



## **La gestion des idées à l'ère de l'innovation digitale : Une étude de cas exploratoire**

### **Idea management in the age of digital innovation: An exploratory case study**

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#### **Résumé :**

Pour bon nombre d'entreprises, l'innovation digitale est devenue synonyme d'impératif stratégique et de priorité opérationnelle. Paradoxalement, l'innovation digitale est un terme fourre-tout dont la signification floue rend la mise en pratique difficile. La manière dont les idées spécifiquement destinées à constituer de futures innovations digitales doivent être gérées est un phénomène récent sur lequel la littérature reste jusqu'à présent muette. Nous apportons une première compréhension empirique à ce phénomène à travers une étude de cas sur la gestion d'idées telle que pratiquée dans une entreprise traditionnelle dans le cadre de sa stratégie de transformation digitale. Nous contribuons à la littérature sur la gestion d'innovations digitales et la transformation organisationnelle en démontrant comment la digitalisation transforme la phase d'initiation de la gestion de l'innovation. Notre cas indique que l'initiation d'innovations digitales nécessite un processus de gestion des idées flexible et une participation hétérogène d'acteurs. Une gestion des idées innovantes sous forme de couples de problèmes et de solutions en constante coévolution y est propice et aide à surmonter des inerties économiques et politiques dans l'initiation d'innovations digitales. Nous espérons ainsi guider les praticiens dans la mise en œuvre d'un processus de gestion d'idées propice au développement d'innovations digitales.

#### **Mots clés :**

Gestion d'idées, innovation digitale, transformation organisationnelle, paires de problèmes et solutions.

## 1. Introduction

Digital innovation management is the scholarly field which investigates how new digital technologies, platforms and infrastructure, change innovation processes and outcomes. Its leading scholars (e.g. Fichman et al., 2014; Nambisan et al., 2017; Yoo et al., 2012) have argued that digital innovation can refer, either in isolation or in combination, to innovation outcomes (a) embedded in IT (e.g. digital artefact), (b) enabled by IT (e.g. digital business model), or (c) supported by IT in their development process (e.g. digital prototyping). Most firms have recognized digital technology as a powerful fertilizer for innovation and have defined digital innovation as a critical part of their digital transformation strategy (Hess et al., 2016). However, there is a certain confusion in the practitioner world about how digital transformation strategies should be operationalized with regard to innovation (Chanias et al., 2019).

While the extant literature offers rich insight into digital innovation *development* (i.e. adoption and design) and *implementation* (i.e. governance and maintenance), little is known about digital innovation *initiation* (i.e. opportunities identification) (Kohli & Melville, 2019). Specifically, scholars have not yet looked into how organisations need to transform their idea management practices to initiate digital innovation. In order to address this gap in knowledge, we draw on idea management literature (Gerlach & Brem, 2017) in combination with digital innovation management literature (Nambisan et al., 2017) to examine how idea management, as “*a sub process of innovation management with the goals of effective and efficient idea generation, evaluation and selection*” (Brem & Voigt, 2007, p.306), is transformed for the purpose of initiating digital innovation. We thus pose the following research question: *How is idea management transformed to help seize digital innovation opportunities?*

We address this question with a longitudinal case study of how idea management is practiced in an incumbent firm in the fragrance industry (i.e. Globex, name changed) as part of its digital transformation strategy. Our findings suggest that in order to seize digital innovation opportunities firms must transform their idea management to (1) handle a more fluid idea management process and (2) leverage a more heterogenous crowd of idea contributors. We contribute to the literature on digital innovation management (Nambisan et al., 2017; Yoo et al., 2012) by raising awareness on how a dynamic approach to innovative ideas as problem-solution pairs (Von Hippel & Von Krogh, 2015) can support these transformations. We furthermore contribute to the literature on organisational transformation (Besson & Rowe, 2012) by highlighting how such a dynamic approach can help overcome economic and political inertia in the initiation of digital innovation.

Our paper is structured as follows: in Section 2, we provide an overview of the extant idea management literature and indicate how it falls short of considering idea management as an initiator of digital innovation. Section 3 presents our longitudinal case study methodology and describes our case. We present our findings in Section 4 and discuss them with regard to the literature on digital innovation management and organisational transformation in Section 5. Finally, Section 6 concludes by restating our main contributions and highlighting fruitful avenues for future research.

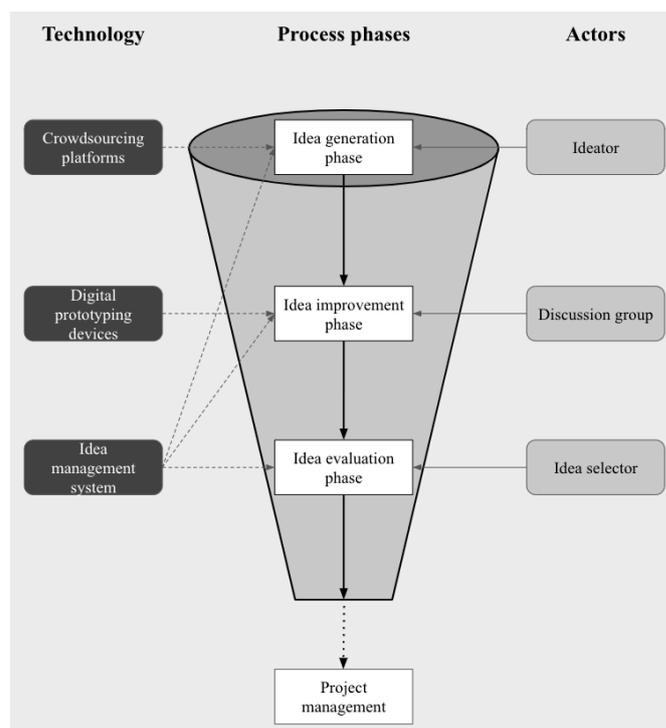
## 2. Background

This section provides an overview of the extant literature on idea management and states how our understanding needs to be extended in the light of digital innovation.

## 2.1 Idea management

Idea management broadly refers to a set of activities organizations undertake to systematically utilize creative ideas and has attracted both practitioners' and researchers' interest for some decades (Thom, 1980). Since its inception in the manufacturing industry in the 18th century, idea management has crystalized as “*one of the most persistent management concepts ever*” (Thom, 2015, p. 238) by continuously adapting to changes in economic, social, and technological environments. One notable adaptation is the shift in its scope of practice from collecting ideas of all types (e.g. via suggestion boxes) to leveraging ideas specifically destined for innovation (e.g. via innovation contests) (Flynn et al., 2003). It has been suggested that companies that deploy an idea management program are more successful in their innovation efforts (Boeddrich, 2004).

In a recent review of the idea management literature, Gerlach and Brem (2017) consolidated 15 idea management models dating from 1980 to 2011 in a conceptual framework to reflect the state-of-the-art knowledge in the field. The framework conceptualizes idea management as a process with six successive phases: preparation, idea generation, idea improvement, idea evaluation, idea implementation, and idea deployment. For the purpose of this paper, we restrict the scope of idea management to (1) idea generation, (2) idea improvement, and (3) idea evaluation, since these phases found most support among the reviewed models.



**Figure 1: Idea management framework (adapted from Gerlach & Brem, 2017)**

Figure 1 depicts an adapted version of Gerlach and Brem's (2017) idea management framework. Ideas enter the funnel on the wide end as they are generated, move through the funnel as they are developed, and exit on the narrow end upon final selection. The funnel stands as a metaphor for the selective nature of idea management, i.e. the decreasing number of ideas along the process. The framework further suggests a generic yet predefined set of actors for each phase (i.e. ideator, discussion group, and idea selector). While some scholars (Brem &

Voigt, 2009; Xie & Zhang, 2010) have included a multi-stage shifting process of ideas within their models to account for a more iterative idea selection process, the general consensus views the practice of idea management as a waterfall process consisting of well-defined phases and involving a predefined set of actors for each phase (Gerlach & Brem, 2017).

The idea generation phase (1) is characterized by the generation of a large number of ideas according to a given topic (e.g. internal crowdsourcing; Zuchowski et al., 2016) or not (Bailey & Horvitz, 2010). Next to internal employees, external ideators can constitute a valuable source for idea generation (Mikelsone & Liela, 2015). Ideas are typically captured, either manually or by the means of a digital platform (e.g. crowdsourcing platform; Schlagwein & Bjørn-Andersen, 2014; Leimeister et al., 2009), stored, and tracked by idea managers using idea management systems (Westerski et al., 2011). In this phase, ideas can be classified and pre-selected according to their type (e.g. business or technical, local or corporate-wide) and financial potential (Wrede, 2007).

During the idea improvement phase (2), ideas are developed to better assess their potential. The ideator can enrich his/her idea through discussion groups, workshops, and prototype experimentation (Brem & Voigt, 2009), and redefine it according to newly available information (Fairbank & Williams, 2001). This phase primarily aims at increasing an idea's chances of being selected in the idea evaluation phase (Flynn et al., 2003).

Finally, in the idea evaluation phase (3), idea selectors decide on the most promising ideas, provide feedback, and reward ideators. Selection criteria and idea selector profiles can vary according to organizational goals, needs, and culture (El Bassiti & Ajhoun, 2013) and according to idea type (e.g. incremental vs. radical, business vs. technology; Sandström & Björk, 2010). A major goal in this phase is to avoid false positives (i.e. selecting unsuccessful ideas) and false negatives (i.e. rejecting successful ideas) (El Bassiti & Ajhoun, 2013). Selected ideas are kept for deployment, others are abandoned or stored in an idea pool (Bailey & Horvitz, 2010).

## **2.1 Initiating digital innovation opportunities**

While idea management did not historically focus on the initiation of digital innovation, a growing number of firms are facing the challenge of effectively developing innovative ideas that have digital artefacts at their core. Scholars in digital entrepreneurship refer to such ideas as "*digital venture ideas*" (Von Briel et al., 2018). Von Briel et al. (2018) theorize that the central role played by digital artefacts in digital venture ideas carries important practical implications for the opportunity initiation process, i.e. for the development of an idea into the imagined market offering. This echoes repeated calls from the digital innovation literature arguing that digital innovation management needs to be studied as a new phenomenon which is fundamentally different from traditional innovation management (Nambisan et al., 2017; Yoo et al., 2012). Scholars have highlighted two major reasons for that.

First, digital innovation management challenges traditional innovation management by leveraging a heterogenous and dynamic crowd of contributors rather than a predefined collection of actors (Nambisan et al., 2017). With regard to the initiation of digital innovation, scholars have shown how organizations leverage crowdsourcing and innovation contests (e.g. Schlagwein & Bjørn-Andersen, 2014; Blohm et al., 2010) to allow for a collection of actors inside and outside the company to submit ideas. Driven by various goals and motivations, these actors can join in and retract from the innovation process in a mostly unpredictable way (Lusch & Nambisan, 2015).

Second, digital innovation causes traditional innovation process phases to blur or overlap (Nambisan et al., 2017). With regard to the initiation of digital innovation, new digital infrastructures such as 3D printing (Rayna & Striukova, 2016), digital makerspaces (Smith et al., 2013), or low-code platforms (Sanchis et al., 2020) enable ideas to be quickly prototyped and tested through iterative experimentation cycles (Ries, 2011). The use of agile methodologies and user centric design for the development of ideas (e.g. Lean Start-up, Design Sprints) further breaks with the presupposition of linear innovation processes and blurs the temporal boundaries between innovation phases (Nambisan et al., 2017).

In sum, digital innovation challenges our traditional understanding of innovation management processes and sub-processes. We expect idea management, as a sub-process pertaining to the initiation of innovation opportunities, to mirror the above-described transformations, i.e. more fluid processes and more dynamic actors. Despite its central importance for practitioners, however, the literature fails to adequately account for these transformations in the initiation of digital innovation (Kohli & Melville, 2019) and link it to the literature on organizational transformation (Besson & Rowe, 2012). We address this gap through an exploratory longitudinal case study on *how idea management is transformed to help seize digital innovation opportunities*.

### **3. Research methodology**

Idea management is a complex phenomenon that requires the investigation of a rich data set. We gathered such a rich data set by performing an in-depth longitudinal case study of a traditional organization which transformed its idea management practices specifically to foster digital innovation (Yin, 2014).

#### **3.1 Case selection and data collection**

We selected the case of a well-established and traditionally structured company operating in the fragrance industry which we refer to as Globex (name changed). At the time of the study, Globex employed roughly 7'000 employees worldwide working in its main business units (i.e. fragrances and flavors) and its transversal support units (i.e. human resources and information systems). Globex constitutes a revelatory example of how incumbent firms, whose core business is not historically built around digital technologies but rather around intensive Research and Development (R&D) activities typically transform idea management to help seize digital innovation opportunities. Specifically, Globex leverages idea management with the goal of achieving innovative outcomes either embedded in IT (e.g. digital artefact) or enabled by IT (e.g. digital business model) and destined either for internal or external use.

Globex constitutes a relevant case for three main reasons. First, top management at Globex has officially identified digital transformation as a strategic priority in March 2018 in reaction to the increased use of digital technologies in the industry. Notably, the successful use of artificial intelligence algorithms for perfume creation constituted a serious threat of disruption for the industry. Second, Globex set up a digital innovation department (March 2018) and a digital innovation lab (August 2018) as part of its digital transformation strategy. The digital innovation department was mandated to foster digital innovation throughout the organization and empower employees to develop innovative processes, products or services with a digital core component. It was affiliated to the Information Systems department but acted as a transversal support function to all organizational departments. The digital innovation lab was affiliated to the Information Systems department and mandated to experiment with artificial

intelligence. The lab was considered out of the digital innovation department's scope and reported directly to the CIO. Third, the digital innovation department at Globex leveraged idea management as a managerial device to support its mission of fostering bottom-up digital innovation. Furthermore, it licensed an idea management system to promote and handle its idea campaigns and acquired a 3D printer and low-code software to stimulate digital prototyping. We were able to obtain access to Globex through the professional engagements of one of the co-authors who was hired as an intern to support the digital innovation department for a six months period. Specifically, the said co-author worked at the company's headquarters and focused on the maintenance of the idea management system and the promotion of idea campaigns and workshops. We complemented this participant-observation with 17 interviews, access to the data management system and internal documentation (see Appendix B, C and D for more details on our data collection, the interview list, and the interview guideline).

### **3.2 Data analysis**

Considering the rich body of literature on how ideas are managed in organizations, we followed a thematic content data analysis approach (Miles et al., 2014). We started with a deductive approach and added inductive insights into relevant transformations as they emerged from the data. Finally, we checked the inductive insights against the literature (see Appendix E for our coding scheme).

Specifically, we deduced thematic codes from the idea management framework by Gerlach and Brem (2017) with a specific focus on process phases and actors, and added thematic codes on digital innovation, digital innovation management and organisational transformation. This yielded 37 deductive codes to which we added 3 inductive codes as we got more familiar with the case (Miles & Huberman, 1994). We derived the additional inductive codes from patterns on how the digital innovation department progressively transformed its idea management process to better support digital innovation. To identify these transformations, we reviewed our data for changes in the digital innovation department's objective, governance, staffing, management practices, and use of digital technology, as well as significant shifts in idea management process phases and actors. We coded our data in a chronological order, coding the earliest data first and gradually moving forward in time. This enabled us to gain a solid overview of the transformations in idea management. To insure the replicability of our findings, one of the authors and a researcher blind to the study trained themselves on our coding scheme and independently marked relevant ranges of text (i.e. sentences and ranges of text in interview transcripts and secondary data) using MAXQDA coding software. We then checked for adequate inter-rater replicability by computing Cohen's kappa coefficient (Cohen, 1960).

## **4. Idea management for digital innovation at Globex**

When Globex announced its digital transformation strategy in March 2018, it outlined a vision of digital innovation built around five strategic pillars: creativity (e.g. artificial ingredient creation), client (e.g. e-commerce), sustainability (e.g. product traceability), legacy (e.g. operations optimization), and people (e.g. recruiting). New digital technology would help generate new business models and organizational processes in each pillar, optimize existing activities and create new revenue streams. By disconnecting from traditional Research and Development (R&D) and New Product Development (NPD) project management pipelines, the digital innovation initiative could foster internal innovation efforts and tie links with external innovation ecosystems. Leveraging employees' creativity and expertise by exposing

them to idea campaigns and workshops was expected to stimulate innovation initiation and to reduce ideas' time to market. The digital innovation department, initially a team of three people that grew into a team of eight between March 2018 and February 2020, was commissioned to help accomplish this audacious vision. The department progressively transformed its idea management process to specifically support digital innovation efforts. Our findings are structured according to the main idea management process phases identified in Gerlach and Brem's (2017) framework.

#### **4.1 Idea generation phase**

Instead of sourcing ideas from the top management or from specialized innovation departments, digital innovation at Globex had to be understood as a collective action of value cocreation among all employees. Practically speaking, Globex had to strengthen its capability for breaking functional silos and developing an innovation community. This represented a significant shift from existing innovation practices that were traditionally grounded in specialized teams (i.e. R&D). To help foster a mindset of innovation among the entire workforce rather than just a subset of employees in R&D teams, the digital innovation department decided to stimulate idea submission with idea campaigns. The idea challenges driving these idea campaigns were defined by the digital innovation department in consideration of needs that had previously been identified by business leads (e.g. during strategic workshops). To better promote and manage idea campaigns, the department licensed an idea management system and built up a network of internal ambassadors and trained innovation champions to communicate and evangelize idea campaigns throughout the company. With regard to employees, the idea management system was positioned as an internally open platform dedicated to the submission, discussion and tracking of innovative ideas. A lead of the digital innovation department said:

*"The idea management platform is not only to collect and incubate ideas, but it's also about community management. It helps us to connect the dots internally, to avoid working in silos and to integrate ideas."* (Lead 1, 13.06.19)

In spring 2019, the innovation department was confronted with tensions arising from the use of idea campaigns to generate ideas specifically for digital innovation. On the one hand, idea campaigns had to be driven by challenges that were broad enough to generate a large quantity of ideas, yet specifically designed to stimulate ideas with digital components at their core. Generating ideas suited to develop into digital innovation turned out to be less-trivial than expected. As a lead of the digital innovation department put it:

*"The challenge with innovation is that you don't want to tell ideators: "focus on the digital". So, at the beginning, most ideas were not digital and we somehow had to twist them to add some digital component so that it matched with our mandate."* (Lead 2, 9.07.19)

Globex addressed this by reviewing its definition of digital innovation and clarifying its mission with regards to digital innovation. An important challenge resided in defining digital innovation in a way that was different from innovation that were already performed by other teams at Globex. The same lead said:

*"There are a lot of innovation teams across Globex but they focus on R&D applications. So that's a different mindset. We're digital innovation. Mostly emergent technology in the industry, such as AI, VR, 3D printing, blockchain applications, new methods of how clients are working... Not just tools but innovative concepts. That's really where our focus shifted into: making sure there's some digital component to it, whether it's exploring a use case or exploring a technology."* (Lead 2, 9.07.19)

By end of summer 2019, the department had settled for the mission of developing innovations either enabled by IT or embedded in IT, and it gradually abandoned activities not directly linked to promoting ideas with digital core components (e.g. strategic workshops, general idea campaigns). On the other hand, however, the department was then confronted with ideas that were at times highly technical. Especially ideas that came from employees in operations were very specific and came with a heavy technological frontload. In the words of a lead of the digital innovation department:

*“Some people would just come with a technical solution that is so specific sometimes we don’t understand what it’s for. What problem does it address and is it relevant?”* (Lead 2, 10.10.19)

In order to gain a better understanding of each idea and to verify its match with the department’s mandate, the digital innovation department decided in autumn 2019 to decompose each idea into its underlying problem and solution statements. When submitting an idea, ideators were now required to fill out a canvas to describe the solution they envisioned and the problem it would help solving. This enabled the department to better assess the problem’s relevance and to make sure that the envisioned solution had a central digital component. A lead of the digital innovation department explained:

*“We needed to take a step back to understand what the underlying need is. We then realized that a lot of ideas addressed the same problem, so we could merge them.”* (Lead 2, 10.10.19)

## **4.2 Idea improvement phase**

Beyond the mere generation of ideas, the digital innovation department was mandated to help reduce ideas’ time to market. In essence, the ideas that had been collected in the idea management system went through a filtering process in order to assess their expected desirability, feasibility and viability. The digital innovation department opted for a design approach that implied quickly going back and forth between user needs and potential solutions via rapid prototyping and testing with internal and external users. However, breaking away from deeply rooted project management practices created tensions, as highlighted by a member of the digital innovation department:

*“As a department, we try to reduce the gap between the innovation process as it should be, that is iterative and sometimes messy, and corporate processes, financial rules and so on, that somehow pervert the proper way to do innovation. Digital technologies can help us reduce this gap. At least for idea management, it enables us to get access at a low cost to a community of people who can provide insights, challenge the topic, so you can somehow continue to iterate on your initial idea while simultaneously convincing people in the company to get more resources.”* (Specialist, 22.11.2019)

The department was aware that top-management support is critical for the success of innovation initiatives and that it needed to bring transparency and structure into the chaotic process of innovation. To enable periodic reporting of key metrics to top-management (e.g. number of ongoing idea campaigns, number of ideas in each phase), a lead of the digital innovation department formalized the idea management process as a stage-gate model that would fit with existing project management practices. The department soon noticed that such a model had the downside of enforcing an outcome focus rather than a process focus on innovation. Essentially, the stage-gate logic made it unattractive for the digital innovation department and ideators to iteratively refine underlying user needs and experiment with alternative solutions. The same member of the digital innovation department highlighted:

*“What we are missing is the iterative approach. I mean, do we allow ourselves to redefine an idea and to reconsider the relevance of a problem? That’s where it gets stuck.”* (Specialist, 22.11.2019)

To help address this first issue, the idea development phase was adapted to enforce first a mock-up stage before moving to the realization of a minimum viable product (MVP). This was expected to encourage ideators to test the assumed need and the envisioned solution early on in the process. However, a second issue arised when the digital innovation department realised that many employees at Globex lacked the necessary technical skills for the rapid development and modification of digital prototypes. Getting timely access to developers for rapid prototyping emerged as a significant challenge. Though Globex employed a number of qualified developers at its headquarters, they were busy with the maintenance of existing systems and required a few weeks’ notice to make themselves available for prototyping projects. Punctual collaborations with off-shore developers located in Asia were also difficult because of cultural differences and language barriers. As a result, digital prototyping was too costly in terms of time and money to stimulate rapid iterations. Ideators would refrain from modifying their initial prototypes because they lacked the necessary budget or because it would have considerably slowed down the idea development process. In September 2019, the digital innovation department therefore hired an UX/UI designer to support the realization and testing of prototypes. The designer worked with the ideators to understand and validate the initial problem and solution statements, create an appropriate mock-up, and hand it over to a full-stack developer for the realization of a MVP. This significantly reduced the time the full-stack developer had to spend on an MVP, lowering the costs and increasing the speed of prototype development, and making iterations more attractive to ideators.

### **4.3 Idea evaluation phase**

When launching the first set of idea challenges, idea evaluation took the shape of shark tank stype sessions where ideators would pitch their improved idea to top-management. However, the digital innovation department soon discovered that executives lacked experience in evaluating innovative ideas. This was all the more true for innovative ideas with digital components at their core. This evaluation mode thus resulted in the digital innovation department developing a great quantity of ideas with little certainty about management support for turning them into actual business projects. The department’s director explained:

*“We used to have plenty of ideas in the funnel that had no management support. So, there was no point in keeping them. We initially though that having a lot of MVPs is great. But now, if management support is not very strong, and by that I mean that we have a VP or a chief behind it, we kill the idea. Because it hasn’t got a chance anyway. And there are so many other opportunities!”* (Director, 17.01.20)

Management support and validated user desirability via prototype testing became central criteria to evaluate whether ideators were allowed to continue idea development. Rather than top-management, the business and IS points of contact who were interested in developing the idea into an actual business project decided if the mock-up would be developed further into a MVP and implemented in a project. These decisions heavily relied on prototype tests that occurred all along the idea development process. These tests consisted in decomposing ideas into verifiable assumptions about the underlying need and the envisioned solution, translating these assumptions into prototypes and (in-)validating the hypothesis with users and other stakeholders. Prototyping tests gradually reduced an idea’s inherent level of uncertainty, fostered management support, and guided the idea development process. In winter 2019, the

department noted that the number of prototyping iterations was a key metric to measure an idea's level of uncertainty in terms of desirability, feasibility, and viability. In the words of department's director:

*"This gets us back to the point: what are we, as an innovation team, here for? We manage uncertainty. If you have something with high uncertainty, you come to us. If you have low uncertainty, you start a project. At some point, uncertainty will be low enough to hand the idea over to a project manager."* (Director, 17.01.20)

Beginning of February 2020, the digital innovation department was satisfied with its formalization of the idea management process and planned to launch additional company-wide idea management campaigns specifically focused on digital innovation.

## **5. Discussion**

The Globex case offers important empirical insights into *how idea management is transformed to help seize digital innovation opportunities*, which we now relate to the extant literature. We contribute to the literature on digital innovation management by highlighting that idea management at Globex was transformed into a more fluid process and a more heterogeneous collection of actors to help seize digital innovation opportunities. We furthermore contribute to the literature on organisational transformation by highlighting that viewing ideas as co-evolving problem-solution pairs helped Globex overcome its economic and political inertia in the initiation of digital innovation. We first discuss how Globex transformed its practice of idea management with a focus on process phases and actors, before we turn to how problem-solution pairs helped Globex to overcome inertia in the initiation of digital innovation.

### **5.1 A more fluid idea management process**

The general consensus views the practice of idea management as a waterfall process consisting of well-defined idea generation, improvement, and evaluation phases (Gerlach & Brem, 2017). Our data shows empirical support for these three phases. However, we identified blurred temporal boundaries between the idea improvement and idea evaluation phases. In the case of Globex, the use of digital technology (e.g. 3D printers, low-code tech) allowed for quick and cheap generation of prototypes (i.e. mock-ups and MVPs) and for their ongoing modification according to stakeholder's feedback (e.g. Rayna & Striukova, 2016). Rapid iterative cycles of prototype development and testing enabled ideators to continuously validate critical assumptions and better assess the potential of their idea (Ries, 2011). This helped them to gain internal stakeholder's support, increase buy-in and release budget for further development. In short, idea improvement and idea evaluation at Globex were intimately linked in order to assess digital innovation opportunities more quickly and more accurately. Our findings thus suggest that Globex transformed its idea management process into a more fluid set of phases to better seize digital innovation opportunities, thereby providing empirical support for theorizations around less-bounded innovation processes in the digital innovation management literature (Nambisan et al., 2017).

### **5.2 A more heterogeneous collection of idea management actors**

Our data showed support for the roles of ideator, discussion group, and idea selector, in the idea management process (Gerlach & Brem, 2017). However, our findings suggest that initiating digital innovation calls for a more heterogeneous and somewhat unpredictable collection of actors. Specifically, Globex levered its idea management system as an internal crowdsourcing platform (Zuchowski et al., 2016) to enable employees throughout the

organization to submit and comment ideas, as well as digital prototyping tools (e.g. Rayna & Striukova, 2016) to allow for feedback collection from internal stakeholders and external users. Globex thereby expanded the role of ideator to include all of its corporate employees and broadened the role of discussion group and idea selector to include an ever-changing collection of internal stakeholders and users. By hiring designers, Globex further increased the heterogeneity of actors in the idea improvement phase. In the innovation literature, the shift towards a wider innovation agency has been referred to as distributed innovation (e.g. Lakhani & Panetta, 2007) and open innovation (Chesbrough, 2003). While multifunctional team members have been a driver of innovation management since the 1980s (Van de Ven, 1986), the heterogeneity of innovation actors is arguably most critical in developing innovative ideas enabled by or embedded in IT. In fact, digital technology offers greater levels of flexibility in how it can be used (Nan, 2011; Garud et al., 2008) because multiple affordances can cause a given digital technology to be used differently by actors with diverse purposes or in various contexts (Treem & Leonardi, 2013). This generates greater ambiguity in how an idea with a digital core component should be understood (Nan, 2011; Garud et al., 2008). Rather than being determined by the ideator in isolation (as implied by the ideator role in Gerlach & Brem, 2017), the meaning of a novel idea emerges from the interaction of various social agents who try to understand, share and modify their understanding of the idea (Berente et al., 2011; Hsieh et al., 2011). The case of Globex shows that the inclusion of a more heterogeneous collection of actors in the idea management process fosters idea generation and refinement through collective sense-making and enhanced value co-creation. Our findings suggest that Globex transformed its idea management process to include a greater variety of actors, thus validating theorizations around less predefined innovation agencies in the digital innovation management literature (Nambisan et al., 2017).

### **5.3 Overcoming organisational inertia by viewing ideas as problem-solution pairs**

Scholars in digital innovation management have suggested that digital innovations should be viewed as “*a sporadic, parallel, and heterogeneous generation, forking, merging, termination, and refinement of problem–solution design pairs*” (Nambisan et al., 2017, p.227). Globex moved towards this approach when it imposed the systematic decomposition of ideas into problem and solution statement (Dorst & Cross, 2001). An idea was understood as a problem (i.e. latent user needs) and solution (i.e. processes, products or services enabled by or embedded in IT) pair that could be enriched as ideators gain new insights into user needs and technical feasibility (Von Hippel & Von Krogh, 2015; Maher et al., 1996). As the network of interlinked problems and solutions became too complex to manage (Makkonen & Komulainen, 2018), the digital innovation department broke it down into multiple problem-solution pairs that could be tested via prototypes. A single idea could thus yield multiple problem-solution pairs and the pairs could be tested with users and other stakeholders to further guide idea development and selection. This resulted in enhanced collective sense-making and value co-creation among the heterogeneous collection of innovation actors, ultimately leading to a better management of the idea’s inherent uncertainty. Instead of approaching ideas as a fixed concept that could either be selected or rejected, problems and solutions were expected to be matched and rematched within the scope of a same idea. As a result, innovation was not restricted to the boundaries of the initial problem and solution space but evolved as new problems and solutions were discovered, consolidated into a network, and again broken down into pairs. This approach can be attributed to collective learning processes but we argue that it is all the more relevant in a digital innovation context because of the remarkable malleability and ambiguity of IT. Figure

2 in Appendix A provides a visual representation and an illustrative example of how Globex managed ideas as problem-solution pairs to better initiate digital innovation.

We argue that viewing ideas as problem-solution pairs helped Globex to overcome economic and political inertia when transforming its practice of idea management. First, economic inertia refers to rigid patterns of resource allocation between exploitation and exploration processes (Besson & Rowe, 2012). Most notably, the patterns of resources allocation within the IT unit at Globex were heavily tilted towards exploitation rather than exploration processes. Viewing ideas as problem-solution pairs helped Globex to circumvent economic inertia associated with IT's rigid patterns of resource allocation. Specifically, the decomposition of ideas into problem and solution pairs enabled ideators to identify and test core assumptions of their idea with mock-ups that required minimal technical expertise from IT. Ideators were thus encouraged to improve their ideas themselves rather than waiting for IT's costly support. By viewing ideas as problem-solution pairs, the IT department could be involved very late in the process (i.e. once the idea's underlying problem and solution were mostly validated) and the innovation department could avoid wasting time and money in untimely technical development.

Second, political inertia refers to rigid patterns of interests and alliances among stakeholders (Besson & Rowe, 2012). At Globex, defining and testing problem-solution pairs was instrumental to engaging business managers in the idea development process and securing their support in the initiation of digital innovation. It allowed to more clearly communicate ideas with digital core components and illustrate their use cases. This made it possible to involve more stakeholders early on in the idea management process, such as prospective users or business managers, and build alliances to push ideas further. It notably enabled the digital innovation department at Globex to better identify business managers who were interested in implementing an idea into a business project. The decomposition of ideas into problem-solution pairs therefore helped Globex to relax political inertia by building alliances early with business managers and prospective users.

Ultimately, our findings suggest that viewing ideas as problem-solution pairs allowed Globex to overcome economic and political inertia and helped transform its idea management processes to better account for the specificities of *digital* innovation, notably by allowing for more fluidity between phases process and more heterogeneity among process actors.

## 6. Conclusion

In an era where “*digital technology forms an innate part of the new idea and/or its development, diffusion, or assimilation*” (Nambisan et al., 2017, p.224), surprisingly little is known about the initiation of digital innovation (Kohli & Melville, 2019). Through a longitudinal case study of one firm, we have identified two ways in which idea management is transformed to help seize digital innovation opportunities: (1) ideas are managed in a more fluid process and (2) ideas are managed by a more heterogenous collection of actors. Our empirical findings support theorizations around less-bounded innovation processes and less predefined innovation agencies in the digital innovation management literature (Nambisan et al., 2017). In light of these transformations, we argued that firms must abandon their static and deterministic approach to innovative ideas in favour of a more dynamic approach where the continuous validation of co-evolving problem and solution statements drives idea development and selection. Our main contribution is an awareness of how the systematic decomposition of innovative ideas into verifiable and co-evolving problem and solution statements can help firms deal with the complexity inherent to digital innovation. Our case study suggests that, given such awareness, incumbent firms can somewhat overcome economic and political inertia with

regards to the initiation of digital innovation. We expect these insights to be of value to academics in the field of idea management, digital innovation management and organisational transformation, as well as to practitioners eager to seize digital innovation opportunities.

We recognize limitations in our research design. First, a single organization was studied as a revelatory case of how a large and well-established organization manages bottom-up innovative ideas with digital core components. However, the practice of idea management is context dependent and no two organizations are identical. We acknowledge the fact that digital innovation is an ambiguous term that can be understood differently in other organizations, possibly leading to different conclusions. The reader should keep in mind that the generalizability of our findings depends on the internal and external contextual elements of the focal organization (on generalizability of knowledge claims, see Lee & Baskerville, 2003). Second, while we were deeply engaged with Globex during the period 2019–2020 through participant-observation and interviews, our reporting of how ideas were managed before the digital innovation strategy in March 2018 relied solely on possibly biased retrospective interviews. We accounted for this bias by purposefully interviewing people who were already involved in idea management activities before March 2018 and triangulating findings between multiple sources.

Our contributions pave the way for further research on the initiation of digital innovation and organisational transformation. We see fruitful avenues for future research in investigating the validity of our findings in other organizational contexts. For example, research may highlight how idea management is transformed in other organizational structures or industries to help trigger digital innovation, such as in start-ups or in firms with a digital core business. We believe such research can enrich our findings and help elucidate how organisational transformation links to initiating digital innovation. Moreover, while we have alluded to some challenges linked the initiation of digital innovation, we see great potential in further research which more deeply investigates the tensions and inertias that are associated with the transformation of organisational routines to leverage employees' ideas for *digital* innovation.

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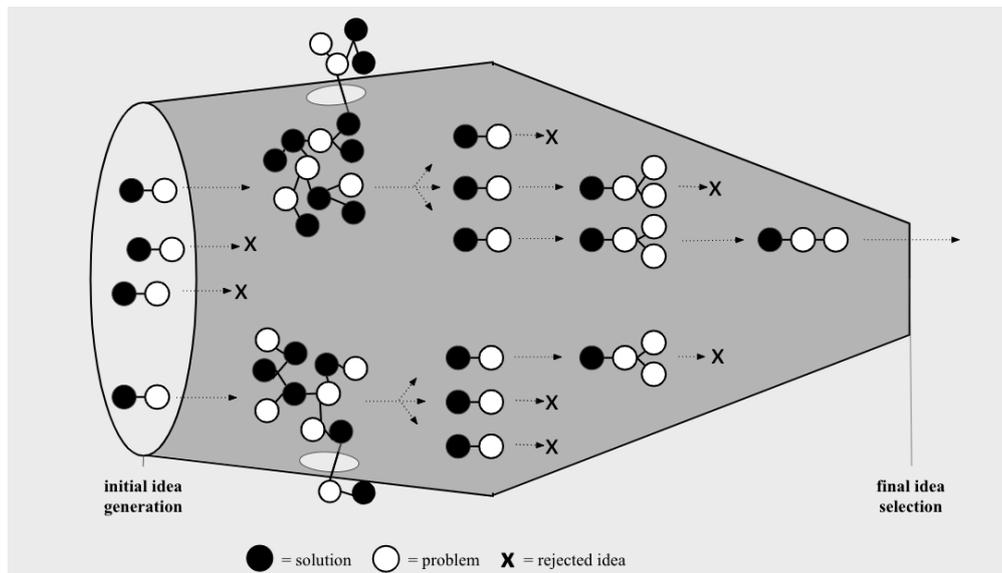
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## Appendix

### Appendix A. Idea management at Globex

Figure 2 presents a visual representation of how the idea management process at Globex as of the end of our case study (February 2020). Below, we explain the figure and illustrate it with an example from the Globex case.



**Figure 2: Idea management framework for digital innovation**

At Globex, the idea management process was initiated when the idea manager launched a call for ideas. For example, the idea manager would call for ideas to improve the way employees work in their fragrances and flavors factories. Ideators would respond to this call by generating ideas and submitting them to the idea management platform as a problem and a matching solution. An employee might for instance identify it as a problem that factory workers have to wear gloves to manipulate ingredients but also have to use electronic keyboards and touchscreens thus requiring them to put the gloves on and off multiple times a day. She might propose as a solution to provide these workers voice control system that enables them to control computers with their voice (*i.e. single problem-solution pair on the utter left side of the funnel in figure 2*). Next, in the idea improvement phase, the ideator and his team would enrich the initial idea by achieving a better understanding of the problem and by considering alternative solutions. With regard to our example, the ideator and his team might speak with factory workers and their managers in order to understand if a voice control system could provide a desirable and viable solution. They might also speak with people outside Globex, such as suppliers of gloves, keyboards or voice control systems to better understand possible solutions. While reflecting on these discussions, they might come up with alternative solutions, such as a different design for the gloves, or a different design for the keyboards. They might also uncover new problems, such as sterilisation of keyboards or comfort of wearing gloves during multiple hours (*i.e. network of interconnected problem-solution pairs in figure 2*). The ideator and his team, supported by the idea manager, would then break down the network of problems and solutions into problem-solution pairs and select the most interesting problem-solution pairs for further development. For example, the ideator, his team and idea manager could agree on the

initial solution of a voice control system for factory workers to control their computers, and decide to look at multiple technologies for such a voice control system (*i.e. multiple problem-solution pairs at the widest point of the funnel in figure 2*). They might also want to consider the alternative of specially designed touchscreens for factory workers to control their computers. As a result of the ideator and his team collecting more insights into relevant problems and solutions, the number of ideas that need to be managed actually increases at this stage (*i.e. the funnel gets wider*). The ideator and his team would then prototype and test multiple solutions for the problem of voice control and keyboard for factory workers by trying out different technologies (*i.e. multiple problem-solution pairs with multiple sub-solutions in figure 2*). Technical feasibility constraints discovered via prototyping as well as user and managers' feedback on the prototypes would enable them to discard problem-solution pairs that are not worth pursuing (*i.e. the funnel gets narrower*). Finally, the ideator and his team would decide on the most promising problem-solution pair for final idea selection (*i.e. single problem-solution pair with single sub-solution on the utter right side of the funnel in figure 2*).

## Appendix B. Data collection

We started interacting with Globex in March 2019 and data collection lasted until beginning of February 2020. During this period, we performed six months of participant-observation and conducted 17 semi-structured interviews (approx. 18 hours) with five key members of the digital innovation department and five participants in idea campaigns (see Appendix C for interview list). The interviews followed a simple and flexible guideline centred on the idea management process and idea management system at Globex. We gradually adapted the guideline as we got familiar with the case (see Appendix D for interview guideline). We systematically transcribed all interviews (108 pages) and synthesised the notes of our participant-observation phase in a written report (10 pages). We also gathered a significant amount of secondary data (110 pages) in the form of internal documents produced by the digital innovation department (e.g. formalized idea management process, formalized digital prototyping process) and participants of idea campaigns (i.e. idea pitches, prototypes). Data collection ended upon theoretical saturation.

Data source	Topics covered	Interviewees	Quantity
Participant observation (March 2019 – August 2019)	<ul style="list-style-type: none"> <li>Idea campaigns/challenges (x5)</li> <li>Innovation workshops (2x)</li> <li>Innovation lab (1x)</li> </ul>	N/A	10 pages of report
Interviews (May 2019 – February 2020)	<ul style="list-style-type: none"> <li>Innovation strategy &amp; process</li> <li>Idea management strategy &amp; process</li> <li>Idea campaigns &amp; system</li> <li>Innovation projects status &amp; progress</li> <li>Prototyping process for digitalisation</li> </ul>	<ul style="list-style-type: none"> <li>Digital Innovation Director (4x)</li> <li>Digital Innovation Senior Lead (1x)</li> <li>Digital Innovation Lead Europe (3x)</li> <li>Digital Innovation Lead America (2x)</li> <li>Innovation Specialist (2x)</li> <li>HR Manager (1x)</li> <li>Manufacturing Global Director (1x)</li> <li>Global Creative Director (1x)</li> <li>Fragrance Development Director (1x)</li> <li>Field Support Technician (1x)</li> </ul>	Total: 17 interviews (10 respondents, 18 h. recording, 108 p. transcript)
Data management system	<ul style="list-style-type: none"> <li>Community mgmt. (campaign promotion, feedback and rewards)</li> <li>Idea tracking (pipeline)</li> <li>Idea patterns (word cloud)</li> <li>Integration with corporate intranet</li> </ul>	N/A	3 pages of notes
Internal documentation	<ul style="list-style-type: none"> <li>Digital innovation services (2p.)</li> <li>Idea campaign status slide deck (20p.)</li> <li>Idea campaign program slide deck (18p.)</li> <li>Prototype definition slide deck (4p.)</li> <li>Pitch slide decks (10p.)</li> <li>Prototype slide decks and VR (2p.)</li> <li>Pitch sessions recap and follow-up (40p.)</li> <li>Digital prototyping process (11p.)</li> <li>Assumption/testing cards (1p.)</li> </ul>	N/A	110 pages of docs

**Table 1: Overview of data sources**

## Appendix C. Interview list

N°	Role	Department	Date	Location	Duration	Thematic	Secondary data
I-1	Digital Innovation Director <i>(alias Director)</i>	IS	10.05.19	On site (old headquarters)	2h	Contextual background: Globex, innovation at Globex, milestones of digital innovation department	Leaflet digital innovation department services; Book on innovation management framework;
I-2	Digital Innovation Director <i>(alias Director)</i>	IS	31.05.19	On site (old headquarters)	1h45	Digital innovation department activities, governance, idea management process and success factors	Slide decks: idea campaign status, idea campaign program, pitch sessions recap and follow-up, prototype definition
I-3	Digital Innovation Lead Europe <i>(alias Lead 1)</i>	IS	13.06.19	On site Skype (old headquarters)	1h	Idea management campaigns and system	Intranet; Idea mgmt. system
I-4	HR Manager	HR	26.06.19	On site (new headquarters)	1h	Digital innovation project in HR	
I-5	Innovation Specialist <i>(alias Specialist)</i>	IS	2.07.19	On site (new headquarters)	2h	Innovation workshops, innovation methodologies	Book on ideation; Book on innovation in incumbent firms
I-6	Digital Innovation Lead America <i>(alias Lead 2)</i>	IS	9.07.19	On site (new headquarters)	1h30	Prototyping, innovation methodologies	
I-7	Manufacturing Global Perfumery Director	OP	10.07.19	On site (new headquarters)	30min	Participation at idea campaign (sustainability)	
I-8	Global Creative Director	PE	11.07.19	On site Skype (old headquarters)	1h	Participation at idea campaign (perfumery)	Slide deck pitch; Slide deck prototype
I-9	Fragrance Development Director	PE	15.07.19	On site Skype (old headquarters)	45min	Participation at idea campaign (perfumery)	Slide deck pitch
I-10	Field Support Technician	IS	16.07.19	On site Skype (old headquarters)	45min	Participation at idea campaign (IS)	
I-11	Digital Innovation Senior Lead <i>(alias Senior lead)</i>	IS	23.07.19	On site (new headquarters)	30min	Innovation coaching, innovation methodologies	
I-12	Digital Innovation Director <i>(alias Director)</i>	IS	30.08.19	On site (new headquarters)	45min	Idea development, UX/UI design	
I-13	Digital Innovation Lead America <i>(alias Lead 2)</i>	IS	10.10.19	On site (new headquarters)	30min	Prototype selection, idea canvas, hypothesis cards	Assumption/testing cards

I-14	Digital Innovation Lead Europe <i>(alias Lead 1)</i>	IS	7.11.19	Skype	50min	Prototyping process for digitalization	Slide deck digital prototyping
I-15	Innovation Specialist <i>(alias Specialist)</i>	IS	22.11.19	On site (new headquarters)	1h30	Idea management transformations (process and actors), problem-solution pairs	
I-16	Digital Innovation Director <i>(alias Director)</i>	IS	17.01.20	On site (new headquarters)	1h	Idea management transformations (process and actors), problem-solution pairs	Book on idea development and prototyping methods
I-17	Digital Innovation Lead Europe <i>(alias Lead 1)</i>	IS	3.02.20	Skype	45min	Idea management transformations (process and actors), problem-solution pairs	

**Table 2. Interview list**

## Appendix D. Interview guideline

Globex interview guideline	
1. Personal information	<ul style="list-style-type: none"> <li>a. Interviewee name and role</li> <li>b. Professional background</li> <li>c. Years of employment at Globex</li> </ul>
2. Idea campaign/challenges	<ul style="list-style-type: none"> <li>a. Idea generation phase</li> <li>b. Idea development phase (prototyping)</li> <li>c. Idea evaluation phase</li> <li>d. Implementation</li> <li>e. Key success factors</li> <li>f. Idea evaluators &amp; evaluation criteria</li> <li>g. Recognition and rewards</li> </ul>
3. Idea management system	<ul style="list-style-type: none"> <li>a. Communication of campaign</li> <li>b. Idea submission</li> <li>c. Idea commenting</li> <li>d. Idea tracking</li> <li>e. Idea selection and feedback</li> </ul>
4. Digital innovation	<ul style="list-style-type: none"> <li>a. Digital innovation department</li> <li>b. Opportunity identification</li> <li>c. Digital innovation outcome</li> <li>d. Digital innovation process</li> <li>e. Digital innovation actors (internal/external)</li> </ul>
5. Organizational culture	<ul style="list-style-type: none"> <li>a. Digital transformation strategy</li> <li>b. Innovation strategy</li> <li>c. Innovation governance</li> <li>d. Organizational structure</li> <li>e. Organizational capabilities</li> <li>f. Openness to external partners</li> <li>g. Competitive environment</li> </ul>

**Table 3. Initial interview guide**

## Appendix E. Coding scheme

Themes	Codes	Sub-codes
Idea management (Gerlach & Brem, 2017)	Idea	
	Idea manager (role)	
	Idea management system	
	Employee (internal) participation	
	Open (external) participation	
	Success factors	
	Success metrics (KPIs)	
	Organizational culture	
	Organizational environment	
Idea generation (Gerlach & Brem, 2017)	Idea generation phase	
	Ideator (role)	
	Idea challenge/campaign	
	Idea submission form	
	Idea crowdsourcing	
	Idea classification/cluster	
	Idea pre-selection	
Idea improvement (Gerlach & Brem, 2017)	Idea improvement phase	
	Discussion group (role)	
	Workshops	
	Experimentation	
	Digital prototyping	
Idea evaluation (Gerlach & Brem, 2017)	Idea evaluation phase	
	Idea selector (role)	
	Idea selection criteria	
	Rewards/recognition	
	Evaluation feedback	
Digital innovation (Kohli & Melville, 2019)	Opportunities identification/initiation	
	Outcome embedded in IT	
	Outcome enabled by IT	
	Process supported by IT	
Digital innovation management (Nambisan et al., 2017)	Fluid innovation process	Overlapping process phases
		Iterative process phases
	Dynamic innovation actors	Heterogenous actors
		Dynamic actors
Organisational transformation (Besson and Rowe, 2012)	Negative psychology inertia	
	Socio-cognitive inertia	
	Socio-technical inertia	
	Economic inertia	
	Political inertia	

**Table 4. Deductive coding scheme**

Themes	Codes	Sub-codes
Dynamic approach to ideas (i.e. problem-solution pairs; Dorst & Cross, 2001; Von Hippel & Von Krogh, 2015)	Idea decomposition	Problem/need
		Solution/artefact
		Problem-solution pair
		Assumption/statement
		Collective sense-making
		Uncertainty management
	Idea enrichment	Problem-solution matching
		Problem-solution network
		Assumption validation
		Prototype testing
		Co-creation
		Heterogenous actors
	Idea evolution	Problem-solution co-evolution
		Prototype iteration
		Problem space
Solution space		
Fluid process		

**Table 5. Inductive codes from case data**