

Stepping up startup innovation strategy: expanding the conceptual architecture

of a startup's value proposition

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Résumé :

Dans les premières années de leur existence, les startups doivent convaincre des décideurs de leur fournir des ressources essentielles, telles que des investissements, des subventions ou le soutien d'incubateurs par exemple. Pour réussir, les entrepreneurs présentent leurs entreprises naissantes d'une manière engageante et convaincante. Pour légitimer leur projet, ils tendent à orienter leur discours en présentant leurs idées comme plus développées et mûres qu'elles ne le sont en réalité. Or cet exercice peut présenter un risque de biais cognitif et limiter la capacité de la startup à adapter son offre et son modèle économiques aux attentes du marché.

Dans cet article, nous étudions un discours d'entrepreneur particulier : le pitch de startup. Nous analysons 121 pitches de startups présentés à un jury de sélection pour intégrer un incubateur. Nous montrons comment le contenu des pitches peut être analysé sous l'angle de son contenu conceptuel et, en utilisant les théories formelles de la conception comme un langage descriptif, nous mettons en évidence l'existence d'architectures conceptuelles sous-jacentes et répétitives. Une analyse plus approfondie des interactions entre les entrepreneurs et le comité de sélection de l'incubateur explore ensuite le processus de décision comme une tâche de conception visant à densifier le contenu conceptuel des projets analysés. Nous suggérons enfin un processus de densification conceptuelle systématique qui pourrait aider les entrepreneurs et les décideurs à exprimer pleinement le potentiel d'une idée ou dans certains cas à préparer les entrepreneurs à un changement ou un « pivot » vers une alternative.

Mots-clés : startup, pitch, conception, decision

ABSTRACT

Startups face many challenges at the outset. During these decisive, early stages, they must convince decision makers to provide them with critical resources, such as capital investments, receiving help from an incubator, or obtaining grants or subsidies.

Successfully convincing others requires entrepreneurs to present their fledgling businesses in an engaging and convincing way. As they work to give an air of legitimacy, they tend to bend reality by presenting their ideas as being far more developed and mature than is the case. While presenting a well-defined project hides the “fuzzy” aspects of innovation and creating a new business, it may present a risk that fixates and curtails the startup’s ability to adjust their trajectory as they move ahead.

In this paper, we study a specific, widely practiced format that formalizes innovative ideas: startup pitch decks. Our empirical data analyzes 121 startups who applied to a Parisian incubator. We start by identifying common threads and differences in their content and structure. We then demonstrate how a presentation’s content can be characterized using formal design theory as a descriptive language and decision-making tool using a model we call “conceptual architecture”. Further analysis of interactions between entrepreneurs and the incubator’s selection committee explores the decision process as a design task that densifies the conceptual content of the pitch. Finally, we suggest a process of systematic conceptual densification that could help both entrepreneurs and decision makers fully express the potential of an idea in terms of continued or future product development, or in some cases preparing entrepreneurs for a shift or “pivot” towards an alternative but conceptually related market.

INTRODUCTION

As innovative products and services are developed, they are almost inevitably presented to a decision maker for selection and approval. These moments are often decisive for the future of the proposal. To increase one’s chances for approval, professional literature suggests adopting a number of formalisms and best practices to create clear, detailed proposals—a process called a “pitch” (Ries, 2011). These presentations are typically built around a single value proposition: how to bring an effective solution to resolve the needs of a well-identified market. Pitches are also accompanied by several detailed but hypothetical projections, estimates, and timelines.

Adopting a structured, solution-centered presentation gives proposals the appearance of a solid, mature proposal with a clearly identified value statement. As those making the proposal reason in terms of what they think their idea *should* or *will* become, they put aside an ensemble of possibilities that it *could* become. These alternatives—what a project *could* become—represent a valuable lifeline for survival due to the high levels of uncertainty inherent in any innovative project. The process of developing a pitch results in a cognitive bias called fixation (Agogué et al., 2014; Jansson & Smith, 1991). In certain settings, fixation constitutes a dangerous blind spot. When changes in course are necessary to succeed, fixation makes those changes difficult to imagine and enact (O'Connor, Leifer, Paulson, & Peters, 2008; Ries, 2011). Many projects do not survive this conceptual change in direction (Arteaga & Hyland, 2013; Ries, 2011).

Our paper focuses on a specific type of innovative project: startup companies. During their first years, startups founders must convince decision makers of the value of their ventures. While they are often still in very early stages of innovation, common “pitching” practices are used to present their companies in a very assertive, solution-focused manner. The choice of project proposers to adopt such an assertive formalism comes from a widely-held belief, present in pop culture and professional literature, that it is the best way to convince a decision maker (Osterwalder & Pigneur, 2013). However, this approach seems to implicitly assume that decision makers have no role in the design and innovation process, acting as naïve benefactors unaware of the fuzzy nature of the front-end of innovation, or entrenched soldiers who are conditioned to automatically account for substantial risks and use the pitch as a relative benchmark between all proposals. We could also imagine that decision makers are experienced professionals accustomed to the innovation process and its inherent uncertainty and look favorably upon project proposals demonstrating the multiple potential outcomes of an early stage innovation process.

Our paper examines this paradox from both a theoretical and empirical standpoint. The first portion of this paper explores existing research in the fields of entrepreneurship and new product development research (NPD) regarding innovative propositions. We will show how the literature addresses the matter of startup pitch as a cognitive legitimation exercise and why entrepreneurs tend to stick to an assertive, exploitation and business-oriented rhetoric. We will then explain how NPD research highlights that the front-end of innovation innovative project should build on an expansive iteration process to explore new concepts. These two fields of research define the boundaries of a lack of knowledge on the actual decision mechanisms when it comes to innovative project with a high degree of uncertainties and a constant effort of legitimation by actors like in startup companies. Trying to fill this gap is of great interest as it

could help better understand these decision processes and could have major managerial implication for both innovative project proposers and decision makers.

We then attempt to reconcile the contradictory views of these two fields by contributing a theoretical approach that builds upon on elements of formal design theory. In the second part of this paper, we test this approach using an empirical dataset drawn from 121 presentations of startups in a business incubator. We present our results, including the contribution of a framework used to identify the conceptual architecture of pitches. In the analysis section, we seek to identify correlations between these conceptual architectures and the evaluations made by decision makers to see if this is a significant consideration in resource-allocation decisions. Finally, we present a series of managerial implications, including how our proposed process of conceptual densification could transform existing presentation practices that cover-up risk and uncertainty into a presentation of a transparent and structured field of innovation under exploration.

LITERATURE REVIEW

THE STARTUP PITCH AS A COGNITIVE LEGITIMATION EXERCISE

The acquisition of critical resources is crucial for the success of new ventures. Contrary to larger firms, newly created companies such as startups do not have verifiable past performance data. Thus, decision makers can't base their resources allocation decision in such firms on objective criteria and use subjective elements in their decision process.

Economic theory provides some interesting concepts to deal with such situations where information is unavailable or unfairly distributed between parties. The concept of adverse selection and moral hazard have been used to explain why a market where buyers cannot properly evaluate the quality of the products they buy will deliver poor quality deals (Akerlof, 1970). Most decision makers will consider the high level of risk that unknown quality of the firm (adverse selection) and uncertain future behavior of the entrepreneur (moral hazard) pose to a potential resource allocation in a startup.

To face this issue, entrepreneurs make significant effort to present their ideas and projects in a way that make them seem credible and understandable to stakeholders. Empirical research conducted in a high-tech startup (O'Connor 2002) shows that *a fair amount of work done by entrepreneurs aims at building and communicating engaging narratives about his company to raise and capture the attention of his stakeholders*. More precisely, as stated by O'Connor "The founder related narrative accounts in order to (a) justify the existence of the company; (b)

convince others to devote funds and other crucial resources to the company; and (c) build the tangible and intangible worth of the company”.

INTERACTING TOWARDS COMMON GOALS: PITCHING AS NARRATIVE SENSEMAKING

This narrative construction derives from the concept of narrative sensemaking (Weick, 1979; Weick et al. 2005). Narrative sensemaking is the entrepreneur’s ability to not only tell the story of their venture creation in an engaging way (e.g. storytelling), but more likely to relate a story where he and his stakeholders are interacting towards common action and goals. Later research has then shown that *narrative sensemaking is a critical ability for entrepreneurs looking for external resources* (Martens et al., 2007; Chen et al. 2009 and Pollack et al. 2012).

The startup pitch is clearly the king of narratives, used and adapted in countless settings worldwide in recent years. It has been stated that having a high ability to pitch an idea is critical for an entrepreneur to compensate for the lack of objective historical performance data on which decision makers could base their decision (Pollack et al. 2012). Empirical research suggests that the level of preparedness of the entrepreneur’s pitch (Chen et al. 2009 and Pollack et al. 2012) is the single greatest factor in an investor’s decision to provide funding. Moreover, an in-depth analysis of 113 videotaped investor pitches shows that this relationship between preparedness and evaluation by decision makers is fully mediated by the cognitive legitimacy granted to the entrepreneurs thanks to a highly prepared pitch (Pollack et al. 2012).

Although different typologies of legitimacy exist in scientific literature, it is widely accepted that three types of legitimacy exist: regulative, normative and cognitive (Schuman, 1995). While regulative and normative legitimacies refer to the compliance with laws, rules or other kind of stakeholder requirements, cognitive legitimacy is a much more tacit and implicit kind of legitimacy that can be defined as follows: “From the cognitive perspective of legitimacy, organizations are legitimate when they are understandable (i.e., there is greater awareness and therefore less uncertainty involved with the organization) rather than considering when they are desirable” (Shepherd & Zacharakis, 2003, p. 151).

Based on this analysis, we can infer that the startup pitch is an assumed effort by entrepreneurs to make their project understandable by decision makers. This effort packages key ideas into a standard format—a common language enabling mutual understanding and affording cognitive legitimacy.

THE STARTUP PITCH AS A GATE BETWEEN THE FUZZY FRONT-END & NPD

Startups are innovation-centered organizations. Literature on new product development sheds interesting light on the startup pitch situation, particularly when addressing the concept of fuzzy front-end.

The fuzzy front-end (Smith & Reinersten, 1991) is the very first phase in the development of a new product or service. It represents the preliminary stages where opportunities are identified and concepts are developed, prior to engaging in a structured and linear product development process. The adjective “fuzzy” refers to the fact that the front-end of innovation is rather nonlinear. Though the front-end is typically represented as a single ideation step before new product development (Cooper 1993), it is in fact an iterative and complex process including five activities: opportunity identification, opportunity validation, idea generation and enrichment, idea selection and concept definition (Koen et al. 2002). This process typically ends with a formal decision to enter a structured new product development approach which have to be taken by decision makers at project interface between front-end of innovation and new product development (Reid & de Brentani, 2004).

Given that the startup pitch as the specific moment when an entrepreneur has to convince a decision maker to grant resources for its future development, one could assert that *startup pitches represent a transition between fuzzy front-end and new product development phases*. In such a transition, the typical items necessary for making a decision to pursue a future development are, among others (Koen et al. 2002): (1) objectives of the project, (2) fit with global strategy of an organization, (3) market or customer needs and benefits and (4) business plan with financial forecasts

THE STARTUP PITCH AS AN INSTANT PICTURE OF ONE POSSIBLE FRONT-END OF INNOVATION

Considering a startup pitch presentation as a validation gate towards NPD could appear paradoxical with respect to the maturity of many startups: in most cases, when they make their pitch, entrepreneurs haven't fully stabilized their vision of addressed market, selected technology, or suitable business model.

As mentioned above, the fuzzy front-end of innovation is a nonlinear process that can be seen as an iterative loop which search for continuous concept refinement under stimuli of the environment, individuals, and organization (Reid & de Brentani, 2004).

The startup pitch can thus be seen as *an instant picture of a project iterating in a concept-strengthening loop*. We can infer that in his/her pitch an entrepreneur could choose to present either one concept being the result of the very last iteration in the fuzzy front-end or a collection

of alternative concepts presented as an historical perspective of this front-end of innovation or as alternative options for future development.

IDENTIFYING THE CONCEPTUAL ARCHITECTURE OF INNOVATIVE PROJECTS AT THE BOUNDARY BETWEEN FFE AND NPD

As stated above, entering the later NPD stages following the FFE phase supposes that some conceptual definition has been achieved (Koen et al, 2002). A concept can be analytically defined as “an entity with properties P1, P2, ... Pn” (Hatchuel & Weil, 2009). Innovation implies at least a partial breakthrough with respect to the usual identity of designed objects, be they products, services, processes. For instance, “a bagless vacuum cleaner” is formally a concept according to Hatchuel and Weil’s analytic definition and, when proposed by Dyson, it was an innovative concept: bagless vacuum cleaner did not exist, and the concept anticipated some important value on the market. Hence, at the boundary between FFE and NPD, we can expect the innovation projects to include a central value proposition expressed under the form of one single concept or, eventually, several interrelated concepts that would form a family or a lineage (Le Masson, Weil and Hatchuel, 2010). In the case of a single concept, the conceptual architecture of a pitch or, more generally, of an innovative proposition at the boundary between FFE and NPD is quite simple. In the case of several concepts, the conceptual architecture can be more complex depending on the choice made by the project team: several concepts could be presented as a sequence, reflecting how innovators progressively came to formulate their final proposition. We could also imagine conceptually unclear, ambiguous presentations in which concept clarification has not come to a clear end. Identifying the conceptual content and architecture of a pitch could also be difficult if part of the concept remains implicit. For instance, “a creative case for smartphones” is analytically a concept (an entity—a case—with two properties: “creative” and “for smartphones”). But part of its value is found in its relationship with a higher-order concept (Taura and Nagai, 2013; David, 2016), like “protection systems for mobile objects”, and this is why decision-makers (incubator managers, investors, partners from larger companies) could support it. Consequently, at the boundary between FFE and NPD, a proposition can implicitly carry more than it seems, which makes detecting its value potential a tricky stage—and a key skill—of the FFE to NPD transition.

RESEARCH QUESTION AND HYPOTHESIS

After reviewing the existing literature on entrepreneurial research and new product development, we assert that the startup pitch can be understood as an exercise of cognitive legitimation by an entrepreneur who has to make his/her new venture fully understandable by decision makers. As a part of this legitimation effort, entrepreneurs tend to present their venture as mature and being out of the fuzzy front-end of innovation process. The combination of NPD literature with literature on innovative design teaches us that identifying the conceptual architecture of a pitch is probably a key component of the decision-making process. Meanwhile, the identification might be neither complete nor unambiguous. Hence, analyzing what really happens in the minds of entrepreneurs who pitch and selection committee members from a conceptual standpoint remains a key question.

Our research question can be formulated as follows:

At the gate between FFE and NPD, what effects does the conceptual architecture of presented projects have on their evaluation by juries?

Five sub-questions naturally emerge:

- From a methodological standpoint, is it possible to identify and describe the conceptual architecture of a pitch?
- Can we produce a classification of pitches with respect to the variety of their conceptual architecture?
- What correlation—if any—exists between this classification and how the projects are rated by selection committees?
- In a discussion with the entrepreneur following the pitch presentation, might the jury itself have an impact on the perceived architecture of the pitch?
- What consequences could our research have on how should pitches be designed and presented?

Our literature review leads us to formulate three hypotheses associated with our research questions:

If the startup pitch aims to make the projects understandable by decision makers, in an assumed effort of narrative sense making (Pollack et al. 2012), it is likely that the pitch presentations follow a standard format.

(H1): We can expect that startups pitch presentations would be built around a conventional structure with recurrent items presented to the audience in order to create a common understanding of the project between entrepreneurs and decision makers.

If entrepreneurs tend to present their ventures as being at the edge of a well-structured NPD process, the maturity of their development in terms of business model or technology often proves that they still remain in a fuzzy front-end process. Literature shows that at this stage the main effort has to be done on strengthening the concept and that this is achieved in an iterative loop (Koen et al. 2002) and thus at this stage the value proposition of a project can be sustained by more than one conceptual proposal. Our second hypothesis is thus:

(H2): Startups pitch presentations can have different conceptual architectures, with one or more underlying concepts.

Some performance criteria for a fuzzy front-end processes builds upon the ability to refine and strengthen the conceptual content of a proposal (Reid and de Bretani, 2004). Considering that decision makers are often experienced innovation practitioners, we can assume that they would evaluate more favorably proposals with a richer conceptual content. Thus, our third hypothesis is:

(H3): the kind of conceptual architecture of a pitch is an influencing parameter on the evaluation of a startup by decision makers.

In the following sections, we analyze our experimental data to test these hypotheses. Considering the importance of strengthening a project's conceptual content in the fuzzy front-end of innovation, we then propose a systematic method to increase concept density in innovative proposals.

METHODOLOGY

OVERVIEW OF EMPIRICAL DATA AND COLLECTION METHODS

The empirical portion of this research builds upon data gathered as one of the authors worked for a construction industry startup incubator located in Paris, France. The incubator offers several forms of support, including coaching by industry specialists, low cost office space, and access to approximately thirty large firms that are partners with the incubator. To join the incubator, entrepreneurs must apply using an online application form. These applications are pre-screened by the incubator management team for completeness (i.e. all required information provided) and the startup's relevance to the construction and building industry. Qualifying entrepreneurs are invited to present their company to a panel comprising nearly twenty individuals, including representatives from the incubator's corporate partners, investors, and incubator staff. Selection committee meetings last a few hours. On average, the committee evaluates eight startups per session. Each presentation lasts roughly fifteen to twenty minutes, including time for questions from panel members. Following each presentation, each panel member individually evaluates four aspects of the startup using a five-point scale: the product offering or "value proposition", overall market size and saturation, the financial credibility of the project, and team's quality. Individual sub-scores from each panel member are then collected and averaged. The four averaged sub-scores are then added to obtain a final score out of 20 points. Total scores lower than 8 are often considered eliminatory.

The present study builds upon 121 PowerPoint presentations given by entrepreneurs applying to enter the construction startup incubator from 2015 through 2017. These presentations are often referred to as "pitch decks" by both entrepreneurs and investors. Pitch decks are used as a visual support to help summarize key aspects of a new company, including the target market, customer needs, proposed solution, competitor analysis, business team, and financial estimates (Ries, 2011, Osterwalder & Pigneur, 2013). These presentations typically contain between 12 and 20 slides—approximately one slide per minute of presentation. Some entrepreneurs add a demonstration video to their presentation. Each slide contains a mix of images and text that supports the entrepreneur's presentation. While all oral presentations were conducted in French, some slide decks are written in English.

To identify the conceptual architecture of each proposal, the 121 PowerPoint presentations were individually and systematically analyzed to identify concepts. Examples of concepts include "data authenticity" or "the home that acts for me". This process is described in the following sections.

METHODOLOGY FOR PITCH DECK ANALYSIS

We systematically reviewed the 121 pitch decks using an eight-step process. This process is summarized below, followed by an example that illustrates the articulation of steps 6, 7 and 8 based on an actual pitch deck. First, we read through the decks (*step 1*), and then noted the key elements identified in our literature-based best practices (*step 2*). We then categorized this information in relation to common items presented in each pitch (*step 3*). Following this rapid analysis, we then went through each pitch deck a second time (*step 4*) while noting all the conceptual formulations present in the document (*step 5*). Building on techniques drawn from formal design theory, we identify a concept as a proposition that doesn't have a logical status in a knowledge space (*step 6*). Considering this definition, we noted, as concepts all parts of the presentation for which we had to ask ourselves “what could it be?” rather than “what is it?” (*step 7*). The very last part of our methodology was to organize the concepts extracted from the pitch deck as a coherent conceptual tree inspired by the formalism of C-K theory, considering that a concept of lower level is a partition of the upper concept, each partition adding new properties to the concept (*step 8*).

EXAMPLE OF PITCH DECK REVIEW

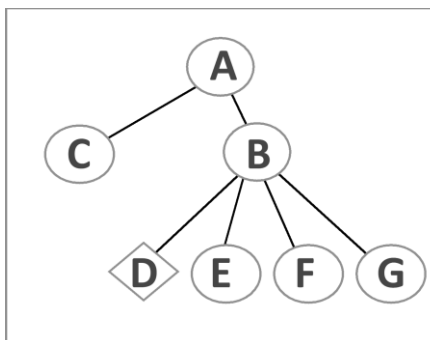
To illustrate the use of the latter steps in our process, we present an example of the analysis used the pitch deck submitted by a startup. Ween is a startup that develops and commercializes a connected thermostat that enables the automatic control of houses heating systems by following the resident's whereabouts throughout the day (geolocation).

The pitch deck is composed of ten PowerPoint slides. The following table lists the concepts explicitly present on each of the ten slides in the document:

Slide number	Kinds of Information	Concepts
1	Name of the startup and company slogan	
2	Market need as identified by the startup	A/ <i>“The connected home that acts for me”</i>
3	Market need as identified by the startup	

4	Unique solution proposed by the startup	
5	Overview of the technology and differentiation in relation to competitors	B/ <i>“Geopiloted device”</i> C/ <i>“Preprogrammed device”</i>
6	Application development forecast	D/ <i>“A device to control heating systems”</i> E/ <i>“A device to control window shades”</i> F/ <i>“A device to control door locks”</i> G/ <i>“A device to control lighting”</i>
7	Evaluation of market size	
8	Focus of one specific market to address	
9	Financial forecast	
10	Closing of the presentation	

We can then propose multiple relationships between the identified concepts. To do so we build a tree-shaped conceptual architecture where lower-level concepts are partitions of higher-level concepts. As an example, concept B “geopiloted device”, is a partition of concept A “The connected home that acts for me”. In the case of Ween the conceptual architecture of the pitch deck is represented visually below and described in the following section:



At the bottom left of the architecture, we find Concept D that most closely describes Ween as a product: D: *“The connected home that acts for me using a geopiloted device to control heating systems.”* Concept A is the broadest or most expansive proposition, the one that includes most

concepts, with two distinct subsets: B “*geopiloted devices*” and C “*preprogrammed devices*”. As concept B is preferred by the startup to concept C, it can be further partitioned in concepts D, E, F and G as follow.

D: “The connected home that acts for me using a geopiloted device to control heating systems”

E: “The connected home that acts for me using a geopiloted device to control window shades”

F: “The connected home that acts for me using a geopiloted device to control door locks”

G: “The connected home that acts for me using a geopiloted device to control lighting”

Concept D describes the product that is actually developed and commercialized by the startup and concepts E, F and G can be interpreted as potential additional product or solution that the startup plans to develop and commercialize in the future as part of a wider product range.

RESULTS

After having explained and illustrated our methodology on one pitch deck, we present the results obtained on the collection of 121 startup pitch decks.

COMMON ITEMS IN ALL PITCH PRESENTATIONS

This first statement we can make when reading the 121 pitch presentations is that if they aren't necessary structured around a single standard format, some recurrent items are very frequently present in the presentation:

- An attempt to describe an identified market need
- The presentation of a unique solution to this need
- Some information on the underlying technology
- Some information on the startup's competitors
- A description of startup's competitive advantages
- A development forecast of the company (with quite detailed financial figures)
- The financial needs of the startup
- The curriculums of the team members
- The expectations of the startup when joining the incubator

Table 1 show the frequency of each of these items in the 121 pitch presentations we have analyzed.

Common item in the pitch presentations	Frequency among 121 pitches
Identified market need	110/121 • (92%)
Unique solution to this need	110/121 • (92%)
Info on underlying technology	72/121 • (60%)
Competition	84/121 • (70%)
Startup's competitive advantages	78/121 • (65%)
Development forecast	73/121 • (61%)
Financial needs	30/121 • (25%)
Team CVs	73/121 • (61%)
Expectations when joining the incubator	40/121 • (33%)

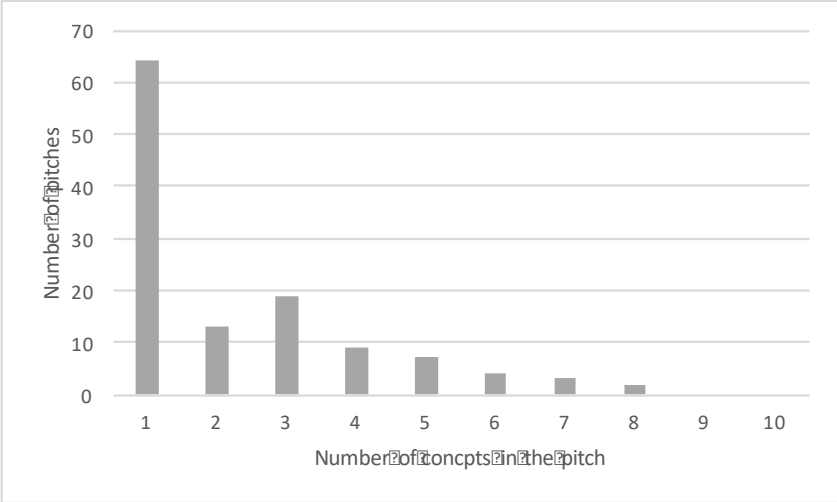
Table 1

This first finding in our empirical data confirms as previously stated that when it comes to presenting its project to a decision maker an innovative project proposer tends to fit with standard professional best practices (Ries, 2011, Osterwalder & Pigneur, 2013). We can then note that these recurrent items are covering the above-mentioned elements expected as being mandatory at the end of a front-end of innovation prior entering a structured NPD phase. These observations enable us to validate our first hypothesis (H1). Startup pitch presentations are structured in a cognitive legitimation effort as a tool for concept validation as if being at the border between fuzzy front-end and new product development.

A NOTABLE DIFFERENCE: THE NUMBER OF DIFFERENT CONCEPTS MENTIONED IN THE PITCH
 Concepts are the starting points of all design processes (Hatchuel et al. 2009) and we could assume that an innovative project proposal presentation should put forward the various concepts that have been at the source of the project resulting in a fairly rich presentation in term of number of concepts exposed.

On this specific matter, we notice that the number of different concepts enounced in the document is a parameter that can significantly vary from one presentation to another.

Graph 1 presents the frequency of the number of concept exposed in the 121 analyzed pitch presentations and shows that in about one half of the pitches only one singular concept is enounced. One half is a lot, but it also means that about 50% of the 121 pitch decks include more than one single concept.



Graph 1

This second finding in our empirical data is a first step toward the validation of our second hypothesis (H2): the existence of various potential conceptual architectures underneath a pitch presentation.

FORMAL DESIGN THEORY AS A DESCRIPTIVE LANGUAGE TO DESCRIBE THE UNDERLYING CONCEPTUAL ARCHITECTURE OF AN INNOVATIVE PROJECT

Formal design theory provides researchers and practitioners with a framework for describing, analyzing and evaluating innovative design processes. (Le Masson & McMahon 2016). It constitutes a powerful theoretical framework to understand the difficulties of conceptual expansion in innovation situations (Benguigui, 2012) and in many cases, it can be used as an analytical tool to control and structure the use of empirical data in research (Le Masson & McMahon 2016).

To build the underlying architecture of the startup pitches we propose a simple methodology. While reading the entire presentation, we took note of each conceptual formulation found in each pitch presentation. By conceptual formulation we mean each proposition that could not be decided as being true or false in our own knowledge space. This knowledge space does include knowledge contributed by the pitch presentation.

After this initial review, we try to place all the noted concepts in a conceptual space by determining which concepts can be considered as a partition of another. Doing so we succeeded to build for each pitch presentation an underlying conceptual arborescence in a graphic representation using formalism of the C-K theory (Le Masson & McMahon 2016).

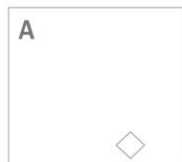
CONCEPTUAL ARCHITECTURE ACROSS 121 PRESENTATIONS

We have applied this methodology to the 121 pitch presentations of our experimental data. After having done this work on the 121 pitches of our data sample we realized that 4 recurring patterns emerged we label as follows and describe in greater detail below.

- A. Lone concept
- B. Conceptual line
- C. Conceptual tree
- D. Inverted conceptual clouds

TYPE A: LONE CONCEPTS • 64 PITCHES (53%)

The lone concept present in these pitches is simply a conceptual formulation of the actual product or service that the startup claim to develop or commercialize. As a lone concept, this representation takes on the following shape in all situations. Lone concepts can evolve into any of the other types of conceptual architectures.


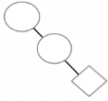
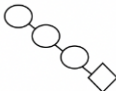


TYPE B: CONCEPTUAL LINES • 28 PITCHES (23%)

Conceptual lines reflect a genealogy of concepts which ends with the proposed product or service. In this conceptual architecture, each concept is clearly understood as a sub-element to a parent concept. However, additional partitions at the same level are not expressed. Conceptual lines can evolve into conceptual trees (type C), or in some circumstances the conceptual line could be pushed aside to become a lone concept (type A).

Three variants of a type B architecture exist, each variant reflecting an additional parent level above the initial concept. The results are summarized in Table 2 below.





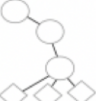
Table 2: variants of type B conceptual architecture

Variant	Composition	Representations	Number of instances
B	<i>Concept + parent</i>		13 46.4% of type B; 10.7% of all pitches
B'	<i>B + parent</i>		14 50% of type B; 11.5% of all pitches
B''	<i>B' + parent</i>		1 3.6% of type B; 0.8% of all pitches
TOTAL TYPE B			28 100% of type B; 23% of all pitches

TYPE C: CONCEPTUAL TREES • 21 PITCHES (17%)

Conceptual trees are the most complete representation. In this conceptual architecture, the primary product or service proposed represents a family. In most instances, they are derivatives of a parent concept or similar applications adapted to multiple sectors. Future growth could reasonably come from higher-level concepts. The results are summarized in Table 3 below.

Table 3: variants of type C conceptual architecture

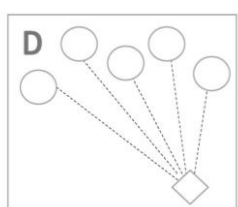
Variant	Composition	Representations	Number of instances
C	<i>Concept + parent & siblings</i>	 OR 	6 29% of type C; 5% of all pitches
C'	<i>C + parent (& siblings)</i>	 ,  , ...	12 57% of type C; 10% of all pitches
C''	<i>C' + parent (& siblings)</i>		3 14% of type C; 2% of all pitches
TOTAL TYPE C			21

100% of type C;

17% of all pitches

TYPE D: INVERTED CONCEPTUAL CLOUDS • 8 PITCHES (7%)

Inverted conceptual cloud: a single concept attached in an unclear fashion to multiple “higher ground” concepts. In this kind of architecture, we identify multiple high-level concepts and one conceptual formulation of the actual product or service, but we cannot clearly establish logical links between them as high-level concepts cannot be analyzed as being partitions of any other concepts. Type D concepts are closest in nature to type A concepts and require special attention to enhance them.



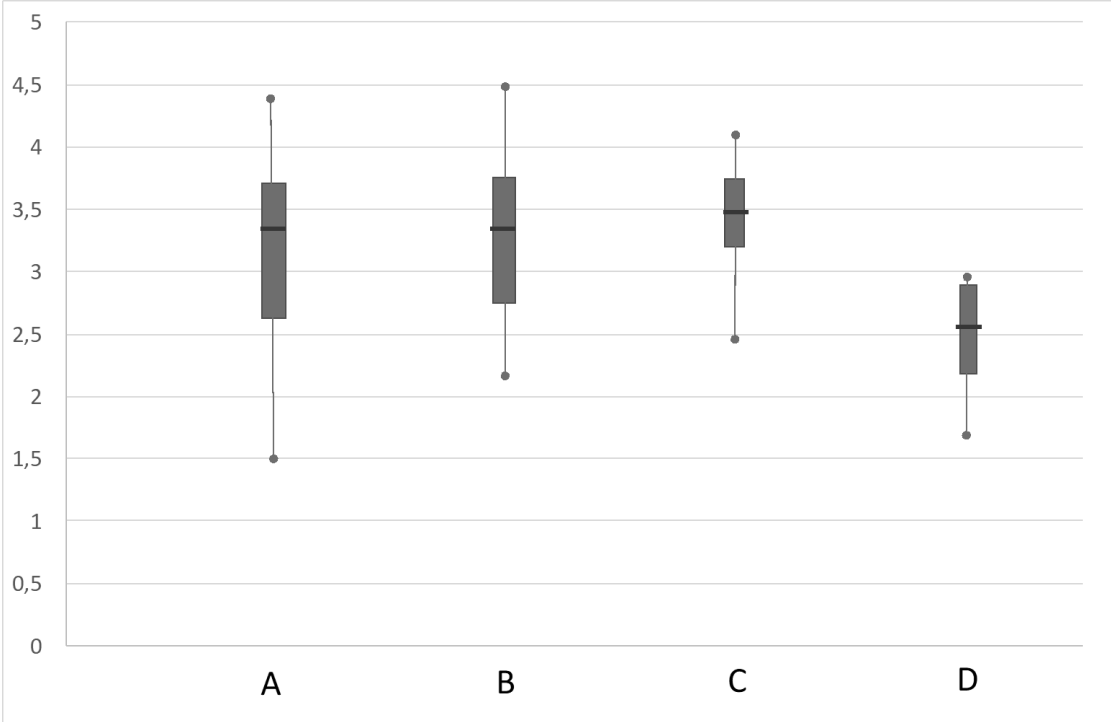
The characterization of our 121 pitch presentations using formal design theory as descriptive language has enabled the emergence of a typology of conceptual architecture of a pitch. These granular findings validates our hypothesis (H2) and shows that a startup pitch presentation can highlight more than one concept and can even present a structured conceptual approach. In next part of this paper we then question our (H3) hypothesis and look for a correlation between this conceptual architecture and the evaluation by decision makers.

CORRELATION BETWEEN CONCEPTUAL ARCHITECTURE AND PROJECT EVALUATION

To identify whether the score given by jury members responded differently to the four conceptual architectures, we used the “value proposition” sub-score as a proxy linked to conceptual structure. We recall that the other three sub-scores are not directly linked with the intrinsic quality of concepts presented—they are intended to reflect market size and maturity, projected financials, and the competency of the entrepreneurial team. We also recall that each sub-score is an average composed of individual sub-scores submitted by each jury member.

We performed a statistical analysis of the individual scores submitted by jury members for each project using SPSS software, comparing the average score to the standard deviation for each conceptual architecture. Our results (Graph 3) show the average of the average value

proposition ratings given by the jury members within a 95% confidence interval for pitches from categories A, B, C or D. This suggests that there is no significant difference between the scores attributed to pitches from categories A, B or C. Presentations from category D result in ratings significantly lower than all other presentations.



Graph 3: average of the average value proposition ratings and their dispersion

At this stage, our preliminary conclusion is that the existence of a large number of concepts with little or poor structure is regularly disregarded by decision makers as a proof of non-clarity (type D of conceptual architecture), the richness of a conceptual architecture underlying a pitch is not a significant criterion that favorably impact the evaluation.

Further analysis examines the standard deviation of the ratings given by the members of the jury for pitches from categories A, B, C or D (Table 2). This suggests that scores attributed by jury members tend to converge more in the case of type C pitches than is the case of types A or B. Type D pitches indicate that jury members have greater difficulty agreeing on the actual value of the proposal.

	Average of average ratings given by jury (5-point scale)	Averaged standard deviation of ratings among jury members
A	3.149768095	0.874294512
B	3.283002156	0.848657304
C	3.418238016	0.753232468
D	2.453333454	0.984603945

Table 4: Averages of the average ratings and standard deviation of ratings

Both results lead us to partially reject our hypothesis (H3).

First, the type of conceptual architecture structured in a pitch is not a determinant of the overall score given to a presentation. In other words, a more complete conceptual architecture does not necessarily result in a significantly lower or higher score. However, the conceptual architecture of a presentation does have an incidence on the convergence of decisions made by committee members. Two data points from our results illustrate this result. First, as decision-makers identify an illogical conceptual architecture (type D), they recognize that additional work is required to establish a clear value proposition. Second, as committee members evaluate elaborate conceptual architectures (type C), they independently reach similar conclusions regarding the entrepreneur's value proposition.

Our results regarding the wide swath of middle-ground containing pitch types A and B invite continued research. These two categories represent the majority of pitches (76%). Although differences in scores attributed by decision makers to proposals in these two categories are statistically insignificant, individual scores increasingly vary. This result leads us to consider the following question: to what extent decision-makers engage in a design process that extends the conceptual architecture of a presentation?

QUALITATIVE ANALYSIS OF THE COLLECTIVE REASONING OF A JURY

To explore this question, we video-recorded a selection committee of the startup incubator. These recordings allow us to analyze the interactions between the jury and the entrepreneurs, followed by the deliberation process between the jury members. Our first recording lasts one hour and a half containing 7 startups presenting. Each presentation is followed by a brief Q&A session with the jury, after which the entrepreneurs leave the room and a brief discussion occurs between jury members.

We analyzed these presentation sessions in the following manner. As we listen to the presentation, we outline the underlying conceptual architecture of the pitch using the same method described previously. We then proceed to analyze the discussion with the jury, noting all verbal elements that could be additional concepts intended to enrich the original proposal. The following table (Table 3) summarizes the three stages of a presentation:

1. Presentation by an entrepreneur
2. Q&A session between jury and entrepreneur
3. Deliberations among jury members

The left column contains verbatim recorded in each phase; the right column displays the changes in conceptual architecture.



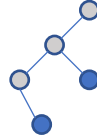
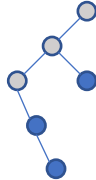
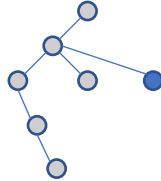
Phase 1: Startup pitch	
Verbatim	Conceptual architecture
<p><i>Drapo is a costing, works execution and assurance service for housing renovations. This service is developed through a network of professionals, presented on a web portal, and the proposal of pre-packaged solutions for home energy performance improvements.</i></p>	
Phase 2: Q&A Session	
Verbatim	Conceptual architecture
<p><i>Q1: You mention in your presentation an average order size of 10,000 euros, while your packaged offers are about 200 euros. Do you have any other offers?</i></p> <p><i>A1: Yes, in addition to our simple packaged offers we propose complex renovation solutions combining more than two different solutions.</i></p>	
<p><i>Q2: I don't understand what is your offer at 59 euros. How can it be so cheap?</i></p> <p><i>A2: Well in fact, as I said it is 59 euros per month. We have incorporated a bank credit in our packaged offer.</i></p>	
<p><i>Q3: Do you make some kind of promise to your customer concerning the actual energy savings they make with your services?</i></p> <p><i>A3: No, not at the time but we know it is something that should be developed in the future.</i></p>	
Phase 3: Deliberation	
Verbatim	Conceptual architecture
<p><i>The starting point is interesting, but the offer doesn't seem to be complete.</i></p> <p><i>...And he is not the only one to propose such services</i></p> <p><i>Above all energy savings is not the best position for his business.</i></p> <p><i>Yes, I agree there are many other things he could do.</i></p>	

Table 5: conceptual exploration & expansion during a startup selection committee presentation

The example of Drapo detailed above clearly shows that starting from a pitch presentation from category B, the discussions between the jury and project proposers and also between the jury members themselves enable the look for potential conceptual expansions that can finally be represented as type C conceptual architecture.

The additional concepts added to the pitch structure can be either concepts that have been intentionally put aside by the entrepreneur in an effort of simplification of its proposal or concepts that had never been identified by the entrepreneur and that arises during the discussion. This result confirms that the understanding of the conceptual architecture of a project presented at the border between the fuzzy front-end and following new product development processes is a critical asset for decision makers in the resource allocation process. And it seems to explain why the completeness of the architecture of a proposal is not a critical parameter in final evaluation: when confronted to a not fully detailed conceptual architecture in project proposal, decision makers seem indeed to undertake a design effort to complete this architecture with not explicit existing concepts or even with additional concepts not even implicitly contained in the proposal.

DISCUSSION AND MANAGERIAL IMPLICATIONS

Considering that the conceptual architectures underlying the pitch presentations from categories A, B and C do not seem to be a discriminating parameter in the evaluation of the startups by a jury, and considering that this could be explained by the fact that a jury is able to complete low structured conceptual architecture through an implicit design effort, we further question the possibility to propose a systematic conceptual rework of the presentations that could enhance their conceptual content and produce positive impacts for project proposers and/or evaluators.

TOWARDS A CONCEPT DENSIFICATION PROCESS

Considering that the startup projects are still in a fuzzy front-end part of the innovation process, an efficient effort to improve the proposals should focus on strengthening the developed concepts (Koen et al. 2002).

To understand what such a “concept strengthening” could be we propose to refer to the idea of “conceptual densification”. This concept has been developed from the work of the analytic philosopher Nelson Goodman, to characterize a reopening of the signifying chain of a symbolic object (Béjean 2009). This concept can be illustrated (and operationally applied) when using

the C-K formalism. When using C-K theory in design activities, one difficulty is to find the “good” partitions, i.e. the one that enables a wide opening of the exploration potential in conceptual space. Densification is an operation that produces additional conceptual partition through making significant variation of existing concepts (Béjean 2007, 2009).

Such a densification process, through the opening of new area of conceptual exploration, is able to reduce the fixation effect of a project team (Agogué 2012) and to favor future evolution of a proposal in the benefit of its future development.

PROPOSED METHODOLOGY FOR PITCH CONCEPTUAL DENSIFICATION

To obtain conceptual densification using the presentation material we had (121 PowerPoint presentations) we proposed a systematic approach. We thoroughly looked for inconsistencies or incompleteness in the conceptual content of the pitch presentations. By ‘inconsistencies’ we mean every conceptual formulation that doesn’t seem to have been fully incorporated in the startup offer although explicitly mentioned in the pitch. As an example, we can quote a startup named OpenSafe which business model did not include any idea of open source or open data. In this case the very name of the startup can be interpreted as a conceptual proposition that is inconsistent with the rest of the proposal and that could be included as an expansive partition of the existing concepts.

By ‘incompleteness’ we mean every conceptual formulation that could be understood by more than one sense and for which only one sense is explicitly exploited in project proposal. For instance, we can mention a startup called Woollet which claim to develop a service for data authenticity validation meaning that they can validate the undisputable origin of the data while authenticity could also mean exactitude or sincerity. These two alternative meanings produce alternative concepts to be explore.

APPLICATION TO A SELECTION OF PITCHES

We have applied our above-mentioned methodology to the pitches presentation we had and it proved its capacity to elaborate densified conceptual contents and alternative exploration areas for all pitch presentations having an underlying conceptual structure of type A, B or C. For type D proposal, the same rework is probably possible, but as the initial conceptual structure is rather undefined it could result in many different proposals, quite different from the original idea, thus exploring irrelevant conceptual spaces, or engaging a “redo-from-start” process.

FUTURE RESEARCH AND PRACTICAL APPLICATIONS

LIMITS OF PRESENT RESEARCH

Our research presents limits that we plan to address through continued research. The first limit stems from the primary data source for this study: PowerPoint presentations. Our approach assumes that entrepreneurs place key ideas on their visual supports to reinforce their message. However, we may find that oral presentations contain additional or substantially different conceptual content than that found in the presentation. Future incubator selection sessions are now video recorded to identify to what extent our results may differ.

Second, while we are confident in the four conceptual architectures identified, we can't yet rule out the existence of additional architectures or sub-architectures at this stage. Extending our approach to a representative sample from multiple data sources – i.e. other sectors than construction, and/or other incubators - would increase the robustness of our results.

Third, the process of conceptual densification may require specific knowledge and skills that remain to be identified. We are researchers and innovation practitioners conducting in-situ experiments based on our experience and pre-existing knowledge. This pre-existing knowledge necessary impacts the alternative conceptual expansions we have proposed in the rework. Thus, the conceptual densification process should not be a systematic way to evaluate the expansion potentiality of a project. Rather, it should be used in association with tools commonly used in the fuzzy front-end such as creative workshops to improve and strengthen a proposal prior to entering a new product or service development.

THE CONCEPTUAL DENSIFICATION: A TOOL FOR PROJECT PROPOSERS, DECISION MAKERS OR BOTH?

This drives us to question the practical managerial implication of our densification process proposal. We saw that using formal design theory we could draw a conceptual architecture of the pitch and to propose a systematic densification of these architecture enabling a future wider exploration of alternative concepts prior to entering a new product or service development phase.

The question that arises is to know if this rework should be a tool for project proposer to improve their proposal before meeting decision makers or to decision makers to evaluate the full expansion potential of an idea before deciding on resource allocation. A third option could be to make this conceptual rework process a common tool for project proposal and decision makers (and other third parties if applicable) in a common effort to maximize project potential.

EXTENSION OF OUR RESEARCH TO OTHER MANAGERIAL SITUATIONS

Finally, we can also note that if our paper focus on the case of startup pitch to enter an incubator, our research might also apply to other management cases. We could alternatively study the interest of project conceptual architecture evaluation and conceptual densification rework for innovative project proposal in corporates, for project entering a Fab Lab or many other management situations.

CONCLUSION

The focus of this paper has been to look at the conceptual architecture of startup pitch presentations in the early moments of their existence. A review of existing literature in entrepreneurial research and fuzzy front-end of new product development has shown that the startup pitch is an exercise of legitimation by the entrepreneur in front of decision makers and that it tends to present a startup in a more mature way than what it really is. Nevertheless, based on 121 PowerPoint pitch decks made by startups applying for support in a startup incubator, we have shown that while pitches are rather conventional in their format and present some recurrent items, they have substantially different levels of conceptual architecture. Formal design theory is a powerful analytical tool for us to characterize the underlying conceptual architecture of the 121 pitches, with four recurring conceptual architectures revealed by our analysis.

If we can fully understand the importance of this legitimation effort, we wondered how one could overpass the trap of cognitive biases that such an exercise poses. To overcome this, we propose a process for the conceptual reworking of the pitch presentations applying the concept of “conceptual densification” to enable entrepreneurs, decision makers, or both to move to higher conceptual ground and then appreciate the extent of the reachable conceptual space and the potential of future development (or pivot) of a proposed project.

This research could now be continued in various directions including the application and experimentation of our conceptual densification rework in various managerial applications.

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ANNEX 1: CLASSIFICATION OF 121 PITCH PRESENTATION AND CORRESPONDING EVALUATION

Startup	Classification	Mean of "offer" ratings	Standard deviation of "offer" ratings
Solitech	A	2,400	1,183
Aelice	A	2,154	0,899
BIM 3 data	A	2,813	1,109
Bricks	A	2,846	0,987
datBIM	A	2,800	0,789
Dispatcher	A	2,647	1,057
Edifycad	A	2,786	0,893
Energie IP	A	3,833	0,577
Foxel	A	3,944	0,873
Inergreen	A	1,467	0,640
Intent	A	3,667	0,730
IO technology	A	2,611	0,979
Isogec	A	3,333	0,492
Itekube	A	3,071	0,730
Keywall	A	2,750	0,707
Lacimenterie	A	2,267	1,100

LBIventive	A	3,737	0,991
Levels3D	A	3,955	0,785
LisaBlue	A	2,333	0,985
Magic Mosaic	A	1,923	0,760
MIP Robotics	A	3,391	0,783
Mydecolab	A	3,435	1,037
OHT	A	4,357	0,633
Opensafe	A	3,417	1,240
Qbot	A	3,905	0,889
R&Drone	A	3,600	0,966
Roboplanet	A	4,071	0,730
Scalog	A	3,643	0,929
SmartCast	A	3,769	0,725
Snapkin	A	4,125	0,885
Solable	A	2,615	0,870
Twistengine	A	2,077	1,115
Woleet	A	3,471	0,800
Xtree	A	3,545	0,858
BIM My Project	A	2,900	0,832
Les Companions	A	3,100	0,938
La Bonne Brique	A	2,5	0,856
iBat	A	3,500	0,907
DB Lab	A	2,640	0,888
VIEO	A	2,500	0,835
WisElement	A	3,500	0,996
Wi6Lab	A	2,800	0,855
Rossini Energy	A	4,100	0,875
Naoden	A	4,000	0,943
Lancey	A	3,900	0,848
Duffus Architecture	A	3,400	0,895
Sofrinnov	A	3,300	0,820
Tenova	A	2,700	0,914
Syscobat	A	3,300	0,745
Karibati	A	2,900	0,997
My Little Worker	A	3,110	0,917
EcoCinetic	A	3,900	0,991

Ipsiis	A	2,600	0,916
Tracktor	A	3,800	0,354
Push4M	A	2,640	0,518
Faber Place	A	3,100	0,911
Easy Smart Home	A	2,400	0,719
YellowScan	A	3,900	1,165
IofMe	A	3,600	0,905
Datacheck	A	1,700	0,965
C2Home	A	3,300	0,985
Captain Tower	A	2,400	0,900
Workwell	A	4,100	0,937
Quartier Frais	A	3,500	0,905
Aerial Coboticus	B	3,533	0,743
Archon	B	2,857	0,770
Bloc in Bloc	B	2,941	0,827
Carravaggio	B	2,818	1,079
e-lum	B	3,600	0,986
Ermeo	B	2,688	1,078
Expert Teleportation	B	3,471	1,125
Glowee	B	4,273	0,703
Habiteo	B	3,870	0,869
Lafacade	B	3,522	0,898
Openergy	B	3,000	1,113
Qualisteo	B	4,478	0,593
Terabee	B	3,938	0,680
Upstone	B	2,588	0,870
XpertEye	B	4,000	0,707
Zephyr	B	3,211	1,134
Disruptive Technologie	B	4,300	0,895
Drapo	B	2,000	0,835
WizzCad	B	3,900	0,793
Hyphen Pro	B	2,700	0,820
La mama des chantiers	B	3,600	0,745
Energic	B	2,300	0,756
Wall In	B	2,500	0,756
360 Smart Connect	B	2,500	0,629

Suna Environnement	B	3,600	0,651
Echy	B	3,100	0,937
GoalMap	B	3,500	0,905
Originel Design	B	2,800	0,866
Augment	C	3,222	0,667
Beton Direct	C	3,529	0,943
BIM in Motion	C	2,846	0,987
BIM & CO	C	3,214	0,579
Bright	C	3,960	0,841
Connect'O	C	3,462	0,967
Devisubox	C	3,167	0,937
Lili	C	3,500	0,674
PersEE	C	3,412	1,064
Realiz3D	C	3,750	0,856
Soldating	C	3,353	0,862
Travauxlib	C	3,250	0,967
Ween	C	3,600	0,910
Combo Solutions	C	4,100	0,669
Ecodrop	C	3,400	0,671
Matabase	C	2,400	0,612
Airthium	C	4,000	0,555
Cad42	C	3,700	0,611
SmartMeUp	C	3,800	0,447
Toolz	C	2,800	0,680
MoveToBim	C	2,900	0,619
Dronéa	D	2,214	0,975
Escadrone	D	2,923	1,115
Habitac	D	1,684	0,946
Hexabim	D	2,533	1,356
Stereograph	D	2,923	0,954
Web2VI	D	2,875	0,641
Kocliko	D	2,400	0,964
Datapole	D	2,000	0,926