The Organizational Impacts of Design Thinking used as a Toolbox for Managers or as a Theory of Design

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The adoption of Management Innovation in organizations is difficult to investigate. Controversies exist on the nature of Design thinking (DT), which can be used as a toolbox for managers, or as a theory of design practice. Based on a multi-case study, this article investigates the impacts brought by DT in organizations, in terms of new practices and roles played by designers. Referring to various definitions of DT and its relation to Design, this article proposes a framework articulating the objectives of DT as Management Innovation and its adoption. The results show two intertwined factors: the fit between the cultural, technical and political dimensions of the organization, and the profile of the change agent, designer or not.

Keywords: Design Thinking, Management Innovation, Organizational Culture, Change Agent

Introduction

Management innovation introduces new management practices and processes that are significantly different from the existing norms operating in an organization. If the variety of these innovations and their multiple contributions to the companies’ performance has been examined in-depth (Damanpour and Aravind, 2012), their adoption and impacts on the functioning of organizations have been poorly analyzed (Volberda and al., 2014). The management innovations are most of the time put under pressure when introduced in companies (Birkinshaw and al., 2008), and go hand in hand with change management (Damanpour and Aravind, 2012). Outlining the contours of a management innovation and assessing its actual degree of novelty are both complex (Adam-Ledunois and Damart, 2017; Mignon and al., 2017; Volberda and Van den Boch, 2013). Depending on the context in which management innovation is implemented, its new principles and practices are more or less aligned with the initial key features of organizations (Ansari and al., 2010). The degree of rupture brought by a management innovation is therefore analyzed based on its diffusion and adaptation trajectory.

Design Thinking (DT) is a representative case of management innovation whose outlines (Rauth and al., 2014) and degree of novelty in organizations (Carlgren and al., 2016a) are complex to assess. While it is often described as a set of practices for acquiring new innovation capacities (Schmiedgen and al., 2015), the concept of DT remains unclear and may refer to a cognitive style, a theory of design activity or a resource for organizations (Kimbell, 2011) depending on the situation. This debate on its definition and its relationship to the professional practices of designers creates a tension in the assessment of DT as a management innovation. Some consider it to be profoundly transformative for the organization (Brown, 2009), while others approach it as a complementary managerial tool (Verganti, 2009; Mahmoud-Jouini and al., 2016). In one case, the designer’s skills are essential to apply and disseminate DT (Walter and Baxter, 2008), while in the other case his practices
are regarded as easily appropriable by managers (Verganti, 2017). Our research question is therefore: what are the organizational impacts of Design Thinking used as a management innovation in companies?

**Conceptual frame**

The outlines of Design Thinking as Management Innovation

DT results from a formalization of the designers’ mode of reasoning (Archer, 1979). It takes its inspiration from their thinking patterns and practices to formulate and solve unstructured problems (Brown, 2009; Johansson-Sköldberg and al., 2013; Kimbell, 2011). Carlgren and al. (2016a, 2016b) and Walter and Baxter (2008) have identified the key practices:

- Multidisciplinarity, i.e. the integration of numerous fields of knowledge, including imagination. DT lies on abductive reasoning: it is about questioning a variety of concepts and their connection with others in terms of a concrete reality that is meant to be transformed (Cross, 2011).
- An exploration approach focused on people’s experience (Brown, 2009). Users are at the heart of problem framing and solving, with the help of field observation and/or co-creation.
- The materialization of ideas, reflected in the use of visualization, experimentation and prototyping very early in the exploration process, not limited to technical performance and functionality (Kimbell, 2011).

In view of these practices, DT would constitute a mixed management innovation as presented by Le Roy and al. (2013). On the one hand because it renews the way companies explore, and thus produce knowledge (Mahmoud-Jouini and al. 2016). On the other hand because it impacts the processes, roles and relationships of the different kinds of expertise. It thus tends to bring together specialties and functions of the organization that were previously separated (Brown, 2009; Jahnke, 2013).

This identification of DT as a mixed management innovation depends strongly on how the links between DT and Design are regarded. Thus, Kimbell (2011) highlights two types of relationships: while DT is seen by some as the basis of a general theory on Design, others regard it only as a simplified approach to designers’ practices and ways of thinking. Our hypothesis is that this tension between DT as a reflexive foundation for Design discipline or as a managerial practice has strong implications on the measure of the impacts brought by DT in organizations.

The nature of the impacts associated with DT

Depending on the relationship between Design Thinking and Design

Some authors consider DT as a toolbox for managers (Boland and Collropy, 2004), relatively detached from the cognitive capacities and know-how of designers (Deserti and Rizzo, 2014; Verganti, 2017). It is therefore not very transformative, especially regarding the relationships between stakeholders, often applied only in exploration phases. It can be utilized as a method that can be used in a flexible way in order to solve new problems (Krupp and al., 2017) and help to overcome a lack of agility, creativity and ability to explore (Deserti and Rizzo, 2014; Verganti, 2017; Krupp and al., 2017). In this perspective, DT would represent a management innovation with a local impact: integrating into existing and well-defined innovation processes, contributing to their improvement. Although the way knowledge is produced is evolving, the relationships between the stakeholders and organizational functions would not be fundamentally transformed (Verganti, 2009). In this context, the key practices associated with DT would be applied in a flexible or even loose manner (Verganti, 2017).

When DT prefigures a general theory of Design, it represents on the contrary a key step in the transformation of the corporate culture, to put Design and user-centred innovation at the heart of its activity (Walter and Baxter, 2008; Liedtka and al., 2013). As a vector of organizational transformation, DT then aims to fundamentally change the whole process from exploration to exploitation of ideas (Rauth, 2014; Walter and Baxter, 2008; Carlgren and al., 2016a). From this perspective, the potential impacts of DT could be global. It thus features all the characteristics of a mixed management innovation, changing not only the modes of knowledge production, but also the relationships within the company. Many authors point out that adopting DT by systematizing its key practices would lead to major changes: reduction of organizational silos and
adoption of decision-making methods based on a mix between rationality and intuition, at all levels of the company (Brown, 2009; Carlgren and al., 2016b).

This is why we are putting forward the following proposals:

*Proposal 1: When DT is considered as a managerial tool detached from Design, it introduces a low degree of novelty, limited to a local scale of the organization.*

*Proposal 2: When DT is considered as the basis of a general theory of Design, it is disruptive for the organization as a whole, both in its way of generating knowledge and in its relationships.*

**Depending on the organizational context**

The greater the degree of disruption potentially brought about by a management innovation, the greater the problems of organizational alignment increase. Consequently, its content is adapted or altered (Volberda and al., 2013, 2014). Ansari and al. (2010) propose to consider technology, culture and power relations as the key components of organizational contexts. A poor alignment of management innovation with these three dimensions would imply a strong potential breakthrough and difficult adoption. The authors conclude that the adoption trajectories of a management innovation vary according to its adequacy to the context. A technical gap would require a moderate adaptation of innovative practices. If the gap is cultural, innovative practices would be tailored but more broadly adapted within the organization. Finally, a political gap would create an ambivalent movement to strengthen innovative practices and compromise their widespread adoption within the company (Ansari and al., 2010). From this perspective, the local or global adoption of management innovation and its degree of disruption depend on the ability to manage “gaps” with the organizational context (Volberda and al., 2014).

The issues of alignment with the organizational context are presented in the academic literature in different ways depending on the definition of DT. When the latter is seen as a toolbox detached from the Design, the problems appear to be weak, because the practices and methods would be sufficiently flexible and therefore adjustable to adapt to the managers’ working methods. Deserti and Rizzo (2014) conclude that the adoption of DT as a managerial tool does not really alter the way large companies operate on a technical, cultural or political level. For example, the materialization of ideas during DT workshops can be based on the use of techniques that are not very different from the practices and thought patterns usually used by managers (brainstorming, mind mapping, use scenarios). Verganti (2017) points out that, in companies with a technology-push approach, DT would help to consider users’ experience earlier in the exploration process, without transforming the engineers’ way of thinking and problem solving. DT would also be consistent with an organizational culture based on market-pull, as it makes it possible to start from customers’ needs. In the statistical approach to marketing, DT would bring a focus on the experiential.

However, while the adoption of DT as a toolbox does not fundamentally change the company’s culture it may still have unexpected impacts on internal power relationships. Thus, some authors tend to show a negative impact on the internal legitimacy of the Design department, when there is one (Rauth and al., 2014). The adoption of DT would thus devalue the expertise of designers by giving the impression that their added value compared to the tools and methods of DT is low. For Verganti (2009), it would tend to limit designers’ role to aesthetics. In the same perspective, Norman (2010) argues for the abandonment of the concept of DT, considered harmful to the recognition of professional designers in companies. That is why we make the following proposals:

*Proposal 3: When DT is seen as a toolbox detached from the Design, practices are developed in a flexible way to align with the technical, cultural and political dimensions of the organization.*

*Proposal 4: When DT is perceived as a toolbox detached from Design, it can have an undesirable effect on the position of the company’s professional designers, by downgrading their expertise.*

Conversely, when DT prefigures a general theory of Design, it implies a systematic adoption of key practices (Walter and Baxter, 2008) that may contradict the traditional functioning of established companies. First of all, from a technical point of view, DT brings tools that are new for managers in order to materialize ideas (such as drawing, video or other forms of rapid, physical and virtual prototyping). From a cultural point of view, DT, which reflects the practices of designers, carries reasoning schemes that are not very compatible with those of managers of large companies. Decisions on exploration projects are usually concentrated within the chain of command, and based on rational criteria. On the contrary, DT is based on employees’ autonomy and includes intuition in the decision-making process (Carlgren and al., 2006b). Some authors such as Beverland (2005) and
Rylander (2009) go further by pointing out that, in companies where innovation processes are structured by a market-pull and/or techno-push approach, the adoption of DT is likely to be interpreted as a challenge to reasoning patterns and the dominant roles of marketing and/or engineering. With its ability to manage multidisciplinary teams and adopt abductive thinking, Design would then gradually take on a central role in the innovation process, to the detriment of other functions. It thus acts as a “glue” orchestrating all practices in the organization (Walter and Baxter, 2008). Since the cognitive skills and abilities needed to mobilize and operationalize DT at this scale are difficult to acquire (Carlgren and al. 2016b), designers would naturally become key in the innovation process (Walter and Baxter; 2008; Brown, 2009). DT as a transitional phase towards a Design centred corporate culture would thus represent a technical, cultural and political break with the models of established companies. That is why we make the following proposals:

Proposal 5: When DT is considered as the foundation of a general theory of Design, it implies a strict application of its key practices, which are at odds with the technical, cultural and political dimensions of established companies.

Proposal 6: When DT is considered as the foundation of a theory of Design, its adoption reinforces the role of designers and the Design function in the company’s innovation processes.

Table 1: Synthesis of proposals from the literature

<table>
<thead>
<tr>
<th>DT as Type of Management Innovation</th>
<th>Adoption of key practices</th>
<th>Degree of rupture to the context (technical, cultural, political)</th>
<th>Impact on the Design function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toolbox for managers</strong> (Verganti, 2017, 2009; Deserti and Rizzo, 2014)</td>
<td>Local and non-mixed (limited to the production of knowledge)</td>
<td>In a flexible and loose way</td>
<td>Little rupture</td>
</tr>
<tr>
<td><strong>Theory of Design</strong> (Brown, 2009; Walter and Baxter, 2008; Carlgren and al., 2016a and b)</td>
<td>Global and mixed (evolution in the production of knowledge and relationships)</td>
<td>In a complete and correlated approach to the designers’ mode of reasoning</td>
<td>Potentially in strong rupture</td>
</tr>
</tbody>
</table>

**Methodology**

We used a qualitative method based on a multi-case study (Yin, 2009), allowing to study complex phenomena whose explanation is intrinsically linked to the interaction between a variety of dimensions, actions and relationships (Langley and Rozy, 2006). The selected approach is based on abduction, an iterative process of enriching the theory based on data collected on the field (Thomas, 2010). The abductive method can lead to the reformulation of certain proposals resulting from theoretical concepts as well as the emergence of new ones (Gehman and al., 2017). The research protocol followed the precepts of grounded theory (Strauss and Corbin, 1990).

24 semi-structured interviews were conducted with 22 employees from four companies, lasting between 45 and 120 minutes each. We interviewed managers who are non-designers (14) and designers (8). They were three types of profiles: (top) manager in charge of introducing DT in the organization, project manager using DT, and designer (when this is a different person). Data was collected in two phases. A first series of 12 interviews was carried out between 2015 and 2016 in the context of research projects aiming to study the innovation practices and organizational transformation. However, the researchers were not involved in an action research approach to deploy DT initiatives in the companies studied. The interviews allowed identifying the innovation practices and cultures as well as the use of DT and the implementation of Engineering, Marketing and Design functions in change management. 12 new interviewed were specifically conducted in 2017, in order to complement initial data on the links between DT and Design, as part of their adoption by companies.

The interviews were recorded and transcribed by each researcher separately. The analysis process was shared. The coding process was shared, based on the concepts provided in the literature review supra. Iterations generated preliminary results that allowed identifying the level of adoption of DT according to the
organizational context. The coding singled out the practices and objectives associated with DT, as well as the degree and nature of the ruptures brought in the organization, regarding new practices and the design function. The second round of interviews aimed at “theoretical saturation” and generated more “groundness”. Theoretical saturation was not completed until reaching a convergence in coding superior to 90%.

Case study analysis

Presentation of the companies and their Design Thinking initiatives

Companies were selected based on the characteristics that underpin their organizational culture, and the diversity of DT’s initiatives over the past five years or more. They all have in common a strong hierarchy, as well as a verticalization of functions and a relatively large silo structure. On the other hand, other criteria differ according to the companies: the place of techno-push and market-pull approaches, which are reflected in the predominance of R&D engineering and/or marketing in the innovation process, as well as the existence of a Design function prior to or concomitant with DT initiatives. These points are summarized in Table 2.

In two cases, Air Liquide and SEB Group, DT represents a creative method used by managers in new user-centred innovation laboratories. As for EDF and Carrefour, on the other hand, DT is at the heart of a company transformation project aimed at integrating design practices more broadly. In the case of Carrefour, the concept of Design Management is even preferred to that of DT, to highlight the strategic value of Design that must permeate all the company’s activities.

Table 2: Presentation of companies studied

<table>
<thead>
<tr>
<th>Company</th>
<th>Initial culture before the use of DT</th>
<th>Design Function</th>
<th>Initiatives and objectives associated with DT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Liquide</td>
<td>Techno-push (90% engineer)</td>
<td>Non-existent Initially recruiting of a Designer at the I-Lab (2015)</td>
<td>DT as a toolkit for user-centered innovation. Used to enhance creativity in the I-Lab, Innovation laboratory created in 2013 (18 people). Goal: develop radical innovation</td>
</tr>
<tr>
<td>Carrefour</td>
<td>Market-pull Limited scope for innovation</td>
<td>Design Center created in 2009 (30 people, led by a Designer) strategic for innovation</td>
<td>DT as a mode of reasoning associated with professional Design skills. Advocacy led by the Design Centre since 2008. Goal: build up a corporate culture and strategic vision focused on users’ experience</td>
</tr>
<tr>
<td>EDF</td>
<td>Techno-push</td>
<td>Innovation Hub created in 2000, integrating 12 designers (since 2012) + 3 Innovation Catalysts: DT experts in the group</td>
<td>DT as transversal skills for all innovation activities. Used in intrapreneurial projects, fablab (I2R) and contests in the Innovation Hub since 2012. Goal: cultural transformation to better take into account societal issues</td>
</tr>
<tr>
<td>SEB</td>
<td>Double approach: techno-push and market-pull</td>
<td>Institutionalized function (44 designers) but limited to product design</td>
<td>DT as a toolkit for interdisciplinary work. Used to enhance creativity in the SEBLab, an innovation laboratory created in 2013 (3 people). Goal: support the group’s business units with rapid prototyping and innovation acceleration</td>
</tr>
</tbody>
</table>

New practices associated with Design Thinking according to the assigned objectives

In all cases, DT-based initiatives involve approaches that focus on users’ experience, multidisciplinarity, and the rapid implementation of ideas (including prototyping). For SEB and Air Liquide, DT is a creative toolkit for developing exploratory projects in the SEBLab and I-Lab innovation laboratories.
When we asked the business units what they needed, [...] people told us about thinking of use, desirability... They also talked about the need to work in co-construction with the other functions of the company. All of them put a name to the methods they wanted to develop inside the SEBLab [...] and most often it was Design Thinking. [SEBLab Manager]

Therefore the goal is to bring new practices, easily usable by managers to complement the existing exploration modalities. Thus, creativity sessions mobilize new materialization tools for the employees: rapid prototyping, drawing (Air Liquide and SEB) or usage scenarios (Air Liquide).

We have no other place [than the SEBLab] to materialize ideas through rapid prototyping or to dare to use drawing as a key element in working together. When SEBLab facilitators lead a creative session with Design Thinking, these dimensions are essential [...] and it profoundly changes our habits and the way we approach projects. [SEB BU Marketer]

For EDF and Carrefour, DT contributes more broadly to a global policy of corporate transformation, with the ambition of impacting all business lines and functions. In this context, convincing people of the interest of DT entails concrete practice rather than methodological training.

The engineer doesn’t forget the user or customer, but by professional deformation, he tends to consider this is not his problem. To change you have to educate. This involves changing exploration methods, and also depends on the expectations of engineers... When they consider that they are missing something, then it is easy to get them to change. [EDF R&D Engineer]

Design Thinking was first and foremost an attitude, which was formalized to be understandable by managers. [The objective to achieve is] to recognize it as a bundle of skills fused into all trades. [EDF Collective Innovation Catalyst]

Carrefour uses DT not only to design innovative products (such as a shopping cart imagined after an observation of the uses and unspoken desires of its customers), but also to rethink core activities such as the construction of internal brands’ identity. In this perspective of global acculturation to Design, Carrefour even participates in the creation of a joint research laboratory in 2017 dedicated to the value of Design for organizations, alongside other academic and industrial actors.

Changes linked to the adoption of Design Thinking as Management Innovation

On the practices within the organization

Whatever the objective assigned to DT, its associated principles and practices overturn the technical, cultural and political dimensions of each company. Its adoption as a management innovation thus transforms the modes of knowledge production and relationships, but on various scales. The rupture is first of all of a technical nature, through the integration of tools from Social and Human Sciences or imagination.

For example, we invited novelists [...]. It’s essential but complicated [...] because in this case, we bring something that really didn’t exist before in the company and yet that is essential to innovate [...]. We don’t use Design Thinking to present ideas on Power Point, otherwise it’s useless! [Air Liquide I-Lab Manager]

The practice of multidisciplinarity also has an impact on the relationships between functions, on a local scale when DT is used in new innovation laboratories (Air Liquide and SEB). Thus, the composition of exploration teams changes from the traditional pair of strategic marketing and R&D engineering, interacting with other functions at specific phases of the innovation process. Within the SEBLab, 5 to 6 representatives of different functions (strategic and operational marketers, R&D and production engineers, designers, and even external users) are involved in all phases of the project over very short periods of time. At Air Liquide’s I-Lab, the changes are reflected in the degree of autonomy of project leaders, who do upstream work with marketing, engineering and production functions as well as start-ups, for example to test prototypes with users. They behave like intrapreneurs, enjoying a freedom of organization that allows them to propose new ways of working and relationships in the activities for which they are responsible.

While the most visible changes are local, the adoption of DT can also have impacts on the rest of the organization, reflecting a broader cultural transformation:
I have observed that the practices developed in the I-Lab are gradually spreading beyond [...]. I see more and more employees who use DT at least partially to carry out their project on a daily basis [...]. For example, they are looking to change the composition of the teams, including more systematically employees from other functions to find a solution. [Air Liquide I-Lab Manager]

In the cases where DT is considered as a step towards Design, this cultural impact is sought on a global scale. Nevertheless, the transformation has not been completed within EDF. While DT’s methods for project management are systematized in the Innovation Hub laboratories, the approaches are not clearly claimed and the associated mindset struggled to be spread. Three cross-functional experts called “Innovation Catalysts” work as facilitators to bridge the gap between the traditional functioning of the organisation and promote DT, which has so far been seen in a rather negative way.

Organizations underestimate the ability of Design Thinking to formalize collaborative processes and organizational forms. Yet it is the discipline best suited to managing complexity. I use it to set dynamics in motion, with a maieutic objective. [Collective Innovation Catalyst EDF]

The obstacles to the adoption of new practices are mainly cultural. DT clashes with the dominant evaluation criteria in an engineering-focused company.

How to enhance other types of innovation in this company where patents remain the standard? This is an on-going discussion... [EDF Project Manager Designer]

If DT represents for EDF a step towards the integration of Design, it is therefore incrementally, without breaking or questioning the preponderance of engineering in the innovation processes.

For Carrefour, on the other hand, the cultural transformation has been faster and more marked since the creation of a Design Centre to meet the strategic ambition of developing innovation centred on uses (Marketing being initially not very legitimate on these subjects). The arrival of a tutelary figure, former head of Design Decathlon, as Design Director has facilitated the process of disseminating DT practices and tools to all branches of the company. Today, the impact of projects carried out according to these Design approaches can be measured by "increased sales or press coverage". This tangible evidence ensures an interest in DT methods on a global scale, although some "silos and power struggles" [Brand Designer Carrefour] remain.

On the Design function

In each case, the adoption of DT also impacts designers and the institutionalization of their role in the organization. For SEB, the designers can be involved from the early stages of exploration projects within the SEBLab, unlike their daily work, where they are limited to product design on prototypes validated by engineers. For them, DT is a rather familiar approach, even if they are "not used to [mobilizing it] in their daily work" [Designer SEB]. On the other hand, they were able to bring their technical skills into the SEBLab: They are the ones who most easily use drawings and graphic representations to reason and share some thoughts.... They are often more active in rapid prototyping or use scenario building. [SEB marketer who participated in a project within the SEBLab]

The experience of designers within the SEBLab has gradually convinced SEB’s Design Director that their role could evolve in the innovation processes, gradually including other forms of contribution in the company.

At Air Liquide, where no Design function existed, DT is not associated with any specific business. However, the need to rely on professional skills quickly became apparent, and the I-Lab recruited a designer. This one has a double skill: as a product designer, he masters the methods and tools of field observation and solution Design; as a "design maker", he masters the methods and tools of prototyping. He is a professional who allows "to move from a traditional logic to a really professional logic" [I-Lab Manager]. This designer is thus mobilized in all phases of the I-Lab projects. Upstream, he takes part in the study of consumer behaviour, explorations and helps to propose approaches to shift points of view. Downstream, he intervenes in the phases of prototyping and integration of user feedback, up to solution Design.

Within EDF Group, the adoption of DT has made little contribution to the institutionalization of the Design function. The reclassification of the "Transversal Design Manager" function to "Collective Innovation Catalyst" illustrates the low prevalence of the profession. Similarly, no career paths are planned for in-house designers. Today, only one project manager comes from a Design background. Nevertheless, the skills associated with her
original expertise as a designer seem to contribute usefully to managing innovation projects involving DT. “The ability to materialize, to give shape” helps her to include and articulate the visions of different stakeholders: “I seek to give others what I have sometimes lacked [when I was involved in projects]: i.e. meaning” [EDF Project Manager Designer].

Like a cat which kicks his paws and sees how it reacts, you have to develop the ability to judge quickly and accurately, to listen, to detect, to assume responsibility for listening to an intuition. These are not qualities specific to designers, but unlike other professional cultures, they have not at least learned to repress them. [Collective Innovation Catalyst EDF]

At Carrefour, the Design function has been considerably strengthened over the past ten years. Thirty designers gathered in the Design Centre play an educational role in the group’s departments. This can be done through the organisation of training courses, conferences or multi-trade workshops, the production of brochures or videos, as well as the organisation of exhibitions. Many consider themselves as “Design Ambassadors” even if their recognition as actors of innovation at the company level is not systematic. While the services are largely convinced of the value of the methods and tools advocated by designers, they use them on an ad hoc basis, sometimes using external competition to reduce lead times. The Design function today aims for a broader political recognition: “We need […] to obtain a critical mass of designers in the company […] and to organize internal governance to avoid bypassing.” [Carrefour Design Director]

Although DT is linked to a global strategic approach for Carrefour, led by the Design function, the political impact remains limited as long as the Design Centre is not fully recognised as a pilot.

Profile and role of the change agent

In the cases studied, two types of profiles carry DT’s initiatives: engineers and designers. Their internal legitimacy depends on the organizational context. In the three companies where the culture is mainly based on engineering, engineers with seniority promote DT. For Air Liquide and SEB, the fact that the use of DT is limited to a clearly identified physical location, and that the pilots are familiar with the organization, facilitated the adoption of practices that are at odds with organizational culture. Open and curious, these engineers have initiated themselves into DT by collaborating on projects with start-ups or experienced consultants.

It is all the more credible to talk to them about an approach [Design Thinking] that is very different from theirs because we are one of them […]. It is also reassuring […]. If we have succeeded, then they too can do it. [SEBLab Manager]

It is easier to convince employees to adopt 360° practices in their daily lives when you are at home, when you have managed to do it yourself and when you communicate with the right words to reassure. [Manager I-Lab]

This internal legitimacy of the change agent has smoothed the political stakes associated with the adoption of DT is key in order to avoid considering the adoption of this management innovation as a questioning of the power held by certain key functions of the organization in the innovation process. For example, as an experienced R&D engineer in the company, the SEBLab manager was able to convince the engineers and marketers responsible for innovation projects to change the way they involve designers, without this being perceived as an infringement of their prerogatives.

Similarly, the main pilot for the adoption of DT within EDF is an engineer. Nevertheless, he defines himself as a “frustrated designer, pushed towards technology” [Collective Innovation Catalyst EDF], who discovered DT during his studies at the University of Technology of Compiègne. Convinced of the relevance of dual profiles in a culture of change, he now uses his engineering background as well as his knowledge of Design to formulate approaches and assign the most appropriate designers on a case-by-case basis.

Carrefour is the only case where a designer occupies a hierarchical position that allows him to be an advocate of DT, because his function is sufficiently institutionalized to ensure legitimacy in the company. He acts as a mentor for designers, defending them so that they can do their job as well as possible. “He tries to open the hierarchical door for us to act.” [Carrefour Brand Designer]

Table 3 synthesizes the results of the compared study.
<table>
<thead>
<tr>
<th>Company</th>
<th>Relationship DT / Design in the initiative phase</th>
<th>DT change agent</th>
<th>Application of DT key practices</th>
<th>Trajectory of adoption of key DT practices and degree of novelty</th>
<th>Impact on the designers and the Design function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Liquide</td>
<td>DT as management tool</td>
<td>Engineer with seniority</td>
<td>Strictly within the I-Lab, more flexibly beyond</td>
<td>Local disruption in a new Lab, with progressive diffusion of the user-centred approach in other entities of the group</td>
<td>Emergence of the Design function: recruitment of a specialist designer</td>
</tr>
<tr>
<td>Carrefour</td>
<td>DT as theoretical basis of Design</td>
<td>Designer at high hierarchical level</td>
<td>Flexibly, considered legitimate on a global scale</td>
<td>Global disruption at the technical and cultural level but partial at the political level (orchestration by the poorly acknowledged Design function)</td>
<td>Design became legitimate to represent the Innovation function because there was a gap to fill</td>
</tr>
<tr>
<td>EDF</td>
<td>DT as theoretical basis of Design</td>
<td>Engineer with a strong design culture</td>
<td>Flexibly, considered legitimate on a global scale</td>
<td>Progressive and punctual adoption on which entities of the company: no technical / cultural / political breakthrough</td>
<td>Designers’ role still limited, spread in the Innovation Lab laboratories</td>
</tr>
<tr>
<td>SEB</td>
<td>DT as management tool</td>
<td>Engineer with seniority</td>
<td>Strictly within the SEBLab</td>
<td>Local disruption in the newly created Lab</td>
<td>Progressive evolution of the role of designers at group level</td>
</tr>
</tbody>
</table>
Discussion

This research allows better qualifying DT as a management innovation impacting organizations on two aspects: the practices associated with exploration projects management, and the role of designers in their implementation.

The way in which DT is used, as a toolbox for managers or as a theoretical basis for Design, is a key element of the theoretical controversy over its degree of novelty. The case study shows that this conceptual debate is not neutral within companies: it strongly influences the strategic objectives assigned to DT, much more than it reveals concrete differences in practice between these two approaches.

Considered as a managerial tool, it is locally deployed in order to acquire new and complementary innovation capacities. When DT is regarded as the theoretical basis of Design, it is promoted as a means of transforming the company's culture and practices in all fields. It is then associated with a mixed management innovation as defined by Le Roy and al (2013), intended to change the production of knowledge and the relationships between actors.

The case study tends to show that these two different visions of DT are linked to different profiles of change agents: DT as a managerial tool is carried by non-designer managers, while DT as a theory of Design is carried by professional designers (Carrefour) or managers who have developed a global knowledge of Design in their career (EDF). These change agents contribute to building meaning around DT. This perspective allows us to rephrase initial proposals 1 and 2, and to propose a new outcome from the field analysis:

Proposal 1 reformulated: When DT is considered as a managerial tool detached from Design, it is based on a strategic objective of acquiring new practices to manage innovative projects. Its application is local.

Proposal 2 reformulated: When DT is considered as the basis of a general design theory, it is based on a strategic objective of global transformation of the organization, both in the way it produces knowledge and in the relationships between actors.

New Proposal: The change agents who use DT as a managerial tool are non designer managers, while DT as a basis for Design is carried by professional designers or managers accustomed to Design and influenced by its practices.

Indeed, the conceptual approaches of DT are linked to different visions of the degree of disruption that management innovation should bring to the organization. But they do not prefigure the actual level of disruption brought by its adoption. In all the cases studied, the practices attached to DT contradict the technical, cultural and political dimensions of large established companies. The strict or flexible application of new practices depends on the need to negotiate their content in regards to the company's cultural and political challenges. In line with Ansari and al (2010), the study showed that these two dimensions determine in which ways the management innovation is adapted. The local adoption of DT as a managerial tool in newly created innovation laboratories makes it possible to strictly apply practices, thus creating a break with existing practices. Using DT contributes to the gap with the rest of the organization by promoting multidisciplinary teams, a user-centered approach and new techniques to materialize ideas. As soon as practices diffuse beyond these laboratories (Air Liquide), they are adapted to fit the cultural and political context of the company. Their application is consequently more flexible, and the degree of rupture less important.

The case study shows that the introduction of DT as a managerial tool does not necessarily devalue professional designers, unlike the results of Rauth and al. (2014) or Carlgren and al. (2016b). Rather, it leads to the enhancement (SEB) or emergence (Air Liquide) of a Product Design function. Moreover, the contribution of designers to the innovation process can extend beyond aesthetics and solution Design (SEB). This positive impact on the Design profession is partly explained by the change agent who plays a key role as mediator, legitimizing the use of DT and reducing potential political tensions. These results lead us to invalidate the relevance of proposals 3 and 4, and to propose the following formulations:

Proposal 3 modified: When DT is understood as a managerial tool, key practices can be strictly applied and therefore a source of disruption as soon as they are adopted in a defined environment that functions differently from the rest of the company.

Proposal 4 modified: DT as a managerial tool introduces a new sensitivity to Design professions, if the change agent contributes to enhancing them through his or her legitimacy, in a way that is consistent with the company’s political context.
When DT is considered as the theoretical basis of Design, the gap between the management innovation and the organization can lead to a strong adaptation of DT key practices. Thus, in the case of EDF, despite ambitious strategic objectives associated with DT, the new practices are applied in a flexible way, sometimes on an ad hoc basis, because the engineer’s culture remains predominant. In this sense, even if designers’ profiles are recognized as relevant in exploration projects, the profession remains poorly represented and valued in the company. The Design function has therefore not been strengthened by the adoption of DT, although change agents play the role of facilitators. This is due to a fragmented hierarchical positioning that does not allow them to act as a lever for global impact.

DT linked to a theory of Design may create a break in practices provided that internal power relations evolve. For instance at Carrefour, the Design Centre promotes DT methods and tools. The function is gradually being strengthened, until being recognized as key in innovation processes – even if not yet unanimously acknowledged. Only then will Design skills appear as a meta-competence at the service of innovation in the entire organization. In this perspective, our results lead us to reformulate proposals 5 and 6:

**Proposal 5 reformulated:** When DT is seen as a general theory of Design, it is at odds with the technical, cultural and political dimensions of the company, and can only be adopted globally when the political context of the company is favorable to designers.

**Proposal 6 reformulated:** When DT is seen as the theoretical basis of Design, it strengthens the Design function in the company’s innovation processes provided that policy alignment has been achieved.

Table 4 summarizes the results obtained and the new framework for analyzing the impact of DT on organizations.

<table>
<thead>
<tr>
<th>DT as Management Innovation</th>
<th>Strategic objectives associated with DT</th>
<th>Change agent</th>
<th>Degree of rupture depending on the context (technical, cultural, political)</th>
<th>Impact on the Design function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toolbox for managers</td>
<td>Local and mixed</td>
<td>Manager non designer</td>
<td>DT practices adopted in a comprehensive and strict manner. They bring rupture in a dedicated space (break with the organization). Beyond the Labs, DT practices are deployed in a flexible way.</td>
<td>Enhancement of the designer as a specialist profession</td>
</tr>
<tr>
<td>Theory of Design</td>
<td>Global but little mixed</td>
<td>Support the organizational transformation towards a Design-centered approach</td>
<td>Tendency to adopt DT’s key practices in a flexible way. The technical and cultural ruptures depend on the capacity to change the relationships of power in the organization.</td>
<td>Enhancement of designers’ meta-competence. Institutionalization of the Design function, innovation pilot</td>
</tr>
</tbody>
</table>

Finally, an unexpected contribution of this research is to highlight the figure of the change agent to explain adoption trajectories, as suggested by Volberda and al (2014). Therefore, the fact that this manager is a designer or not influences the strategic objectives assigned to DT. In addition, the change agent’s internal legitimacy (partly linked to the function embodied) is key in the diffusion of management innovation. Distinguishing between DT as a toolbox for managers and a theory of Design also highlights different skills and contributions of designers in the adoption of DT practices. While using DT does not always require a professional designer as a sponsor, including a variety of expertise and forms of idea materialization remains attached to professional Design skills. In line with Carlgren and al (2016b), these results suggest that the more the company seeks a significant break, the more specific skills are involved in the implementation of DT. Acquiring these skills takes time and can slow down the adoption of DT in organizations.
Conclusion

Until now, research on the degree of disruption associated with DT has mainly focused on its generic principles rather than on its adaptation while diffusing in organizations. This research proposed to consider DT as management innovation in two different ways: as a toolbox for managers or as a theory of Design. This allowed distinguishing between its generic principles and actual adoption trajectories depending on organizational contexts. The results contribute to informing the debate on the impact of DT in companies.

This research presents several perspectives for future work, and limitations. First of all, it does not analyze all the potential impacts of DT on the organization and is limited to impacts on practices and on the Design function. Further work on the decision-making process in innovative projects could thus be useful to complement our approach. Secondly, the generalization of the proposals made in this article is not possible at this stage. The abductive method made it possible to produce relevant hypotheses and a clearer analytical framework to define and evaluate the impact of DT as management innovation, based on the initial objectives attached to it and its adoption trajectory. However, these hypotheses must be tested on more numerous and varied cases. Finally, this study opens up new research perspectives on the role of designers and non-designer managers as change agents.

References


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