gates if you want, along this process. I think it is a good discipline to have. But it is far from proven that this will allow you to succeed in the end. Having some discipline is important, it's critical. But at the same time, if you talk big innovations, you don't really know which directions the project is going to take and all these gates may prove useless. I'll take an example: if you want to capture CO₂ and you want to turn this CO₂ into a chemical with commercial value, you are facing a tremendous technical challenge. A lot of chemical companies are working on that... And I don't know if we will ever succeed to turn that idea that looks like a good idea into a real one. Another example is around the storing of energy. All of the electric cars and so on turn around energy storage. It's a real challenge. We know how to transport energy but we don't know how to store energy. We don't know how to store energy for a car without having a truck full of batteries attached to the car. We don't know how to make those cars autonomous for hundreds of kilometers like gasoline allow us to do today. These are tremendous challenges. One day, someone may succeed in breaking the problem but in the meantime, it's a huge problem. Many companies are dealing with this but most are unsuccessful, I think. You can have all the gates you want on a project like that, which is very ambitious. They won't help very much the process. Because what you need there is still, if you want, at the gate 1 which is coming with an invention that allows to solve the problem.

T: So, what you mean is that for more “radical” innovations, innovations that are really different from what we are used to do, stage-gate process are not that great?

C: When it comes to what we call breakthrough innovations, innovation with totally new technologies, usually these gates are not really effective. If you want, we only work at the level of the first gate: do we have the technology, is it possible, feasible? This leads us to another question: what is innovation? There are all kinds of definition for innovation. A very simple one is “something new that sells”. An innovation is not an invention. You can have all kind of inventions that won't turn into an innovation. An innovation fulfills a need, expressed or unexpressed by consumers. A typical innovation is the iPad: having this problem solved was a major innovation. Fulfilling this consumer needs, even if unexpressed, was a success when it materialized. This was basically a breakthrough innovation. You can have very mundane innovation, very small ones which look like they are little technically speaking but they will have major effect from a business standpoint.

I'll take an example which is one idea we had. While I developed laundry liquid detergents, there were washing machines with compartments where you would put the powder that was used back in the days. The problem of liquid detergents is that people would add them to the same compartments (because there was no other place to place it) and the liquid would run immediately into the machine. And what happened is that some of these machines will have the liquid run inside the machine and go directly to the “sub loss” (the evacuation part). So it would never be used to actually wash anything. So people having this type of machine will use the liquid detergents but in fact their clothes will be washed with just hot water. The detergent was at the bottom of the machine and would never come back. Huge problem to resolve ... This is when we developed the notion of “Ariellette”. It was a small

plastic ball. You add the detergent inside the plastic ball and you place the ball in the drum of the machine, where the clothes were. That has totally salvage the problem. That plastic ball, no technical invention, was a major innovation because it solves a problem that consumers were not aware of but it solved the problem. It solved the future of liquid detergent. And now, liquid detergents are by far the number one form of laundry detergents. Very few people continue to use powders. It was because of that innovation that it was made possible. The innovation *per se* was very mundane, technically but it was a clear innovation because it was really creative.

What I meant to say is that innovation takes many forms. I wouldn't call it innovation if you change the perfume or the package of a detergent, unless in doing so you add a functionality to the product. In other words, some packages are designed so that when you pull the product, it would foam. The first time we did that, it was an innovation. Innovation means that you give something to the consumer that didn't exist before. And that people will buy because if nobody buys it, it's not an innovation because innovation means business.

T: Indeed, innovation is very broad and there really is this newness with business potential idea. To come back to stage-gate process, we discussed that for breakthrough innovation, the first stages were more important than latter stages. Is there any other tool to manage this kind of innovation?

C: Usually, when you talk breakthrough innovations, if you don't have a feeling for how you are going to solve the technical problem, don't even try, it's useless. Usually, when engaged with such innovations, you have an idea in mind about how you are going to do it. You have technical leads and technologies at your disposal that you think could be useful to solve the basic challenges of this innovation. But if you don't have that, you're never going to solve the issue.

Usually, it requires that somebody has a brilliant idea. Then, two things will happen in the majority of the cases. When somebody has this brilliant idea, others don't see this is brilliant and will kill it. "We've already tried that, it won't work" and so on. And if few situations, we do follow the person with the brilliant idea and that may or may not work. The first killer of a brilliant idea are the people themselves. Thinking it has already been done or not being able to identify the brilliance of the new idea. One thing when I was manager of R&D, I was solicited many times by people who came to me. I had about 2000 searchers working for me. People would come to me and say "I have an idea", they wouldn't say they have "a brilliant idea". So they have an idea to do ... whatever. First you have to measure the degree of passion of the person that comes to see you. Somebody of a relatively low rank (or big) that come to see the head of R&D, it requires quite some courage. Secondly, it requires also a lot of conviction. When people are convinced that they have an idea that is justified and you could see they have passion for this idea, I would not turn them down. I would tell them "OK, you try". I'll give them resources and ask them to run the last experiment first. In other words, it means "check as early as possible if some of the hypothesis of your new idea will work or not" and come back to see me when you have done that. The best chance to get a breakthrough idea is to have somebody who has a brilliant idea to actually come to the management. You have to be listening to your people. You have to make them come out if they don't. Let them speak out. Because they don't always express their brilliant ideas. Fear of failure is a major obstacle. People are afraid that, if the idea doesn't work, they will be blamed for it in some ways. This is something that you need as a manager to identify and make sure that there is no feeling of fear in the organization. Fear of failure is a key thing against innovative ideas.

T: And once those people come to you, if you trust them to give them resources and if the experiments are positive (critical hypothesis seems to be true), does those projects go to the stage-gate process?

C: Yes, they will. They will materialize into projects of some sort. Again, it depends on ... You know, you have some companies who are trying to bring a lot of discipline in R&D. Personally I think this is a nonsense. It's an art more than a science. Trying to bring rigor in innovation processes, in the way it is managed, is ok. But not to force that some ideas will be discovered in a given period of time, that doesn't work like that. So you will have of course a number of projects people will be working on and, depending on the availability, new projects may be added or some projects, if it looks promising, may be added at the expense of a project that looks less promising. It comes down to innovation management, literal management. But for sure, if you come across interesting ideas, the role of a manager is not to drop it.

T: You've just mentioned that some projects could receive resources that would otherwise go on another project. Does it mean that innovation projects are managed in some kind of portfolio?

C: Yes.

T: So, it is the performance of the portfolio as a whole that is managed and not only the performance of individual projects that is managed when taking decisions?

C: Correct. At the level of the manager of R&D, not at the level of each individual project of course.

T: Like a financial portfolio, I guess there is some kind of balancing issue to mitigate some risks. Can you develop how you do that? Some criterion used to balance the portfolio?

C: In most industries, business managers will stay in a position for 3 or 4 years. And then, they will move on to another business unit or leave the company and go somewhere else. There is in the business management a relative short time life. That is a key difference with R&D. In most companies, people that start their career in R&D, they will finish their career in R&D. They will specialize in some technologies, products or aspects because they will spend all their life on this area. The dilemma which is common to most industries is that you have a business management interested in short-term innovation and projects because they only have a couple of years to see the project materialize because they move on to something else. And that is a relatively short period of time to come with innovation and in particular with breakthrough innovations. So there is a conflict between business management who wants fast innovation and a R&D organization who is working in a much longer time frame than them. So being able to combine short-term developments with long-term developments is another issue in the management of R&D. Short-term project are OK but you need to have a mix of short and long-term to pave the way to major innovation to take places alongside minor innovations. That is another issue that a manager of R&D has to deal with.

T: Thank, that is an interesting insight ...

C: I will give you an example with Swiffer. I had global responsibilities for several categories of products. And one of them was hard surface cleaners (Mr. Clean, etc.). And I had a R&D budget on this category worldwide which was about 25 million dollars. And the CEO called me and said "we aren't progressing in this category, we don't have any innovation. So here is what I am going to do: I am going to cut your

budget by half. So from 25M to 12.5M\$. I am going to do that with a number of categories. The money taken from those categories not delivering is not going to be brought back to the company. It's going to go in a common pot for innovation" That pot was about 215M\$. "I am going to gather a committee of people to inspect ideas proposed and that money will be available for totally new ideas with innovation potential." So he was taking half the budget of this category but you may have access to more money if your people have brilliant ideas. So I went back to my global teams. I told them I didn't want to lose those 12M\$ and suggested we better find a way to come up with brilliant ideas. We came up with what becomes Swiffer. It was a totally new idea, based part on the hearth of surface cleaner but not in the constraint of existing brands. We presented that to the committee. And I got 25M\$ for that project ... so my category's budget went from 25M\$ to 12.5M\$ to 37.5M\$. Swiffer was created with that money and it was a tremendous success in the world. If we weren't given the possibility to think out of the box, come with something not associated with an existing brand, we wouldn't have come with something totally different. And the money for that kind of thing was not available before. So that was a very powerful move to develop brilliant ideas into P&G. Another one of that nature was Febreze. It was another brand that was created. Since that time, in the last fifteen years, no new brand has been created in P&G. So it was how powerful that approach was.

T: Can I ask you about Swiffer? In the way you came up with the idea of Swiffer?

C: It was an interesting thing. I wasn't going to enter details but now that you ask me ... P&G had, at the time, 56 sub-categories of products running from shampoos to diapers, baby wipes, etc. We had the brand Pampers (diapers for babies) and I wanted to develop baby wipes under the name "Pampers" and the management of Pampers didn't want to do that. Because Pampers was a diaper, not a baby wipe product ...

So 56 categories of products. All those categories were located in beauty care, healthcare, food, detergents and the like. People who were working inside those categories had no idea of what people working in other categories were doing. At that time, I was the head of R&D for all categories for Europe, Middle-East and Africa. I realized I was the only one that had access to all the technologies available in P&G. None of the people reporting to me had access to all technologies because they were working on a given category or sector. People in laundry had no clue about the technology used in diapers or beauty care.

I organized a seminar at the HQ. I brought technologist people from all the categories. And we presented the various categories on which P&G was selling product every day (not what was under development). We introduced specific technologies used in each category. We presented the technologies that P&G was selling every day, not the new product, the everyday technologies. And we found out 80% of technologists didn't know half of what P&G could already do. So we did those presentations in the morning. And in the afternoon, having been exposed to those technologies, are there new ideas of products that came. In one afternoon, we developed about a thousand of new product ideas. One of them was what would become Swiffer. It linked surface cleaning technologies and paper technologies (used in diapers and "essuie-tout" for example). [Technical explanations]. So that's how we developed Swiffer. The technology existed already but the concept that we could replace vacuum cleaning didn't exist.

The mechanisms and devices that were developed in order to force the organization to think out of the box were quite powerful. We had some others. For example, we had core patents that were very

important because we use those patents in existing products. We told ourselves that if we offered the technology to our competitors (licensing), they would copy our product. And in order to stay in the game, we will be forced to innovate. And also, by giving them access to our technologies, we would make them dependent of our technology. They will be less equipped to develop their own technologies. So you see, the thinking was around “what could we do to force us to be more innovative and, at the same time, make the competition less competitive in innovation?”. Plenty of thoughts like that were developed in those days.

T: That’s very interesting! So, you have some kind of portfolio, with projects that are more breakthrough and with projects that are a bit less. Are those projects managed differently? Is the day-to-day incremental innovation managed in the same way as the breakthrough idea?

In principle, it is not ... but in fact it is. In principle, it follows the same pattern whether it’s a breakthrough idea or a small innovation. It would have to be cleared by consumers, we have to mature the idea and check if consumers are satisfied by the idea, the price structure that we plan to have and so on. That is covered, whatever the type of innovation.

Now, there are challenges for big innovations that are far more important. Usually, a breakthrough innovation would require significantly more means to put in the marketplace. There is also significantly more uncertainty because it’s totally new so we don’t know how consumers are going to react. I mentioned the liquid detergents. We missed out the fact that in about 20% of the machines, the product will go in the bottom. It was very difficult to predict: we have few machines to work on and if those machines don’t have this problem, we can’t really know in advance. Many more challenge: the acceptance of this breakthrough technology, the cost of it. Usually those innovations will be more expensive. An existing technology will be more and more optimized and has people working on this technology that can find ways to reduce costs thanks to experience. In a breakthrough technology, you don’t know how to reduce costs because you are not familiar enough with the technology. So it will be more expensive. And then you will be promising that there will be some cost savings associated with this technology but you don’t know when they will materialize and to which extent they will materialize. Usually in this type of situations, R&D has two enemies. Finance, because they will always say “this is too expensive, we cannot afford. We hear you that they will be some savings but we are not sure. We have to take your word but we are not sure we want to do that because you are not really sure when you will be able to deliver those cost savings.” The other enemy is the manufacturing. Because when you come with some breakthrough technologies, you come with something that is new in factories as well. And if the process is new, who is going to carry all the work to make it work, it’s going to be manufacturing. They would be able to optimize their costs with existing technologies, something they cannot do with new technologies. So you have two major disciplines besides R&D who usually don’t look necessarily at new technologies as being very interesting, this is finance and manufacturing. Advertising and marketing will be more of an ally because they are creating some interesting challenges for them. But at the same time, they are also taking a risk as to whether this is going to work in the marketplace or not. So there is a lot to manage besides just managing an innovation, when it comes to breakthrough innovations. You really need to engage other actors to follow you and be convinced about your vision, your data, your capacity to deliver the cost savings you promised and so on so forth.

You know, I developed one major thing: a concept of euro products which led to the concept of euro brand. It was a Harvard business case at the time. When I got appointed to this position for managers of R&D for Europe, Middle East and Africa (I was assigned in America before), I arrive to Europe. The Europe of P&G was 13 countries with 13 general managers. Each of them had their own R&D organization, their own plants and their own product program. In other words, Pampers, there were 13 Pampers programs. There were 13 Dash and Ariel programs. And so on. And I said this is crazy, we cannot manage effectively the organization with all these myriads of products. So I said we are going to develop for each category an European product. And frankly, when I said that, at the time, I didn't know how to do it. People were washing at 90° in Italy and 50° in Scandinavia. They were using different qualities of chemicals in each country. How can we propose the same product to countries that have different habits and practices, different economics? All of that while staying superior or at an equal level. I am not going to go into details. But it required a major innovation. That's how we introduced the notion of "compacted" product. The first compacted detergent was introduced at that time. Compaction was a way to get rid of all kind of feeders, elements that were in the products but were not serving from a performance standpoint. By removing all those elements, we saved some money and we could use that money to invest in new technologies. That is how we did it. But you can imagine, I got the opposition of all general managers. They were concerned that if the competition was moving, they would be unable to respond. I got the opposition from my boss, the executive VP for Europe. And I got the support of the chairman and the support of my R&D boss. So finally, we did it. It worked, it was a major success. Then, it turned out to be a tremendous thing. Once you had an European product, you could think of an European advertising. So we created the notion of European brand management as opposed to national brand managers (Ariel manager Holland, Ariel manager Italy, Ariel manager Germany, etc. and the same for every brand). We could develop the notion of European branding, the same advertisement everywhere in Europe. We also reduced the number of plants from a dozen to three. A critical mass of supply of the same ingredients which resulted in economies of scale. Every time there was an improvement, we could make the improvement at once in the 13 countries; as opposed to previously when it could take one or two years to put every country on the same page. Competition that stayed on the old model couldn't follow. And we had our period of glory in Europe with this approach.

So we started with the notion of European products, which faced tremendous resistance. When you got all general managers against you, it takes some challenges to break. When you come with breakthrough ideas that change totally the organization, you have to face all the consequences of that. People will see the negative and not the positive. The interesting idea is that two years later, we look back and we find out that if we wanted to go back to the old formulation, there would be significantly more expenses in the process, although we put much more technologies in the new product. So very interesting story... Typically when you go after breakthrough, you have this kind of problems. If this is an established business! If you are in a start-up, you need to have a breakthrough, this is a totally different story. And there, you are writing on a blank page. When you do the same in an existing corporation such as P&G, you have to fight a major inertia.

T: Thank you, that was very interesting. Thank you a lot for your time, it was really helpful for me. I gathered a lot of useful insights here, thanks to you.

Appendix 8: Interview 2

Duration: 45 minutes

Date: 5th of July 2016

Interviewer: Thomas Busschot (T)

Interviewee: Fabrice Renard (F)

Note:

- Interview conducted in French
- The recording was unavailable due to technical difficulties. Therefore, this transcript is based on notes taken during the interview.

T : Pouvez-vous vous présenter rapidement pour l'enregistrement ?

F : Je m'appelle Fabrice Renard, je travaille chez Trion. Trion est une société qui travaille dans la chimie, spécialisée dans la production de phosphates qui sont utilisés dans des domaines variés comme l'agriculture, l'alimentation, les médicaments et les usages industriels. Nous sommes une boîte de taille moyenne, avec environ 1400 personnes employées et un chiffre d'affaire d'environ 800 millions d'euros.

Je suis arrivé dans la boîte il y a plus ou moins dix ans. C'est à ce moment qu'il y a commencé à y avoir du changement et des innovations dans le secteur. J'ai été nommé directeur innovation, recherche et développement et laboratoire. Ma mission a été définie à l'époque comme étant de « réfléchir sur les partenariats et les associations possibles pour anticiper les reconversions ». C'est-à-dire qu'il y avait beaucoup de changement et qu'on m'a demandé de réfléchir au futur de notre secteur.

T : Parfait. À présent, commençons par une question générale. Sachant que l'innovation et le management des projets d'innovation présentent énormément d'incertitudes, de quelle façon gérez-vous généralement cette incertitude ? Avec quels outils, quelles structures ?

F : Tout d'abord il y a un aspect stratégique. Nous travaillons avec un portefeuille d'une vingtaine de projets. Il s'agissait de prioriser les sujets et de garder une cohérence avec la dépense de ressources. À cette fin, j'ai développé un outil que j'appelais « le robot ». [...] En gros, ça fonctionnait avec une matrice de risques (risques liés au marché, risques liés à la technologie, etc.), les cash-flows escomptés à moyen terme et à long terme et les coûts impliqués. Le robot leur donne un certain classement, un score si vous voulez. On peut sélectionner les projets sur base de ce que le robot a donné.

Ça peut paraître un peu bête mais un des buts était de s'assurer qu'on n'investisse pas 500 mille euros par an dans un projet qui ne rapporterait que 200 mille euros en 2020. On voulait s'assurer de garder une cohérence au niveau des coûts impliqués.

Une autre façon de travailler, à un niveau organisationnel, était un peu particulière. Même si c'était non-dit, il y avait des retournements de situation pas clairement exprimés ou annoncés par le management. Je veux dire par là que suivant le climat et les événements récents, comme les résultats de l'année financière, la rentabilité des derniers projets, il y a une tendance à favoriser certains projets plutôt que d'autres. En gros, si la situation est un peu plus tendue, on va favoriser des quick-wins et des projets avec peu de risques et des gains à court terme. En revanche, quand ça va un peu mieux, on

s'autorise à rêver. Tout le monde a envie de supporter ce genre de projet mais c'est un risque et l'envie de prendre des risques dépend de ces facteurs.

T : C'est intéressant. Pouvons-nous revenir sur la gestion des projets en portefeuille ? À part « le robot », aviez-vous d'autres méthodes pour gérer les projets ? Est-ce que vous cherchiez à équilibrer le portefeuille, de la même manière qu'un portefeuille financier ?

F : Oui, bien sûr. Comme je l'ai dit, nous travaillons avec un portefeuille d'une vingtaine de projets. Les projets dedans sont choisis en fonction du score qu'ils ont obtenu avec le robot par exemple. Mais ils sont aussi choisis selon d'autres critères. Par exemple, il y a des sujets prioritaires pour nous, que ce soit parce que des actionnaires l'ont demandé ou parce qu'on pense que c'est un marché intéressant à développer pour le futur. C'est très important pour nous et ça doit être fait tôt. Quand on peut voir un nouveau arriver, c'est-à-dire qu'il devient évident que c'est un marché profitable, nos concurrents qui sont des plus grosses boîtes peuvent se jeter dessus et accélérer le développement en jetant un million pour acheter des petites boîtes et des start-ups qui ont déjà avancé dans le développement de cette technologie. C'est quelque chose qu'on n'est pas capables de faire évidemment. Donc, il y a des sujets prioritaires pour nous et on complète le portefeuille de projets en fonction de la stratégie générale de Trion.

T : Est-ce qu'il y a d'autres outils que vous utilisez ? Par exemple, pour le management des projets individuels ?

F : Alors, depuis quelques temps, il y a une forte demande pour une approche plus rigoureuse de l'innovation. Et je crois qu'il y a un certain « push » des consultants qui veulent vendre des méthodes, des logiciels de gestion et leurs conseils sur ces implémentations. Chez Trion, on a plus ou moins adopté l'approche Stage-gate, je suppose que vous en avez déjà entendu parler. Avant, le Stage-gate n'était pas utilisé formellement. Mais on faisait la même chose de manière informelle. À savoir, on revoyait l'avancement des projets et on prenait les décisions d'arrêter ou de continuer.

Le Stage-gate, je ne suis pas entièrement convaincu par ce modèle. C'est un outil qui a des défauts et des qualités. Pour limiter les dépenses sur des projets morts, c'est-à-dire des projets qui continuent à utiliser des ressources mais dont les perspectives d'avenir sont terminées et pour filtrer les projets mort-nés, c'est-à-dire ceux qui n'ont pas d'avenir commercial, le Stage-gate est un outil pratique.

Mais le Stage-gate limite énormément l'innovation intuitive, l'audace et la prise de risques. Pour que ça marche, à un moment, il faut y croire. Et le Stage-gate a tendance à effacer cet aspect. En plus, les processus de Stage-gate sont déjà utilisés par les grosses firmes. Vous savez, quand les consultants viennent nous parler de ces méthodes « révolutionnaires », ça me fait toujours sourire. Car c'est ce qu'ils ont déjà vendu aux toutes grosses boîtes. Et maintenant, ils veulent nous le vendre à nous. C'est un problème car ça uniformise un peu trop.

L'innovation est devenue consensuelle. Et si nous et nos concurrents réfléchissons aux mêmes idées, avec des gens qui ont une certaine éducation et un certain bon sens, au travers des mêmes processus, fatalement on ressortira tous avec plus ou moins la même chose. Et les moyennes boîtes seront perdantes car, comme je l'ai dit tout à l'heure, les plus grosses boîtes ont beaucoup plus de moyens pour soudainement accélérer leur développement. Ils nous battront en vitesse.

T : Effectivement. Et vous avez des façons de régler ces problèmes ?

F : Eh bien, des gates adaptées à l'ADN des sociétés pourraient un peu casser ça. C'est-à-dire avec un peu plus de folie et d'audace. Mais comme je l'ai dit, les processus de Stage-gate sont souvent de bon aloi, il y a des consensus. Le but de ces processus, c'est d'uniformiser. Dans l'innovation, il y a une conformité, il y avait plus d'innocence avant.

Moi, je suis plus attiré par des gens avec une vision. Le Stage-gate, c'est bien pour la gestion mais ce n'est pas bien pour le futur. La gestion est trop orientée court-terme.

Les success story sont souvent originaires de coups de poker. Il faut autoriser le rêve et la prise de risques. Sinon, on s'enferme. On manque d'audace, on n'ose plus réfléchir à une autre histoire.

Alors, évidemment, dans les faits, on contourne un peu le Stage-gate. Plus on met des règles, plus on trouve des moyens de les contourner, vous voyez ? Pour prendre une image, c'est comme dans les prisons où le maton a plus d'importance et d'influence que le directeur de prison.

Il y a des inconditionnels du règlement, des gens qui croient que tout dans la vie peut être formalisé. Pour faire plaisir à ces gens, on met en place des systèmes. Mais la culture, chez Trion, est plus rêveuse. En fait, le processus de Stage-gate est toujours en cours d'implémentation chez Trion. Dans les faits, il n'est appliqué que partiellement. Il faut le mettre en place pour jouer le jeu, si vous voulez, mais on l'adapte à nous.

Ce que je veux dire, c'est que quand un projet passe les Stage-gate, c'est qu'il y a une histoire derrière. En fait, les décisions se prennent plus au feeling, elles ne sont pas vraiment documentées si vous voulez. On poursuit des raisons stratégiques derrière ces décisions.

Appendix 9: Interview 3

Duration: 40 minutes

Date: 26th of July 2016

Interviewer: Thomas Busschot (T)

Interviewee: John van der Heyden (J)

Note:

- Interview conducted in French
- A part of the recording was unavailable due to technical difficulties. Therefore, this transcript is partially based on notes taken during the interview

T : [présentation du thème du mémoire]

J : Alors, un premier bout de réponse qui me vient à l'esprit sur ce thème, ce qui me vient à l'esprit en premier, c'est le conflit entre l'organisation traditionnelle « grande entreprise » (où on fait des budgets en septembre pour l'année prochaine dans lesquels on doit clairement identifier quelles ressources vont être utilisées, pendant combien de temps et pour réaliser quoi) et d'autre part, lié à l'innovation et les nouvelles méthodes de travail, les approches Lean startup, les méthodes agiles dans les projets et donc la nécessité d'improviser au fur et à mesure, de découvrir en cours de route et puis, d'autre part, se donner la marge de lancer des initiatives dont on ne peut vraiment pas dire aujourd'hui si oui ou non elles ont un business case, ni si oui ou non elles ont du potentiel et connaîtront le succès. Alors

que traditionnellement, vous avez d'abord une très longue étude pour s'assurer s'il y aura du succès et un business case à la fin. Et on a du mal aujourd'hui. On se veut orienter dans ces nouvelles approches où on va faire X proof of concepts. On va faire des prototypes et on verra quels prototypes seront lancés in fine. Mais à la limite, il faudrait déjà faire des business case des proof of concept ... ce qui n'a pas de sens.

Vu d'ici, en première réponse par rapport à la question générale, c'est la première difficulté qui me vient. C'est l'organisation traditionnelle, les habitudes et tout ce qu'on a mis en place pour gérer les ressources et les budgets depuis de nombreuses années, qui n'est tout simplement pas adaptée aux approches de travail plus modernes qui se veulent agiles.

T : Vous avez en effet mis le doigt sur un des grands conflits dans ma recherche. Puis-je vous demander très rapidement de vous présenter ? Votre background professionnel, votre position actuelle et le lien avec le management de l'innovation ...

J : Donc ... ça va prendre un peu de temps parce que c'est intéressant de positionner comment se situe l'innovation dans l'organisation.

Je suis John van der Heyden, je travaille chez BNP Paribas depuis 5 ans. Et avant ça, j'ai fait différentes choses autour de la gestion de projet, du Product management sur des produits internet et mobiles. J'ai fait dix ans chez Wardline qui était le fournisseur de tous les services autour du paiement en Belgique, à la fois les terminaux dans les supermarchés, l'informatique dans les banques (cartes de crédit/débit, bancontact, etc.). Chez Wardline, je m'occupais de la partie paiement internet et mobiles. Le jour où Wardline a été racheté par Atos, il y avait une grosse opportunité d'implanter en Belgique des nouveaux services qui existaient dans le portefeuille français. J'ai été chargé de développer ces offres. Bref, mon background, c'est le paiement internet, le mobile. Arrivé chez BNP, je me suis beaucoup occupé de banque en ligne, banque mobile... donc des canaux. Mais aussi du côté sécurité des canaux : comment sécuriser les paiements bancaires en ligne, s'authentifier avec TouchID sur son iPhone et des choses comme ça. Et aussi les nouvelles offres : comment utiliser sa carte de manière sécurisée sur internet. Finalement, les deux se rejoignent un peu car c'est de la banque sur internet avec une dimension sécuritaire et une dimension client (comment il le comprend, sa confiance dans le système). C'est la célèbre combinaison de la fameuse « user experience », le plus facile à comprendre possible, et de l'impression/réalité de sécurité.

C'est un territoire où on est en concurrence avec des tas de choses qui ne sont pas bancaires. Du coup, c'est un territoire dans lequel a priori on a peut-être innové dans le sens « soutenir un niveau », ou ne pas être infiniment moins bien que ce que PayPal ou Apple est capable de faire. C'est moins le cas d'autres produits bancaires comme les comptes d'épargne où les autres concurrents sont surtout bancaires et où les attentes des clients ne sont pas forcément révolutionnées tous les trois mois.

Du coup, voilà la justification de pourquoi il y a « innovation » dans ma job description. Le morceau de la banque où je me situe est la banque de détail (qui regroupe la banque privée et la banque de détail, opposée à la banque « corporate » qui s'adresse aux grandes entreprises). Traditionnellement, tout était bien organisé avec des Product managers par produit. Et on avait rangé dans la case innovation tous les produits pour lesquels il n'y avait pas encore de Product managers parce que c'est nouveau, qu'on est train de les développer ou de les créer. Et puis, récemment, et c'est déjà une première réponse à comment l'organisation évolue pour mieux gérer ces contraintes qui ont été des freins à

l'innovation, on a mis en place au niveau de la structure des projets une dimension qu'on appelle les domaines. Un domaine a une vision un peu plus large, comme un portefeuille de produits/services. Dans la banque, un produit ou un service, c'est assez proche. Donc le domaine a une vision un peu plus large. Il y a des gens du marketing, de la gestion des opérations, des juristes, des experts de la compliance, etc. On s'est, au niveau des projets, organisés en domaine, en regroupant tous ces acteurs, pour définir ensemble la manière dont on définit les budgets et dont on l'alloue aux projets.

Donc, avant, il y avait, côté sales et marketing, un pôle de demande. On faisait notre liste à Saint-Nicolas et on demandait ce qu'on voulait. Et puis, en face, il y avait un pôle de delivery qui vous répondait « bah ça ne va pas être possible » et ils expliquaient pourquoi. Je schématise un peu ...

Et maintenant, autour du domaine sur lequel je me concentre, les comptes et les bancaires (qui adressent les comptes bancaires, la manière de faire un paiement, etc.), les projets et les priorités sont définis par un mix de gens qui gèrent les plateformes, de gens responsables du pool de ressources pour le développement et de gens qui sont en face du client (qui apporte l'axe demande à la discussion). Et cette organisation par domaine nous permet un peu plus d'arbitrer, y compris en cours d'année, y compris quand une nouvelle opportunité se présente.

Ça fait deux choses en fait. D'une part, d'un point de vue équilibre entre le nouveau et la maintenance, ça crée de la clarté. On voit beaucoup mieux pourquoi une partie du budget doit être mise en place pour que le système aille plus vite, soit plus stable, etc. même si ça ne se voit pas du côté client, ça facilitera les projets ultérieurs. Cet équilibre est plus transparent. Et d'autre part, ça permet de redescendre à un niveau plus proche du terrain. Les arbitrages entre des choses qu'on avait définies il y a un an (je veux dépenser autant sur le projet X et autant sur le projet Y). Et puis, un an plus tard, la constatation que pour X, finalement, le MVP est amplement suffisant pour le développement alors que le projet Y a besoin de ce solde justement.

Et donc, cette première adaptation de l'organisation, et ça se pose de manière transversale, par-dessus ou même en supplément de l'organisation verticale traditionnelle où les gens de l'IT ont un chef IT et les gens en marketing ont un chef en marketing. Ça veut dire que la vision stratégique reste dans l'organisation traditionnelle mais l'exécution a été confiée à des groupes positionnés de manières plus transverses. Ça fait qu'il y a plus de gens autour de la table au moment où on discute. Et évidemment, ça accélère le processus par rapport à ce qu'on faisait avant. Par exemple si le budget était dans les mains de quelqu'un du marketing, qui décide de financer un projet. Puis, en voyant quelqu'un de l'IT, se rendre compte que ça ne marche pas pour telle et telle raison. Là, on a un peu simplifié le processus en mettant les bonnes personnes autour de la table dans ce cadre.

Mon job, c'est plus ou à moins à l'échelle de ce domaine, de travailler depuis la traduction de la stratégie en grandes priorités, en idées concrètes de réalisation et orchestrer ces idées en termes d'étapes. Voir ce qu'on fait en premier et en deuxième. Et là aussi, il y a des contraintes sous-jacentes. Cette traduction de la vision en étapes, elle passe par les composants à mettre en œuvre pour construire les étapes en question mais elle passe aussi par ce qui intéresse pour l'organisation et pour le client. Au-delà de cette traduction, traditionnellement, on faisait une roadmap découpée en années. Dans ces années, on applique des projets dont on planifie les bénéfices sur une certaine échelle de temps. Mais maintenant c'est en train de bouger. Maintenant, la vision se traduit plutôt en une série de priorités et les priorités se traduisent en deliverables plus compact. Pour utiliser le vocabulaire à la mode, on fait des MVP, on fait des pilotes voire des prototypes. On les teste de manière

beaucoup plus artisanale. Ça peut être de manière informelle ou avec un focus group et une procédure très formelle (derrière une vitre, observer les réactions de gens exposés au concept, etc.). À côté des projets d'infrastructure purs où ça reste très traditionnel (si on doit changer la plateforme X ou Y, on ne va pas faire une étude), les projets qui doivent se transformer en un produit entre les mains du client, au lieu de les mettre dans un tunnel de 3 ans en espérant qu'à la fin, ce sera quelque chose qui ressemblera à ce que le client voulait, on livre des petits morceaux à la fois. Puis on les teste et on les améliore si ça s'avère nécessaire.

Donc ça c'est un bout de la manière dont on fait de l'innovation dans la banque. C'est relativement décentralisé. Dans chaque domaine, il y a des gens qui vont traduire la stratégie de l'organisation en stratégie de domaine et qui vont l'appliquer à une série de projets. On essaye, en combinant tous ces domaines, de couvrir 100% du marché, y compris la partie de marché qui n'existe pas encore. Quelque part, à côté du rôle et des services traditionnels de la banque et du modèle économique traditionnel, il y a des évolutions à grande échelle qui font que ... par exemple, l'évolution du taux d'intérêt impacte définitivement la rentabilité de la banque, l'évolution du cadre légal en Europe impacte la rentabilité des services de paiements.

Au-delà de la nécessité de faire évoluer ce qu'on a en main, on a la nécessité de développer de nouvelles approches : du partenariat, un nouveau type de produit ou de services, un nouveau rôle pour la banque et qui serait légitime aux yeux du client, ... Là aussi, dans une large mesure, la manière dont on est structuré, ça permet de dire que tel produit ou service destiné au client, c'est le retail banking qui doit en avoir l'idée, qui doit porter cette idée et la tester. Ce nouveau service destiné aux entreprises, c'est corporate qui doit. Et si une idée de service de paiement suggère qu'il faut remplacer les cartes par des sifflets et les terminaux de paiement dans les magasins par des micros, alors dans le domaine qui s'occupe des paiements (qui combine des gens du retail et du corporate) va se mettre d'accord pour qu'un côté vende bien des sifflets et que l'autre vende bien des micros. Donc on a normalement une couverture plus ou moins complète du périmètre de la banque.

Ceci dit, il y a toujours le besoin de quand même rappeler aux gens qu'on peut réfléchir en dehors de son cadre et regarder plus loin. Il y a le besoin de rappeler aux gens que ce n'est pas juste une dizaine de personnes dont la job description mentionne la stratégie et les roadmaps qui doivent avoir toutes les idées. Donc il faut distiller dans toute l'organisation une culture d'innovation. Ça, forcément, ça ne peut pas être distribué. Ça doit être mis en place de façon volontaire et organisée. Et donc on a, dans la banque, pour toute l'organisation, on a l'équipe d'Olivier Peeters, qui s'appelle « Home for Innovation », dont la mission consiste en grande partie à créer une culture d'innovation. Faire comprendre à tout le monde, quelle que soit leur place dans l'organisation, que s'ils ont une idée, ils ont le droit. Et que c'est même plutôt bien vu. Et donc mettre en place des outils qui vont depuis l'organisation de concours internes, d'événements, d'un incubateur à l'intérieur de la banque jusqu'à des outils pratiques : un forum pour discuter de différents sujets et proposer ses idées. Le but est de rappeler aux gens dont ce n'est pas écrit que c'est le métier qu'on ne doit pas s'arrêter simplement à rendre l'outil qu'on a aujourd'hui un peu plus rapide ou un peu moins cher.

Donc voilà comment ça s'emboîte. Il y a vraiment cette entité d'innovation qui a rôle de communication et de mise en mouvement de l'organisation. Ils sont là pour faire bouger les choses et réveiller les gens. Et ils ont leurs propres projets à leur échelle. Par exemple, quand ils organisent ce qu'ils appellent un « sprint », un concours d'idées internes où celles qui sont sélectionnées sont

incubées pendant X mois, ce sont des projets très spécifiques à eux. Et ce sont des projets qui sont menés jusqu'à un prototype, une analyse, une étude de marché ou un business case sur base duquel on décide si on va lancer le projet ou pas. Il y a donc des projets qui sont initiés chez eux et puis qui sont lancés dans le domaine correspondant, voire lancés à l'extérieur de la banque dans certains cas. Et en plus de cette équipe, il y a l'organisation par domaine qui pilote des projets un peu plus transversalement qu'avant et qui normalement va couvrir l'évolution normale de la gamme de produits et de services et les nouveaux produits si les opportunités sont là.

T : Merci, ça fait une description assez large de votre organisation. Ça me sera assez utile. L'organisation par domaine permet-elle aussi de garder une vue d'ensemble de tous les projets ? Y a-t-il des mécanismes qui permettent de traquer tous les projets d'innovation et d'identifier où ils en sont ?

J : Avant l'existence des domaines, il y avait une organisation portfolio globale qui tentait de regrouper tous les projets de la banque, de les comparer les uns aux autres et de les mesurer. C'était un niveau d'abstraction trop élevé. Les gens autour de la table ne pouvaient pas en même temps connaître les détails de chaque projet et les voir tous ensemble. L'organisation par domaine est une tentative de redescendre le niveau d'agrégation à un niveau où on est capable d'avoir une vue d'ensemble, où en gros tous les projets dont on parle utilisent un peu les mêmes plateformes, les mêmes spécialistes au niveau des ressources ou servent les mêmes clients ou les mêmes objectifs au niveau business. C'est un niveau où les gens autour de la table sont capables de comprendre le contenu de chaque projet et capable d'articuler mentalement les tradeoffs : si j'arrête ce projet, ça aura tel impact sur tel asset et on ne réalisera pas telle fonctionnalité dont on avait besoin pour un autre projet. Mais si on la réalise quand même dans le cadre de tel autre projet, on peut quand même le faire et on transfère du budget. C'est donc redescendre le niveau de décision à une altitude à laquelle on est capable de prendre des décisions en connaissance de cause. Bien sûr, cela amène des difficultés, liées aux organisations matricielles.

Appendix 10: Interview 4

Duration: 47 minutes

Date: 26th of July 2016

Interviewer: Thomas Busschot (T)

Interviewee: Frank Dethier (F)

T: Can you talk briefly about yourself: your name, your position in your company and the link with innovation management?

F: Sure. Yes of course. In a nutshell, my name is Frank Dethier. I am 46, I have a professional career of about 22 years. I have worked all my career in innovation, immediately from the start. I have been innovation manager in several companies, in different industries. For the last six years, I am an innovation consultant. So now, I give consultancy to companies on how to handle innovation management as a whole.

T: So the position you are holding right now at ABInBev is consultant?

F: Yes. Actually, at the moment, I am streamlining for them what we call the whole “idea to market” process. So, from the very first initial idea until we launch something on the market, how should we harmonize and optimize that. And introduce also a project portfolio system for them.

T: Excellent, that’s exactly the subject I am interested in. So, I think you agree that innovation projects have much more uncertainties than other types of projects ...

F: Yes.

T: So how is it in general dealt with by managers? What are the tools and structures put in place to deal with this uncertainty?

F: Yes. There are a few things. There is more than a few but in the end, it’s about what you select to use. I use a couple of elements. A first one is that you need to keep a line, or let’s say a link if you want, between your innovation goals in this project and your innovation strategy. It should fit in the strategy of what your company wants to achieve. That link, you need to maintain it. It is especially important in innovation because ... Sometimes you start a project with goal A. And while you are running the project, the goal A becomes goal B. Because you learn, etc. So you will change your goals. That is all perfect. But in the end, the goal B should also be aligned with the strategy because otherwise, you’d better stop the project. That type of link you need to maintain is more important in innovation context because changing the scope and the goals don’t happen so often in normal execution modes. So there is one key element here.

Another key element is that you need to be flexible in terms of processes. Because in innovation projects, you typically don’t know exactly what you want to achieve, how you want to achieve it. So you need to be much more agile and flexible. Your processes must be agile and flexible. So that’s a second key element.

The third one is from a people perspective. You need to teach, coach and also have people that can deal with uncertainties and ambiguities. So if all the people in your project team cannot deal with that then you won’t be able to run big and ambitious innovation project.

The fourth one, what I call the most “fluffy” one: as an organization, you need to create an environment in which people are comfortable in taking risks and making mistakes ... and even failing. And that is not to say that as an organization you want to fail. It’s much more about that it should be accepted that in an innovation context, projects can fail. If you don’t allow that, people won’t take risks, won’t try things. And your innovation results will be a lot less.

For me, those are four key elements. I may miss other elements because I am thinking and talking at the same time.

T: You mentioned previously you wanted a portfolio system in ABInBev. Is such mechanism a good thing to have to manage innovation project?

F: It is, but that is a different level for me. Everything we discussed so far is for me linked to doing your projects right (as good as possible). While a portfolio management system, for me, is much more a discussion about doing the right things. A portfolio is a discussion about which projects should we run.

But the four key elements is much more about how you should run those projects, making the things right. I am not sure whether I made myself clear?

T: It's very clear. What I meant is that, as you mentioned, innovation projects can fail because there are much more risks and uncertainties. In my findings, usually, companies use this kind of portfolio approach to mitigate the risks of one individual project, so as to reduce the pressure. The employees know that not everything is on their shoulders. They know that someone is making sure that overall it's working.

F: Yeah, that's true. This is absolutely true. For example, in ABInBev, we have every year about 700 projects. Then, yes, you need a portfolio system to define, out of those 700 projects, should we run all of them or can we stop a hundred, what is the impact? This type of discussion is what you have in a portfolio management meeting. But even then, in such meeting, if you decide to run some projects, those projects can still fail. Let me give you two extreme examples:

Suppose the economic condition next year is very bad. People don't want to consume. What I call the "risk appetite" of the company, ABInBev, is really low. They don't want to take any risks. What you do then, in a portfolio management meeting, is that you take out all the projects with high risks. You stop all of them. You only run low risks projects. That is then a decision of the company link to the strategy.

Maybe years after, the conditions are better. The mindset is very risky and the company wants to try new things. And the risk is allowed. Then you suddenly increase the number of projects that are very risky. This means that, in the end, you will probably fail more projects. But that was your choice. Failing projects, you can always have it but it can be sometimes a conscious choice when you decide as a company "I want to run many high risk projects" then you have to accept that you will have more failures.

T: Is there any kind of systematic review process for innovation projects selected? How are those projects reviewed?

F: A lot of company, ABI included, still use what I would call a linear stage-gate process. Are you familiar with stage-gate processes?

T: Yes, I am familiar with them.

F: So a lot of companies still have that. You have gates you need to pass to move to the next level. In order to prepare those gates, projects teams have recurring meetings in which they work on the deliverables they have to finish for certain gates. Also here in ABI, a lot of initiatives work in that way.

However, more and more, you see an agile way of working appearing whereby projects teams, on their own behalf, can decide better or more what do they need to focus upon, what are their priorities. Less driven by the management than by the team themselves.

T: What are the main advantages of an agile approach?

F: Very simple, I am a big fan of it. Not because it's new or fancy, not at all. For me, it fits perfectly in an innovation context. The linear way of working we had in the past, that works great if you know what you have to deliver, what you have to do. Once you know exactly what you have to do and how to do

it, then work linear and stage gate. Do it. However, in an innovation context, you don't know upfront what you have to do and how to do it. Then agile works better.

By the way, I explain to companies that you ideally have the two processes. As long as you don't know what you are going to deliver and how you are going to deliver it, then work agile. The moment you have define the value proposition and you know how to do it, immediately start working in a linear stage gate process.

T: According to what you say, you suggest there should be a two-speed process. In the first step, you should use something more flexible, like agile, because you have a lot of uncertainties, namely about what you should do and how you should do it. But then, as soon as you take care of the uncertainties, as soon as you cleared those issues, you can start with linear processes because it's more efficient?

F: Yes, indeed.

T: So, in the first steps, if you use the agile "methodology", would you say that people need to be much more entrepreneurial?

F: Yes.

T: So you advise for the two-step process.

F: Absolutely. Before ABI, I worked on an assignment in a chemical company, Hensman. We organized it like this. Here in ABInBev, we will organize it also like this. So, I am personally absolutely convinced of that. And I see more and more companies adopting it that way.

T: According to you, is there different kind of innovation projects? Are there some projects that are so innovative and that don't need that kind of two-speed process?

F: Yes. For me, the moment you know what to do, you can immediately start with the stage-gate. It's not mandatory to do it like that. It's only when you don't know what to deliver that you better work this way. But once you know, then start immediately with your linear stage-gate process. In that case, you only need one methodology and this is a lot faster of course.

T: So for projects that are much more innovative, it's really needed to do it this way. If you go directly to stage-gate process with something completely "crazy", it won't work?

F: Very likely, it will fail.

T: Do you think there needs to be some kind of organizational separation between the two processes? How can you make people usually good at being efficient, how can you make them good at being flexible? One solution is to make them work separately, what do you think about it?

F: I've worked in both models. And both models, what I mean with that ... I even worked in three different models. All three models have their disadvantages and advantages. There is no model that is ideal. It depends on the industry you are in, it depends on the company, it depends on the variables. I don't think there is one ideal model.

One is what I call structural separation. As you suggested, you separated the two by having different parts in the organization. One part is working on agile and innovation and another part is working on

efficiency and delivery. And different people are needed also. That was one model. The big advantage is very simple: you can optimize each part of the organization for its own role. You can even hire the right people for each part of the organization. So you can really optimize it. The big disadvantage is that you create two organizations in the organization. In the end, all that organization 1 creates needs to be delivered and brought to market by organization 2. All this transfer is causing a lot of delays, uncertainties, a lot of re-questioning things, etc. That is a big disadvantage.

The other model I worked in, what I call conceptual separation. That is a bit like the google model. You work on 20% on your time on innovation and 80% of your time on projects for delivery. That has again pros and cons. The big advantage is that you don't have the physical separation. The same people work on innovation and delivery; the transition between the two then goes a lot smoother. The big disadvantage is that it doesn't work with disruptive innovations. You cannot work on something totally new only for 20% of your time. For small new innovations, yes it will work. But for big new innovations, no. There, you need to work full time on it. And not 20% of your time.

I even worked for six months in a start-up developing apps. That industry goes extremely apps. You need to develop an app in 3 months. You cannot transfer from person A to person B because it takes too much time. What we did is that, as a whole team, we worked entirely on innovation in the first weeks. Then, after 3 weeks or so, as a whole team, we stopped doing innovation and we started doing implementation or delivery. As a whole team, we moved from innovation role to delivery role. Especially in industries that are extremely fast, you need to do that because the transfer between person is way too slow.

So, I worked in those three models and variations. They each have disadvantages and advantages. It really depends on the industry, the speed of the industry, the amount of disruptive innovation that you want to achieve versus small incremental innovation, it depends on the size of the organization, the geographical locations (everybody on the same location or spread across different locations), etc. It depends on a lot of factors. For me, there is no model that works in every situation. Or at least, I haven't find it yet.

T: Thank you, that is very helpful ...

F: By the way, a lot of those things, I give them in trainings to companies. So quite some of the things you asked, I also address in those courses.

T: Yes ... I know it's not that new.

F: No, it's maybe not that new but still a lot of companies struggle with this. A lot of what I explain is sometimes ten or twenty years old. You could maybe find books explaining it. But even after all those years, even large companies such as ABInBev are still struggling with that every day. And a lot of other companies as well.

T: That's concerning indeed [...] You mentioned company had some kind of risk appetite that can fluctuate. Does it mean that in a portfolio perspective, in a high level of decision, you use some kind of balancing criteria? Other than just risks. Maybe short-terms versus long-terms or other ...

F: Yes. And that's all about portfolio management: finding the right balance. The right balance is not the "correct" one, it's the balance that fits with the company. There are many variables. For example,

time horizon. Usually we work with horizon 1, horizon 2, horizon 3. We also work with frameworks. It's a bit similar: we work also with different time horizons and risk profiles. In a lot of industries, until five years ago, a typical (and I really use 'typical' because every company is different) partitioning was 70/20/10. Which means 70% for short-term and low risks, 20% for medium terms and medium risks and 10 for long-term and high risks. 70/20/10 are your investment budget of course. But that was until five years ago.

Between five years ago and now, a lot of start-ups came into existence. They took quite some business away from large companies. A lot of popular start-ups like Uber, Airbnb, etc. I see more and more large companies, because of this trend, willing to take more risks. So, increasing their 10% to 20% or more.

T: According to you, companies are willing to take more risks with the third time horizon because of the emergence of start-ups?

F: Yes. But that may be a temporary trend. Maybe in five years, they will change again.

By the way, this is also what I am saying here in ABInBev. These percentages (I cannot share the percentages used now in ABI) are reviewed every year. They are not fixed for several years. We review them every year, depending on the risk appetite and the strategy.

T: So this balance is really managed deliberately?

F: Yes.

T: We've covered many of the topics I wanted to cover with you. Do you think it would be appropriate to have two kinds of management structure in an organization? One structure would be really about incremental projects, innovation projects that are not so distant. This structure would be much like the stage-gate process we discussed, skipping the agile step and directly going to the linear process. The other structure would be something much more entrepreneurial. For example, using an effectual approach: trying, making mistakes and progressing by iterations. On a broader level, a portfolio level, the management would need to find a balance between the projects going into the two structures. Is it close to what is done in reality according to you?

F: A lot of companies that I've worked for the last five years, no. But before, I was working in Philips and we worked like that. I am a big fan of this method. The big advantages we just discussed is that you can really use the right processes, the right people and create the right culture in those two parts of the organization. The two most difficult pain points are really the discussion "how much to invest in bucket 1 and in bucket 2?", so exactly the percentages partition we discussed. What should be those percentages and agreeing upon that. In the end, different people will be responsible for these different investment budgets. You have the traditional fight for the budget between the managers. That is one frustration, difficult point.

The second big point, something more difficult, is that, whatever you create in the innovative part of the company (or whatever you call it) will need to be transferred to the other part of the company. But that other part of the company has already its own targets, based on the 60% budget their received. Whether you like it or not, typically that part of the company wants to pay less attention to those big innovations. So, the company itself, in this model, is often killing internally its own new innovation. Even if your innovation team have identified all the unknown elements, this innovation is

still different to what the company is doing normally. Let me take for example ABInBev: we are selling beer. All the sales people are selling beer. Suppose, I am not saying it is, the innovation team is making beer ice cream. I am just making a ridiculous example. Your innovation team identified how to do a great beer ice cream. For the sales people, used to selling beer, this is something really strange. They don't know how to do it. Even if you demonstrated the value proposition and how to do it, this stays something strange for them. It lies outside their comfort zone. Therefore, they typically won't do it very well and even won't like to do it. This means that the organization is killing the innovation internally.

If you have something disruptive, you need to do it all the way and not even transfer it to the "delivery" part of the organization. Because, for that delivery part ... Suppose you are working there. You get ten projects in your comfort zone and you get one outside your comfort zone. Which one do you think you will take care of first? I think you know the answer ...

T: Yes ... The ones you're familiar with because you know how to do it.

F: Indeed.

T: So, your suggestion is that, once the disruptive innovation is cleared (uncertainties are cleared), we shouldn't transfer it the exploitation (delivery) part? We should still manage it separately?

F: Yes, but of course, you can't do that for a hundred new projects. But if you have few disruptive innovations (the number depends on the size of the organization), in my experience, the transfer always kills the innovative idea, it never works. My recommendation is that for those projects, the exploratory teams need to bring it to the market as well. They don't need to transfer it internally. But you need to determine for which things you will do that because you need to set up new structures for that (sales, etc.). It's a costly exercise. So you need to be selective on the projects and be very careful with this, in my experience.

T: I think you have guessed that it is one of my big concern, what should be the exact separation between the two structures.

F: Yes, I've worked in many different models. And I've seen things go right and go wrong in each of them. As an organization, you need to organize yourself according to all those variables: the types of innovations you want, the industry you are in, etc. If you take chemical industry, it's very slow moving. There, you can still afford to have a central innovation team that transfers its results into delivery teams. They can afford that because it goes slow. In very fast industries, you can't afford that.

It depends on a lot of variables that will in the end determine what is best for your company. There is no single model that works for everyone.

T: I think we covered all the topics. Thank you very much for your help!