

**MOVING TO HIGHER GROUND:
BUILDING INNOVATION CAPABILITIES TO OVERCOME
CONCEPTUAL BIASES IN NEW PRODUCT & SERVICE DEVELOPMENT**

Antoine Thuillier, Matt Fuller, Albert David

**Université Paris-Dauphine, PSL Research University, CNRS, DRM, M-Lab,
75016 Paris, France**

ABSTRACT

Startup companies face many challenges in the early years of their existence. During these critical stages, they are often required to convince decision makers to allocate critical resources to them to obtain venture capital, support from a startup incubator, or government subsidies.

To succeed in this, entrepreneurs must present their new born businesses in an engaging and convincing way. However, to create legitimacy surrounding project, 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” aspect of the front end of innovation and new business creation, entrepreneurs also take a considerable risk by curtailing the inherent potential of their innovative concepts. In this paper, we study a specific form of formalization of innovative ideas: startup pitch decks. We analyze 70 startups pitches as they apply to enter an incubator. In this paper, we highlight common trends and major differences in their structure. We then show how underlying conceptual architecture can be characterized using formal design theory as a descriptive language and decision making tool. We then suggest a process of conceptual densification that could help entrepreneurs and decision makers (or both) 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 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 relatively rigid, 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.

This backs proposers in a potentially dangerous blind spot for the future development of their project—a cognitive bias called conceptual fixation (Agogué et al., 2014; Jansson & Smith, 1991). However, emerging, innovative projects generally include a high degree of uncertainty. Despite prior support from decision makers, proposals may require fundamental changes later on to ensure survival. When changes in course are necessary to succeed, conceptual fixation can make them 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 focus on a specific type of innovative project: startup companies. During their first years, a startup's founders must convince various decision makers of the interest 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 a rigid and assertive formalism comes from a common belief, largely disseminated through professional literature, that it is the best way to convince a decision maker (Osterwalder & Pigneur, 2013). However, this posture seems to implicitly assume that decision makers are unaware of the fuzzy nature of the front-end of innovation and out of touch with reality, or that they automatically account for the risk of innovation and use the pitch as a relative benchmark between all proposals. We could also imagine that decision makers are skilled professionals accustomed to the innovation

process and to the uncertainties of the front end of innovation. They might therefore consider more favorably project proposals showing the uncertainties 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 NPD research regarding innovative propositions. 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 portion of this paper, we test this approach using an empirical dataset drawn from 70 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 by decision makers to see if this is a significant parameter in resource allocation decisions. Finally we discuss a series of managerial implications, including how the proposed process of conceptual densification could transform existing presentation practices that try to hide risk and uncertainty into a presentation of a transparent and structured field of innovation under exploration.

LITERATURE REVIEW

The startup pitch as 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 don't have verifiable past performance data. Thus decision makers can't base their resources allocation decision in such firms only on objectives criteria and have to accept a fair amount of subjective elements in their decision process.

Economic theory provides some interesting concepts to deal with such decision situation 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).

Being aware of that, 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 have to spend much attention in the pitching of their ideas and projects to make it credible and understandable by all stakeholders. Recent field based research carried in a high technology startup (O'Connor 2002) has shown that *a fair amount of work done by entrepreneur aim at building and communicating engaging narratives about his company to raise and capture the attention of his stakeholders*. More precisely and as stated by Ellen 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 and Weick et al. 2005). Narrative sensemaking is the entrepreneur ability not only to tell the story of its 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 one of these "king of narratives". 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 shows that among other variables concerning investor pitches, the one with the higher impact on resource allocation decision for funding is the level of preparedness of the entrepreneur's pitch (Chen et al. 2009 and Pollack et al. 2012). 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 the 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 stakeholders' 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).

Thus, existing literature provides interesting input to understand why and how startup pitches have a critical role to play for entrepreneurs looking for external resources. As they have no objective performance data to provide to the decision makers to support their requests, they have to address the adverse selection issue through a process of narrative sensemaking where pitching plays a central role. This pitch main function is to engage decision makers in granting sufficient legitimacy upon the startup to eventually consider the opportunity for resource allocation. This legitimacy is evaluated as the capacity of the presented project to be understandable and analyzable by the auditor.

From these points, we can infer that the start-up pitch is an assumed effort by entrepreneurs to make their project understandable by decision makers. This effort goes through putting the key idea into a quite standardized format that constitutes a common language enabling common understanding and granting sufficient legitimacy.

The startup pitch as a gate between the fuzzy front end and 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 of a new product or service development process. It is a preliminary stage where opportunities are identified and concepts are developed before going to 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 is eventually ended by 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).

Considering 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: they have generally not, at the moment when they pitch, fully stabilized their vision of addressed market, selected technology or suitable business model.

As above mentioned, 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 NPD stage from the FFE world supposes that some conceptual definition as 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 (Lemasson, 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 carriers of the project: several concepts could be present as a sequence reflecting how innovators progressively came to formulate their final proposition, but 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 shell for smartphones” is analytically a concept (an entity – a shell – with two properties: “creative” and “for smartphones”). But part of its value is in its relation 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 process.

RESEARCH QUESTION AND HYPOTHESIS

After reviewing the existing literature on entrepreneurial research and new product development, we have asserted that the start-up 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. Combining literature on FFE and NPD with literature on design reasoning 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 project carriers and members of juries from a conceptual standpoint is 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?

Four 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 correlations can be established between this classification and how the projects are rated by selection committees?
- What consequences could our research have on how should pitches be designed?

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

If the start-up pitch aims to make the projects understandable by decision makers, in a assumed effort of narrative sense making it is likely that the pitch presentations are formatted on a quite standard presentation.

(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. Our second hypothesis is thus:

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

A performance criteria for a fuzzy front end process is the ability to refine and strengthen the conceptual content of a proposal. Considering that decision makers are often skilled innovation practitioners, we can assume that they would evaluate more positively proposals with a wider conceptual content. From this we pose our third hypothesis

(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 nearly a dozen large firms that are partners with the incubator. To join the incubator, entrepreneurs must apply online using an application form. These applications are pre-screened by the incubator management team for coherency (i.e. all required information provided) and pertinence 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 with the objective of evaluating approximately eight startups per session. Each presentation lasts roughly fifteen to twenty minutes, including time for some questions from panel members. Following each presentation, each panel member individually evaluates four aspects of each 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 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 70 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; some entrepreneurs add a demonstration video in their presentation. Each slide contains a mix of images and text that backs 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 70 PowerPoint presentations were individually and systematically analyzed to identify concepts. such as “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 70 pitch decks using a 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 pose that a concept is 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

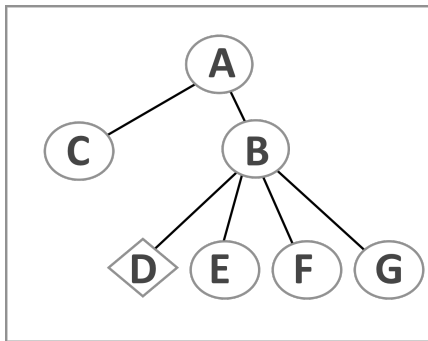
To illustrate the use of the latter steps in our process, we present an example of the analysis used the pitch deck submitted by a startup. Ween is a startup that develops and commercializes a connected thermostat that enables the automatic control of houses heating systems by following the resident’s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

The pitch deck is composed of 10 PowerPoint slides. The following table lists the concepts explicitly present on each of the 10 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, as 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 most broad or expansive proposition 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”

RESULTS

After having explained and illustrated our methodology on one pitch deck we present below the results obtained on the collection of 70 startup pitch decks.

Common items in all pitch presentations

This first statement we can make when reading the 70 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 70 pitch presentations we have analyzed.

Common item in the pitch presentations	Frequency among 70 pitches
Identified market need	66/70 • (94%)
Unique solution to this need	66/70 • (94%)
Info on underlying technology	43/70 • (61%)
Competition	52/70 • (74%)
Startup's competitive advantages	52/70 • (74%)
Development forecast	46/70 • (66%)
Financial needs	23/70 • (33%)
Team CVs	35/70 • (50%)
Expectations when joining the incubator	28/70 • (40%)

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.

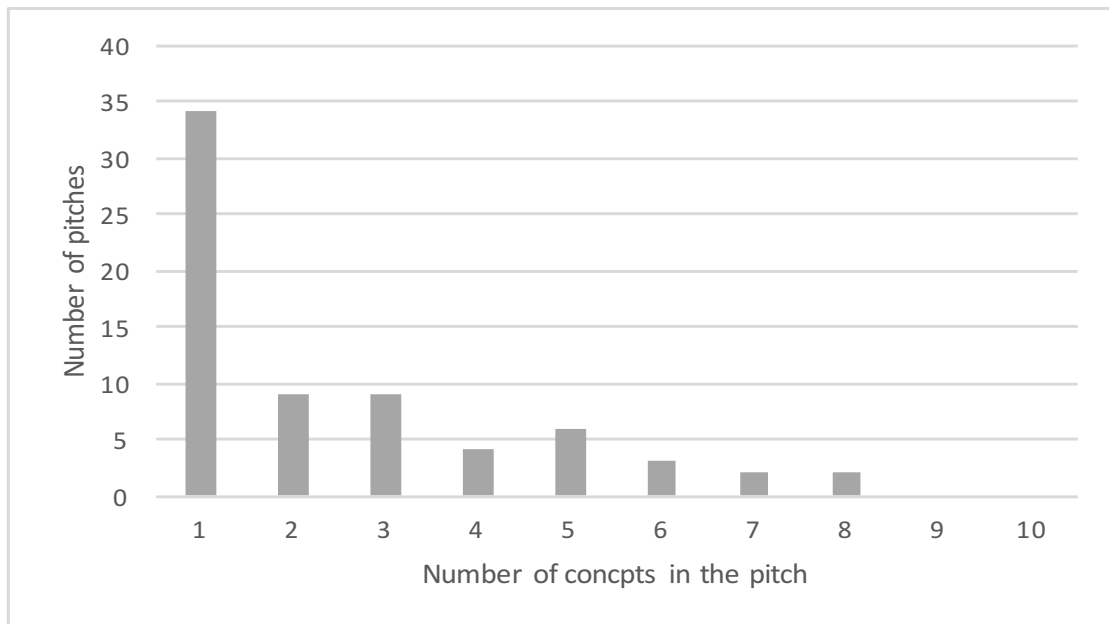
These observations enable us to validate our first hypothesis (H1). Startup pitch presentations are structured in a cognitive legitimation effort as a tool for concept validation as if being at the border between fuzzy front end and new product development.

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 70 analyzed pitch presentations and shows that in almost one half of the pitches only one singular concept is enounced.



Graph 1

This second finding in our empirical seem to validate our second hypothesis (H2) on the existence of various potential conceptual architecture underneath a pitch presentation. However, we still don't have explicitly illustrated these architectures as we lack a descriptive tool to do so.

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 proposed a quite simple methodology. Reading the whole documents, we noted 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.

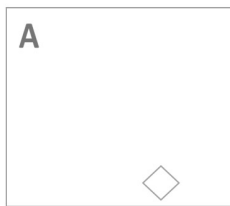
After this first screening we try to place all the noted concepts in a conceptual space by determining which concept can be considered as a partition of another. Doing so

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 70 presentations

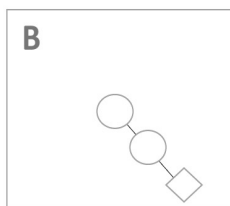
We have applied this methodology to the 70 pitch presentations of our experimental data. After having done this work on the 70 pitches of our data sample we realized that 4 recurrent patterns emerged.

For the 34 pitch presentations that contain only one single concept, the underlying architecture are not worth to be individually represented here. The lone concept present in these pitch is simply a conceptual formulation of the actual product or service that the startup claim to develop or commercialize.

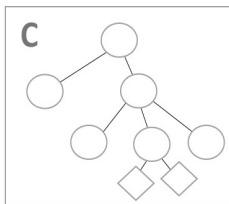
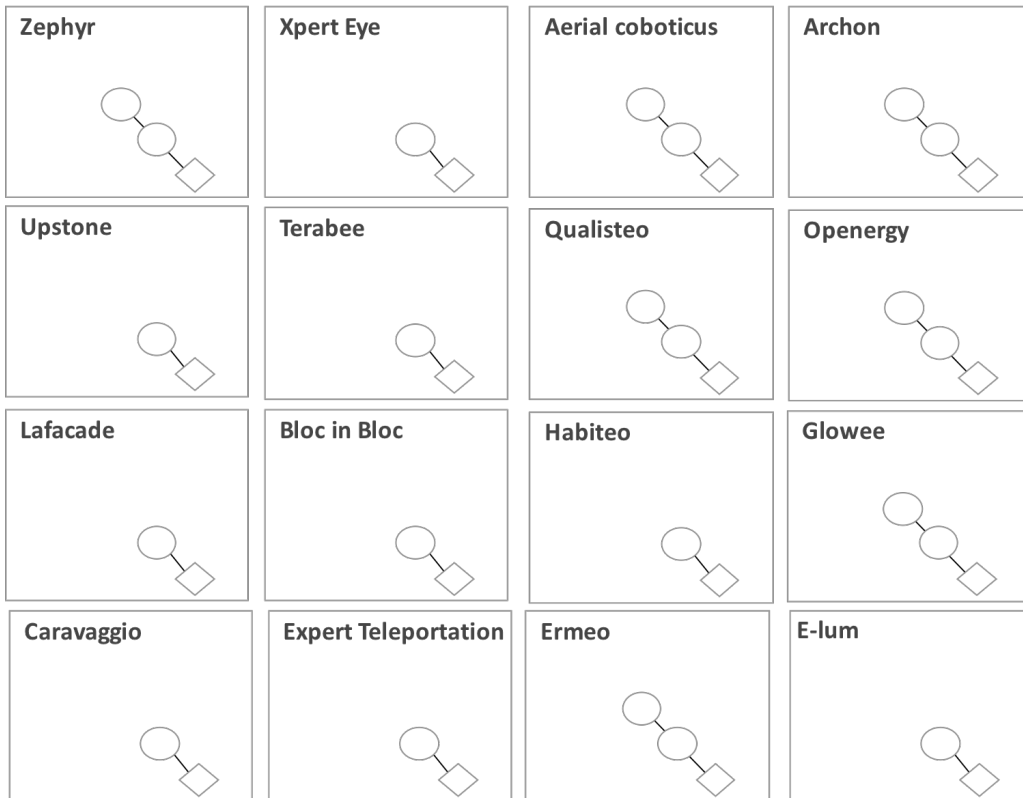


A. Lone concept: the proposed product or service being the only conceptual formulation of the pitch

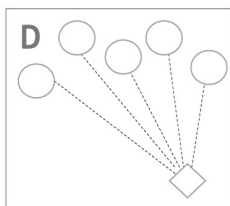
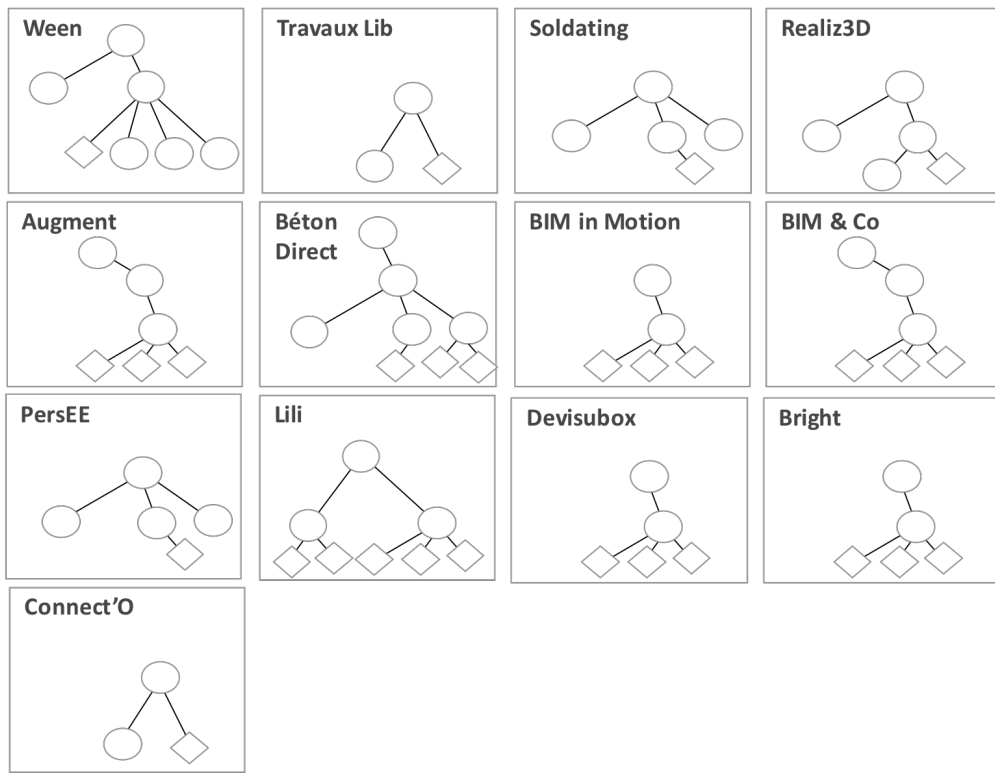
We have then graphically represented below the underlying conceptual architecture of the 36 other pitch presentations.



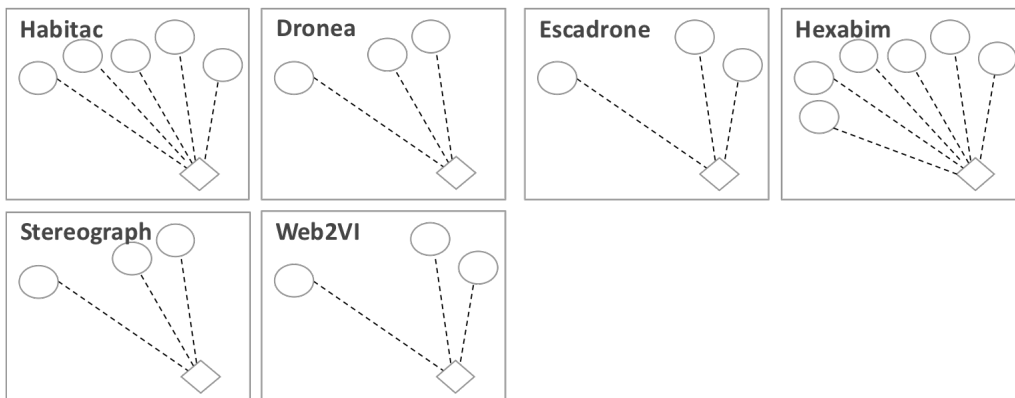
B. Conceptual line: a genealogy of concepts which ends with the proposed product or service



C. Conceptual tree: lowest level components are the products or services proposed and other branches contains potential area for future development



D. Inverted conceptual cloud: a single concept attached in an unclear fashion to multiple “higher ground” concepts



The characterization of our 70 pitch presentations using formal design theory as descriptive language has enabled the emergence of a typology of conceptual architecture of a pitch. This finding finely validate 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.

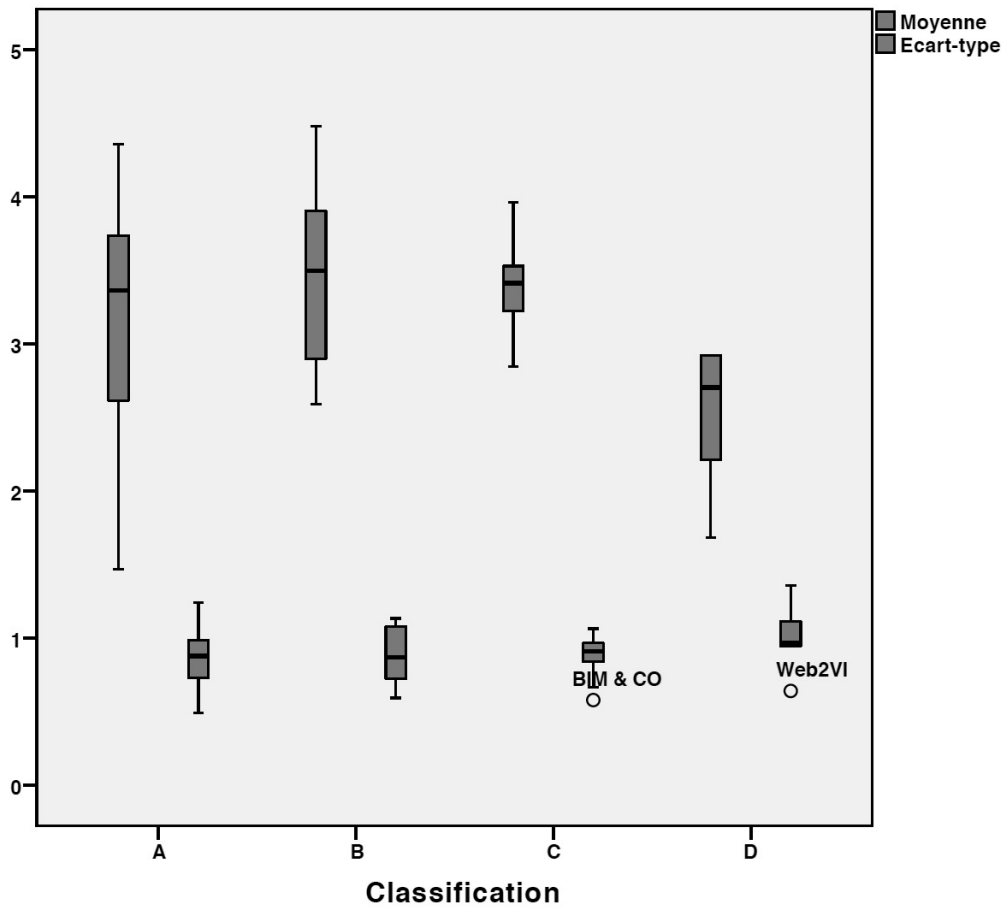
ANALYSIS

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. This showed that there was no significant difference between “value proposition” scores for presentations associated with categories A, B or C. On the contrary, startups identified in category D were significantly badly evaluated on the “offer” grade.

Graph 3 shows the average and standard deviation of these ratings within a 95% confidence interval for pitches from categories A, B, C or D. This suggests that there is no significant difference between the evaluation of pitch presentation from categories A, B or C while pitch presentations from category D result in ratings significantly lower than all other presentations.



Graph 3

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 impacts the evaluation.

This leads us to partially reject our hypothesis (H3).

We could explain the rejection of this hypothesis by different factors. Our main rationale for assuming this hypothesis (H3) was the fact that decision makers were supposed to be skilled innovation practitioners with experience of the specificity of the fuzzy front end part of innovation process. We could now wonder if the evaluation of the positive impact of a wide conceptual architecture beyond an innovative project requires some specific skills that are not common among the evaluators of the considered selection committee.

DISCUSSION AND MANAGERIAL IMPLICATIONS

Considering that the conceptual architectures underlying the pitch presentations from categories A, B and C don't seem to affect the evaluation of the startups by a jury, we further question the possibility to propose a conceptual rework of the presentation that could enhance its conceptual content and produce to be demonstrated 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, Béjean 2009).

Such a densification process through 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 (70 pitch PowerPoint presentations) we proposed a systematic approach. We thoroughly looked for inconsistencies or incompleteness in the conceptual content of the pitch presentations.

We give here a few examples of these inconsistencies and incompleteness.

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 didn't

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 Woolet 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 proposal of type D, 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.

FUTURE RESEARCH AND PRACTICAL APPLICATIONS

Limitation of achieved work

Our research present some limitations that we would like to go beyond in future work. The very first limitation is due to the research material itself. As it is composed only by the visual pitch PowerPoint presentation, we lack the oral part of the pitch. For some presentations, we might thus miss some conceptual content that would not have been fully readable in the PowerPoint although present in the oral version.

Concerning the pitch underlying conceptual architecture classification, we can question the robustness of our process. If we have not found more than 4 different architecture type among our 70 pitch presentations, we can't be affirmative that no other type of architecture could exist at this stage. Furthermore, we would like to evaluate the robustness of our classification process. For the purpose of this paper, the 70 pitches have been reviewed and classified by the authors in a common work. We would like to set up a more quantitative classification of pitch presentation by non-specialized and independent reviewer to confirm this robustness.

The third limitation concerns the conceptual densification process. We are researchers and innovation practitioners coming with our specific pre-existing knowledge. This pre-existing knowledge necessary impact 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 years of their existence.

Based on 70 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 70 pitches, with 4 recurring conceptual architectures. 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.

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 direction including the application and experimentation of our conceptual densification rework in various managerial applications.

REFERENCES

Agogu , M. 2012, October 15. Mod liser l’effet des biais cognitifs sur les dynamiques industrielles : innovation orpheline et architecte de l’inconnu. Ecole Nationale Sup rieure des Mines de Paris. <https://pastel.archives-ouvertes.fr/pastel-00767164/document>.

Agogu , M., Kazak i, A., Hatchuel, A., Masson, P., Weil, B., et al. 2014. The Impact of Type of Examples on Originality: Explaining Fixation and Stimulation Effects. *The Journal of Creative Behavior*, 48(1): 1–12.

Arteaga, R., & Hyland, J. 2013. *Pivot: How Top Entrepreneurs Adapt and Change Course to Find Ultimate Success*. Hoboken, NJ, USA: John Wiley & Sons, Inc. <http://doi.org/10.1002/9781118778852>.

Akerlof, G.A. (1970). The market for lemons: Quality uncertainty and the market mechanism. *Quarterly Journal of Economics*, 84, 488-500

Baker, T., & Nelson, R. E. 2005. Creating Something from Nothing: Resource Construction through Entrepreneurial Bricolage. *Administrative Science Quarterly*, 50(3): 329–366.

B jean M. ; *Le management des entreprises a prestations artistiques : activit s de conception, r gimes de signification et potentiel de croissance* (2009)

B jean, M. (2007a). *Densification as a mindset for arts management: learning from jazz drumming*. EGOS 2007, Vienna, Austria.

Benguigui J-M (2012) *Les 10 ans de la th orie C-K : Revue de litt rature*. Paper presented at the AIMS

- Chen, X., Yao, X., Kotha, S. (2009). Entrepreneur passion and preparedness in business plan presentations: A persuasion analysis of venture capitalists' funding decisions. *Academy of Management Journal*, 52(1), 199-214
- Cooper, R. G. 1993. *Winning at New Products*. 2nd ed. Reading, MA: Addison-Wesley.
- Daly, P., Davy, D. (2016), Structural, linguistic and rhetorical features of entrepreneurial pitch. Lessons from Dragons' Den. *Journal of Management Development*, Vol 35, No 1, 2016, p 120-132
- David, A. (2016), "How do innovators reason", Cercle de l'Innovation, Paris-Dauphine University, October.
- Gardner, W. L., & Avolio, B. J. 1998. The Charismatic Relationship: A Dramaturgical Perspective. *The Academy of Management Review*, 23(1): 32.
- Getty, P. (2014). *Twelve magic slides. Insider secrets for rising growth capital*. Apress
- Hatchuel, A., Le Masson, P., & Weil, B. 2006. *Building Innovation Capabilities: The Development of Design-Oriented Organizations*: 294.
- Hatchuel A. and Weil B., C-K design theory: An advanced formulation, *Research in Engineering Design*, 19(4):181–192, 2009
- Hussinger, K., & Wastyn, A. 2011. In Search for the Not-Invented-Here Syndrome: The Role of Knowledge Sources and Firm Success. *SSRN Electronic Journal*. <http://doi.org/10.2139/ssrn.1892749>.
- Jansson, D. G., & Smith, S. M. 1991. Design fixation. *Design Studies*, 12(1): 3–11.
- Katz, R., & Allen, T. J. 1982. Investigating the Not Invented Here (NIH) syndrome: A look at the performance, tenure, and communication patterns of 50 R & D Project Groups. *R&D Management*, 12(1): 7–20.
- Kawasaki, G. (2004). *The art of the start: The time-tested, battle-hardened guide for anyone starting anything*. Penguin
- Koen, P. A., Ajamian, G., Boyce, S., Clamen, A., Fisher, E., Fountoulakis, S., Johnson, A., Puri, P., & Seibert, R. (2002). Fuzzy-front end: effective methods, tools and techniques. In P. Belliveau, A. Griffen & S. Sorermeye PDMA toolbox for new product development (pp. 2-35). New York: John Wiley & Sons.
- Le Masson, P., McMahon C (2016). Armand Hatchuel et Benoit Weil : La théorie C-K, un fondement formel aux théories de l'innovation. *Les grands auteurs du management de l'innovation et de la créativité*, In Quarto - Editions Management et Société, pp.588-613
- Lemasson, P., Weil, B. and Hatchuel, A. (2010), *Strategic management of innovation and design*, Cambridge.
- Martens, M., Jennings, J., Devereaux Jennings, P. (2007). Do the story they tell get the money they need? The role of entrepreneurial narratives in resource acquisition. *Academy of Management Journal*, 2007, Vol. 50, No 5, 1107-1132
- O'Connor, E. (2002). Storied business: Typology, intertextuality, and traffic in entrepreneurial narrative. *Journal of Business Communication*, 39, 36-54
- O'Connor, G. C., Leifer, R., Paulson, A. S., & Peters, L. S. 2008. *Grabbing Lightning*. John Wiley & Sons.
- Osterwalder, A., & Pigneur, Y. 2013. *Business Model Generation*. John Wiley & Sons.
- Pollack, J. M., Rutherford, M. W. and Nagy, B. G. (2012), Preparedness and Cognitive Legitimacy as Antecedents of New Venture Funding in Televised Business Pitches. *Entrepreneurship Theory and Practice*, 36: 915–939.
- Reid, S. E., and U. De Brentani. 2004. The fuzzy front end of new product development for discontinuous innovations: A theoretical model. *Journal of Product Innovation Management* 21 (3): 170–84.
- Ries, E. 2011. *The Lean Startup*. Crown Business.
- Shepherd, D.A. & Zacharakis, A. (2003). A new venture's cognitive legitimacy : An assessment by customers. *Journal of Small Business Management*, 41 (2), 148-167

Smith, P.G. and Reinertsen, D.G. (1991). *Developing Products in Half the Time*. New York: Van Nostrand Reinhold.

Taura & Nagaï, (2013) "A systematized theory of creative concept generation in design: first-order and high-order concept generation", *Research in Engineering Design*, 24: 185-199.

Ward, T. B., Patterson, M. J., & Sifonis, C. M. 2004. The Role of Specificity and Abstraction in Creative Idea Generation. *Creativity Research Journal*, 16(1): 1–9.

Weick, K. (1979). *The social psychology of organizing*. Reading, MA: Addison Wesley.

Weick, K., Stutcliffe, K., Obstfeld, D. (2005). Organizing and the process of sensemaking and organizing. *Organization Science*, 16, 409-421.

Zott, C., & Huy, Q. N. 2007. How Entrepreneurs Use Symbolic Management to Acquire Resources. *Administrative Science Quarterly*, 52(1): 70–105.

Annex 1: classification of 70 pitch presentation and corresponding evaluation

Startup	Classificatio n	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
LBInventive	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
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
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
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