P/REFERENCES OF DESIGN

IMPLEMENTING DESIGN THINKING FOR EXPLORATION AND EXPLOITATION: CREATING CONDITIONS FOR ADOPTION.

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ABSTRACT | This paper aims to investigate how organizations should create the conditions to facilitate Design Thinking implementation to balance their exploration and exploitation activities towards innovation. Literature has shown diverse contributions of Design Thinking to companies. However, very few have discussed one of its natures of being a mediator to nurture companies' capability to explore and exploit simultaneously and how Design Thinking implementation actions could foster this positive role. This paper has carried out a case study methodology to reflectively analyze three empirical cases in which authors have actively participated and has presented different approaches in three projects to reveal key factors that companies should take into consideration for creating the conditions for Design Thinking implementation. Implications for companies regarding the relationship with their organizational learning process have been discussed eventually. The research provides a deep understanding of how companies could facilitate Design Thinking implementation, highlighting which specific factors and conditions could enable its ambidexterity approach, especially for managers.

1. Introduction

The competitive condition of the market puts companies in the position of having to constantly find new ways and strategies to compete and succeed. According to March (1991), this condition of competitive advantage could be achieved by adopting a tradeoff between exploration and exploitation. Usually, companies are performing exploration when their activities are oriented to search, experimentation, and variation. On the other hand, companies concentrate on exploitation when there are choice, execution, and variance reduction (Lavie, Stettner & Tushman, 2010). Moreover, Levinthal and March (1993) added that the knowledge domain gives a fundamental difference between the two approaches: exploration focuses on new knowledge, while exploitation focuses on what is already known by the company. Over the years, companies often use exploitation more than exploration actions. This is because adopting exploitation brings more immediate results, and the returns of such strategies are more precise and more certain (Denrell & March 2001). However, the preference for exploitation actions alone may result in many companies needing to prepare for market changes (Fang, Lee & Schilling, 2010). In order to be truly innovative, companies need to adopt both: the real challenge is to understand how to balance the two approaches.

Balancing exploration and exploitation can be facilitated thanks to the adoption of Design Thinking (DT) inside companies. Indeed, Design Thinking has been classified as a catalyst for innovation and change by several scholars and practitioners (Brown, 2008; Forrester, 2018; Liedtka, 2015; Martin, 2009; Sheppard, Sarrazin, Kouyoumjian and Dore, 2018). Among the most established benefits are positive implications for organizational transformation and innovation (Brown, 2009), better decision-making (Liedtka, 2015), customer orientation (Kumar and Whitney, 2007) and competitive advantage (Martin, 2009). Design Thinking can act as an internal mediator giving companies the possibility to both explore and exploit (Deserti & Rizzo, 2014). The characteristic of ambidextrousness is indeed inherent to Design Thinking, given its nature of integrating deductive, inductive, and abductive thinking (Martin, 2009). This research aims to investigate how Design Thinking implementation has played a role in balancing exploitation and exploration inside companies. Moreover, it wants to underline what key factors companies need to consider creating the “conditions” to adopt and implement it effectively. The investigation is based on three empirical cases examined through three primary parameters: the design drivers, representing the strategic reasons behind the process of DT adoption, the implementation format adopted, and the organizations’ maturity in using design, looking at the grade of integration of DT. The investigation was made through participatory observation (made directly by authors) on three cases adopting DT. The authors had the opportunity to interact with the three companies for a period of 24 to 36 months.

The article is structured as follows: the subsequent section presents the adopted theoretical background, examining the evolution of exploration and exploitation processes and discussing their importance within organizations. Furthermore, Design Thinking and its importance in supporting exploration and exploitation processes are analyzed. Later, an overview of the research methodology and the adopted framework for selecting cases is presented. Then, empirical results are described and subsequently discussed, identifying five initial findings for companies when implementing DT to balance their exploration and exploitation activities. It ends with a discussion on how the proper conditions to guide companies in defining their own ways to balance exploration and exploitation activities should be set.

2. Theoretical Background

2.1 Exploration and Exploitation Towards Innovation

One of the most important objectives for companies is to sustain a competitive advantage inside their marketplace. Pavitt (2005) argued that innovation can be reached through a process of exploration and exploitation of opportunities to develop new products, processes, or services. The terms “exploration” and “exploitation” have taken on considerable centrality in organizations since their first appearance in March’s pioneering article (1991). They have become two fundamental aspects within organizational analyses of

technological innovation: organization design, organisational adaptation, organizational learning, competitive advantage and, indeed, organizational survival (Gupta, Smith & Shalley, 2006). Also, different literature started to discuss the notion of exploration-exploitation, such as organizational learning (e.g., Levinthal & March, 1993; March, 1991), organizational design (e.g. Tushman & O'Reilly, 1996), knowledge management (e.g. Brown & Duguid, 2001), adaptation (e.g. Brown & Eisenhardt, 1997), and Ambidextrous leadership (Rosing et al.,2011; Zacher & Rosing, 2015; Klonek et al., 2020). It is impossible to define a priori whether a given activity represents an opportunity for exploration or exploitation for all companies. These two concepts are often relative and have to be defined from the point of view of an individual organization. This is because specific knowledge, technology or markets may be new to one organization while already known to another.

All the literature agrees that resource-allocation constraints, organizational inertia, and desirable organizational outcomes condition the implementation of exploration and exploitation. A great debate has developed not only on the definitions of terms but also on the possibility of bringing these two processes forward in parallel within organizations. One of the main reasons for the difficulty of following them in parallel is that they require many resources. Companies don't have illimited sources, so they need to understand how they want to use them and where they need to be dedicated (Gupta, Smith & Shalley, 2006).

Anyway, since the beginning, there has been consistency in thinking that organizations need both exploitation and exploration to achieve persistent success (March 1991), so the real challenge is to understand how to balance these two processes. Some studies have suggested that "ambidexterity" (Benner & Tushman, 2003) is the answer, while others propose that "punctuated equilibrium" is the way to balance these aspects (Burgelman, 2002). Ambidexterity refers to the simultaneous pursuit of both exploration and exploitation by highly distributed and separated subunits or individuals, each of which specializes in one of these two activities. Punctuated equilibrium, on the other hand, applies to temporal rather than organizational distinction and implies that passing between cycles of exploration and exploitation is a wiser choice than pursuing both simultaneously.

2.2 Design Thinking in Organizations for Balancing Exploration and Exploitation

Design Thinking, as an innovation approach, is implemented to propose valuable ways to capitalize on organizations essential resources and generate experimentally cutting-edge solutions and changes. Design Thinking (DT) was born to codify how designers see and think (Liu, 1996). Nowadays, among the different sources, there is not a specific and precise way to define it, and its concept is broad (Cooper, Junginger & Lockwood, 2009). Many different debates take place around DT, about what exactly it means and what the differences are from other methods and processes such as creativity, innovation or systems thinking (Kimbell, 2009). The literature agrees it is an iterative and exploratory process (Braha and Reich, 2003) used to solve problems, guided by human-centeredness (Junginger, 2009; Liedtka, 2015; Dunne, 2018).

During the last two decades, DT has been critically analysed by scholars from design, business, and innovation management disciplines. It has been identified as a "powerful, effective, and broadly accessible" approach to innovation that can be integrated into all aspects of business and society" serving the purpose of "generating breakthrough ideas" (Brown, 2009). Recent literature, both from Design and Management scholars, consolidates how DT adoption brings positive implications for organizational transformation and innovation (Brown, 2009), better decision-making (Liedtka, 2015), customer orientation (Kumar and Whitney, 2007) and competitive advantage (Martin, 2009). An increasing number of organizations are aware of the potential to integrate and appropriate DT internally; contaminating the corporate culture with new practices can support how business approaches changes and innovation processes, such as balancing exploitation and exploration. The dual nature of the DT approach is strongly linked with the concepts of ambidexterity within businesses; DT adoption can play the role of the internal mediator, generating a fertile ground for companies to simultaneously explore - dealing with the uncertainty of the front-end innovation - but also exploit - dealing with the development of product and or services (Deserti & Rizzo, 2014). The ambidexterity in DT derives from the different thinking models that it embraces: one of the crucial characteristics of DT consists of combining deductive, inductive and abductive

reasoning (Martin, 2009); this is not only a pivotal aspect to bringing Design Attitude within organizations (Michlewski, 2015) but also a way to balance exploration and exploitation helping the established organization to reduce the typical “bias toward reliability” (Martin, 2009; Sutton, 2001). Ambidexterity may be created by dedicating a portion of the enterprise to DT. At the same time, the rest is based on exploitation or instilling a widespread mindset of DT that includes all of the company's components in the exploration activities. More specifically, it is worth illustrating the different aspects to consider when defining the various cases of DT adoption in organizations.

Most of the adoption cases of DT are recognized under the label of innovation activities or labs; however, the strategic reasons - the design drivers - behind the process of adoption are multiple, as effectively summarized by David Dunne in his last book “Design Thinking at Work: How Innovative Organizations are Embracing Design” (Dunne, 2018). For most, it is about facilitating a disruptive innovation path or improving better experiences for customers; an increasing number of other goals more oriented to internal cultural development for changing internal mindset or feeding internal teamwork across the organization silos, or also to retain and attract talent and valuable people; at last for some, adopting DT has the aim of activating a system change organizational and social (fundamental changes). Businesses might combine different reasons to implement DT, usually following a gradual process of integration of design into organizational life (Buchanan, 2015), starting from tactical issues arriving to vision and strategy passing by organizational problems of operation.

The other crucial factor to consider is the placement of the Design Thinking provider, internal or external (e.g., design consultancies). Different “placements” correspond to a variety of forms through which organizations adopt DT. The internal DT adoption forms vary from established innovation labs with designers - design units - recruiting designers in strategic positions or building the DT competence of existing employees through dedicated educational programs. The pure external DT adoption models include all the typical forms of design consultancy activities to support the adoption of DT in the organization: design sprint sessions, long-term projects, training programs, or other forms of design consultancy activities. The organizations choose the adoption model depending on their goals, culture, innovation strategies and sizes.

3. Methodology

DT adoption can guide companies in dealing with uncertainty in innovation - exploration and fostering the development of products and services - exploitation (Deserti & Rizzo, 2014). Therefore, this paper aims to understand how DT implementation has played this role and what key factors companies need to consider creating the “condition” to adopt and implement effectively. The case study method (Yin, 2009) has guided the research to analyze three cases in which authors have carried out DT implementation. In each case, the data has been collected through participant observation (Gatt and Ingold, 2013; Gunn et al., 2008) by the authors’ empirical research actions. The authors refer to this as not a detached form of observation but a close look at the engagement understood and responded to by the people involved in the research.

3.1 Case Selection

Three projects have been selected for empirical research actions, and authors have applied the following criteria of selection:

- Authors have participated directly in all three projects as an external expert team, who brought design thinking from outside and implemented it inside the companies;
- The methodological approach and methodology used in the projects is the same in all three cases;
- Organizations in all three projects are big companies which have a large internal structure and huge numbers of employees;

- In all three cases, design thinking activities have been conducted with the involvement of actors at the companies' strategic level;
- All three projects have been for a long period, between 24 - 36 months.

3.2 Framework for Case Analysis

The main indicators extracted from the literature that have guided the inquiry in the three cases are design drivers, the format or means of DT implementation, and the organization's maturity level of understanding and using Design.

Table 1. Case study framework (elaborated by authors).

Indicators	Contents
Design Drivers (why)	improving better experiences for customers or internal actors retain and attract talent and valuable people facilitating disruptive innovation path changing internal mindset (design culture) activating a system change
Format/Means (how & what)	design sprint training - dedicated educational programs create internal design unit/lab/hub recruiting designers in strategic positions long-term project collaboration
Design Maturity	design or design thinking is not considered an essential skill for companies' development design is used as aesthetic and functional skills for tangible outputs design thinking is acknowledged as strategic advantages

3.3 Innovation Stories in Three Cases

The design thinking activities conducted in each of the three cases will be presented and analyzed using the conceptual framework presented above. The following table has summarized the initial design drivers, the primary format of DT implementation actions, and the design maturity of each case to show the differences and similarities.

Table 2. Elements in the framework presented in each case (elaborated by authors).

	Initial design drive	Main formats	Design Maturity
Case One	Facilitating disruptive innovation path	a. Explorative projects b. Training activities	Design was used as aesthetic and functional skills for tangible outputs
Case Two	Changing internal mindset (design culture)	a. Explorative projects b. Training activities	Design thinking was acknowledged as strategic advantages, and operationally involved at the strategic level
Case Three	Improving better experiences for internal actors; Retain and attract talent	a. Practical projects b. Training activities	Design thinking was acknowledged as strategic advantages, but not yet involved at the strategic level

Case one: Implementing design thinking in a traditional Chinese furniture company.

The first project is an ongoing project between the authors and a Chinese furniture company that has been running its business for over 20 years. The initial collaboration aim was to find a new approach to facilitate innovation inside the company, not only at the product development level but the companies' strategic level. Thus, the drivers at the basis of this activity are facilitating a disruptive innovation path but also kicking off a process of internal cultural development.

The collaboration started with introducing an external Design Thinking team, composed mainly of authors, the company's CEO and managers of R&D to the whole company. The initial activities were explorative research projects and training courses for the company's managers and designers. The research projects in the first year were aimed mainly at collecting up-to-date resources and information on furniture and related sectors internationally and transforming them into thematic topics and directions for the company's internal R&D team (design teams included). On the other hand, the training course has been carried out twice. The first time, selected design managers and designers came to participate in training activities in the authors' institute (physically outside the company and their daily working routine and environment); the second time, the authors dedicated five days to the company and organized intensive training workshops with selected managers and designers (physically inside the company). All the activities have been strongly supported by top-down policy and guaranteed commitment from participants.

The second year's collaboration has been planned based on the first-year experience and has retained the two approaches: project-based and capability-building through training. Authors have worked on moving towards understanding the company's structure and logic, as well as exploring potential opportunities of intervention. The main collaborative actions were mixing and integrating two types of DT activities in order to have a coherent and effective result. The design methods and tools produced in the collaboration projects have also been taught to participants (employees) in the training so that they can apply them to practical challenges and problems. The main outputs of the second year's collaboration are strategic design guidelines for new product development, design research guides, and the launch of the joint design centre with the authors' institute inside the company. The idea of the third year's collaboration will then focus on supporting the building of a research centre abroad, which will strategically position as a bridge to link European resources and DT experts with the headquarters, as well as the recruitment of talents from abroad.

Case two: Design thinking training activities for a Japanese company in the telecommunication sector.

The second project was an activity implemented for four years between the authors and a Japanese company leader in the telecommunication sector. The initial collaboration was aimed to identify possible ways in which design can act as a boost for the implementation of innovation strategies across different levels of the company. The drivers at the basis of this activity are facilitating a process of internal cultural development but also retaining and attracting valuable people.

Firstly, during the first year, the authors were engaged to do explorative actions, supporting some level of the company in finding new possibilities for their company. New thematic topics and directions for the company's internal R&D team (design teams included) were identified. Then, during the other three years of collaboration, a series of training courses for the company's managers and designers were provided. All three years of courses were attended by design managers and designers selected by the Japanese company. For the second and the third year of the collaboration, attendants come to Italy, inside the authors' institute, to participate in training activities. The training activities were held for three weeks, each week, with five days of training per week. During the fourth year of collaboration, the training was held inside the headquarters of the Japanese companies, where the authors were invited to provide the training in-house. Here, the authors have provided training in five days using the format of workshops where selected managers and designers were also invited. All the activities have been strongly supported by top-down policy and guaranteed commitment from participants.

As mentioned above, the first year of activity, through research activities, was dedicated to mixing and integrating two types of DT activities. In particular, the focus was on both elaborating strategic design guidelines and creating design research guides. The objective of this first year of collaboration was to

understand how design can support different levels in finding new areas of development. During the other three years of collaborations, working through training formats, the activities focused on various aspects. One of the objectives was the training of international employees coming from different centres of the company operating in different parts of the world. Another objective was the development of a design culture through a general understanding of what design is and its evolution. Moreover, the training aimed to integrate design thinking methodologies and contents, developing first attempts through training workshops. Finally, the last objective concerned the development of a new process to use inside the company, integrating DT and scenario-building techniques. All training aimed to bring a design thinking approach into the company through training of essential stakeholders, experimenting with it since the courses where practical proposals were developed.

Case three: Design thinking implementation in a Corporate and Investment division of an Italian bank

The third case consists of a long-term design-based research project in collaboration with the Human Resources unit within a leading Italian bank. The trigger of this collaboration is to explore how DT adoption can improve the quality of the working life of employees. Thus, the drivers at the basis of this activity are: improving better experiences for internal actors, the need to retain and attract talented people, and also to kick off a process of internal cultural development. Thus, the HR management team invested in setting up a completely new operative team called People Experience, which literally has to design the "employees journeys". People Experience aims to design micro-experience that can reflect on macro-experience in order to promote organizational culture and make tangible the value offered by HR to the whole division. The strong commitment of HR and its awareness of the value of adopting DT facilitate the research collaboration. The authors perform an active role in all the different iterative steps of the project.

At first, the project focuses on understanding how to intervene through designing the employee experiences: mapping the state of the art of the employee lifecycle in this bank, understanding the context in which the DT project should land, and moreover, understanding the role of the DT implementation. This phase of the activities is named Scoping and permits the authors to redefine the shared direction of the project collaboratively with the company. Indeed, there a need to produce a permanent and long-lasting impact within the organization's routines; thus, the redefined focus consists of gradually fostering proactivity and an employee-focused vision (human centricity) within the HR unit first to finally promote and make the organizational culture tangible to the whole company. This passes by working on creative confidence (Kelly & Kelly, 2013) of employees, starting from enabling the People Experience team to develop qualitative human experience.

The means to initially address this challenge is a process of applied training dedicated to HR members of the company to feed the internal design culture through specific DT training activities. This phase of activities is called training and is divided into different phases, which gradually involve various actors in collaborative activities. Indeed, the ecosystem of actors involved is articulated in progressively bigger circles: the plan is structured in this way, aiming to effectively integrate the DT into the routines of the division, thus gradually impacting the internal client experience and the whole organizational culture. The approach that stands as a theoretical reference is to set up a process that activates a progress loop (Amabile & Kramer, 2011): make the employee touch the meaningful progress of each small step iteratively. This set of training activities takes place in multiple "Experience Design Lab" dedicated virtual places developed as a learning area for the employees involved in each step. After the first year of activities, mostly devoted to training, the project moves to a phase called Implementing. During this third cycle of activities, the DT implementation enlarges its scope to a wider audience. Indeed, the project finally arrived to propose exploratory solutions to define a new way of working life experiences after the COVID-19 pandemic.

4. Research Findings

The authors have reported on three projects to present how DT implementation has contributed to guiding companies in balancing exploitation and exploration. They have followed three different innovation paths and strategies; however, some common findings have been observed.

4.1 A "Reframed Brief" is Necessary to Guide DT Implementation Effectively

All three projects have started with requests from big companies to bring DT inside towards fostering innovation. All three companies have acknowledged the contributions and importance of DT, and all of them have considered DT to fit their development needs and desires they had in mind. However, none of them had a clear idea of the "proper ground" that DT could initially land inside the company as a "newcomer". The question is what DT could or should intervene and how DT could fit and effectively support the company's vision in the long term. In all three projects, the authors have spent a certain amount of time understanding who the companies are, their strengths and weaknesses, and their real challenges and problems.

In case one, after the initial collaboration request arrived, the authors physically conducted a visit and field trip to the company, which helped them gain a precious first-hand understanding of the company. This activity has modified and reset some parts of the collaboration plan (e.g., project topics) and expected results. In the second case, one part of the first-year collaboration was understanding how DT could intervene at different company levels to define new business opportunities. In the last case, the first phase was dedicated to defining the collaboration scope (e.g., project typology and potential areas) and checking the coherence between DT intervention and the company's needs. "Reframing" (Dorst, 2011; Cross, 2006; Kolko, 2010) has often been considered one of the main characteristics of Design Thinking. When conducting DT implementation, the reframing action not only plays a role in defining opportunities and solutions but, more importantly, enables the identification of real problems or challenges and sets the "proper" brief. Authors' practical experiences could tell that it is essential for companies who have an interest in implementing DT and external DT teams to take time to know each other, to share visions and opinions on approach and expectations, and to create a "situated" path for companies to benefit from DT before conducting concrete DT activities. This guarantees effective adoption of DT with a long-term vision and profound impact.

4.2 Design Training is an Effective Way to Implement DT, Contributing to Building Individual Capability Related to Exploitation and Exploration

Training activities have been carried out in different forms in the three projects, and it has been observed that big companies are willing to invest in talent capability building, especially the soft skills related to DT. The frequency should be well-planned. Stimulating internal culture development through DT training is a way to foster the condition to make DT approach adhere to the organizational context, as well as to align employees with this new approach from the mindset to operations. Furthermore, due to its feature and applications model, DT capability is only possible to learn and obtain with practical experience. Therefore, training activities provide a "ground" to try, do and learn. One difficulty or potential risk is that sometimes companies can struggle not clearly seeing the link between training outcomes and improvement on traditional/core business, especially when many of them started with an objective more related to exploration. Authors have dealt with this issue in all three cases through active communication among different actors at different levels, setting different parameters to evaluate the results and visualizing progress.

In the first project, training was a part of the initial collaboration ideas for organisations to gain DT skills, methods and tools. The training actions aimed to broaden employees' innovation views and equip them with a systemic approach. The training topics are highly related to the companies' core business and sector. Training activities are a significant part of DT implementation in the second case. The company has

chosen a new topic to work on, but the focus was on transferring the DT mindset, methods, and process to the participants. In the last case, training activities entered into play at the second phase and were oriented by project development needs thanks to the reframed brief. It has guided the company to link its initial exploration objective of implementing DT to generating results that could impact its core business.

4.3 Actors' Engagement at Different Levels and Positions Facilitates DT Implementation

It is important to engage stakeholders, from managers at the high level and at essential decision-making positions to individual employees at the basic operative level, in the DT implementation process towards transferring design intervention to design integration within the organization (Wrigley, Nusem & Straker, 2020). Rauth, Carlgren and Elmquist (2014 b) have stated the necessity of establishment legitimacy for gaining acceptance and support for DT implementation in organizations. Therefore, the engagement of

very top-level decision-makers, e.g., CEOs and directors of essential departments, could play as the endorsement to "welcome" DT. However, that is far more than enough. From project experiences, authors have understood that the challenge of effective implementation of DT is also about how employees perceive and practically benefit from it. Engaging them in real experience is necessary to make sense of why this approach and method will be helpful and should be integrated into their daily working activities.

In the first case, DT implementation has involved product designers, marketing researchers, design managers, the director of the R&D department, the marketing and communication department and companies CEO in different phases during the process. The engagement also enables these actors to understand among themselves: their different roles and perspectives towards a shared objective, as well as how the DT approach could support their work and tasks. In the second case, the design director, who acted as ambassador to introduce an external DT team (mainly composed of authors) within the company, selected employees with very diverse backgrounds (both cultural and professional) to participate in the DT training. In DT implementation activities, they shared perspectives and knowledge through collaborative learning. In the third case, DT is also welcomed from a top-down approach, guaranteed by the top managers. Nevertheless, the practices have enlarged from small groups to various departments and positions, which allowed diverse employees to take part in experimenting and interacting with situated DT methods and tools and providing their personal feedback as well as obtaining their personal learning results.

Therefore, involving actors and stakeholders of the company enables DT implementation to facilitate systemic change within organisations, both vertically and horizontally. These interventions are seeds for gradually cultivating a design culture inside in the near future.

4.4 Dedicated Physical and Digital Spaces for Practising DT

The notion of having physical spaces as an element for supporting the success of DT integration is documented in the literature (Leifer &Steinert, 2011; Dunne, 2018; Wrigley, Nusem & Straker, 2020). The dedicated spaces could isolate employees participating in DT activities from their daily working routine and tasks to feel safe to try, experiment and make mistakes, which are necessary to obtain the DT mindset and approach. These spaces also act as playgrounds or gyms for DT learners to do exercises and practices to train their DT minds and actions gradually. It is essential to specify that the dedicated spaces don't refer to the fixed physical ones. They correspond to the different DT implementation activities and formats. Due to COVID-19, many digital versions of dedicated spaces have acted actively in providing virtual spaces to substitute for conventional spaces.

In case one, in the beginning, DT actions have taken place outside the company, or the company has created specific rooms dedicated to particular DT activities. From the second year, a joint design center has been created to build an internal ground for cultivating DT initiatives, continuous DT practices, and a design culture. In the second case, most of the DT implementation actions in the second and third year have been conducted in a learning space inside educational institutes, where DT experts and all

participants (employees) frequently interacted and worked together for a certain period (around four weeks). In the third case, the “Experience Design Lab” - a temporary “digital” design lab with fixed scheduling- was created inside the company as a virtual learning area for involving employees in each step of the DT activities. However, the critical challenge is linking what is experienced in the “dedicated space” to a broader range of the organisation's audiences, actors, and stakeholders. This space should also deal with the request of being “open” and “connected” to other parts of the organizations. Companies should make use of the produced outputs, generated atmosphere, and reflections and effectively connect them to face other organisational challenges.

5. Discussion and Conclusions

The paper identifies a set of empirical directions to consider in setting the proper conditions to guide companies in defining their ways to balance exploration and exploitation activities through the support of DT adoption. These directions emerge from the analysis of the findings and their discussion in relationship with the extant literature and practitioners’ contributions.

As confirmed in the literature, DT adoption plays a mediating role between exploration and exploitation. DT is an “ambidextrous” approach by nature, generating a fertile ground for fostering companies’ ambidexterity. The empirical results obtained during the research projects present how the DT implementation can combine both “ambidexterity” with a “punctuated equilibrium” in an organization. Indeed, in various cases, DT's implementation makes the organization simultaneously deal with novel challenges by exploiting internal routines and resources. This happens, including multiple organization's units and individuals in the various moments of the exploration activities; the critical aspect involves various actors but in different and alternated experimental cycles of activities. This can be defined as an evolving path to gradual ambidexterity: business can be guided in gradually being ambidextrous thanks to DT's support that nurtures a specific type of (design) culture within the organization. As it happens in the process of DT adoption in organizations, a gradual integration process (Buchanan, 2015) can be the solution to permeate the organizational life effectively.

To make this process effective, it is fundamental to support the organization in being open and prepared to welcome changes to nurture resilience (Hamel & Välikangas, 2003) in the organization, thus proactively adjusting in front of an uncertain future. Indeed, DT implementation should start with a set of activities dedicated to facilitating a mutual understanding between the DT provider and the organization in question; as presented in the findings part, before conducting any activities, it is critical to comprehend the organizational context and cultural aspects deeply. This is why the first cycle of exploratory activity can often start in a dedicated space among the company components; this safe zone to experiment gradually can stimulate a more expansive area, merging its results with the more operative and routinary activities within corporations.

From a sustainable point of view, to balance innovation activities on exploitation and exploration, organizations should not only rely on external resources and support; it is crucial for them to gain the capability and gradually deal with it by themselves. By nurturing internal culture development, organizations acquire and internalize new knowledge that will make them more capable of autonomously facing changes. Even in this sense, DT implementation acts as a means to activate a matching process between exploration and exploitation.

Therefore, all the different DT activities inside organizations aim to nurture a knowledge transfer from external DT providers to internal receivers through capability building. In organizations where DT's values have not been well recognized and acknowledged, the knowledge transfer process should start with an introductory phase to relate DT to the pre-existent one in organizations (Aklin,2011; 2013) and to articulate the objectives, typology of actions and detailed plans. Actors (companies' employees) at different levels and positions should all be related or involved in the transfer process to be aligned.

The adoption of DT must be considered in a specific and situated context: it cannot be considered a model for organizational change that can be applied indifferently in any context or situation (Gero, 1998). Therefore, a critical reflection must be made on the conditions that characterize the context of the implementation of this kind of approach to innovation. Company factors such as the significant dimension, the vital need and tension of change, and the presence of knowledgeable top management ease and accelerate the contamination process with DT in the corporate context. DT must not be intended as the purpose of the innovation but instead, as a means through which innovative purposes are achieved. DT can act as an engine of change; DT adoption may play a critical role in activating static organization processes to exploit internal resources and actively explore uncertain paths.

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