DOCTORAL SCHOOL
UNIVERSITY OF MILANO-BICOCCA

Department of Educational Human Sciences
PhD program EDUCATION AND COMMUNICATION - Cycle XXIX
Curriculum in ORGANISATIONAL STUDIES

DESIGN THINKING IN ORGANISATIONS: A PRACTICE-BASED APPROACH

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Academic Year 2016/2017

ABSTRACT

The concept of Design Thinking (DT) has emerged in business and management discourses as a promising approach to innovation. Numerous organisations start to apply DT practice on different scale for the purpose of the strategic renewal. Despite the growing popularity of the phenomenon in practice, there exists no coherent conceptualisation of DT in theory. The field of DT is young, full of contradictory statements and ambiguities, especially for what regards DT outcomes and benefits. Hence, this dissertation aims at consolidating the field by advancing knowledge on how DT is understood and practiced in organisations. For this, a practice-based approach was selected as a research perspective for gaining theoretical insights based on empirical findings. Moreover, this dissertation aims at explaining the relationship between the DT practice and innovation processes in organisations, so that to establish a dialogue between the two fields. For pursuing these goals, the literature on DT and innovation has been comprehensively reviewed for identifying existent problems and challenges of both fields. The empirical part of the research is developed according to an interpretative philosophical position and a qualitative approach. A single case study of the IBM Company was selected as a research strategy. The primary data were collected by a combination of three ethnographic methods (interviews, mobile ethnography, digital ethnography), and blended with secondary data from the desk research. In the analysis phase, a grounded theory approach and the narrative analysis were used to process the data. Research findings provide a historical context of the IBM Corporation and the IBM Design Company. Then, the IBM DT framework is analysed, and compared with how it is put in practice by IBMers in Italy. The IBM DT practice revealed to be constituent of three main components (mindset, agency, tools) that are orchestrated by DT principles. It was possible to find sub-dimensions and main characteristics for each constitutive element. Specifically, 3 sub-dimensions of mindset (learner, inventor, doer), 4 working modes associated with agency (explorative, sensemaking, imaginative, generating), and four typologies of tools (methods, techniques, frameworks, digital software). Moreover, six DT principles were identified, namely: humanocentrism, focused improvement, diversity-driven collaboration, holism appreciation, continuous learning, and multimodality. It was possible to observe how DT practice contributes to the innovation process in four different innovation phases: identification of the opportunity for change, strategy formulation, roadmap planning, crafting the final output. Finally, the role of contextual factors in the DT practice is discussed. Based on findings, some insights are drawn about the characteristics of the DT practice, and some ideas are advanced regarding the nature of the phenomenon. Finally, possible ways to contribute further to the field development are discussed, together with practical implications.

Keywords: design; design thinking; innovation; strategy; practice; IBM.

ACKNOWLEDGEMENTS

One bee won't collect enough honey (Ukrainian proverb).

Doing the research at the intersection of more disciplines was very challenging for me, therefore I am happy of not having been alone in this journey. Even if this initial acknowledgement is not essential to science, for me this personal note is very important, it is my tribute to all people who directly or indirectly helped me to arrive to the level of consciousness that permitted me to produce this final work. I would like to name all, taking the risk of forgetting someone, but I hope they will forgive my memory.

First of all, I would like to thank my supervisor Raoul Nacamulli for supporting my experiments, permitting me to seek my authenticity, and sharing enthusiasm for my work. I am deeply indebted to Alessandra Lazazzara for her pragmatic and generous support, and for showing me the way even in the most tragic moments. I am grateful to Barbara Quacquarelli for encouraging me on academic challenge and helping me in finding my professional identity. I am also thankful to scholars and fellows of the research centre "Bicocca Training & Development Centre" for building for inspiring discussions, workshops, and conferences. My gratitude goes also to all scholars from the Department of Educational Human Sciences, in particular to Laura Formenti and Guido Veronese for their encouragements, Alessandro Pepe for methodological discussions, not forgetting Francesco Paoletti for his punctual annual feedback on my research.

Of course, I am thankful to all my PhD colleagues for their moral support, for sharing the same passion, and for being great friends. The moments we've passed together are precious: courses and conferences, summer schools, common library work, cafeteria talks. In a particular way, I would like to thank Silvia, Camilla, Roberta, and Marika for always granting me with their support and for showing their interest. I am also grateful to all colleagues from the English Group for nice and insightful debates.

I want to thank all people who inspired my research interest toward design: a talented graphic designer Stefano Novajra, professor Francesco Zurlo, and all my friends from Giorgetti and Shoto who gave me the long-lasting opportunity to observe and get closer to their design practice. I thank Naiara Altuna for being my research angel, sponsoring my research, discussing the early results and improving them. I thank all IBMers, who dedicated time to my research project and were so generous and open with me, along with other experts on topic that I interviewed.

I thank to all people whom I met during my academic travels in Finland, Norway, Sweden, Germany, France, and Italy. Those moments of confrontation with scholars and fellows from

Euram, Egos, Itais, Esrea and Desma communities were the most useful and powerful motivational engines, permitting me to do great leaps in my research. A special thanks to Anna and Thomas for hosting me in Paris, and to the University of Agder for offering me a free course on methodology. I am also particularly grateful to Eusebio Scornavacca for providing me with useful feedback and suggestions. Thanks to everyone who helped me to destroy previous (raw, unattractive and ridiculous) versions of my work.

I also express my sincere gratitude to Simona Marchesini, who has always been my personal coach and helped me to stay focused on my authentic passion. I thank to Ingrid Hollweck for being my model of persistence and entrepreneurship. I am also thankful to all colleagues from Coachpeople for inspiring me with insights from their professional practice. Of course, I am also thankful for outside of the academic microcosm that have stimulated my curiosity: all the members of the European and Italian Design Community, especially Milan Service Design Drinks, for making me believe in interdisciplinarity and contaminating me with their dynamism; the network of Global Service Jam for meeting enthusiastic social entrepreneurs.

A sincere thank you to all my friends for helping me to build the courage to face the biggest challenges, for sharing my small achievements, and giving me the days of rest. I am particularly grateful to Sara, Nataliia, Kirsten, Oleksandr, Maria, Viktoriya, Yaryna, Ilenia for their kind interest in proceedings of my work and their suggestions. My deep gratitude goes also to my Italian families, for giving robustness to my fresh roots: MariaRosa, Marta & Co, Silvia T. & Co, Lucia & Co, Luigi, Silvia C. & Co. Finally, I express my gratitude to the most important people of my life: my mom for her immense love and support; my dad for remembering me the real value of things; my sister for always being there and transmitting me her nerdy enthusiasm; and Alberto for sharing every moment and for growing together.

I also express my profound gratitude to my Ukrainian countrymen. My phd journey has started concurrently with the war in my homeland. It was horrible staying distant from the battle that my relatives and friends were - and unfortunately still are - bringing on. I decided to do my "battle" in the only place I could be useful - in my work. Thinking of my countrymen has always given me courage, saved me from making discounts to myself, and always helped to dream in big. My motto was the phrase of Phil Ochs "In such ugly times, the only true protest is beauty".

During the writing phase, I reflected a lot on the academic habit of using “we” instead of “I”. I felt more comfortable with using the first person, because this work is pretty much expression of me, because in some cases I dared with hazardous styles (and I hope that people devoted to traditions won’t take it for arrogance), and also because I see this dissertation as my dialogue with the reader. So, please, mind that using the first person is just my sincere attempt to “humanize” your reading experience, make it more engaging, and not a symptom of exagerated self-confidence.

Iryna Prus

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INTRODUCTION

Contemporaneity always lies on the road from the past to the future
(Oleksandr Dovzhenko, film maker)

Contextual background: a thirst for innovation

The contemporary society is described by different scholars in a variety of ways: "postmodern" (Lyotard, 1984), "liquid" (Bauman, 2002), "disenchanted" (Cambi, 2006), "post-managerial" (Klikauer, 2013), etc. Notwithstanding all these labels, the majority of scholars converge to the idea that the contemporary world is characterized by rapid and constant change: opportunities, constraints, and objectives are in a continuous flux. Moreover, the blurred boundaries between artefacts, structures, processes furtherly contribute to the growing complexity (Latour, 1996). Technological and digital development increased globalization processes and interconnectedness (Giddens 2011). Such a pace and depth of the evolution of human ways of life seem to be unprecedented in a human history. In these conditions the established political, economic and social systems are being constantly stressed to reinvent themselves. Some people even claim that the exponential velocity, scope, and systems impact of recent transformations may herald the arrival of the Fourth Industrial Revolution, that will bring changes into the entire systems of production, management, and governance (Schwab, 2016).

As a result, nowadays business operates and competes in an increasingly turbulent environment, and faces numerous subtle forces (G. Friedman, 2011). Environment is degrading, resources are depleting, population is increasing, and there is a constant demand for more products and services. The anti-consumerism movement insists in eradicating the mentality of materialism as a *raison d'être*. With the advent of the ideas of circular economy, there is an attempt to change the business ethics into more sustainable and systemic. This impacts the nature of the business competition. Since the second industrial revolution the economic life has been dominated by the competition between manufacturing organisations, whereas nowadays the competition is based on knowledge production (Drucker, 1969, 2011).

The necessity to meet the scale of anthropological and ecological transformations required the extension of products life cycle and the shift towards the service economy. According

to the data of the World Bank[1], during last 20 years in the service sector the added value in the GPD grew +10%. Digital economy (Tapscott, 1996) became a powerful enabler of the growth of the tertiary sector of the economy. The widespread availability of computers and the pervasive Internet formed a digital infrastructure capable of providing digital services in new and different ways (Williams, Chatterjee, & Rossi, 2008). Moreover, digital developments are exploiting the potential of decentralized networks for unlocking the value of underused assets on the market. In this sense, collaborative and sharing economy are gaining more confidence in the modern capitalist system (Sundararajan, 2016). It is argued that these changes may signal the intent of capitalism to reinvent itself (Wallerstein, Derleugian, Collins, Mann, & Calhoun, 2013).

As a result of social, technological, economic and environmental changes, business models that have worked for years are cracking. In the condition when the contemporaneity belongs to the realm of unknown, predicting future is almost impossible. The philosophical principle of "epoché", which invites to suspend judgement, seems to be reasonable in this case. As the system's structure is weakening and becoming more plastic, there is a growing possibility to break the order in a desired way. No wonder we are entering into the "new era of innovation", where instinctively organisations are trying to reinvent themselves and their relationship with the environment in the evolutionary perspective. Innovation has become at a time a word deeply signed by fashion, a word to which organisations can't renounce to adhere (Dess & Picken, 2000; Tushman & O'Reilly, 1996).

The practice shows that the principles of business innovation that were good for traditional business thinking, developed in a more or less stable and predictable environment, are ill-suited for the contemporary competitive arena. After almost 60 years of the research on the innovation management, the science has developed huge knowledge, but no valid theory that could explain how to create value year after year.

The rise of Design Thinking

Since 1990s there has been a raising curiosity among practitioners from different fields towards design disciplines for finding a new way of innovating. There have been done a parallelism between designing and innovating. Since the beginning of the 20th century, designers were frequently called to work on innovation challenges. Moreover, if traditionally design practice was about forms and functions, over years it has become an art of dealing with complex and ambiguous matters for the purpose of their improvement (Bruce and Bessant, 2002; Borja de Mozota, 2010; von Stamm, 2010). Different factors contributed to reshape the design practice, and made it attractive for other fields, such as: business, education, policy-making, urbanism, healthcare, taxation etc.

[1] http://data.worldbank.org/indicator/NV.SRV.TETC.ZS

Along with the expansion of the design practice to non-traditional fields, the term "Design Thinking" (hereinafter DT) has emerged and immediately become a buzzword. The US design firm IDEO has been the main proponent and an active promoter of DT among businesses and social life. IDEO leaders wrote a series of promotional books, the intention of which was to get a majority of people and organisations to think and work like designers (Kelley & Kelley, 2013). With the help of their network (e.g. Stanford D.School, Rotman School of Management, creative agencies), IDEO managed to turn DT in sort of philosophy and movement. This recomposed the role of designers in the society, created a series of new design-like professions and enriched a lot of traditional professions.

At the same time, DT received a huge resonance within the business and management field (Junginger & Faust, 2016). In the last years, DT has been put in practice in numerous international organisations (e.g. P&G, Apple, Microsoft, IBM, SAP, Coca-Cola, General Electric, Johson & Johnson etc). Moreover, many large organisations have recently acquired design firms (e.g. Accenture, Deloitte, IBM, Google, Facebook) in order to grow the design capabilities (Maeda, Xu, Gilboa, Sayarath, & Kabba, 2016). Over years, design has become one of the most popular topics covered in the business press, and nowadays it is taught in the most prestigious business schools.

The introduction of DT into business and management is still at an early stage (Buchanan, 2015). Traditionally designers have always existed in organisations and worked on perceptible artefacts (e.g. products, websites, devices, logos). But for the community of design champions, it was clear that the role of design in business and organisations is broader and more comprehensive than the part it played in traditional product development (de Mozota, 2006). Design attitudes, skills, methods and techniques have started to be applied to issues of the innovation strategy. Indeed, DT is described by its proponents as:

> *"... a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success" (Tim Brown, president and CEO, IDEO).*

It seems that DT seeks to help organisations to adapt to the new competitive arena, by meeting social expectations and meanings, and facing virtuously technological constraints. As IDEO's main addressors were from business and managerial audience, where convention does not require strict referencing and positioning the text in relation to other texts, the consequence is that the literature on DT is not theoretically based.

Notwithstanding the high attention DT received over last years, it still remains a black-box phenomenon, difficult to understand and explain (Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013). While some people refer to DT as a management fad (Nussbaum, 2011), others see in it a signal of the cultural reform (Buchanan, 2015). The ontological nature of

DT remains still a mystery. Moreover, it is not clear how design relates to DT, and how both concepts relate to innovation practice. Concurrent with the promise of DT's benefit for organisations and business, and its potential to develop into one of the defining fields for agency of the next decades, there persists the risk of DT turning into a failed fad (Boyer et al., 2011; Mulgan, 2014).

Research perspectives on Design Thinking

The state of the literature on the phenomenon of DT is quite mature to legitimatize it as a research field, but there still exists significant obstacles that impede the development of the field and implicate confusion. First of all, there is little coherence around the definition and the concept of DT in academia.

Sometimes DT is described as a stand-alone phenomenon, other times it is linked with such words as a process, method/methodology, attitude, approach, framework, strategy. An attempt to make sense of the nature of DT resulted in a pluralism of descriptions: some going closer to "thinking" - a cognitive process, a reflexive practice, the creative inquiry, an imaginative act, way of reasoning and making sense of thing; others going closer to "design" - the creation of artefacts, a problem-solving activity, spirit or culture of innovation, way of approaching indeterminate problems (Buchanan, 2015; Johansson-Sköldberg et al., 2013). The framework that keeps together the large variety of interpretations is lacking, and risks to bring to the dilution of the concept (Lindberg et al., 2011; Carlgren, Rauth, Elmquist, 2014). In order to advance the research on the phenomenon, it is essential that scholars define the ontological categories of DT and their hierarchical order, as well as define the difference with other overlapping concepts (e.g. creativity, imagination, co-design).

Moreover, the topic of DT is mainly developed within the domain of design and business disciplines. Yet, it is not clear how the previous design research can contribute to explain the concept, and how DT links with main business and managerial concepts and theories (Johansson-Sköldberg et al., 2013; Johansson & Woodilla, 2009). The difference in language of both disciplines is a further sticking point for the creation of the unified framework. Moreover, there are significant diversities among the two disciplines for what regards epistemological stances, methodological approaches, and theoretical modes (Alvesson & Kärreman, 2007; K. Friedman, 2003). Design research is based on practice, but as a newly born discipline it still struggles with converting tacit knowledge into a theory. In contrast, business and management studies use in these cases grounded theory and inductive inquiry. The inductive theory building through conceptual research is surely the missing element in the progression of the field, and a pre-requisite for establishing causalities.

For what regards the DT practice, till today is has been studied in a vacuum without

specifying the contextual characteristics. As a consequence, there is an illusion that DT is a magic pill capable of functioning in any kind of setting. This is also the root cause of the rising scepticism towards the results that DT produces. Exploring DT through its situated use and incorporating market and organisational context into research designs can permit to improve the quality of insights on the complex causalities of DT practice. This will also permit to explain how DT clashes over the traditional way of working in organisations and what kind of change it is aiming to bring *(Wylant, 2008; Rylander, 2009).*

As DT gained global traction, so has the illusion. It is nowadays a frequent situation that organisations apply DT without really knowing what it is, how it works, why it's needed, and what outcomes it should produce. At the same time, virtuous practitioners report among DT benefits longer innovation horizon, future-proofs products and services, easier innovation implementation and acceptance. In order to advance our understanding on the benefits that DT may bring, we should frame the concept in academic discourses and close the divide between theory in practice.

Purpose and research questions

The purpose of this research is to consolidate the field by refining and extending the concept of DT and to provide deeper theoretical and practical perspectives for a more critical and reflexive engagement with the topic. In order to fulfil this purpose, a series of sub-purposes are pursued in this research.

First, this study is aiming at investigating the DT meanings, categories, forms, based on its practical enactment in natural circumstances, and advancing an inductive theory through contextual explanations. The second sub-purpose is to address the complex nature of the phenomenon, critically discuss it, and position it into a bigger interdisciplinary picture. For this, a new glossary will be developed, and further connections between discourses on DT, business and management studies, innovation studies, and other social sciences will be done. Finally, in this study I will seek to explain the role of contextual factors on the effectiveness of DT practice, and propose a contingency approach to the topic.

This study will fulfil the research aim by answering three main research questions:

1) How is Design Thinking understood by people in organisations?

To answer this question, I will explore how people define DT, how they describe it, by means of which elements and characteristics. I will search for different types of descriptions: normative, affective, performative, etc.

2) How is Design Thinking practiced by people in organisations?

For getting insights on this question, I will analyse what behaviours are usually associated with DT, what formats of DT there exist, who is involved in DT, etc. Moreover, I will analyse

contextual factors that influence the DT practice.

3) What relationship is there between Design Thinking and innovation in organisations?

The purpose is to explore what purposes people in organisations use DT for and how they perceive the DT results and benefits in relation to innovation processes in an organisation.

This dissertation is based on a qualitative inquiry into the DT practice in IBM company. A single case study will permit to make a thick description of the phenomenon, understand and interpret the ontological categories of DT, as well as outline the complex interaction between DT and innovation processes.

Reader's journey

To help the reader better understand my study, this dissertation has been structured around the idea of a "Reader's Journey." It is divided in five parts.

Part I gives an overview of the research done on the origins, the term and the concept of DT. It discusses how DT is situated in the context of business, outlines the possible uses of the DT by organisations and problematizes how business is taking advantage of it. In addition, it critically discusses different discourses on DT and provides the reader with the theoretical approach on the topic.

Part II investigates the history of innovation and the theoretical contributions on the concept of business innovation. It presents possible ontological and epistemological approaches on the topic, critically discusses the role of strategy in innovation process, and outlines possible ways how DT fits into innovation discourses.

Part III describes the philosophical underpinnings of the study, the research design and the methodology of the empirical research. It describes the theoretical mode and discusses how research goals are achieved and how the quality of the research is assessed.

Part IV presents the case study of IBM. At the beginning, the historic perspective on the company is presented, and its strategic and innovation orientation is discussed. Then, the turn to design and DT is explained, and the insights from the DT practice are discussed in-depth. Finally, the IBM way of taking advantage of DT for the innovation is reported.

Part V critically discusses the findings in relation to the existent theory and presents conclusions. Moreover, it provides an outlook on possible future research and proposes a series of practical implications.

In the table below I explain how the structure of the dissertation helps in creating a fluid reading experience.

Table 1 Reader's guide to the dissertation

Part I, II	• understand the statement of the research problem • get acquainted with main theoretical definitions and frameworks • discover relationships between main research concepts and events
Part III	• get acquainted with main philosophical and methodological reflections • understand how the study was implemented • discover the quality criteria implemented in this study
Part IV	• learn how the empirical material have been framed and constructed • get acquainted with the relevant parts of the interpretive repertoire • understand the link between empirical evidence and theoretical reasoning
Part V	• discover how findings address and solve the research problem • evaluate the contribution of the study for theory and practice • understand how the study may be used to build on it

PART I. DESIGN THINKING: LEARNING FROM DESIGNERS

Humans are producers of their life circumstance not just products of them. (Albert Bandura, psychologist)

The historical origins of Design Thinking

In order to identify the moment when DT started to be approached in the management discourse, it is useful to trace back the roots of the DT in the design disciplines. Sociological and economic meta-reflection is necessary to gain insights on the evolution that happened from design to DT till gaining its huge popularity today. Thus, the aim of this section is to destroy possible false assumptions of the reader regarding the design by illustrating the common challenges of design and the change in design practice in the last 100 years.

It is quite difficult to define a word "design" as it has multiple meanings in modern language. Indeed, there is an anecdotal phrase that highlights this plurality of its meanings: "Design (discipline) is to design (practice) a design (new proposal) to produce a design (final result)". However, the origin of the word "design"[2] indicates on the fact that it has been traditionally associated with practice of designing. Further we will analyse how the design practice changed over years, and how these changes were reflected in the design discipline.

The historical roots of design are linked to the Bauhaus[3] tradition (Bayazit, 2004). The Bauhaus style brought a profound innovation in a way common goods were perceived – the radically simplified forms, the rationality and functionality, and the idea that mass-production could be reconcilable with the individual artistic spirit. Before 20th century design was seen as rewarding aesthetics, whereas with the arrival of the 2nd industrial revolution design started to be adopted dominantly by product engineers.

After the World War II, the world was living the reconstruction period and design was called to bring improvements in highly developed industries in conditions of the shortage

[2] The word "design" derives from Middle French "desseign", from Latin "designare" - to mark out, devise, choose, appoint.

[3] Bauhaus was an art school based in Germany (1919-1933), which became one of the most influential currents in modern design.

of means and skills. There was a growing interest in understanding the articulated methodology that assisted the design process and applying it on a larger scale, mostly for the industrial and building process. For the purpose of solving complex problems of that time, design was considered as a problem-solving and decision-making activity (Bayazit, 2004). Cybernetics, which was developed in 1940s became the model for rational behavior and influenced many design methodologists and theoreticians. Thus, the early idea of design practice was aiming at finding an optimizing solution and the designers work was mostly individual.

In 1950s, after the launch of the Soviet Union's "Sputnik" in 1957, the American government became concerned about the creativity and financed numerous studies on the topic (Edel, 1967). This required a new look at the subject of design methods. Specialists from the field of engineering and industrial design in those years lived a rush for creativity techniques. Everyone agreed on the need to translate design into a teachable doctrine about a design process, which will permit to produce "objective" results independent of the figure of a designer. The newly created field of "design science" (Gregory, 1966) attempted to incorporate scientific techniques and knowledge into the design process and decision making. An important contribution to this approach was done by Herbert Simon (Simon, 1969), who established the foundations of a "design science". The first Conference on Design Methods held at the Imperial College in London in 1962 marked the beginning of the "design methods movement", and launched the design methodology as a subject or field of enquiry (Cross, 2007).

In 1960s, designers were no longer focused upon the product as the center of a design task but started to be interested in human needs. Soon the "design science" approach based on rationality and logic was criticized as too rigid and simplistic (Bayazit, 2004; Cross, 2007). In 1970s the design movement was living its critical point with main scholars leaving the movement. Under the influence of liberation humanism, new design methods movement raised in the USA, proposing to introduce the "2nd generation design methods" (Rittel, 1972).

The new design research was aiming at advancing satisfactory or appropriate solutions (as compared to optimizing) and claimed for opinionated and participatory design process, where designers could partner with different problem owners (as compared to an individual work of a designer). Participatory methods proposed to consider problem owners as subjects of study (i.e. user-centered design), as designer partners (i.e. participative design), or sometimes as peer designers (i.e. co-design) (Sanders & Stappers, 2008). Moreover, participatory design fostered the collaboration with social scientists and anthropologists. Thus, 2nd generation design methods abandoned mechanized, quantified view of design towards existentialist/phenomenologist view concerned with the "humanness" of human beings.

In 1980s cognitive sciences and artificial intelligence started to be interested in applying design methods for their scope, while design benefited from them by developing new techniques (e.g. "think-aloud" technique, "protocol analysis"). This disciplinary link fostered new research perspective. Charles Eastman was among first scholars who focused on designer's behavior (Eastman, 1968), while Donald Schon continued his work and integrated it with elements of hermeneutics (Schön, 1983). Designer was understood as a practitioner, who creates through the reflection-upon-the-creation. Following this stream of studies, big efforts were done to develop the cognitive aspects of expert designers for the computer-aided design scope (Bayazit, 2004).

Starting from the 1990s designers were called to work upon complex challenges that required the collaboration with multiple disciplines. The interaction with other professions permitted designers to note that somehow everybody is a designer. As a consequence, in the late 1990s, the design community was trying to connect different disciplinary perspectives by creating interdisciplinary fields (e.g. instructional design, business design, interaction design, service design etc.).

Along with design community promoting design, there have been practitioners doing the same. One of the active proponents of this view was the Californian design firm IDEO, who since 1990s stressed that any discipline can take inspiration and learn from the way designers think and work (T. Brown, 2008; Kelley & Kelley, 2012). It was IDEO to advance the term "Design Thinking" especially with the purpose of its application in business and management. DT became IDEO's brand that sponsors their way working with innovation (Kelley, 2001, 2005; Brown, 2008, 2009). IDEO's own research in the design field has been influenced by the practices at Stanford University and entrepreneurial culture in Silicon Valley during late 1970s. If at the beginning, IDEO outlined DT as a process model conveying their best practices, later they started describing DT by means of methods, instruments, and principles.

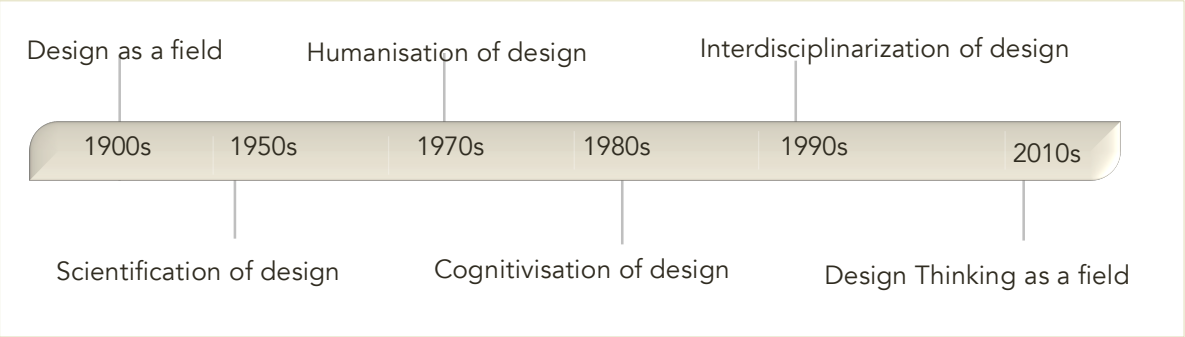


Figure 1 The historical roots of the field of DT

As we can see, the idea of DT builds on the previous research from design theory. As such, it incorporates some characteristics and elements from different historical periods of design: (1) teachable methods and process; (2) human-centered perspective; (3) thinking

models; (4) interdisciplinary collaboration. However, due to IDEO's influence, the DT practice is motivated by different kind of challenges, more complex and ambiguous, more aiming at innovation. Moreover, it incorporates certain still implicit characteristics that distinguish it from many others ways of designing. Along with the popularity of the DT practice, the field of inquiry on DT is also constantly growing. Over the last 20 years there have been published more than 1778 books, the majority of which belong to the domain of Business & Economics.

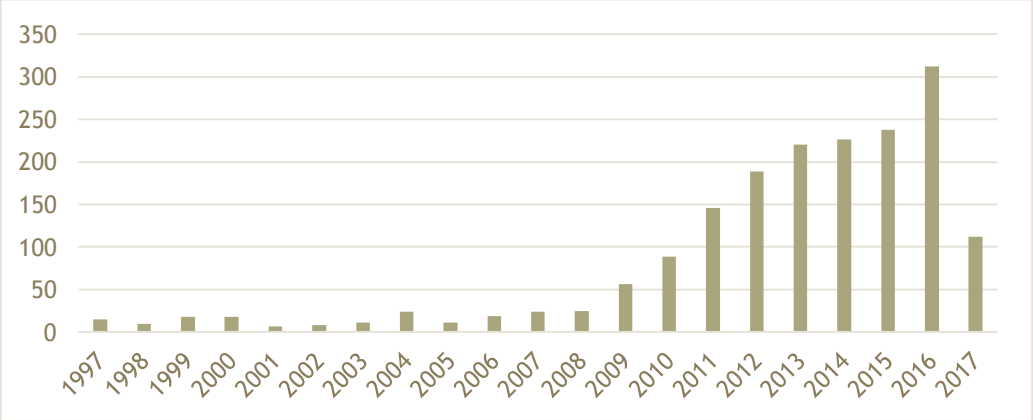


Figure 2 Books published on the topic of DT
(results from WordCat database; books; 01.1997 - 06. 2017; all languages)

Multiple definitions of Design Thinking

In this section, I will address the most recurrent definitions of DT in the literature by organising them around 3 main topics: process models, attitudes and practical skills, thinking style. This analysis doesn't have the goal to be exhaustive; it is rather aiming at outlining those characterising elements that may be appealing for business and management theory.

PROCESS MODELS

In design theory, successful design behaviours have been translated into organised process models. The first references to a multiphase structure of the creative process go back to 1920s with Poincaré (1924) and Wallas (1926). Their work was the starting point of the research movements into design creativity, which looked for new models to best describe the phases of a creative problem solving process (Tschimmel, 2012). Since then, there have been produced a milieu of different design process models for various purposes: explaining the problem solving process, teaching the process, etc. (Dubberly, 2004). However, most of them agreed that an iterative nature of the process and constant interweaving of content-oriented and process-oriented sequences (Stempfle & Badke-

Schaub, 2002). Following on classical design process models, DT has been also presented as a process divided into several phases. Hereinafter, I will overview the 3 most popular process models.

D.School/HPI model

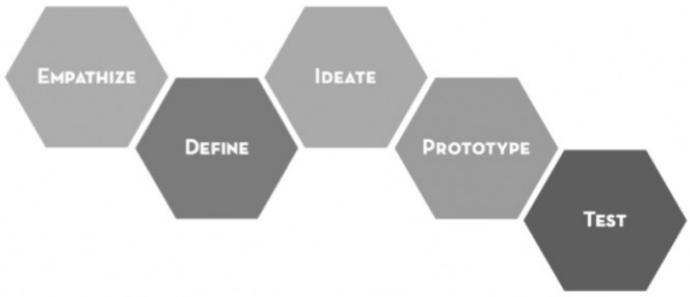


Figure 3 D.School model of the design process (Stanford University, USA)

This model started from the initiative of Procter & Gamble in the early 2000s, and was developed by Claudia Kotchka (Procter & Gamble), Roger Martin (Rotman School of Management), David Kelley (d.school at Stanford University and IDEO) and Patrick Whitney (IIT Institute of Design at Illinois Institute of Technology). The initial idea was to develop a structured approach to innovation that could be employed by both business people and designers. The D.school at Stanford University (2010) has been partly credited for the spread of DT, and proposed a stepwise, iterative process framework which is often depicted as a sequence of activities that can be interpreted as linear: empathize (data collection based on, for example, ethnographic studies), define (data synthesis to gain a refined problem understanding), ideate (suggest ideas for solving the problem), prototype (develop tangible and experienceable representations of the ideas) and test (with potential users).

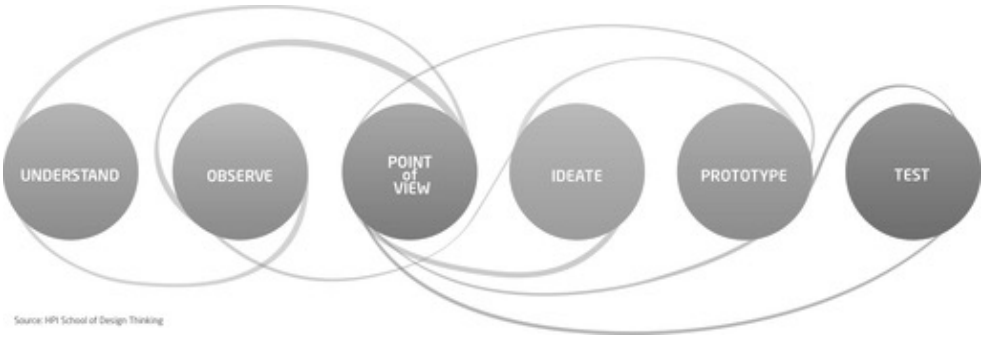


Figure 4 HPI model of the design process (HPI School for Design Thinking, Germany)

At the School for Design Thinking at the Hasso Plattner Institute in Potsdam, Germany

(Stanford's sister school), a more explicit depiction of the initial phase breaks empathise down into "understand" and "observe".

D.School/HPI model

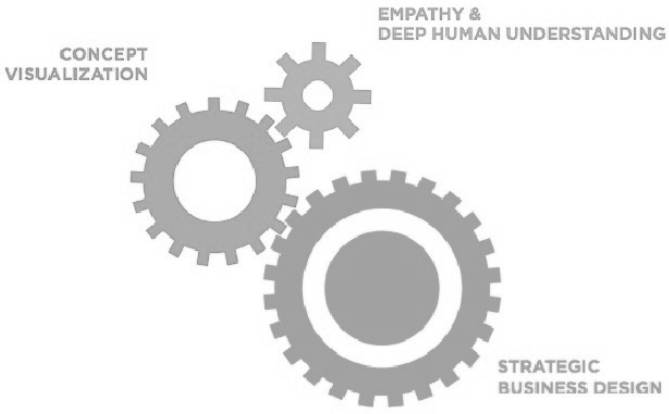


Figure 5 Three Gears of design (Rotman School of Management, Canada)

Heather Fraser from the Rotman School of Management continued working on the initial idea of DT up to proposing "three Gears of Design" (2006, 2012). While the first two gears, "empathy and deep human understanding" and "concept visualization", are similar to the activities described by D.School, the third gear "strategic business design" is rather overlooked in the D.School model. In 3 Gears model, the third gear defines the strategy to make big ideas valuable and viable to both the market and to the organisation. By help of visualization and system-mapping techniques the model guides to design a strategy for all stakeholders and refocus the organisation resources to set on a path for long-term, market-inspired value-creation. Moreover, this model invites to practice business design collaboratively across disciplines, working iteratively through every gear, and using the most appropriate tools for each gear.

The Double Diamond model

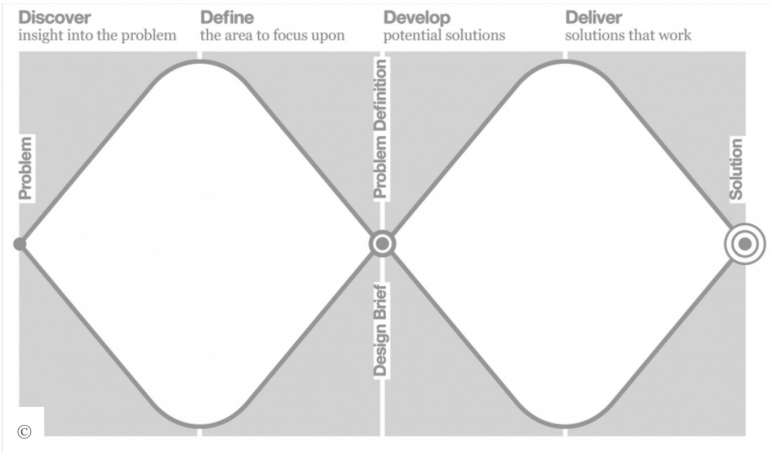


Figure 6 Double diamond model of the design process (Design Council, UK)

The Double Diamond model was developed at the Design Council (UK) in 2005. Divided into four phases (Discover, Define, Develop, Deliver), it maps the divergent and convergent stages of the design process, showing the different modes of thinking. The first quarter of the model (i.e. discover) begins with an initial idea or inspiration, often sourced from a discovery phase in which user needs are identified. The second quarter of the model (i.e. define) represents the definition stage, in which interpretation and alignment of these needs to business objectives is achieved. The third quarter (i.e. develop) marks a period of development where design-led solutions are developed, iterated, and tested within the company. The final quarter of the model (i.e. deliver) represents the delivery stage, where the resulting product or service is finalized and launched in the relevant market.

ATTITUDES AND PRACTICAL SKILLS

What can possibly entrepreneurs and managers learn from designers? Surely their attitudes and practical skills. There are myriads on books regarding these issues (Cross, 2011; Dorst, 2015; Kolko, 2011; Michlewski, 2008). In order to transmit them to other fields, they have been synthesised under a set of principles that I will briefly describe.

The main DT principle invites to focus always on human values. Designers have always tried to access to personal experiences, understand mental and emotional states of people, and to respond to them with an appropriate emotion (Cross, 2011; Sas & Zhang, 2010). In designers' language, this attitude is called "empathy", even if in some cases it would be more correct calling it "sympathy"[4]. Empathic designers are sensitive to social aspects of their work, unusual events occurring in their environment, new habits and behaviours of people (Owen, 2007). While sympathic designers put themselves in the position of other people. For this, observation and effective inquiry are essential for effective design research (Cross, 2011; Owen, 2007). Designers actively observe and study their environment and people living in it, they engage and interact with them in order to grasp and comprehend people's experiences. This process of research is full of ambiguity, therefore the exercise of uncertainty tolerance is crucial as well (Cross, 2011; Owen, 2007).

The next principle is to correctly frame problems. Understanding the problem context has been always crucial for designers, therefore they trained themselves to adopt a systemic stance on problems (Pourdehnad, Wexler, & Wilson, 2012). They seek to approach problems from a variety of perspectives and purposefully design solutions that embraces the complexity and balances potentially conflicting ideas. The art of designing is about simplifying complexity without losing richness and vitality (Nelson, 2007; Norman, 2010).

[4] Empathy is when you understand the feelings of another but do not necessarily share them; sympathy is when you share the feelings of another and care about them (explanation by Merriam-Webster).

At the same time, designers don't only recognize structural constraints and dependencies but also socio-economic patterns (Gray & Vander Wal, 2014). Designers puts system interests at a level with human interests, guaranteeing that the best interests of humankind may be considered in any project (Owen, 2007).

DT promotes radical collaboration and invites to bring together people from various backgrounds. Why? Designers used to work closely with experts from other fields, and this synergistical collaboration has always shown high-quality results (Cross, 2011; Owen, 2007; Stempfle & Badke-Schaub, 2002). The interdisciplinary setup of design teams demonstrated that the heterogeneity increases the potential for innovative ideas to emerge. But it's not only about putting people together. Usually designers are owners of a T-shaped skillset: subject matter expertise combined with broad knowledge in other domains (Owen, 2007). A T-shaped skillset enables designers to collaborate and communicate effectively in multidisciplinary teams (Cruickshank & Evans, 2012). Moreover, it's about the culture of interaction. All team members get involved in the process of discussion, abstraction of ideas, and advancing concepts. Structuring the group process is an important, as it influences the degree of the collective learning. Trust is important, as well as non-judgemental attitude. On the other hand, communicating on complex issues in interdisciplinary teams requires special virtuosity. For this, designers use much visualisation and storytelling (Valsecchi et al, 2016). It helps them to communicate in a transparent way and engage other participants involved in the design research.

When solving problem, DT promotes optimism and proactivity. Designers usually establish optimistic ways of working by balancing moods and controlling emotional lows and highs (Cross, 2011; Kelley & Kelley, 2013; Owen, 2007). At the root of this attitude there is the belief that better solutions for problems can be found. Optimism of designers helps to consider different constraints as inspiring and challenging (Dunne & Martin, 2006). Moreover, confidence represents positive encouragement to action and facilitates self-expression and creativity. Even if it may sound paradoxically, DT principles invite to be biased toward doing over thinking.

THINKING STYLE

As highlighted by scholars Beckman and Barry, DT has much in common with the learning process (Beckman & Barry, 2007). What can entrepreneurs and managers learn from the way designers learn and reflect? First of all, designers alternate between divergent and convergent thinking. They are able first to explore multiple perspective by using paradoxical thinking, Janusian thinking, counterfactual thinking etc, and then synthesise what have been learnt into a meaningful framework.

Another important point is that designers' way of thinking is constructionist. Designers construct knowledge in the "world of experience", in life, in the praxis of living. From here

comes the conviction that the root cause of any problem should be found not by doing a desk research but by interacting directly with the problem. Similarly, from here comes also the conviction that experimentation and prototyping are an integral part of learning and innovating.

In order to reflect on observed or studied situations, designers try to create meaning and establish relationships with objects in the world (Heylighen, Cavallin, & Bianchin, 2009). Designers are known for a peculiar way of problem framing, reasoning, sensemaking (Dorst, 2015; Kolko, 2011; Lawson, 2006). Moreover, designers have developed multiple tools and techniques to manipulate, organise, prune, and filter data. As Schon (Schön, 1983) stated, designers are first of all reflective practitioners, and they use iteratively all three kinds of reasoning – inductive, deductive, and abductive (Cross, 2011). The synthesis that designers produce is an abductive sensemaking process, and designers are particularly keen in it.

In finding a solution, designers account for multiple perspectives and multiple voices (Verganti, 2013). As long as in design knowing and feeling are tightly linked, designers have learnt to defer judgment and keep an emotional control, especially when wild and seemingly unrealistic ideas are expresses in brainstorming sessions. This designers' attitude is sustained by recent research findings that demonstrate that people's evaluations don't reflect the information about the object of judgment but also the information from their own affective reactions (Clore & Huntsinger, 2007). Moreover, designers are particularly skilled in analogical thinking (Cross, 2011; Lawson, 2006). Analogies help designers to support reasoning and invite new inferences. On the neurological level, analogies are enabled by neural networks, and parallel or serial processes in the brain (e.g. analogical retrieval, combining, mapping).

Last but not least, the visual thinking. Designers appreciate all kinds of sensorial stimuli, which help them to consolidate multidimensional meanings regarding the problem (e.g. drawing, moving, listening). They also use their aesthetic sense and judgement while interacting with the environment (Michlewski, 2008). Rich sensory experience tends to reduce rather than increase ambiguity because different forms of sense information have different properties that tend to complement each other. In order to come up with a solution, designers often conspicuously draw from many disparate sensorial sources, i.e. use multisensorial thinking. Visualisation also helps to make ideas tangible, reveal hidden links, and create rough representations (Cross, 2011; Kolko, 2011; Owen, 2007).

Is Design Thinking a fad? Toward a positive view

The discourse around DT is characterized by ambiguity, and that is the reason why it is frequently described as a buzzword. The idea of trying to prove the opposite brought me to analyse the nature of management fads. Miller, Hartwick, & Le Breton-Miller (2004)

identified characteristics of management fads. Fads consist of simple, straightforward ideas, over-promise, propose solutions for everyone, have a step-down capability, allowing superficial and ritualistic implementation, are in tune with the zeitgeist, are novel, not radical, attain legitimacy via gurus and stellar case examples, and are born of lively, entertaining prose. Whenever fads persist over time, they turn into fashions. Fashions have the characteristics to evolve and transform over time. Fads and fashions in some cases positively transform organisations, whereas in others have a long destructive influence. The abortive reorganization following any fad/fashion usually creates human disappointment and involves high financial costs. What makes the difference between positive and negative outcomes is the dynamic nature of fads/fashions.

In contrast with the traditional negative view of fads and fashions, Lipovetsky proposed to recognise to them a positive connotation, as long as they emerge from the autonomy of consciousness within democratic institutions. For the author, the fundamental condition to the raise of any fad or fashion is the freedom of self-expression. Obviously, there have always existed social conventions that acted as restrictions, but the chronological succession of fads/fashions highlights the possibility of individuals to express and made alternative choices. Moreover, Lipovetsky observed that in the contemporary world fads/fashions are a cornerstone of collective life because their nature is hegemonic. Today, due to the growth of media and information, it is easier for people to follow the cultural mainstream, recognise fads/fashions, and decide whether to adhere to them or not (Weinberg, 2007). If we assume that people embrace fads or fashions as a means of self-expression, we will move toward the idea of mature fads/fashions, which unites collective unconsciousness. In this sense, a fad or a fashion is only a container that detects the permanent tension between what exists and what is desired.

Given these premises, the phenomenon of the widespread use of the DT by organisations can be understood under two different perspectives: as a momentary fad or as an enduring fashion camouflaging the emerging paradigmatic shift. A deeper comprehension of the phenomenon from systemic perspective may give useful insights for unveiling its real and complex nature. Reasons why organisations adhere to DT are not explored enough. In this section, I will try to do this by grouping them into 4 categories: economic, cultural, social, organisational.

ECONOMIC REASONS

Organisations has always been interested with understanding the value that DT can produce for business. As the concept is not yet developed, and there no valid measurement instrument, there exists no way in establishing any causality. However, this effort has been done regarding the design. As design is hard to isolate as a function and the design function operates differently by industry, the alternative way was to look at the value of design-centric organizations as an aggregate. Indeed 2013, Design Management

Institute and Motiv Strategies collaborated to develop a market index that could be used to track how design-centric companies perform relative to the index Standard & Poor 500 over time (Rae, 2015). Over years, the results support a growing body of findings that good design drives shareholder value. In 2015, the Design Value Index, based on a portfolio of 16 publicly traded stocks from companies considered to be "design-centric" contingent on a set of criteria that reflects best practices in design management, shows a 211% return over the index Standard & Poor 500. This shows that over the last 10 years, design-centric companies have maintained significant advantage on the market

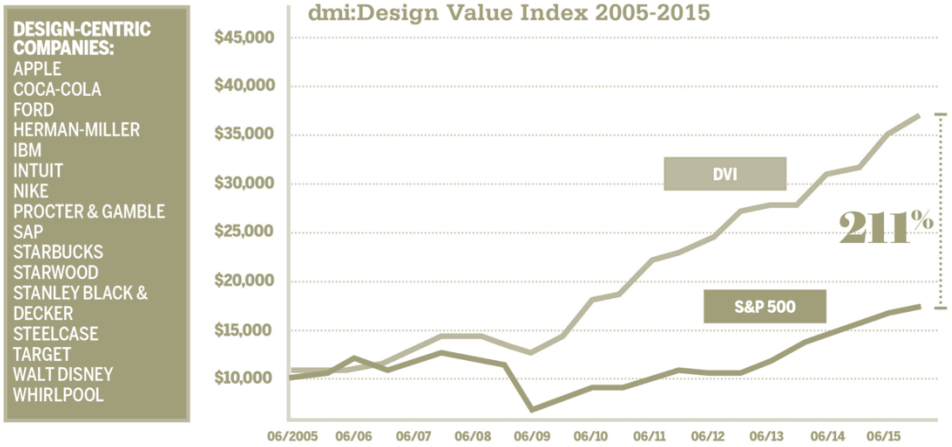


Figure 7 Design Value Index 2005-2015 (by Design Management Institute)

Other interesting insights come from the world of start-up companies. The statistics by CB Insights says that 36% of start-up companies in U.S. Internet-Only category that have recently received highest fundraise (e.g. Slack, Airbnb, Pinterest, Upstart, Social Finance) are designer co-founded. Moreover, 21% of the so-called global "unicorn" startups[5] across all sectors have co-founders who have embraced design or come from a design, arts, or human-centered background (Maeda et al., 2016).

CULTURAL REASONS

As suggested by Klaus Krippendorf, contemporary culture is dominated by design activity, and not by science as it was till some years ago. This is evident in the increasing willingness of people to assert themselves and act on their own behalf; to think and write about the future; to experiment with newness; to create art, entertainment, and technical gadgets; to grow businesses; to become stakeholders in public projects; to enroll others into their projects; or to run for political office (Krippendorff, 2005). In short, the scientific mindset has been surpassed by a culture that has moved design activity into its center.

[5] A unicorn is a startup company valued at over $1 billion. The term was coined in 2013 by venture capitalist Aileen Lee, choosing the mythical animal to represent the statistical rarity of such successful ventures.

Table 2 Ingredients of emerging design culture (by Klaus Krippendorf)

Scientific culture	*Design culture*
• Technology-centered • Hierarchical knowledge structures • Rationally derived and assigned functions • First-order understanding • Technology serves to predict and control • Finding technological solutions to social problems • Re-searching past records for patterns • Know-what was, how something worked	• Human-centered • Stakeholder networks, advocacy, and markets • Interactively negotiated and supported meanings Second-order understanding • Technology facilitates design in everyday life • Proposing desirable futures and paths to them • Creating and exploring required variability • Know-how to transform possibilities into realities

Nelson and Stolterman (2002) developed a similar view of design. The authors discussed design as based on four pillars: the real, service (to the community), systems, and holistic considerations. Indeed, technology-centered designers worked in laboratories, from outside a community of users and according to specifications that limit their concerns to what is demanded of them. As a result, such scientific culture was marked by hierarchies of authorities communicating specifications from larger systems to their subsystem, and ultimately to individual users of technology. Contrarily, today everyone who acts today as a human-centered designer, works from within a community, assumes the responsibility of serving the larger whole and implicitly creates a design culture that embraces everyday design activities.

SOCIAL REASONS

Some scholars underline that the most important reason for the increasingly prominent design culture is that designing is intrinsically motivating and satisfying (Krippendorff, 2005). Designing is a way to understand things, to make them meaningful, to feel familiar with them, and to make them part of one's life. In designing, people realize who they are to themselves and in view of others, of the members of their community. Whereas in the scientific culture this was not possible. There people were prevented from self-expression, they were reduced to appendixes of systems, machine parts, robots, anonymous and interchangeable prisoners. The design culture offers to people an opportunity to seize on opportunities to realize themselves in their own terms, without being imposed upon.

This natural inclination of people to express themselves in their job is also expressed by the concept of job crafting (Wrzesniewski & Dutton, 2001). It expands perspectives on job design to include proactive changes that employees make to their own jobs. By crafting their job, people make physical and cognitive changes in the task or relational boundaries of their work in order to experience different kinds of meaning of their work and themselves. People in organisations do it at all levels, and for all kinds of tasks (Berg, Wrzesniewski, & Dutton, 2010). Thus, people intentionally alter the ways in which they define the meaning of their work and their work identities because it has positive effects

on people's degree of psychological well-being, work engagement, and performance (Berg, Grant, & Johnson, 2010; Tims, Bakker, & Derks, 2012).

To support the idea of self-expression in work, the philosopher Byung-Chul Han describes that nowadays the society is moving from "discipline society" towards a "performance society" (Han, 2015). While in discipline society the productive capacity of people was based on obedience, in a performance society people give priorities to the self-realisation and one's empowerment at work. Compared to the discipline society, the productive capacity of the performance society has one unique resource - a "desire". Similarly, Klikauer speaks we are moving to a post-managerial society (e.g. Klikauer, 2013). If managerial society can be denoted as a kind of "enslavement" of individuals through ideological instruments and imposed "necessities", in the post-managerial society employees are human individuals who plan and use the instruments of their labour for the realisation of their own needs and faculties towards humanity and environmental sustainability.

ORGANISATIONAL REASONS

Most of the contemporary organisations were thought and designed with purpose to be efficient, effective and productive, and to bring benefits for employees, shareholders, and stakeholders as well as individuals in society at large. Paradoxically, there is widespread dissatisfaction with organizations and organisational life. Workforce burnout and disengagement is a big issue today. Gallup's Q12 questionnaire reveals that only 13% of workers worldwide are engaged, while 63% are not engaged and 24% are actively disengaged (Gallup, 2012). The burnout phenomenon can't be explained only by dispositional factors, but by the interaction between dispositional and contextual factors.

As George Nelson (1957) has suggested, we do not yet understand the full effect of organizations on our lives. What is their affect on thought and behaviour of people? The criteria by which most of the organisations have been designed in past were given for granted and not explicit. That is why today we are not always able to conclude on what principles have been neglected in earlier organisation design theories, and consequently understand how in what way DT comes forward with a different perspective on organisations. However, today as never before we are facing urgency on workplace innovation. Workplace innovation was recognised as a main driver of economic growth (Dhondt & Totterdill, 2014), and the European Commission made it a priority in the reinforced EU Industrial Policy Communication (Kesselring, Blasy, & Scoppetta, 2014). Different countries also recognised the importance of the WI in their policy agenda on the national level (i.e. Finland, Sweden, Ireland, Norway, Germany, Australia, Japan, USA etc) (Alasoini 2009).

Workplace innovation is actually an umbrella-term that describes modernisation aspects of a bundle of practices in organisations, specifically: work system, workplace democracy,

high tech application, workplace boundaries, people practices, workplace experience, workplace culture. As recent research shows, during last twenty years significant changes happened within all of these domains (Prus, Nacamulli, Lazazzara, 2017).

The role of Design Thinking in business and organisations

Long before DT arrived to the business and management discourses, design practice has always been deeply involved in organisations and management. Indeed, designers played an important role in developing the products of business (e.g. industrial design, graphic design, package design). However, the placing of designing significantly expanded in the 21th century towards more complex design challenges. Richard Buchanan (2011) suggested there are four orders of design, understood as "places" of discovery that progressively illustrate the growing complexity:

1. Symbols and signs
    - Symbols (e.g. logo, ideogram, pictogram, icon etc.)
    - Graphical interfaces (e.g. flyers, web pages, visual widgets etc.)
2. Objects and artefacts
    - Consumer products (e.g. meal, personal care products, cleaning products, etc.)
    - Consumer goods (e.g. furniture, clothing, footwear, toys, radio, bicycle, watch, etc.)
    - Interiors (e.g. space, light, shapes etc.)
3. Interactions and organized activities
    - Services (e.g. cleaning, food, transportation, training, technical support etc.)
    - Events (e.g. conference, travel, seminar, wedding etc.)
    - Processes (e.g. room booking, information sharing, workflow etc.)
4. Systems and environments
    - Physical environments (e.g. workplace, school, neighbourhoods etc.)
    - Virtual environments (e.g. software, applications, virtual communities, virtual learning environments etc.)
    - Digital systems (e.g. digital circuits, ICT systems, computer systems etc.)
    - Physical & digital infrastructures (e.g. space station, automated driving system etc.)

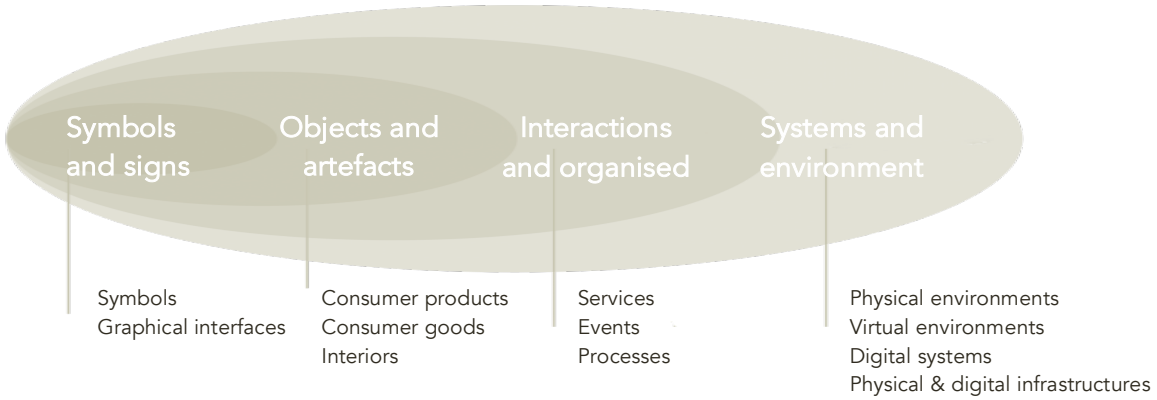


Figure 8 Four orders of design (by Richard Buchanan)

Designing in organisations occurs in all these four places. Moreover, organisations themselves are products of designing (Junginger, 2015). As the nature of DT is still ill-understood, it is unclear whether the places where DT occurs are exactly the same or may vary. Therefore, in analysing the relationship between DT and organisations, we will talk about motifs why DT is being used in organisations. These are: (1) new approach to business strategy and entrepreneurship; (2) new management style; (3) new organisational culture.

STRATEGY AND ENTREPRENEURSHIP

The upsurge in interest to design in business is better understood from the systemic perspective, that stands away the rhetoric of innovative thinking. The contemporary market has prepared the conditions for the "New Age" of design. The times when design was used only for developing the products or services, was characterised by a relative stability of the market. In those times, in business "profit" had priority over "the product" or "the service" that the organisation proposed. The competitive strategy based on market analytics was the main driver of economic development. The market was organised around inter-organisational networks and mutual adjustment between them, and the main concern of organisations was for the well-being of oneself and one's immediate stakeholders. Strategy consultant companies contributed significantly to enhance this business philosophy by producing a series of analytic tools. As a result, managers have lost touch with the products and services of organisations, absorbed with the analytic side of business (Buchanan, 2015).

With the digital disruption, the market context changed and liberated new opportunities for design. of As Otto Scharmer's "U theory" explains, we are entering into a new market stage, organised around commons (Scharmer & Kaufer, 2013). The economic awareness is concerned for the well-being of other stakeholders and the whole. Thus, the purpose of organisations is starting to balance between profit and the quality of products/services. The real purpose of organisations is found in the customer and his/her experience of what

is meaningful in the offerings of organisations. This causes new engagement of design in management, especially entrepreneurship and strategy, which returns our understanding to a focus on the quality of products/services and processes.

Finally, DT has also undermined the established paradigms and logics dominating the field of design management research, dealing traditionally with products/brand design (Cooper, Junginger, & Lockwood, 2009). In last 10 years, value creation for business has shown remarkable changes from a sole focus on how to manage design processes to a focus on the value added of DT in an era of contextual turmoil. It has been recognised that the whole business model, and not only products and services, should create an overarching value of integrated design. Organisations are starting to become aware of the evolving orders of design from a dominant product focus to a focus on interaction and environments (Erichsen & Christensen, 2013).

MANAGEMENT STYLE

If the whole business model should be set up accordingly to new products and services, shouldn't the managerial approach change as well? Years ago, in 1989, Angela Dumas and Henry Minzberg has advanced the proposition that management itself has been the mechanism of delegating design of organisations activity (Dumas & Mintzberg, 1989). The authors highlighted that in modern business context such delegation may undermine the perception of the harmony of the system. DT in seen by some scholars as an attempt to regain to the managerial profession its transformative power (Buchanan, 2015). That is the reason why nowadays DT is being studied in top business schools.

It has been since 1970s that management scholars started to discuss the similarities between design and management practice during numerous cross-disciplinary conferences and finally recognised that design was closely aligned with management than at any time in the past (Collopy & Boland, 2004). The field of management theory has witnessed an increasing interest in the potential hybribization between design and management. Yet, while scholars were inviting for more critical analysis (Efeoglu, Møller, Sérié, & Boer, 2013; Lindberg, Gumienny, Jobst, & Meinel, 2010), the DT movement by IDEO was already bringing forward the blending.

So, what characteristics of DT revealed to be the most appealing for business and management discourse? Process model, attitudes or thinking style? This question still has no answer. Of course, the will to practically deliver creative problem-solving raised interest in DT process models. DT has also undermined the widespread assumption that managing is about making decisions and has brought in the managerial profession the designerly attitude. The main ideas is that managerial problems can't be solved just by evaluating alternatives and taking decision: there is much more difficulty, ambiguity, and contradiction that must be addressed (Buchanan, 1992). Therefore, managers can't just

passively accept the world as it is given within familiar boundaries, but be more entrepreneurial and transformative. But without any doubt, the main interest of managers has been addressed towards the designerly thinking style.

The "thinking" part of DT have overcome the "design" part when Roger Martin started working with IDEO at the beginning of 2000s. Martin used the concept of DT to reconceptualize his earlier models of knowledge funnel, i.e. ongoing cycle of generating ideas (abduction), predicting consequences (deduction), testing, and generalizing (induction) (Martin, 2009, Dunne & Martin, 2006). He argued that DT promotes long and deep-level understanding of the problem space, a kind of interrogation-like space where to uncover the truth and minimize missing details. In DT problem and solution spaces are perceived as separate and are explored in parallel by moving back and forth and using iteratively divergent and convergent thinking. This goes in contrast with traditional managerial problem-solving, which bases on convergent-only thinking. Classical managerial thinking overlaps problem and solution space and tends to deduce optimal solution rationally from the inner structure of the problem (R. Martin, 2007). This message gained widespread acceptance among practicing managers.

Table 3 The comparison between designers' and manager's traditional thinking styles

Designerly typical thinking	*Managerial typical thinking*
Visual thinking (e.g. sketching, prototyping)	Verbal thinking (e.g. diagrams, tables)
Interpretative and subjective reasoning	Rational and objective reasoning
Embodied and tacit knowledge	Explicit knowledge
Avoiding cognitive biases and false assumptions	Immediate searching for correct answers

Other scholars have also done attempts in understanding the difference between traditional designers' and managers' approaches to problem-solving. Rylander (2009) argued that managers and designers have different perspectives for framing the problem, and different processes and resources at their disposal for solving the problem. Business thinking and design thinking are based on fundamentally different epistemologies: a rational, analytic, or intellectual approach, versus an interpretive, emergent, and explicitly embodied approach. Schreyögg and Geiger (2007) also underlined that traditional business makes intensive use and generate knowledge in the discursive mode only. This kind of knowledge acquisition rejects all forms of embodied or tacit knowledge. In business emotions and intuition, as well, cannot be verbalized and validated in an argumentative process in the knowledge construction. Similarly, Alvesson (2004) underlined that in managerial thinking practical skills, the ability to use the body and creative talents are not necessarily understood in terms of knowledge acquisition, as compared to design.

ORGANISATIONAL CULTURE

As Ezio Manzini has wrote recently, design is not only practice but also a culture (Manzini, 2016). And the emerging design practice has its own cultural configuration that is still unexplored. The author highlights only two aspects of it - solutionism and participationism, and calls for further investigation. Similar ideas has been also advanced by Dumas and Minzberg when they talked about integrating design in organisations under the form of "infusion" (Dumas & Mintzberg, 1989). For authors, design should become a way of life in organisations, and infuses the whole organisational system. Contrarily to the ideas that design should be a function, but an attitude that permeates all the activities.

How can we characterise the design culture? It encompasses the knowledge, values, visions, and quality criteria. In traditional idea of design, this part was delegated to managers, who acted upon it by means of programs, policies, norms. What we observe for the phenomenon of DT is that its culture emerges from conversations occurring during the design practice in various arenas (e.g. conferences, books, blogs). There is still no comprehensive description of it, but there are a series of articles and books discussing ways of building "design-driven" culture and "designful" companies. (Gray & Vander Wal, 2014; Neumeier, 2008).

The arrival of new culture has been enthusiastically met because of a series of challenges that the field of organisational development was facing (Eneberg & Svengren Holm, 2013). First of all, organizational environments have become increasingly complex with rapid change resulting in a need to become more innovative. Organisational context is characterised by ambiguity and uncertainty and hence requires an interpretive framework. DT surely contributes in creating the conditions for such an interpretive framework, even if it is still not clear in what way. Yet, the authors Eneberg & Svengren Holm bring some examples: the reintroduction of democratic values in organizational change, cooperative and experimental working, as well as effective multidisciplinary communication.

Scholarly discourses on Design Thinking

The field of DT is situated within a particular intellectual framework, that have been created at the intersection of more disciplines, yet the common research platform is still lacking. Specifically, in order to advance the field, we need to clarify the aim and the object of the field, as well as possible research approaches.

Johansson -Sköldberg et al. (2013) did an attempt in comprehensive evaluation of different discourses on DT. They identified that there are two types of conversations on DT. The first one is held within the community of design theorists, while the second – within design and management practitioners. While it is obvious that two discourses are related to each other, it seems that they go in parallel without points of connection. At first glance it may seem that the only their connection is the word "thinking", which use is rather paradoxical

in both conversations.

In first conversation, scholars frequently use the term DT equally with term "designerly thinking". Here, DT is understood in a variety of ways: as the creation of artefacts (Simon, 1969), a reflexive practice (Schön, 1983), a problem-solving activity (Buchanan, 1992), a way of reasoning (Cross, 2011; Lawson, 2006), or as the creation of meaning (Krippendorff, 2005,). If the earliest discourse on DT is rooted in post-positivist perspective (e.g. Simon's idea of a design science), almost all later discourses on DT are deeply rooted in a pragmatist epistemology. According to this stance, a raison d'eˆtre of the field is to help, guide, suggest how the designer comes to do what he/she is doing. The main aim is to observe and understand the creative design process, as well as to produce guidelines, useful aids, insights. We can say that the function of the word "thinking" here is to invite designers understand what they are doing, rather than just learning how to do it.

Adding "thinking" to "design", that has been in precedence considered only as a practical device (e.g. "doing"), is a call for a bigger consciousness of proper profession. Arriving at this kind of knowledge is almost impossible within a dominant pragmatist epistemology, which proposes a completely different perspective on the reality and poses different kinds of questions. Therefore, a new field of DT appeared, where multiple disciplines can help designers to answer other questions regarding their profession. Indeed, not all contributors in this conversation are design theorists, e.g. Donald Schon was a philosopher, and Klaus Krippendorff is a researcher of semantics. If we should outline the starting point for the DT, it will surely be the shift from product-oriented design methodologies to process-oriented design methodologies.

The second type of conversation on DT is held within the community of management practitioners and scholars. Here, DT is also understood in a variety of ways: as IDEO's way of working with innovation (Brown, 2009), as a way to approach business and organisational problems (R. Martin, 2007; R. L. Martin, 2009), as a part of management theory (Collopy & Boland, 2004). Here, the first two discourses are addressed to practitioners and codified in a form of "self-help" books, where publishing practice doesn't require citing other authors. As a result, these discourses are quite stand-alone, although linked between them (i.e. Roger Martin and IDEO actually collaborate). For what regards the third discourse, Collopy & Boland connect designing practice to managerial practice by showing analogies, just to demonstrate that managers already think like designers, although the authors use old Simon's design science ideas to create a dialogue between the disciplines. According to this stance, a raison d'eˆtre of the field is to help managers to face their daily problems in a qualitatively better way through normative models and suggestions from best practices. The function of the word "thinking" here is to create a bridge between two at first glance distant territories.

Management practitioners immediately liked the term "thinking" because cognitive operations are usually associated with managerial profession, e.g. strategic thinking,

planning, decision making, problem-solving, etc. However, DT entered in organizations with the claim that managerial ways of thinking are different from designers, even if it's not clear in what way precisely. Another paradox of "thinking" regards IDEO's idea of DT, packaged as a model of a thinking process, which reduces complex designers' thinking to a simple set of thinking techniques.

Given these premises, it goes automatically that a more critical analysis is necessary to unite the two conversations. First, we need to understand the object of the newly born field. This may be, for instance, designing as a universal human activity. Accordingly, a designer is anyone who designs. Unfortunately, the English language doesn't permit to make distinctions between what in our collective imagination is understood by "designing", i.e. a specific professional practice, and what we are trying to denote by "designing" in DT. Indeed, the field of DT treats "designing" closer to the meaning of "projecting[6]". With these premise, we need to ask ourselves whether DT is an appropriate way to define the academic field or we would better give preference to the meta-theory of design, advanced by Terence Love (2000).

The second step is to outline the aim of the field and the main ontological categories. For this, it is helpful to understand those questions that the previous literature tries to answer. Unfortunately, in most cases, research questions are not explicit, therefore we need to interpret them from the contents. Moreover, books and articles address many research questions at a time, therefore it is difficult to characterize them. However, basing on the existent literature, it is possible to define three explanatory dimensions that describe designing. The categories are: design practice, design cognition, and design knowledge.

The category of design practice lies on the observable level. It is useful to focus on what designers actually do in their situated work. Within this category, different authors defined possible places of designing (Buchanan, 1992; Collopy & Boland, 2004), and gave thorough descriptions of a wide range of designing practices, methods applied, and ways of organizing activities (Cross, 2011; Lawson, 2006). It is important to underline that IDEO's and IDEO-like DT process models also belong to this category, because they are just a normative translations of formalised practices.

The category of design knowledge represents the cultural dimension of designing. This category encompasses different kinds of knowledge: factual, semantic, aesthetic. Only factual knowledge is observable, whereas semantic and aesthetic requires interpretation. This category was developed by such scholars as Klaus Krippendorf (2005), Roberto Verganti (2013), Donald Norman (2004), who provided some insights on how the meaning

[6] from Latin "proiectus", past participle of proicere – literally "pro-forward", to stretch out, throw forth. Early senses of the verb were "plan" and "cause to move forward".

is being constructed.

The remaining category of design cognition lies on the unobservable level; therefore, it should be answered by more sophisticated research methods and theoretical effort. This category is useful for understanding the processing happening in brain during designing, and the mechanisms underlying this processing. Here it is important to underline that design consciousness can be perceptual, reflective and affective. Within this category, Schön (1983) was the main contributor with his theory of reflection-upon-action. Other important contributors are Cross, (2001), Dorst (2015), Kolko (2011), Owen (2007), etc.

These ontological categories are useful for creating a common glossary for the development of the field, yet further analysis is needed in order to understand their hierarchical structure and ontological status. Given these premises, there are some useful conclusions that we can drive of advancing the knowledge of the field. First, designing is inherently a cultural phenomenon, and designers are culture-bearers. Consequently, research should address designing as situated in a particular system of meanings. Second, designing occurs in a brain, it is a product of creative interior monologue. It means that research should address also the role of other brain processes, e.g. intentions, memory, future forethought. Third, design process always unfolds in a concrete space/time. Therefore, research should account for the interaction with the context and explain the influence of contextual constraints or affordances. Finally, designing is an embodied practice, and designers have a relational understanding of their actions. This means that the research should study designing as a concrete phenomenological experience. If we see designing and DT as connected, then it's good to take advantage of these learning also in developing discourses on DT.

Finally, scholars will be able to generate theoretical insights on DT only by understanding what DT practitioners do in their day-to-day praxis. This is the only way to narrow the gap between academic and practitioners, and in this way practitioners will be able to apply and adapt theory that comes out of their practice, and scholars will find new and better ways to help practitioners understand why things work or not. Moreover, persisting on the will to fix the boundaries of design and DT may be an erroneous scholarly strategy. Instead, the dynamics of their interaction should be explored. Hence, in the empirical part of my research, I will seek for thick descriptions of how people conceive and experience design, DT, and how they see their practice connected to other practices in the organization (e.g. innovating, changing, strategizing). But first, I invite the reader to discuss the literature in innovation practice in organisations and identify its points of junction with DT.

PART II. LINKING DESIGN THINKING AND INNOVATION

We have wished to make life better, but we have not known how or for whom to make the attempt. (Elie Metchnikoff, biologist, zoologist, Nobel Prize winner)

The benefits and dark sides of innovation

The word "innovation" is the mantra of nowadays business leaders. The lack of innovation has become the easiest way to explain everything from slow job growth to Apple's falling stock. The general economic propaganda of innovation makes everyone believe that innovation is a priori solution, and is directly related to the evolution. Everyone likes to be called an innovator; every firm wants to innovate; governments legislate to make whole nations innovative. As John Lyons says, innovation "is popularly considered to be a great endowment" (Lyons, 2005). The 21st century is without any doubt the epoch of creative awakening and enhanced general propensity to innovate. Innovation has been steadily integrated in our "mental models" (North, 1993).

The irony behind the word "innovation" is that, originally, it was an accusation and had nothing to do with creativity or invention. From its very emergence in Ancient Greece, the concept of innovation (kainotomia) had a political connotation, and meant subversive or revolutionary activities. Innovation was explicitly forbidden by law and used as a linguistic weapon by the opponents of any societal change. The Reformation added to innovation a heretic dimension (individual liberty), and the Renaissance a violent overtone. Together, these characteristics led to the understanding of innovation as conspiracy (designs, schemes, plots). The Enlightenment has brought the idea that it is possible to improve the society and our quality of life by innovation. This signified a drastic shift in ideology: from the view that we ought to preserve a God-given social order to the view that that we ought to use science (in a broad sense) to understand the world and master it so as to increase our wellbeing. However, according to historian Benoît Godin (2015), before the 19th century, innovation was a concept of limited theoretical content, close to the meaning of novelty. Only lately it was enriched with intentional thought, dreams and imagination. In this section, the intention is to unveil the characteristics of meaning that we usually associate with innovation through a historical analysis.

In the late 19th century innovation began taking root as a term associated with science and industry, matching the forward march of the Industrial Revolution, although the language of that period focused more strongly on invention. The differentiation from invention to

innovation occurred in 1930s due to the Austrian economist Joseph Schumpeter (Schumpeter, 1934). He defined invention as an act of intellectual creativity undertaken without any thought given to its possible economic import, and specified innovation happens when firms figure out how to craft inventions into constructive changes in their business model. After Schumpeter, innovation obtained the meaning closely related to business value.

In years, the focus has shifted from inventions to innovations. As Google's Ngram database of word use in books shows, at a certain point in 1950s "innovation" suddenly became bigger deal than "invention". After World War II there has been a complete reversal in the representation of innovation. Those who contested innovation in the past – governments – start de-contesting innovation and produce reflexive thoughts on innovation as a policy tool. One after the other, international organisations and governments embraced innovation as a solution to economic problems and international competitiveness (OECD, 1966; 1969; 1970; 1971; US Department of Commerce, 1967: UK Advisory Council on Science and Technology, 1968), and then launched innovation policies (Pavitt & Walker, 1976).

Figure 9 The occurrence of terms invention, innovation, novelty overtime (Google Books Ngram Viewer, consulted on 1st September 2017)

As a result, the dominant representation of innovation shifted to that of the economy. Technological innovation was understood as a tool to reduce lags or gaps in productivity between countries, and to serve industrial leadership and economic growth. Government gave fundings for research and development in laboratories and foundations (Kuznets, 1959; Pavitt, 1963). As a result, innovation became a basic concept of economic policy and started to be approached as a packaged, predictable research product. Science policy shifts to technology policy, to innovation policy, and indicators on science and technology are relabeled indicators of innovation.

Nowadays the technological leap is allowing us to blow past previous limitations and take us into new economic territories. According to Smihula, in 1985-2015 the information and telecommunications revolution opened a new economic cycle, which is now acting as a

main engine of economic development (Šmihula, 2011). The large academic community has already univocally recognised that the possibilities offered by new digital infrastructures altered completely the way of business innovation calling it "digital disruption" (Barrett, Davidson, Prabhu, & Vargo, 2015). Indeed, in business, the belief in the transformational power of ICT and efficient orchestration of the network motivate the progression of the product/service innovation (Srivastava & Shainesh, 2015). Over years an infrastructure has been built to support this enhanced propensity to innovate (e.g. innovation hubs, maker spaces, hackatons etc.).

The wave of digitalisation and user-generated content gave the possibility to treat culture at the same scale as natural sciences: now we have enough data and fast enough computers to study the "physics of culture" (Manovich, 2016), and this opens up new possibilities for entrepreneurial thinking. Modern analytics (e.g. folksonomy, social network analysis, digital ethnography, integrated ERP) and high-speed computing allow to see the new emerging patterns in society and are an important element of entrepreneurial strategies. With the help of modern technologies, it is easier for managers to create new services aligned with customer needs and find new market niches for existing services (Damanpour et al. 2009; Matthews and Shulman 2005). Moreover, computer simulation actively influences the decision making of entrepreneurs.

At the same time, formal methods of studying society are becoming less capable of dealing with the culture, as digitalisation and the society follow the same co-evolutionary path. As a result, digital infrastructures are becoming increasingly liquid (e.g. Archer, 2014; Bauman, 2013), and the stability of culture is undermined (e.g. Elder-Vass, 2017). Studying society is quite challenging in these condition, as there is no fixed reality, and cultural "short runs" are becoming increasingly short (Simon, 1991). Thus, new and fast methods for studying society are needed.

There exist also a dark side of the digital innovation, as some ethical consequences at the systemic level should be also addressed. Rapid and accelerating digitization and robotisation is steadily bringing economic disruption with a series of social issues. As it races ahead, it is leaving behind a lot of workers, influence the new division of labour and undermine the institutional equilibria (Levy & Murnane, 2012). As a result, Bill Gates has recently suggested taxing robots "at similar level" as human workers, while other policy-makers advocate for a universal basic income. Thus, ethical debates should be also taken into account when building the innovation strategies in business, as what is profitable in a short-term, may not result so in a long-term perspective.

The four paradigms of innovation

For what regards innovation, theory and practice have always walked hand in hand. From the beginning, scholars embraced a eulogistic view of innovation, which caused the diffuse "pro-innovation bias" (Rogers, 2010). From the beginning, the aim of scholars was to understand innovation in order to serve the practical: how to accelerate and get more out of innovation; what kind of strategy and policy are required to this end.

The field of innovation started by the early 1980s, when studied on innovation were maturing and many researchers gradually coming to share a common body of literature, methods and concepts (B. R. Martin, 2012). However, due to significant differences in epistemological and ontological assumptions, it is possible to recognise different schools of thinking. Doing a comprehensive and in-depth review on this topic would be too ambitious; in any case, the literature review permitted me to identify four schools of thought. Over years, the four schools of thinking on innovation created scaffoldings for four different frameworks for formulating strategies for innovation.

POSITIVIST SCHOOL

This school is the first school of innovation thought, established in 1980s. It represents a normative view of innovation. Organisations are understood as closed systems, and innovation is usually understood in terms of new products or services. This school aims at proposing a rigorous process for managing innovation, along with metrics for measuring critical factors of success (Booz et al. 1982; Cooper 2001; Urban et al. 1993; Ramaswamy 1996; Ulrich and Eppinger 2004). This is perfectly in line with the general aim of the school to produce practically useful knowledge.

The main interest regards the structural aspects of the innovation process. Scholars assume that innovation process can be broken into constituent parts, and the relationships between key innovation variables can be identified. Another established assumption is that the innovation model is similar in all organizations. Consequently, the final aim is to produce models for finding problems and proposing solutions. These models are generally linear; they propose typical operations, identify stages, and provide labels for various contexts of investigation. However, some more advanced models include the idea of running simultaneously different stages (Wheelwright and Clark, 1988; Edvardsson and Olsson, 1996), or running them in both directions – linear and parallel (Alam and Perry, 2002). The dominant ontological view is that the investigated reality is stable over time and that innovation is a predictable phenomenon that can be observed, analysed, and managed (Lobler, 2013).

Notwithstanding numerous limits, this school has for many years played a key role in business planning, and still remains well positioned (Garcia and Calantone, 2002; Godin, 2006). This paradigm produced a host of best practices, e.g. dividing R&D into decentralized autonomous teams, spawning internal entrepreneurial ventures, setting up corporate venture-capital arms etc.

Table 4 Main characteristics of the positivist school of thought

Main aim of the research	• Predicting and controlling innovation, providing insights for decision- and policy-makers
Main theories and models	• New product development (NPD): Six-stage model (Booz et al., 1982), Stage-Gate model (Cooper 1990, 2001), development funnel (Wheelwright and Clark, 1992), Concurrent engineering (Wheelwright and Clark, 1988; Brown and Eisenhardt, 1995) • New service development (NSD): Eight-stage model (Bowers, 1987), linear model (Scheuing and Johnson, 1989), four-stage model (Johnson et al., 2000), Service design (Ramaswamy, 1996), service design (Edvardsson and Olsson, 1996), ten-stage model (Alam and Perry, 2002)
Ontological position	• Reality is stable over time and predictable
Epistemological assumptions	• Innovation addresses known market needs and uses known technology • Innovation is a normative process to meet market uncertainty by minimizing risks • Innovation is a defined programmatic effort with clear resource constraints • Innovation is a sequence of orderly steps

POST-POSITIVIST SCHOOL

Compared to the first school, scholars from this school frame innovation in a more open, relational, and systemic approach. Such vision of innovation integrates requirements of users, possibilities of technology, and opportunities for business (Cooper and Kleinschmidt, 2007; Tidd et al., 2005). It also emphasizes the importance of the wider relational context for the innovation and considers multiple actors taking part in the innovation process.

In this school, reality is a result of social conditioning, therefore innovation is explained through social structures (Peters et al. 2013). The nature of innovation is understood as iterative, i.e. involving multiple circles of designing, testing, getting feedback and revising (Cooper, 2014). This school of thought invites managers to move beyond highly structured and risk-averse innovation processes, and to mobilize relational contexts, both inside and outside organizations.

The general effort of this school is to identify the antecedents/enablers of innovation and to provide understanding of the hidden driving forces and mechanisms that support innovation (Tidd et al. 2005). Scholars from this school have advanced numerous customer-oriented models, which are based on thorough understanding of customers' voices and

their involvement in the innovation process (Von Hippel, 1988; Franke and Piller, 2004; von Hippel, 2005). User-generated and community-generated models challenge the idea that innovation process should be protected (Franke and Piller 2004; Nambisan and Nambisan 2008). Instead, they provide guidance for new ways to encourage innovation by customers and other actors, organize internal practices, and develop customer relationships.

The main contribution of this paradigm for strategizing managers is that the epistemology underlying strategy has transformed into a more humanistic discourse, capable of embracing ambiguities and paradoxes. The novelties proposed by this paradigm are collaborating with customers and implementing rapid prototyping.

Table 5 Main characteristics of the post-positivist school of thought

Main aim of the research	• Providing deep understanding of customers, their needs, and the context in which these needs will be fulfilled
Main theories and models	• NPD: User-based innovation (Von Hippel, 1986), iterative or next- generation Stage-Gate model (Cooper, 2008, 2014) • NSD: New service development models (Johnson and Gustafsson, 2003), iterative new service development (Miettinen, 2011; Tuulaniemi, 2011), agile or spiral development model (Schneider and Stickdorn, 2011) • User-generation or community-generation models (Franke and Piller 2004; Franke and Shah 2003; Nambisan and Nambisan 2008)
Ontological position	• Reality is complex, unstable, and only partially known and predictable
Epistemological assumptions	• Innovation addresses unknown market or stakeholders' needs • Innovation is a process that helps to respond to multiple uncertainties and risks • Innovation encompasses relationships and collaborative work

PRAGMATIST SCHOOL

This school treats innovation as a social process, which involves a wide group of actors and is situated in a particular context (Gherardi, 2012; Engestrom, 2001). The beginning of this school of thought goes back to the works of social constructivists, and later infuses with ideas of sociomaterialism. It builds on a premise that the reality is constructed by social practices (Schatzki, 2001; Orlikowsky, 2002). At one hand, human agency is grounded in social practices and is shaped by them; on the other hand, human agency changes social practices in a continuous process of transformation. In some studies, material things are also carriers of agency (Schatzki et al. 2001). The sociomaterial relationships are investigated as being performed here-and-now through a network of connections-in-action" (Gherardi 2015). The resulting epistemological implication is that subjects and objects are dynamically and iteratively co-articulated in intra-action.

This school seeks to explain what characterizes and constrains innovation by approaching culturally and historically formed structures, interpretations, and meanings (Kimbell 2011). Within this school, models and concepts are aiming at analysing and supporting the understanding of innovation in a particular context. The focus is on grasping the changes

in how people interact, and discover new ways of creating value. Given the supremacy of social issues, sometimes innovation here is called to go beyond business benefits to improve human life and society as a whole.

The main epistemological basis is that knowledge is obtained from direct experience in the context (Feldman and Orlikowski, 2011). Scholars aim at interpreting innovation phenomena. Instead of searching for ways of normating innovation, they rather explicate the process by which people come to describe, explain, or account for the world (Berger and Luckmann 1966; Gergen 1985).

The main contribution of this paradigm for strategizing managers is incorporating semantic and interactionist views into the innovation process. The strategy of "blue ocean" comes exactly from this paradigm (Kim & Mauborgne, 2004). Moreover, emergent and adaptive strategies also make part of this school of thought (Mintzberg, 2000).

Table 6 Main characteristics of the pragmatist school of thought

Main aim of the research	• Understanding and interpreting the nature of innovation problems, asking questions and facilitating multi-voice dialogues
Main theories and models	• critically reflective learning/expansive learning (Engestrom 1987, 2001) • developmental learning (Ellstrom 2001, 2010) • value innovation (Kim & Mauborgne, 2004) • design-driven innovation (Verganti 2009)
Ontological position	• Reality is the result of social construction, it is always linked to the context
Epistemological assumptions	• Innovation is mediated by social factors (norms, rules, shared meanings) • Innovation follows nonlinear dynamics • Innovation is path-dependent • There are no universal solutions to innovation problems, and managers can only use guidelines and insights

COMPLEX ADAPTIVE SYSTEM SCHOOL

The rise of this school of thought took hold in the mid-1980's with the formation of the Santa Fe Institute. Here, innovation is understood as a key property of complex adaptive systems operating between order and anarchy (i.e. on the edge of chaos). Organisations are understood as complex adaptive systems with a certain structural complexity. The complexity is better visualized as a network/an ecosystem of many agents gathering information, learning and acting in parallel in an environment produced by the interactions of these agents. Scholars in this school regard innovation as arising from the interplay of these multiple actors who find new ways to integrate resources, resulting in a mutual value creation (Edvardsson and Tronvoll 2013; Lusch and Nambisan 2015; Michel et al. 2008).

An important assumption is that innovation occurs within relationships among different actors engaged in cooperation (Ritter and Gemunden, 2003; Moller and Svahn, 2006;

Mele and Russo-Spena 2015; Vargo et al. 2015). As such, innovation is always co-innovation (Hasu et al. 2015; Korhonen and Kaarela 2015). The epistemological stances of this school embrace the idea that innovation is unpredictable because of nonlinearity of interdependencies among agents.

For scholars of this school, social world has a precarious ontological status, and reality results from an inconceivably large number of accidents. So, the main goal of scholars is to describe the role of a chance as compared to fundamental laws. The laws are regularities perceived by the system, which lead to formation of schema; they allow the system to prescribe behavior for itself. This sequence leads to the emergent behavior of the systems.

The most important contribution for strategizing managers from this paradigm is the idea of innovation systems, i.e. a coherent set of interdependent processes and structures that dictate how the organisation searches for novel problems and solutions, synthesizes ideas into a business concepts, and selects which projects should be funded (Pisano, 2015). This paradigm promotes the idea that the adoption of a specific innovation practice will require a series of complementary changes to the rest of the organization's innovation system. From here, an innovation strategy is necessary to avoid that different parts of an organization can easily pursue conflicting priorities. Even if diverse perspectives are critical to successful innovation, without a strategy to integrate and align those perspectives around common priorities, the power of diversity may become self-defeating.

Table 7 Main characteristics of the complex adaptive system school of thought

Main aim of the research	• Recognising patterns of complexity, explaining the fundamental underlying laws of matter and the role of chance in the functioning of complex adaptive systems
Main theories and models	• Service ecosystems (Lusch and Nambisan 2015; Vargo et al. 2015) • "Co-s" (Russo-Spena and Mele 2012) • Business model innovation (Osterwalder, 2010) • Open innovation (Chesbrough 2003; Chesbrough et al. 2006) • Connect & develop model (Sakkab 2002) • Platform innovation (Gawer and Cusumano 2002) • Innovation value chain (Hansen and Birkinshaw 2007)
Ontological position	• Reality is precarious; it is the result of continuous co-evolution between interacting agents and their environment
Epistemological assumptions	• Innovation is a continuous flow • Innovation is always generated by multi-level networks • Innovation is unpredictable and improvisational

Innovation and strategy: friends or foes?

As we could see, the managing of innovation is tightly connected to numerous dilemmas to solve and numerous choice to do (Christensen & Christensen, 2003). That is the reason why innovation has always been connected to strategic discourses. Scholars propose that defining a strategy for innovating guarantees the commitment to a set of coherent efforts, promotes alignment among different groups in organisation, and clarifies priorities (Pisano,

2015). On the other hand, scholars propose that the existent strategy may also be a significant obstacle for innovation because existing strategies tend to facilitate cognitive inertia, path dependency and low levels of experimentation (Vanhaverbeke & Peeters, 2005; Dobni, 2010). So, what is the relationship between the two?

As Gobble (2012) posit, innovation and strategy should be analysed as a co-evolutionary relationship. Indeed, innovators should understand the strategy and be able to see how their work fits within the larger corporate strategy, in order not to do non-useful work or senselessly spend money in R&D. On the other hand, innovators with their innovative thinking should contribute to shape the strategy so that the company can fully capture the value of its innovation activities. And this is the need of the moment. As the productive lives of strategies are getting shorter, organisations need to find new avenues for growth and sustainability, or in other words they need to do strategic innovation. Gary Hamel (1997) suggested that the capacity for strategic innovation will be the next competitive advantage for companies around the world.

Hamel also underlined that strategy itself does not lead to innovation, as innovation strategy also requires the right context. However, the history has shown that the degree to which innovation strategies succeed is higher when they are aligned with the overall purpose and strategy of a company (Gobble, 2012). Understanding the relationship between strategy and innovation permits organisations to establish a realistic and palpable innovation agenda, as the degree of compatibility guarantees manageable levels of risk. Of course, an idealistic situation would be developing a clear and actionable understanding of how and where innovation fits in the overall corporate strategy, but the strategic alignment, i.e. the degree to which innovation efforts are driven by and emerge from the overall corporate strategy and the corporate culture, is so difficult to achieve. Let's analyse the reasons why.

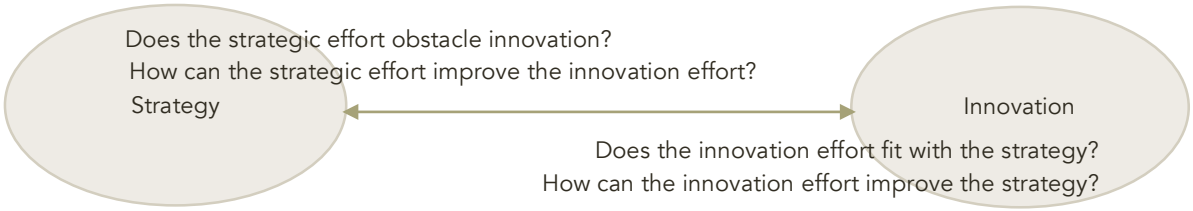


Figure 10 The relationship between innovation and strategy

The main reason is that in crafting an innovation strategy, the "what" is as much important as "how". As Dobni proposed organisations should re-consider how they strategize by changing their focus from a "what-strategy" to a "how-strategy". This will permit organisations to tackle the emerging opportunities for business (Dobni, 2010). Yet, finding the best way to strategizing is a difficult task. There is a variety of strategy tensions to solve

each time. A framework is necessary to orchestrate trade-offs, complementary changes, and resources distribution. I will briefly address these tensions by analysing the three dimensions of any strategy: content, process, and context (De Wit & Meyer, 2010).

Figure 11 Strategy tensions by Bob de Wit & Ron Meyer

PROCESS

Strategy process describes the manner in which strategies come about, how managers organise their activities, and how they face changes in organisation to sustain their strategy. Strategy process is defined as a course of actions for achieving an organisation's purpose (De Wit & Meyer, 2010). Traditionally strategic management approach characteristically emphasized administrative management and set only the context for entrepreneurial behavior. But since mid 90s, it has been argued that strategic management don't not work in a dynamic environment and that it must rely on strategic agility, flexibility, creativity, and continuous innovation (Mintzberg, Quinn, & Ghoshal, 1995).

As a rule, strategy process is described through 3 main dimensions: (1) strategic thinking, i.e. the way managers organise their reasoning process; (2) strategy formation, i.e. the way managers organise their strategizing activities; (3) strategic change, i.e. the way managers organise changes to achieve a successful renewal process.

Even if usually strategic thinking is associated with rational and analytical thinking (Schoemaker and Russo, 1993), there is a broad understanding that managers need to employ both analytical and intuitive thinking, even if they are each other's opposites (Langley, 1995; Pondy, 1983). The use of intuition is also understood as necessary and beneficial, as it permits to cope with complexity and qualitative data. Yet, what really goes to the heart of the strategic reasoning is the tension between logic and creative thinking.

In order to be aware of unfolding opportunities, managers need to evaluate logically whether their assumptions are still valid and functioning, and at the same time to think creatively beyond the current models of reality. Logic and creativity are at odds with one another. Rationality follows a straight line, while creativity moves along unpredictable curves. Finding ways to incorporate both types of thinking into organization is challenging, as these are two completely different styles of thinking that usually bring to conflict situations. Similar tensions are observed for what regards the strategy formulation. Here, the old debate is whether strategy should be deliberate and accurately planned or flexible enough to accommodate the emergent patterns (Minzberg, 1985). Finally, the other paradox that managers face is change: should it be more gradual and fragmented or radical and coordinated?

CONTENT

Strategy content outlines what should be the course of actions that the organisation should follow to achieve its purpose. It clarifies how to transform opportunities into sustainable competitive advantage and create an alignment between the organisation's internal strengths and weaknesses on the one hand and its opportunities and threats in its external environment on the other (Ireland et al., 2003). Schendel and Hofer (1979) stated that at the heart of the concept of strategy there is an entrepreneurial choice. Entrepreneurship describes the process of value creation through developing new products/services and seeking new markets (Ireland et al., 2001). In brief, entrepreneurship regards innovation on the high level of the pyramid and directly addresses the organizational renewal and growth (Sharma & Chrisman, 1999). As multiple scholars underline, the integration of entrepreneurial (opportunity-seeking) and strategic (advantage-seeking) perspectives seems to be a promising approach for coping with the effects of the new competitive landscape. Although their foci differ, both perspectives are inevitably interrelated, and are often complementarily supportive of each other (Ireland et al., 2003; Meyer & Heppard, 2000).

Depending on the size and scope of the organization, strategy is usually layered in 3 levels: (1) business strategy, which outlines organisation's competitive advantage on the market over other rival competitors; (2) corporate strategy, which defines what businesses the organization will be in; (3) network strategy, which defines the relationship with other organisations operating on the market.

There are two ways in which organization usually formulate their business strategy. The first is to pursue market opportunities and seek for external consonance, whereas the second is to take the resource base perspective and seek for internal consistency. It is clear that organisations need to adapt themselves to market developments and they need to build

on the strengths of their resource bases. At the same time, it is unclear what of the two factors should be dominant. The variety of opinions among scholars regarding this point is dauntingly large, with diametrically opposed positions. Similar tension could be observed for corporate strategy. The dilemma here regards the way to organize business units, whether to prefer multi-business synergy and inter-business cooperation, or to prefer that single business could remain highly responsive to the specific demands of their own business area. The main question is whether a corporation should be an integrated whole or a collection of parts. Finally, organisations face the dilemma of how to structure their ties in collaborative arrangements with other organisations, as there are multiple forms that go more towards competition or towards cooperation.

CONTEXT

Strategy context describes the set of circumstances under which strategy is determined. It answers the question "where" of strategy. Scholarly largely agree that every strategy context is unique. Still, it is not clear what should come first – the strategy or the context? Some scholars argue that it is impossible to shape the context, therefore it is only possible to adapt. Others argue that strategizing managers should create their own circumstances instead of being enslaved by them.

There exist three levels at which we can analyse the strategy context: industry, organizational, international. Each of these levels requires resolving dilemmas. For instance, on the industry level it is necessary to resolve whether industry circumstance should set the rules to that an organization should comply or whether an organization should have the freedom to choose its own strategy. On the organizational level, key strategic issues have to do with the question whether the organizational circumstances (e.g. resources, structure, culture) should be developed in response to the strategic choices on the top of the pyramid or vice versa. Finally, on international level, managers should clarify whether it's preferable to adapt to the diversity of the international context or persist with domestic style strategy.

To conclude, at the heart of every strategy, a fundamental tension between apparent opposites can be identified. The challenge of the strategic management is to wrestle with these strategy tensions. The way strategic choices are done is a rule determined by a series of explicit or implicit assumptions about the nature of these tensions and directions to take.

Strategic decisions on innovation

As the history shows, innovation may trigger emergent phenomena that are not directly tied to the economic success; sometimes there are even negative consequences. Therefore, strategic decisions on innovation are crucial to defining the way to innovate (Christensen & Christensen, 2003). The big dilemma for strategizing managers is to decide why, where, when and to innovate, and how to measure the success of innovation.

DEGREES OF RADICALNESS

If we look back into the past, we can notice how there has always been a double focus in bringing innovation. Since the first Industrial Revolution, the Western economy brimmed with heroic "macro-inventions". The history of innovation showed that such inventions, which deals with an essentially new technology and constitute a radical break with the past, has the ability to usher in a phase of renewed economic progress. Examples of such radical inventions are steam power and electricity in the 19th century, and automobiles and information technology in the 20th century. Their impact was substantial and wide-ranging, affecting both the pace of economic growth and the sources of leadership (Ville, 2011). Even long run economic fluctuations (e.g. Kondratiev cycles) have been associated with these macro-inventions, rising with the diffusion of each new breakthrough and tailing back thereafter (Šmihula, 2011).

At a certain point the shift happened towards micro-inventions and incremental innovations (Mokyr, 1990). It was shown that within each major historical phase of macro-invention there lie many micro-inventions, which incrementally improve the original concept and often economically are even more convenient. Of course, originators are the first to absorb its economic benefits and have the trading opportunity to sell the innovation to others. However, incremental innovations help to avoid the costs of developing and may gain more in terms of spanning developmental gaps from its widespread deployment.

Radical innovation is usually driven by either advances in technology or a deliberate change in meaning. Instead, incremental innovation is usually performed through a series of mutual adaptations by the developers and the use community to bring the two into better alignment. The major difference between the two is whether the innovation is perceived as a continuous modification of previously accepted practices or whether it is new, unique, and discontinuous (Norman & Verganti, 2013). Defining radicalness requires a conscious and responsible evaluation of risks and responsibilities.

PLACES OF INNOVATION

If in the first half of the 20th century, innovation regarded mostly products and new technologies, in the second half, the types and location of innovation shifted and with it economic and industrial hegemony. From the 1950s Japanese organisations began to challenge European and American organisations particularly through holistic innovation in manufacturing systems (i.e. lean production), new approaches to labour management, and the development of new forms of inter-organisational relations (Fruin, 1992). This gave rise to the organisational innovation.

Since the early-1990s, a big attention was given to the role of networks and collaboration in innovation. In this period, the idea of "systems of innovation" emerge, the process of innovation is now more open and socially responsible, and the equality becomes an issue. For the first time, the idea of experience and social innovation emerged (B. R. Martin, 2012). During the past decades, the "places" of innovation has morphed - breaking loose from the R&D department, extending beyond products and services into internal business processes, and spilling outside the walls of organisations. In years, innovation has become an "eco" of arising societal awakening, infiltrating in almost all fields of social activity. Innovation is no longer just a means of solving problems – it is ideologically sublimated and has become entrenched at the very heart of how society functions – where innovation is important in itself quite regardless of what gets innovated (Lane et al., 2011).

The digital boom has furtherly extended the places of innovation into digital infrastructures. Due to the widespread availability of computers and the pervasive internet, digital services has been steadily growing (Williams et al., 2008). Unlike simple services, digital services are obtained and arranged through a digital transaction (i.e. information, software modules, or consumer goods) over Internet Protocol. The fundamental part of digital services is the ability to connect and use the infrastructure of the IP-based internet. Even if digital service may start digitally, this does not mean that all interactions between computer technology and human beings are limited to be solely digital. Indeed, due to the developments in IT field, we observe the growing trend of servitisation, which further intermingles products and service offerings (Neely 2008; Vandermerwe and Rada 1988). The other important aspect of digitalization is the ubiquitous nature of digital infrastructure, which makes the whole process of innovation acceptance faster and easier (Lyytinen et al., 2004). Yet, given the plurality of places for innovation, it is a big challenge deciding on what should be innovated for the integrated product and service offering.

FREQUENCY OF INNOVATION

The Industrial Revolution ushered in humanity's first machine age. The first time our progress was driven primarily by technological innovation, and it was the most profound time of transformation and inventions. The ability to generate massive amounts of

mechanical power prepared the territory for new kinds of innovations, and now we are living in the second machine age (Brynjolfsson & McAfee, 2014). If in past steam engines provided us with the extra power for our muscles, nowadays computers and other digital advances provide us with the ability of extra mental power, the ability to use our brains to understand and shape our environments.

An important area where we see a rapid acceleration in digital improvement is robotics and the Internet of Things. Nowadays machines can navigate through and interact with the physical world of factories, warehouses, battlefields, and offices. The Internet of Things makes available massive bodies of data relevant to almost any situation, and this information can be infinitely reproduced and reused. As a result, the business possibilities are multiplying as never before, and with frequency that we have never seen before. The challenge is in finding the way in which these digital value chains may benefit customers and be sustainable over time (Tapscott, Lowy, & Ticoll, 2000).

CRITERIA OF INNOVATION SUCCESS

With the arrival of digital channels and social media technologies, it became easier to obtain feedback from customers on new products and/or services. The connection with customers has been enhanced and has become more transparent (Wiley, 2008). Moreover, the interactive approach to manage innovation activities creates an open climate for continuous innovation that captures the learning from failures during the development process.

Criteria for evaluating the innovation success are also an important issue. Nowadays the majority of strategic choices are done basing on a series of short-term performance criteria (e.g. return on investment, numbers of ideas), that are not based on any conceptualisation of innovation, and, therefore, provide no useful information for robust business strategies. Current practices of evaluating innovation continue to follow mainstream linear thinking, which oversimplifies the phases of innovation and the complex dynamics between actors. Innovation projects are usually locked down earlier than necessary to gain time advantage of newness. The innovation process unfolds in less articulated way to move rapidly to the final solution (Cooper, 2008). This surely impacts the quality of final solutions. And all related decisions are frequently done just basing on manager's hunch. It is evident that new criteria of innovation success are needed.

Design and strategic thinking in driving innovation

The nature of complexity that strategizing managers are dealing with today requires new approaches. It is obvious that positivist and post-positivist schools, that have dominated managerial practice for decades are showing their inefficacy in dealing with contemporary complex problems. A rule, we call these problems "wicked" because traditional approaches can't resolve them (Buchanan, 1992; Rittel & Webber, 1973). Different scholars

and practitioners describe them by such characteristics as: interconnectedness, complicatedness, uncertainty, ambiguity, conflict of interests, societal constraints (De Wit & Meyer, 2010).

Traditional managerial theories are unable to explain the strategy tensions in innovation, nor to produce tools for coping with them. Traditionally, strategy tensions have been approached in 3 different ways: as a puzzle (e.g. finding the best way for relieving the tension), as a dilemma (e.g. choosing among the two), or as a trade-off (e.g. finding a different balance between two conflicting situations) (De Wit & Meyer, 2010). As a consequence, the goal of traditional managerial tools became to help with choosing a particular course of action between the two alternatives. However, such approach has shown to be ineffective for what regards wicked problems.

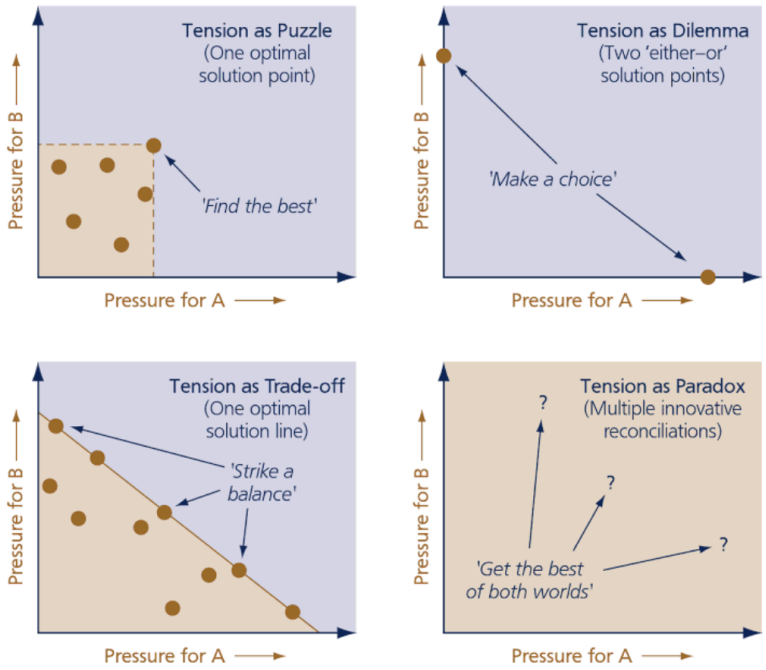


Figure 12 The four ways of approaching strategy tensions (by Bob de Wit & Ron Meyer)

The fourth way to approach wicked problems is treating them as paradox, where two contradictory - and maybe even mutually exclusive - situations can be true at the same time (Poole & Van de Ven, 1989). And this approach has been argued to be the best in case of wicked problems (Buchanan, 1992). In nowadays fast-changing market, where we begin tells us little about where we will end up. Therefore, there is a need to shift the emphasis from what we know about the point of departure to what we know about the future, and how we visualise it. It is more important to achieve insights into the nature of the complexity and to formulate vision for coping with it. Thus, there is a general renewed interest in future-focused strategic thinking and future-focused strategic tools and techniques (Voros, 2003).

DT, deeply rooted in pragmatic paradigm, entered into managerial discourses in 1990s in a precise moment when everybody calls for new strategic approaches and perspectives. There is a myriad of articles and books defining DT as a unified framework for innovation, strategy for innovation, strategic resource etc. Yet, there is no understanding on how DT can be linked to previous discourses on innovation and strategy. If DT is a new approach, in what is it different and what are its main characteristics?

We can find some insights on these questions from the studies on novelty in organizations. Frigotto (2018) proposes that innovations are positive ("white") novelties, that in some cases, are designed by organizations, while in other cases – just found. When the author says "found", she actually means the emergent novelties. Let's explore what she actually means. Emergence is a natural process, which is appropriate to biotic systems (e.g. living organisms), and which is aiming at the propagation of its organisation through growth and replication. In emergent phenomena, the components of the system self-organize and influence the outcome through their mutual interactions without an overarching intention. Therefore, emerging novelties are naturally occurring, but they don't always end up in positive outcomes. Instead, strategizing and designing are top-down processes, in which humans begin with the desired effects and outcomes and look for causes that will bring these about, while controlling the whole process. This is possible through a series of tactics like intense interaction with environment, careful reading of the emergence signals, trial-and-error approach etc.

Van Alstyne & Logan (2007) propose that innovation is successful only if it embraces the interplay of strategy, design and emergence. Capra suggests that strategies and design can anticipate, harness, and cultivate innovation by understanding and mimicking the dynamics of emergent phenomena (Capra, 2002). The notions of "emergence" in innovation and strategy trace back to contributions of Mintzberg (1978). Moreover, lately there are a series of studies that invite to integrate serendipity into strategy (Christensen, Allworth, & Dillon, 2012). However, there are a series of unanswered questions. For instance, to what extent is it possible to control or influence the emergence of novelty? How can organizations increase their exposure to and enhance their ability to recognise emergent novelty? What is the role of randomness and human intent? DT may be the way (maybe one of thousands) for answering these questions. Indeed, it promotes a new type of organisational cognition, learning and tools for dealing with novelty.

First of all, DT is a dialectical way to recognising new opportunities for business. The "wicked" market is characterised by ambiguities, and multiple "correct views" of problems and solutions. As wicked problems impact multiple stakeholders in a different way, a dialectic approach may help to evaluate both important opportunity costs, but also side effects. The challenge is to accurately validate different views, and to design strategies to create value for customers and for the ecosystem of partners that organisations are

embedded in (Sniukas et al., 2016). Hence, the knowledge on business opportunities should be based on a wider spectrum of information gathered from larger number of diverse sources.

Strategizing managers need to enable the freedom to see things differently and to experiment at the limits of their knowledge and ability. Moreover, strategy should be refined in an iterative process, as it is assumed that the best approach lies somewhere in between formal planning on the one side, and flexibility and intuition on the other (Hamel, 1996; Hayashi, 2001; Miller & Ireland, 2005). For this, DT offers the right balance between heuristic and evidence-based ways of reasoning (Gigerenzer, Todd, & ABC Research Group, 1999). DT also promotes a series of tools and techniques for efficient learning. First, DT invites to combine divergent and convergent thinking. Second, DT promotes iteration to learn reflectively and clarify progressively the ambiguity. In DT, you often start with a very rudimentary version of the strategy, and engage immediately in business activities on a small scale. As you go through several cycles of acting, learning, and further designing, the maturity and sophistication of the strategy increases up to a point where you start rolling out the strategy on a larger scale.

DT also reduces risks of failure, because it promotes teamwork and multidisciplinary discussions. As wicked problems are characterised by interconnectedness, relevant knowledge and resources for solving complex problems are distributed among many individuals, therefore the active involvement of groups of people is necessary for the construction of knowledge (De Wit & Meyer, 2010). Indeed, DT proposes new language to permit different stakeholders interact and exchange their adversarial points of view without the risk of being misunderstood. It is made possible through a series of visualisation techniques (e.g. sketching, role playing, prototypes) that display the ambiguity. By visualisation, perception and interpretation are bound together and in this way, the risk of misunderstanding is reduced.

At the same time, the consideration of multiple stakeholders involved brings inevitably to the conflict of interests. Because of competing interests, there is often a need to trade off "goods" against "bads" within the same value system. Conflicts of interest among different stakeholders are to be expected. How final solutions will be crafted depends on interaction between different interests that are unlikely to enter into fully cooperative arrangements. For coping with this challenge, DT offers integrative methods and ways for finding collective arrangements. The wide participation of people in a problem-solving process translates automatically into a diversity, therefore a special collaborative culture is needed to bring the diversity and relevant knowledge together into a form of a coherent picture.

In front of these promising benefits that DT may bring, what still remains unclear is the influence of the corporate strategy on it. We know that releasing the innovative forces in a

company does not automatically translate into the desired capabilities that secures the company's high performance (Vanhaverbeke & Peeters, 2005). Without DT becoming part of the overall direction of the company, it is likely to just contribute to the chaos. The other important question to ask is on what level does DT interact with the corporate strategy? As we have seen from the previous chapter, DT is understood in terms of strategy & entrepreneurship, managerial style, and organizational culture. These three dimensions are quite aligned with the three dimensions of strategy - content, process, and context. If we presume that there should be points of connection, we still have to discover the characteristics of their nature.

In the empirical part of this research, I will seek to provide more clarity on the way DT relates to innovation and strategy in organisations. Specifically, the focus will be on how business opportunities are defined on different levels in organisations, how the strategy tensions on innovation are solved, and the role of the context in innovation efforts. The analysis will also try to uncover the hidden underlying assumptions of DT in order to find links with different schools of thought on innovation and foster major connections with previous literature.

PART III. RESEARCH APPROACH

See what is visible, and learn from it about the invisible (Grygoryi Skovoroda, philosopher)

Philosophical position

The current theme in the previous two chapter is the complexity and ambiguity around the concept of DT and its benefits for innovation. The concept of DT is loosely defined, and its links with innovation can be only developed on an intuitive level. At this moment of the field development, the common understanding of the phenomenon is lacking. Therefore, any research on the topic necessitates both an empirical setting and research strategy that can effectively manage these particular challenges. In crafting the research strategy, no specific theory has been used. Instead, I made a choice to be guided just by a loose paradigmatic framework. This kind of approach may be seen by some scholars (especially with positivist background) as rather "anti-foundationalist", but it perfectly embraces my conviction is that there is no correct path to knowledge, no universal standard, no special method that automatically leads to intellectual progress. This research does not seek for rigid answers, it rather approaches the reality from the perspective of people and organisations who own their experiences regarding DT. The interpretivist paradigm is helpful for the aim of my research also because the nature of the research questions is open and potentially producing conflicting narratives, that require holding together multiple perspectives.

Interpretivists believe that reality is not objectively determined, but is socially constructed (Husserl, 1965). Hence, the research aim is to understand and reconstruct the constructions that people hold, find consensus, show the value of subjectivity and advance propositions on what the reality might be. Moreover, interpretivist paradigm is open enough to new interpretations, which arises possibilities for abduction in the research process.

The focus of this study is on investigating meanings and categories by which people and organisations understand, describe and use DT, basing on their practical experience. Interpretivist paradigm could surely at best guide the research effort in this direction. Compared to positivists who often accept only one correct answer, interpretivism is much more inclusive, it accepts multiple viewpoints. The idea of multiple perspectives arises from the belief that external reality is variable (Willis, 2007). The acceptance of multiple

perspectives in interpretivism often leads to a more comprehensive understanding of the situation (Klein & Meyers, 1998; Morehouse, 2011). This may significantly facilitate DT researchers by providing in-depth and insightful information on the phenomenon from people.

Other points of interest of my research are the context of DT and its links with innovation. Here, interpretivist paradigm could also offer correct ontological lenses. In essence, interpretivism is concerned with the uniqueness of a particular situation, contributing to the underlying pursuit of contextual depth (Myers, 1997). The underlying epistemological assumption of interpretivism is that by placing people in their social contexts, there will be greater opportunity to understand the perceptions they have of their own activities (Hussey & Hussey, 1997). Knowledge consists of those constructions about which there is relative consensus among competent people to interpret the substance of the construction. These constructs may be relatively different; therefore, they need to be continuous revised and brought into juxtaposition in a dialectical context.

In interpretivist paradigm, the researchers' reflexivity is a vital part of the analysis (Eriksson and Kovalainen, 2008). Therefore, research findings are always results and constructions of a researcher's own interpretation (Alvesson and Skoldberg, 2000). It's the researcher who chooses what is worth describing and what should be emphasized, basing on his/her interpretation of the case (Failclough, 2001). During the whole research process, I have worked on my self-awareness as a researcher, trying to understand my involvement with the topic and the nature of my choices. I tried to make reflexivity part of my daily routine, so I was keeping an e-diary, where I could order my thoughts through writing. I was also a lucky person because during these years I was surrounded by friends and colleagues, who work as professional coaches and trainers. Whenever I felt confused, I always was granted by their gentle support as they suggested me self-reflection questions and exercises to clarify my emotions, desires, and unveil cultural biases.

As a researcher, I was continuously using the self-check procedure by answering the following questions: What is my role as a researcher in this study? What emotions and desires underline my motivation to know? Am I biased as a researcher? Am I able to provide alternative explanations? How and why do I choose among alternative explanations? Is there a fit between mine and participants' reconstruction? Are the findings helpful to the research participants? If yes, to whom precisely? Whose points of view am I trying to favour?

My research interest arose from my work experience. Before my phd journey, I worked in a consultancy company, who applied philosophical approach for the purpose of strategic HR and T&D issues. There, I had possibility to work in a close contact with their designer and I noted the added value that he was giving to the discovery process. Moreover, since my student times, I have been frequently working as a translator with some Italian furniture

producers and shoemakers. Conversations with their creative directors and plurennial observation of their work inspired my interest toward aesthetics and the concept of beauty. Hence, my very first assumptions were that design is somehow connected to the elegance of solutions and to the deep and fine understanding of reality. At the same time, I was searching the answer why people suffer so much in organisations, and I was continuously asking myself why organisations can't become places of beauty. That was the exact moment I came across the concept of DT during one of the HR conferences, and I decided to explore its relationship with my assumptions on design.

At the beginning of my journey, I felt very uncomfortable in exploring the world of design because of my weak connection with it. I understood that theoretical knowledge is of no use until I try to live my own experience. Therefore, I actively searched for occasions to practice DT, e.g. I participated in open service design jam sessions, I attended service design conferences and community meetings. This were unique occasions to make my own collections of perceptions, ideas, and assumptions. Through the whole research process, I have been constantly moving between design and business disciplines, continuously changing hats and perspectives. This exercise was useful to challenge my own assumptions.

Research design

In line with interpretivist paradigm, this research adopted a qualitative approach to research. Indeed, as Creswell (2009) states, the qualitative research is the best suited for exploring and understanding the meaning individuals or groups ascribe to social problems.

Within qualitative approaches to the research, a single case study was chosen as a research strategy. According to Yin (1984), case study is an empirical inquiry that investigates a contemporary phenomenon within its real life context, when the boundaries between the phenomenon and the context are not clearly evident, and in which multiple sources of evidence are used. The case study is suitable for achieving empirical knowledge on complex phenomenon, examining it in natural setting, and understanding interactive processes and relationships within specific contexts. Moreover, it allows to "slice" different levels of context and switch between different levels of analysis. The use of a case study also provides both historical and up-to-date information, making it suitable for a more comprehensive study of the phenomenon (Marschan-Piekkari & Welch, 2011). Due to the high number of informants involved, it provides possibilities for alternative explanations of the phenomenon. Because of these characteristics, it was decided that a case study could offer greater depth and breadth of enquiry than many other strategies.

The main question driving the casing process for this study was "What would be a case, in the total universe of organisations using DT, that is likely to lead to interesting theoretical insight?" The criteria for selecting a case study were: high awareness on DT, pool of DT

experts, suitable DT projects, strategic innovation related to DT. These criteria reduced the universe of possible cases to a list of several companies. These companies were contacted for verifying the interest to participate in a study.

From theoretical and convenience sampling, the IBM company resulted the best choice. Because of some characteristics, the case was considered "a better glimpse of reality" (Kempster & Parry, 2011). The IBM Company is considered to be the largest case of DT worldwide, as since 2012 the company spent $100 million to grow design capabilities, hired 1,000 designers, founded a DT Academy, and extended DT courses to the whole population.

IBM is the one of few companies, who elaborated its own definition and conceptualization of DT, which is described in IBM Design Thinking Field Guide and is available on the IBM Design Thinking website (www.ibm.com/design/thinking). Moreover, the IBM Company has publicly expressed its strategic interest in DT. Indeed, new roles of distinguished designers were brought on executive level, design camps were organized for C-suite, there were created 39 design studios worldwide, just to name some of the related strategic transformations.

A partnership agreement was signed with the company (see Appendix 1), and the access to the field was negotiated in the period October '16-April '17. The case of IBM Company was analysed on two levels: macro and micro. The macro level regarded headquarter's practices and was mainly explored through official corporate documents and available video testimonials. The micro level was explored through the analysis of the practices of IBM Interactive Experience (iX) Group in Italy. This group makes part of IBM Global Business Services. The main goal of IBM iX is to support enterprises in digital transformation by relying on co-creation logic and DT methodology. Their main activities are oriented toward developing digital strategies, new digital and mobile platforms, wearable systems, digital communication channels, providing social and customer analytics, realizing marketing campaigns, making 360° customer experience, etc.

The main assumption of distributing our attention on two levels embraces the systemic position and recognize that "macro" and "micro" is made of the same stuff and that this distinction should be repurposed as one of "large" and "small" phenomena (Schatzki, 2011). However, I don't expect the phenomenon to manifest on macro level any transcendental elements (e.g., institutional logics or social forces), rather I embrace the idea that adding the macro focus can help to trace inter-connections and follow the steps that lead to certain outcomes over others. Such double focus only helps to explain the complex, vast, ramified reality of the DT phenomenon.

Research methodology

In line with interpretivist paradigm, for this research I searched methods that enable to understand in depth the relationship of people to their organizational context (McQueen, 2002). The aim of the research methods was to help me view the world through the eyes of other people in order to grasp their own interpretations of reality.

DATA COLLECTION

The data collection followed 3 stages. The first stage (October-November '16) was dedicated to scoping study. Three exploratory interviews were brought out: one with a Distinguished designer in US headquarter (via Skype), one with HR partner and one with a DT champion in Italy. The scoping study was further developed through desk and Internet research. This scoping study helped to further refine the research questions, decide on the appropriate methods to use, and gave insights into where and how to perform the case study.

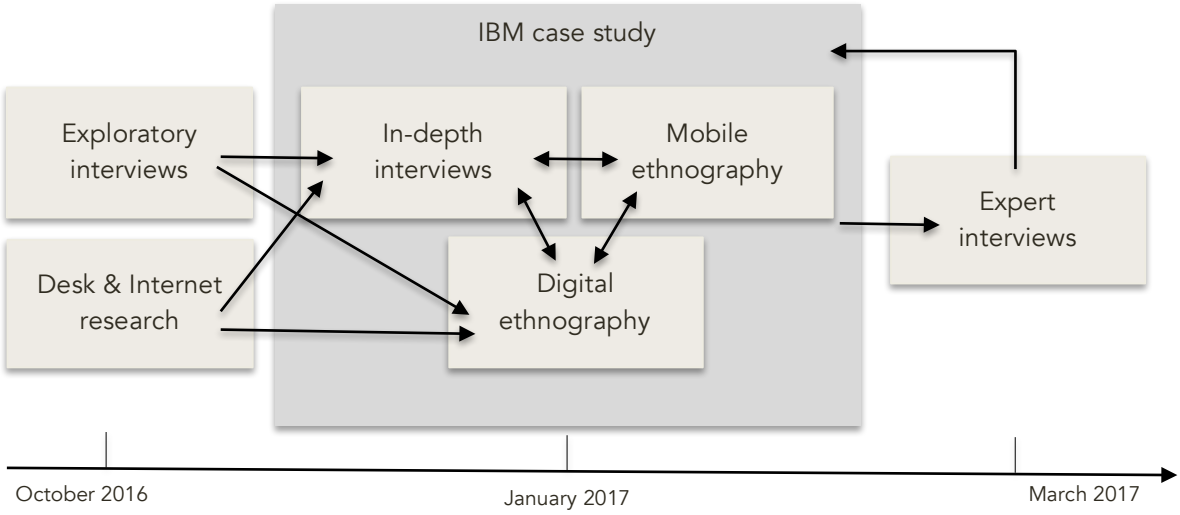


Figure 13 The timeline of data collection process

The second stage (December '16 - February '17) was dedicated to the collection of main dataset. At this stage, the study was a combination of different ethnographic methods. Primary and secondary data were collected synchronically. Secondary data were retrieved by digital ethnography by interrogating main IBM corporate channels (e.g. IBM Design website, IBM Design Vimeo channel, IBM Design Medium page, IBM Design Box page, Corporate Youtube channels: IBM, IBM Think Academy and IBM design etc.). Primary data were collected in 2 ways: through semi-structured interviews with key organisational informants, and though the project of mobile ethnography with anonymous volunteers (among 16 interviewees). The results from the all sources were continuously compared and integrated.

For in-depth interviews, mainly people based in Milan were involved. These were specialists from "Strategy Creative and Design" group, who practice DT daily in their work, and specialists from other groups, sporadically apply DT in their job. At the beginning of the study, an interview protocol was prepared (see Appendix 3). It was developed based on literature review and the scoping study, and later checked and refined by the IBM research referee. 14 professionals from IBM were interviewed in face-to-face meeting of 40-60 minutes. All interviews were held in English and audio registered. Before the interview, each participant received an Information Sheet (see Appendix 1) and, if the interest to participate was confirmed, she/he was asked to sign a Consent Form (see Appendix 2). A particular attention was dedicated to assuring privacy, explaining ethical behaviour, and establishing a trust atmosphere. The independent status of the researcher was emphasised. Participants were given the possibility to withdraw from the study at any point, or to cancel afterwards some phrases in the transcriptions of their interviews.

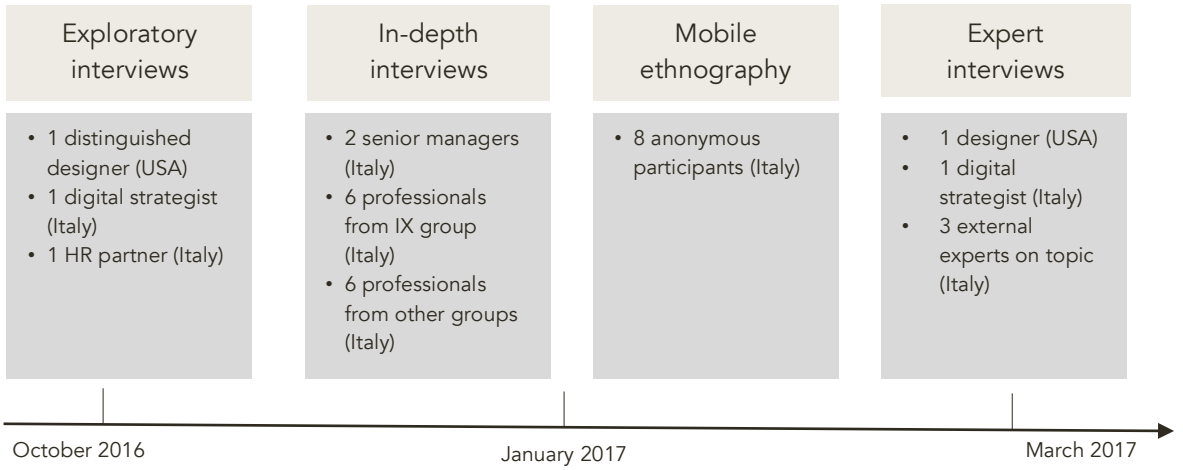


Figure 14 Sources of primary data

The method of mobile ethnography was thought to gain inputs other than narrative (see Appendix 4). 20 IBMers received an invitation email, and 8 anonymous participants decided to take part in the study. The participation was voluntary and lasted 1 month (February 2017). It was based on the use of the free mobile app "Experience Fellow", designed basing on academic research (Stickdorn et al., 2014). Mobile ethnography is a research methodology that leverages the dispersion of smartphones. In mobile ethnography, independent mobile users report their experience, based on genuine feelings generated in the exact moment in time. This study had no intention of recalling experiences nor giving feedback to them afterwards: the intention was of gathering insights into IBMers' experiential journeys. Specifically, it aimed at investigating how employees experienced DT and the surrounding context in the exact moment when they were applying it.

IBMers were asked to install the mobile app and join the project by scanning a QR code.

With the help of the app employees were able to share their emotions, images/video, notes in a completely anonymous way. They were asked to document any moment of their experience that they considered important/useful for the research. For instance, how IBMers were practicing DT, what particularly enabled or slowed down their work, what seemed paradoxical to them, encouraged/discouraged them to use DT etc. Employees chose themselves what and when to report. It was done intentionally not giving people precise directions about situations to report, as my intention was to understand what moments people will associated with "DT practice". Moreover, participants received weekly push notification; it was an attempt to keep high engagement though the project.

The third stage (March-April '17) was dedicated to making sense of data, refining the analysis, giving rise to relationships between different categories. The explanatory interviews were conducted with 1 digital strategist (Italy) and 1 designer from US headquarter (USA). Moreover, 3 external specialists were involved for expert commenting on the case. These explanatory interviews were completely open-ended, and their main aim was to triangulate points of view, discuss the categories and relationships.

DATA ANALYSIS

The data analysis took place in three phases, all of which involved internal iterations. The analysis was all data-driven, and no theories were used to guide the analysis. In the first phase, exploratory interviews were transcribed from audio files. A temporal bracketing techniques was used to address the materials obtained from the digital ethnography. A narrative approach was selected as a suitable strategy for synthesizing evidence on the initial stage. As outlined by Czarniawska (2004), complex situations can be better understood in story format.

In the second phase, in-depth interviews were transcribed from audio files. When the transcriptions were ready, I sent them back to their holders and asked to check the appropriateness of data. In some cases, I had doubts that emerged after the transcription, so I took that opportunity of e-mail contact to ask for clarifications. When all the transcriptions were approved, they were imported into the research software NVivo. The data from the mobile application Experience Fellow were extracted on aggregated level for a single user in a form of 4 outputs: summary of employees' journeys, their emotional curve, the geographical distribution of experiences on the map, and photo materials. All these data have been also imported to NVivo. Finally, secondary data (i.e. corporate presentations, guidelines, reports), were also imported to NVivo.

Data were coded in NVivo according to suggestions of Glaser and Strauss's (1967) grounded theory coding method. All data has been thematically grouped according to the emerging themes. As coding progressed, it became apparent that many themes were related, therefore they were reclassified into a series of categories and related sub-

categories by using N-vivo's hierarchical tree structure. Memo were used to clarify ideas and identify relationships with other categories. Constant comparison between emerging and already coded themes was an important step in the coding process. NVivo facilitated the creation, linking and hierarchical management of themes. Interpretation was an iterative process that involved interaction between macro and micro levels, evidence and theory.

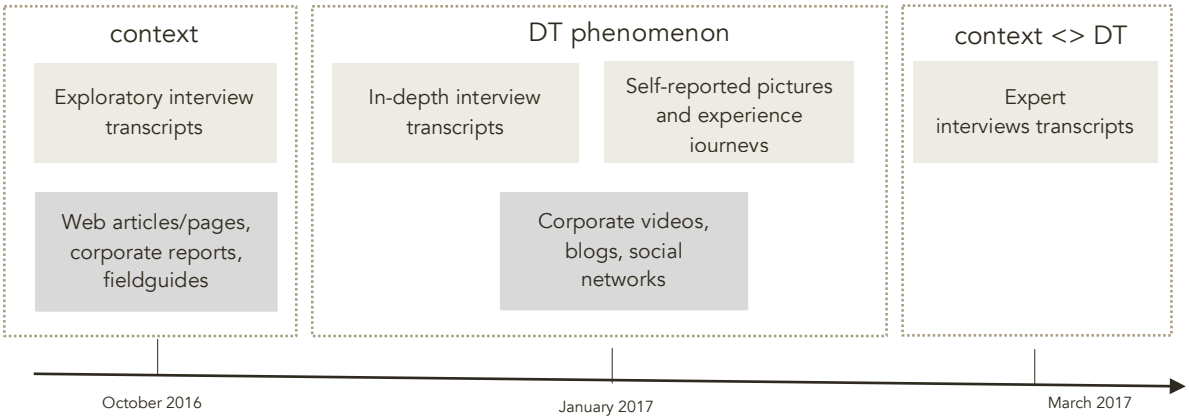


Figure 15 The process of data analysis

Through extended reflection on the primary narrative and the consideration of existent categories and subcategories, the primary narrative was reduced to the main research findings. Developing a coherent story and exploring the key relationships between issues was the hardest part of the analysis. For this, I was frequently using 2x2 matrices, diagrams, mindmaps, storycards. This reflective process expanded my interpretation of the evidence over a series of iterative cycles. Finally, key findings were written up as a second-order narrative. Through iterating between the first and the second-order narrative and reflecting on the findings separately and as a whole, relationships between the key findings were further explored.

In the third phase, the expert interviews have been transcribed. The analysis here regarded the distillation of the key findings. The focus was on matching the patterns on different levels of analysis. Expert comments have been used to establish relationships between the findings and the extent to which they influenced each other. This resulted in the final third-order narrative.

Theorising mode

The theorizing mode in this study has been suggested by philosophical and methodological commitments that I've done at the moment of research design. This way of theorizing makes part of a rich tradition of "idiographic" social science. Compared to "nomothetic" social science, which seeks to generate law-like explanations, the idiographic social science seeks to understand the particular (Welch, Piekkari,

Plakoyiannaki, & Paavilainen-Mäntymäki, 2011). Unlike traditional positivist epistemology, which insists on the unity of the social and natural sciences, interpretive approach emphasises the uniqueness of the social sciences.

The practice-based studies are not focus on really producing or refining a theory of practice in a form of a system of general propositions (Abend, 2008). Scholars from the practice-based studies consider that reducing the complex nature of practices to transcendental principles may lead to testable inconsequential propositions or normative check-lists, that may narrow our analytical lenses on the abductive nature of practices (Blumer, 1954; Bourdieu, 1990). Even if practice-based studies identify the constitutive elements of practices, these are only used as instruments for empirical research. Practice-based studies do not investigate practices as abstract entities; they rather "praxeologise" phenomena and ground explanations in what is empirically observable.

Even if scholars recognize that such disembedded concepts as cognitive abilities or mental schemes can be help to understand what is going on during the DT practice, they cannot causally explain the real-world phenomena. Therefore, instead of trying to analytically understand disembedded concepts, there is much more sense in tracing back and describing phenomena through arrangements of the elements that produce the state of affairs under investigation (Nicolini & Monteiro, 2016). Hence, theorising should be understood as the effort to enhance our understanding of the phenomenon based on the accumulation of contextual specificities rather than the creation of abstract categories and causalities (Becker, 2014). As Heuts and Mol (2013) propose, a rich theoretical repertoire is obtained from exploring together ever shifting cases and learning from their specificities.

Embracing a practice-based approach rethinks completely the role of theory. Indeed, in practice-based approach theory is a device to grasp and represent the social world. It is a necessary tool for navigating the world of uncertainties, without constringing it by existent theoretical concepts, but at the same time not getting lost. Therefore, a theoretical framework is a necessary "infra-language" that let facts and practices speak for themselves. Without this infra-language, we risk to collect empirical regularities without understanding the fundamental whys and hows (Lounsbury & Beckman, 2014; Latour, 1988).

Given these premises, I can't actually speak about theory building in this research. Instead, I can define my theoretical mode as "particularization". I had no intention in establishing causal relationships, as according to my epistemological lenses this would be too "simplistic" in the face of the complexity of the phenomenon (Stake, 2005). Thus, the aim of my theoretical contribution is to provide "thick description" of the phenomenon of DT, and to demonstrate how the organisational context imbues human actions with meaning.

The methodological strategy of the case study was particularly appropriate for this mode of theorizing, as it permitted to understand the uniqueness of the context in its wholeness

(Stake, 1995). Indeed, this way of using case studies is called "interpretive sensemaking", and it constitutes a long lasting tradition of research (Welch et al., 2011). Case researchers in this tradition argue that the scientific idea of *erklären* (explaining an action by attributing it to exogenous causal factors) should be replaced by *verstehen* (understanding an action through the actor's subjective experience of it) (Johnson & Duberley, 2000). Lincoln and Guba (1985) suggest that case studies are well suited for understanding of human experience, because they enable the rich contextual description essential to such understanding.

The choice of "particularization" theoretical mode is also more preferable for connecting research with practice (Sandberg and Tsoukas, 2011). It provides practitioners with rich representations of practices, activities, tools, so that they can see through conventional modes and reflect upon alternative modes. Indeed, thick contextual descriptions open up the world of possibilities beyond what is currently accepted as "normal" and enhance the abductive learning. Practitioners can take hints from rich concrete examples, interrogate their own practice, and refine it (Eikeland and Nicolini, 2011).

Notes on the quality of the study

As long as interpretivist positions are founded on the theoretical belief that reality is socially constructed, we should admit that there can be multiple, valid claims to knowledge, and the researcher's relationship to knowledge is also essential. As suggest by scholars, a set of completely different quality criteria are needed to evaluate an interpretivist research (Guba and Lincoln 1994; Korhonen and Kaarela 2015). For this study, the model for ensuring trustworthiness included four criteria: credibility, transferability, dependability, and confirmability (Guba, 1981; Symon & Cassell, 2012).

CREDIBILITY

If the positivist research uses internal validity to refer to the systematic error, the interpretivist research proposes the criteria of credibility to ensure that the study measures or tests what is actually intended. Credibility criterion answers the question "How congruent are the findings with reality?" (Merriam, 1998). In this study, I adopted a series of techniques to gain confidence that the study accurately records the phenomena under scrutiny.

First of all, I gave preference to well recognized research methods in order to incorporate correct operational measures for the concepts being studied. The questions for the interview were constructed basing on the best practices in the field. For instance, I took inspiration from works of Wrzesniewski & Dutton (2001). As long as the interviews were hold in a foreign language (i.e. English) for both parties, I practiced active listening and paid a special attention to the words. My 10-year long experience as an interpreter was helpful in conducting these interviews. In case of doubts, I reformulated phrases and asked

for approval, or I asked synonyms and variants of translation. In order to gain contextual knowledge and develop familiarity with the culture of IBM before the research project took off, I studied web, documents, watched available videos, and had informal talks with some people from my personal network who in past worked in IBM. The "prolonged engagement" with participants was not possible because of organizational issues, however most of the interviews were held close to the lunch time, therefore I took the occasion of eating in a canteen for informal talks with participants (Lincoln & Guba, 1985; Erlandson et al.,1993).

As Hamel et al. (1993) emphasized, the appropriate sampling tactics is important if the researcher is to be confident that informants are typical of members of a broader society. Hence, in order to triangulate data sources and hear multiple voices, I paid attention to include in a sample people who could be positioned on two extremes of a continuum: DT evangelists and DT skepticists, young and older professionals, interns and managers. The main sample was constituted by people from IBM Italy - Segrate (16). To triangulate the sites and reduce the effect of particular local factors peculiar to IBM Italy - Segrate, people from IBM USA - Austin (2), and external experts (3) were involved. The triangulation of methods was also foreseen by the research design. Specifically, a combination of interviews, digital ethnography, desk research, and mobile ethnography. This triangulation effort is the expression of Dervin's concept of "circling reality", which she defines as "the necessity of obtaining a variety of perspectives in order to get a better, more stable view of 'reality' based on a wide spectrum of observations from a wide base of points in time-space" (Dervin, 1983).

For what was possible, I did an attempt of "triangulating" me as a researcher: I discussed my findings and assumptions with my supervisors and colleagues, to bear in their experiences and perceptions. I also did member checks by asking feedback from participants on the accuracy of interview transcriptions, and tried to enhance my formative understanding by discussing early results with some IBMers (Van Maanen, 1983). The intention of this study is not to invent the wheel but to attentively examine previous research efforts and assess the degree to which my findings are congruent with those of past studies. Therefore, in the discussion part multiple examples of similar studies are reported.

TRANSFERABILITY

The interpretivist research doesn't search for generalizability, as its epistemological position admits that findings are relevant only for a particular context. Erlandson et al. (1993) note that even conventional generalisability is never possible in naturalistic studies. Other scholars suggest that, although each case may be unique, it is still an example within a broader group of cases, therefore the prospect of transferability should not be immediately rejected (Stake, 1994; Denscombe, 1998). In this research, I recognize the importance of the contextual factors which impinge on the case and admit that similar

contexts can reproduce similar reality. Hence, the external validity of this research is assured by sufficient details about the research situation so that readers can judge to which other contexts the findings could be relevant (Merriam, 1998). My responsibility as a researcher was to ensure that sufficient contextual information about the fieldwork site is provided to enable the reader to make such a transfer from "sending" to "receiving" context (Firestone, 1993).

As multiple scholars underline, there is no shared understanding of what actually "thick description" of the phenomenon means (Guba, 1981; Firestone, 1993). The selection of what is important to report is up to the researcher, however in the writing phase I was using suggestions by Denscombe (1998) and Pitts (1994) to correctly describe the boundaries of the study (e.g. people involved, time and duration of data collection, study location, type of interaction).

The IBM case was particularly rich in offering me insights on "multiple environments" in which the phenomenon takes place. For instance, many of the participants have passed periods abroad (USA, UK, Germany), and they frequently referred in their narratives to those experiences, shared their observations of foreign colleagues, and made comparisons. However, as a researcher, I also asked myself about the transferability of the findings, therefore in the explanatory stage of the research I interviewed 3 external experts. Due to the ethical reasons, the scope of these interviews wasn't to discuss directly the finding from the IBM case, but to check assumptions regarding the transferability inferences. The three interviews explored the same units of analysis, but were aimed at collecting multiple perspectives on them. The experts were: CEO of a design consultancy company, HR practitioner in company X in charge of DT space, and a workplace strategist from a strategic consultancy group.

Of course, staging studies with the same protocol in different settings might enable a more inclusive, overall picture on the phenomenon. Some scholars posit that the real understanding of a phenomenon is gained only through several studies, rather than one major project conducted in isolation (Pitts, 1994; Borgman, 1986). They also propose that, whenever different investigations offer results that are not entirely consistent with one another, this may reflect multiple realities. As Dervin puts it, every contradiction, inconsistency, or diversity is not an error of transferability, but an occasion for abduction-driven research (Dervin, 1983). Asking what accounts for difference in different time-space conceptualizings may unveil interesting insights on the dynamic nature of the phenomenon.

DEPENDABILITY

The positivist employs the criteria of reliability to show that, if the study were repeated, in the same context, with the same methods and with the same participants, similar results would be obtained. In interpretivist study, the idea of changing nature of the phenomena

renders such provisions problematic (Fidel, 1993; Marshall and Rossman, 1999). Therefore, in interpretivist research, the researcher provides an audit process that tracks and accounts for changes in the methodological process. The dependability criterion is called to create awareness on the articulation of choices and interpretations that the researcher makes during the inquiry process, as well as to show evidence of taking responsibility for those choices.

In this study, my effort was to be transparent with methodological choices and to propose to a reader a "prototype model" of the study. In the Appendices, all research materials can be found. The illustrative schemes in the methodological section are used to show a clear logic and sequence of choices. Moreover, according to suggestions of Lincoln and Guba (1985), the intellectual audit trail technique was used to illustrate the dependability of the study. In the following table, the reader can see the course of development of the study and take account of my strategic and methodological decisions.

Table 8 Intellectual audit trail of the study

	Philosophical position	*Research design*	*Data collection*	*Data analysis*	*Theoretical mode*
Questions and doubts	At the beginning, my intention was to use critical realism paradigm, but this paradigm doesn't propose valid methods for studying the phenomenon as for today.	I had a doubt whether multiple case study would be more appropriate, but IBM case is so unique, that it is almost impossible to find any other organisation that can be comparable.	My initial intention was to include observations among research methods; unfortunately, it was not possible due to organisational issues.	At the beginning, my intention was to conduct the research in a theoretical vacuum, as grounded theory proposes. After first interview analysis, I felt I needed some frameworks to proceed further.	My initial intention was to create a model of innovation dynamics and show how DT fits in, but I realized I don't have enough evidence to sustain it
Rationale for the final choice	Interpretivist paradigm is more apt for the construction of the DT concept based on people's meaning and organisational practices, and for capturing the contextual depth	A single case offers the possibility to go in-depth and blend different contexts; this perfectly fits the aim of refining and expanding the DT concept	The observation part has been substituted by a mobile ethnography project. This was a way to overcome the research constraint.	Grounded theory was used only as a methodology for coding, but there had been a continuous iteration between existent theory and data.	Creating links with the existent literature and argumenting their relationship is a better strategy for the future development of the field

CONFIRMABILITY

In order to enhance the objectivity of the findings and to permit the reader to make his/her

evaluations, I tried to ground my conclusions in data by showing where the data came from and how they were transformed into finding. Miles and Huberman (1994) consider that a key criterion for confirmability is the extent to which the researcher admits his or her own predispositions. Moreover, to ensure that findings are the result of the experiences and ideas of the informants, rather than my characteristics and preferences, I try to explicitly declare assumptions underpinning my reasoning in the analytical stage of the research.

Throughout the text the reader will find citations and raw materials, that support my reflections. Moreover, in the following data-oriented audit trail, the reader can see how the data was gathered and processed during the course of the study, and take account of my theoretical and analytical decisions (Koch, 2006).

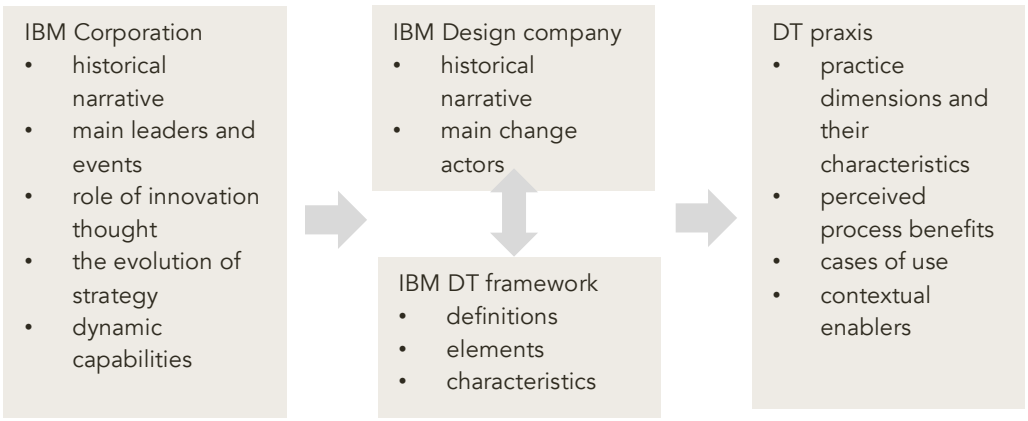


Figure 16 Theoretical audit trail

PART IV. FINDINGS

Good design is good business (Thomas Watson, Jr., IBM's second president)

IBM Case: background and context

IBM is one of the biggest technology companies in the world, which operates in the field of information handling. As of 2016, IBM counts for more than 380,000 employees and is present in over 170 countries. Established in 1911 in the USA, IBM that at that time was called CTR (Computing-Tabulating-Recording Company), quickly gained a dominant position on a technology market. Throughout these years, IBM managed to expand significantly and remain highly innovative. Most of the IBM's products have been designed and developed to record, process, communicate, store and retrieve information. IBM offered to the society such technologically advanced devices as: tabulating machines, RAMAC disc storage unit, IBM Selectric typewriter, floppy disc, IBM personal computer, ATM machine, Watson computer. In mid 80s, the company covered 40% of all computer industry sales (Harreld, 2007). Since mid 90s, the company has entered the IT service market. If in 1911, IBM had $800 thousand in net income, in 2010, company's net income counted $14.8 billion.

100+ YEARS OF HISTORY

At the beginning, CTR was a merger of three manufacturing companies, conducted by Charles Flint. Mr. Charles was known as a "father of trusts", as he acquired about 21 companies. As he got interested in computing business, one of the most promising acquisitions was Hollerith company, that at that time was working on a tabulating machine. Notwithstanding high expectations, the business didn't go high immediately. It motivated Mr. Charles to hire Mr. Thomas Watson Sr. to run the company – the move that later has shown to be well-chosen. During the years when Mr. Watson Sr. was in tenure, he increased by one hundred times the annual revenues from the tabulating machine business.

Mr. Watson Sr. brought an explosive growth to IBM and literally created the information industry. He focused the resources of the business on tabulating machines, as he was convinced that IT will have a bright future. In 1924, he renamed the company in

International Business Machines (IBM), under which it is known today. Under his leadership, IBM started to enter foreign markets, e.g. Brazil in 1917, Japan in 1925, China in 1928, Spain in 1941, Thailand in 1948, India in 1951 etc.

When during the Great Depression (1930s-1940s), main IBM's competitors were closing down their businesses, Mr. Watson Sr. decided to keep the production open to gain benefits when the economy recovers. Indeed, when in after-Depression period, IBM received a big government contract, and managed to fulfill it only due to the large product stocks. During the Great Depression, Mr. Watson Sr. also dedicated resources to research and innovation. In 1932, he created a new division for research and development in engineering. When the economy was up, this was the slingshot that allowed IBM to utterly dominate the IT industry for the next 50 years.

Mr. Watson Sr. influenced the IBM's culture and made it employee-centered. Indeed, IBM was one of the first companies in the USA, who hired people with disabilities, created training programs for employees, introduced 40h working week, offered group life work insurance to employees, introduced paid vacations, etc. Such IBM's people policies significantly influenced the whole idea of employees' management. Another important Watson's Sr. impact on the company was his "THINK" moto, that he used as an invitation to be more reflexive. According to Mr. Watson Sr., "the trouble with every one of us is that we don't think enough. We don't get paid for working with our feet — we get paid for working with our heads". Now the motto is so deeply embedded into IBM's culture, that we can find it in all IBM's products and initiatives. For instance, IBM named its laptop computers ThinkPads, named the line of business-oriented desktop computers ThinkCenter.

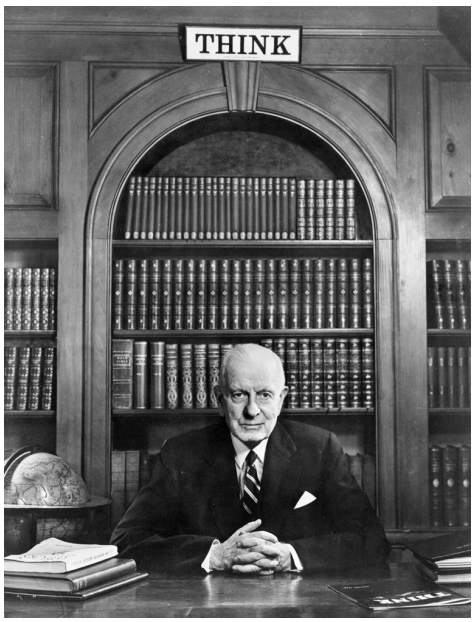


Figure 17 Thomas Watson Sr.

In 1952 the son of Mr. Watson Sr. took his place, Mr. Thomas Watson Jr. His ascension to CEO marks the IBM's transition to a modern corporation. He made the company a formidable technological and commercial engine, and gave IBM its international dimension. Under his leadership, the company has consolidated its position on a global market (e.g. Singapore in 1953, Egypt in 1954, Hong Kong in 1957 etc.), and became a multi-national "IT business behemoth".

Mr. Watson Jr. had also an important impact on the company itself. He created corporate management practices, and compiled unwritten IBM philosophy and behaviors into policies and procedures. He actively promoted learning and innovation focus. Indeed, under his supervision, research laboratories were build up. Due to the IBM's excellence, the company managed to establish a variety of partnerships. For instance, it played a crucial role in air space programs launched by NASA.

In the years of Mr. Watson Jr.'s tenure (1952–1971), the innovative products of IBM have revolutionized some industries, e.g. magnet stripes had a huge impact on retail industry etc. Under his management, IBM faced a remarkable growth: if in 1957, the company made $1 billion revenues, in 1971, the revenues were $7.5 billion. For the impact he had, the Fortune magazine called him "the most successful capitalist who ever lived" and Computerworld named him one of the 25 "people who changed the world".

After Mr. Watson Jr., Vincent Learson (1971-1973) continued with the strategic direction in the mainframe computer market. IBM continued to maintain dominant position on the market and, in those years, was litigating the massive anti-trust suit filed by the Justice Department. Later, Frank T. Cary (1973-1981) guided IBM in period of rapid growth in product, revenue and profit. His most notable accomplishment was recognizing that the personal computer was going to be an emerging product category, and that IBM was completely missing the fast-growing minicomputer market. Consequently, he forced the creation of a dedicated group. This line of work continued during the tenure of John Opel (1981-1985), until IBM launched the first IBM Personal Computer in 1981. IBM had tremendously talented people. Indeed, the research done in IBM laboratories expanded the scientific boundaries with five IBM researchers sharing three Nobel Prizes of 1973, 1986 and 1987 in physics. Yet, when John F. Akers (1985–1993) became CEO, IBM was showing first signs of inefficacy. The PC revolution dramatically undermined IBM's core mainframe business, and revenues were going down.

MID 1990S NEAR-FAILURE AND THE LEGENDARY TURNAROUND

At the beginning of 90s, IBM went through tough times. It underestimated the power and the speed of emerging competitors, but also didn't react readily on emerging trends. The market of business computing was changing, e.g. there was a shift to smaller and open systems, a traditional computer value chain was disintegrated. As a result, serious financial

problems came in, with a loss of $5.0 billion on revenues of $64.5 billions in 1991 (Garvin & Levesque, 2005). Hundreds of thousands of employees were downsized. The stock prices on IBM shares drastically fell. For many Wall Street analysts, it was the end (Harreld, 2007).

These difficulties gave impulse for the company transformation, with the arrival of a new CEO Louis Gerstner (1993-2002). He spoke to different stakeholders to analyze what did not function. IBM's matrix structure was too complex to allow the company react quickly to market changes, processes at well-established business lines were too rigid to pick up new opportunities, initiatives for internal growth faced significant budget constraints etc. On the other side, the company was full of smart and talented people, there were necessary resources to continue to grow, and there were multiple ideas in "file drawers". Yet the company failed on executing those ideas and strategies.

Mr. Gerstner created a recovery plan to stabilize the situation. For this, he reorganized the company, cut expenses, but most importantly introduced the new principle of customer-centricity. Putting a customer in the center of the business meant that the whole culture together with long-standing business model needed to be changed. It was an ambitious task for a multinational company with thousands of employees. Mr. Gerstner has also changed the strategic direction of the company. He understood that in times of different software types, that run on different platforms, customers would soon need integrated software solutions. Hence, IBM salvation might be shifting from producing hardware to providing solutions. The newly established direction was to become a world-class service company in IT sector. This was the most significant strategic change since the establishment of the company.

For becoming a learning organization, Mr. Gerstner reorganized strategic processes in the company and made general managers main actors in this process (Harreld, 2007). In the "IBM Leadership Model", he created a path to make a link between strategic planning and execution. The trigger for the strategic change shouldn't have been a planned strategic meeting, but a perceived gap between the market and the organisational performance. In formulating a strategy, there should be four main streams of thought and action. First of all, determining company's intent to go in a concrete direction and address a certain goal. Then, gathering facts about the market (e.g. customer needs, technology developments, competitors' behaviours). Then, challenging the status quo and addressing creatively possibilities for change within given resources (e.g. new products and services, new ways of working). Finally, defining the business design by selecting customer groups to target, describing the value proposition and ways to capture it.

When the phase of strategic formulation is closed, it's time for assessing organisational resources and verifying whether the strategy is possible to execute or whether changes should be done in order to fulfil it. First of all, critical tasks are analysed to specify key

success factors which are necessary to deliver activities outlined in business design. Then, company capabilities and skills are analysed to verify whether they can guarantee the execution of critical tasks. Then, climate and culture are assed. Finally, the formal organisation (e.g. structures, metrics, rewards) is checked to assure that the strategic context is appropriate.

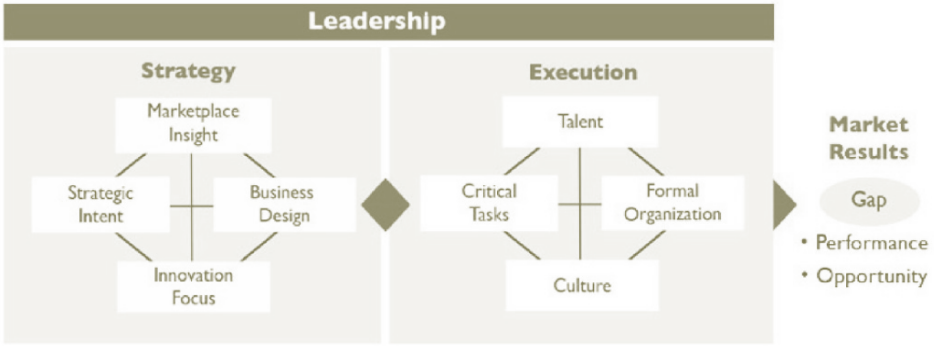


Figure 18 IBM Leadership Model (retrieved from Harreld, 2007)

To translate this model into life, a series of initiatives were introduced. For instance, teams of executive functional leaders and cross-sectional general managers started to meet on regular basis. A number of teams were built to guarantee higher efficacy for each stream of strategic activity (e.g. strategy teams for adjusting strategical initiatives, technology teams for assessing market readiness for new technologies, integration and value teams for winning plays initiatives). Team workshops called "strategic leader forums" were held to discuss a specific problem or opportunity. They were learning sessions about company's future and covered a deep-root cause analysis and a specific action plan. Corporate investment fund was developed to provide funding to the most promising ideas.

To guarantee that the innovation effort could be translated into business, IBM established the program of "Emerging business opportunities". It covered a set of processes, incentives and structures designed explicitly for identifying and realizing emerging business ideas. The company has recognized that mature business lines need to operate differently from the emerging ones. Thus, for new opportunities, separate organisations were created with their own leaders and funding. They worked not according to the traditional KPI system, but a new system based on reaching milestones. Senior management was rigorously overseeing all such initiatives in order to ensure that the starting of businesses gets sufficient resources. Whereas some of such start-ups failed, others have succeeded and were added to existing production lines. The agility of the company increased, and new ambidextrous approach showed great success. Indeed, the financial results constantly improved and proved the effectiveness of the undertaken approach. From 1993 to 2002 IBM's market cap increased from US$29 billion to US$133 billion.

Gerstner's successor, Mr. Samuel Palmisano (2002-2011) continued IBM's transformation. His ultimate goal was to reestablish IBM as a world class service organization. He pushed the company even more fiercely towards services industry. Palmisano's strategy represented an audacious effort to increase market share and margins. He eliminated production of low margin hardware, for example PC business was sold to Lenovo in 2005. In software and service the company built its expertise mainly on acquisitions of smaller companies. Thus, from 2003 till 2007 IBM spent $11.8 billion on 54 acquisitions (i.e. 36 software and 18 service companies), which allowed to transform company to a global service corporation.

At the beginning of 21st century, IBM was consistently profitable and even passed Microsoft in its stock market valuation in 2011. Mr. Palmisano has also left his imprint on the company's culture. Under his guidance, company values were re-examined. In a 72-hour discussion on the Intranet, employees were asked questions on IBM's valued and demonstrated the shift in cultural orientation. Main selected values were: dedication to clients' success, innovation for the company and the world, and trust combined with personal responsibility for the world.

In 2011, the leadership in IBM shifted to Virginia Rometty, who in her strategy concentrated on three business imperatives: (1) cloud computing, (2) mobile, social and security efforts, and (3) data analytics. According to her view, these are the biggest disruptions in the technology service industry, therefore these topics will be in focus for many IBM's customers. Preparing for the changes, IBM has trained each of 100.000+ consultants in the areas of potential growth. Concentration on these three selected imperatives led to a double-digit growth in these areas. Even if these revenues did not compensate for profit declines in other departments, and the company started to show lower financial earnings, the general strategy is more long-term. Indeed, the priority of the moment is on building dynamic capabilities and preparing the strategic and organizational context for these businesses.

The turn toward design

Since 1990s, numerous acquisitions of software companies were done by IBM. As the IBM company was making big strides in domains of cloud and cognitive computing, the top management realised that business success in these sectors must draw inspiration from the human experience viewpoint. For years, IBM teams were characterized by a very technology-driven culture, while the new market situation required major attention dedicated to customers. Customers are maturing in their understanding and use of technology, and such technology savviness goes side by side with the growing request of incredible user experiences.

When in 2009 IBM acquired Lombardi Software, a design-driven software company, it has become a turning point for changing the company ethos from process-oriented toward design-oriented. The projects, that ex Lombardi teams were working on, showed outstanding results and higher customer acceptance. In 2012, incoming President and CEO Ginni Rometty decided the company's products and solutions should have greater emphasis on customer experience. It was a clear signal: IBM should take inspiration from Lombardi's ways of working and extend the user-centered design to the whole company.

In 2013, the IBM Design company was created. It united a team of design evangelists whose goal was to shepherd the initiatives of design transformation. It was clear to everyone that such intent is rather ambitious. First, the IBM company is a $80 billion revenue company, with a portfolio of well-established products and customers; thus, the design transformation should take account of the legacies to set an evolutionary path for the organizational rejuvenation. Second, IBM is a giant, with 400.000 people employed, and bringing them all onboard will take time and much effort. The IBM Design team worked on a comprehensive design program, which was sustained by the top management. In 2014, the IBM top management announced they would invest more than $100-million in an effort to become more design-centered corporation[7].

The IBM Design team gathered people both inside and outside the company in order to lead the change. Phil Gilbert, formerly President of Lombardi, played an important role in helping IBM break with the engineering past, usher in new processes and practices, and initiate a cultural change. At the beginning, he led IBM's Business Process Management group, but in 2013 was appointed a general manager of the newly created IBM Design company. In his role, he sets the strategy for and leads the transformation of product design at IBM. In years, IBM Design team continued to grow both in numbers and in visibility. The main pillars of the IBM Design company are four: design philosophy and language, people practices, workspaces, work organization. Except these change management initiatives, they are also supposed to support key projects and, through a partnership with Global Business Services, evangelize the change efforts across the organization and IBM's clients.

Three years after launching the IBM Design program, IBM has decided to launch the role of Distinguished Designer. Since 20 years, IBM has an established role of Distinguished Engineers to highlight engineering effort critical to IBM's success. The intention of Distinguished Designer initiative was to invigorate the company's tradition to recognize important contributors of IBM's success. To become an IBM Distinguished Designer requires ample evidence of IBM and industry-wide impact and eminence. As for today,

[7] Source: "IBM Commits $100 Million to Globally Expand Unique Consulting Model That Fuses Strategy, Data and Design," IBM press release, March 27, 2014.

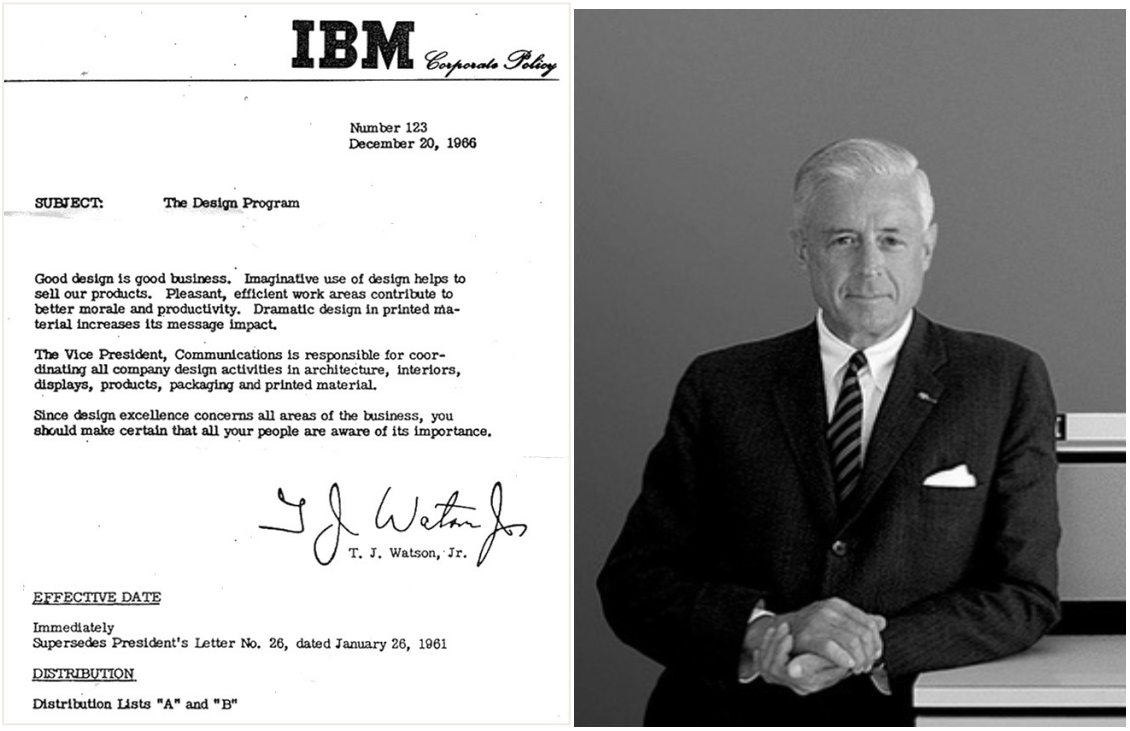
IBM has three Distinguished Designers: Doug Powell, Adam Cutler and Charlie Hill. Doug Powell guides the IBM Design Education + Activation program and develops the global IBM Studios project. Adam Cutler is responsible for IBM Design practice and drives IBM's cognitive design agenda. Charlie Hill is responsible for Design Transformation and guides the effort of aligning user needs, technical innovation, and market opportunity.

THE DESIGN PHILOSOPHY AND LANGUAGE

In embracing the future, the design team decided to invoke the past. Indeed, IBM has a long design heritage, and it served as a big inspiration for the new design team. Back in 1956, IBM was the first large company to establish a corporate-wide design program. In that times, Thomas J. Watson Jr. asked renowned architect Eliot Noyes to become the first head of design at IBM. Eliot Noyes gathered a group of designers and architects, who worked with IBM in 1950s-1980s. Just to name some of them, Charles and Ray Eames, Eero Saarinen, Paul Rand, Ludwig Mies van der Rohe. All of these outstanding people has left their creative imprints on IBM graphics, products and architecture.

The first version of the IBM Design program has been maintained for 20 years. Later, designing practice has always been around, designers have always worked in IBM, and were highly valued. Yet, they were quite invisible in the eyes of others. In 1993, Karel Vredenburg introduced to the company the User-Centered Design (UCD) approach. It focuses on designing a compelling total customer experience - everything a customer sees, hears, and touches about a product or system. A team of experts at IBM, especially Scott Isensee and Carol Righi, continuously worked with Karel Vredenburg to improve the first version of UCD. Later Karel, Scott and Carol published a book based on their collective experience (Vredenberg, Isensee, & Righi, 2001). The updated version of UCD was used in 2000s to approach product design and consulting projects in IBM. In 2013, when the new IBM Design company organization was born, Karel Vredenburg was nominated IBM design director.

The second wave of IBM Design Program in 2012 was aiming at celebrating the “design heritage”, but at the same time giving it fresh meaning. If in 1950s, T. J. Watson Jr. looked to the “imaginative use of design”, the idea of IBM’s design renaissance is radically different: everyone in IBM should embrace designerly ways of thinking in all IBM’s software, hardware and services efforts.



IBM Corporate Policy

Number 123
December 20, 1966

SUBJECT: The Design Program

Good design is good business. Imaginative use of design helps to sell our products. Pleasant, efficient work areas contribute to better morale and productivity. Dramatic design in printed material increases its message impact.

The Vice President, Communications is responsible for coordinating all company design activities in architecture, interiors, displays, products, packaging and printed material.

Since design excellence concerns all areas of the business, you should make certain that all your people are aware of its importance.

T. J. Watson, Jr.

EFFECTIVE DATE

Immediately
Supersedes President's Letter No. 26, dated January 26, 1961

DISTRIBUTION

Distribution Lists "A" and "B"

Figure 19 T.J. Watson Jr. letter on the importance of design in IBM

The mission of IBM Design is to delight customers by and pursuing better fit with their needs and by using for this goal all of the considerable skills within the company. That's why IBM Design has articulated it vision statements in a trilogy "Works Together" (i.e. customers want IBM products and services to work together to solve their problems), "Works the same" (i.e. customers want to have the same "look and feel" when they interact with IBM products and services), and "Works for me" (i.e. customers want IBM products and services to meet and exceed their expectations.)

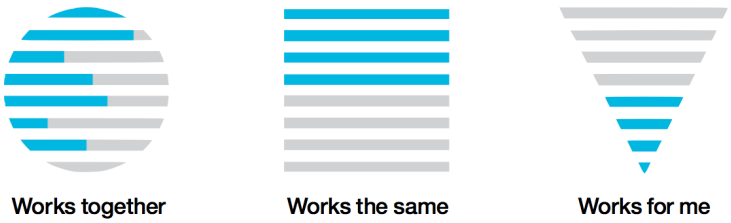


Figure 20 The new design philosophy in IBM

Yet, in order to make the mission more tangible, a new language was necessary to make two "worlds" – technology and design - communicate together. For this reason, the IBM Design team has developed a set of libraries and guidelines in the form of IBM Design Language. The goal was to promote "unity not uniformity", which leaves room for creative experimentation within the established boundaries. Then, training and communication initiative also play an important part in ensuring that a common language is applied and proliferate across the company.

PEOPLE PRACTICES

In pursuing the change, the IBM Design team realized that the IBM population workforce demographics had to change. They set up the ideal ratio would be 1 designer to 8 developers. In 2012, when the design program was launched, the ratio was 1 designer to 72 developers. For closing this gap, the company decided to hire more than 1000 design talents within a 5-year period. The figures to hire were mainly of 5 design disciplines: visual designers, user experience designers, industrial designers, user researchers, front-end developers. These new professions are characterized by T-shaped skills and human-centered mindset.

The IBM Design team has intentionally decided to fill two-thirds of its "design population" with new graduates. This strategy was aiming at attracting new generations with very fresh perspectives on the world and on the profession, giving them the possibility make their experiments, but within established processes and structures. On the other hand, the IBM Design team realized that dropping a bunch of designers into existing teams wouldn't be enough, and a bundle of people practices was necessary to accompany this "rejuvenation" process.

For this reason, a program of hiring, onboarding, and training initiatives was launched. IBM Design has created a group of dedicated recruiters focused on scouting design talents. They seek senior professionals for leadership positions, and recent graduates for operations. At the beginning, the history of design in IBM was used as a means of talents attraction, while later the IBM Design Program has gained enough popularity to generate its own interest.

The Design team is perfectly aware that it takes years to grow mature teams, and that the fruits of the hiring campaign won't be visible soon. Yet, they dedicate much effort to onboarding initiatives, and to training IBM's entire workforce on designerly ways of working. In order to guarantee that the maximum effort can produce maximum results, the Design Academy has been established to deliver the program of "IBM Design Education + Activation":

Table 9 The IBM Design Education + Activation Program

Format & target	*Duration*	*Main goal*
Design camps for executives	1 day	To make executives understand their role as patrons/leaders/advocates of IBM DT, to show the executives how to work with their teams using DT framework and language
Design camps for product managers	2 days	To make product managers understand their role as patrons/leaders/advocates of IBM DT, to align DT practice and product management within a continuous delivery cycle
Design camps for product teams	5 days	To offer to interdisciplinary teams the possibility to practice DT, to experiment with new mentality and hands-on activities in a protected

		environment
Maelstrom Internship Program	10 weeks	To introduce new hires to the IBM world, to make them work together in a team on different types of projects: micro-projects, personal projects, ongoing projects
Designlines Webcast	ongoing	To reach IBMers around the world, to make them participate in online conversations with practitioners and experts, to share best practices and answer questions.

It worth underlying that the IBM Design team measures the impact of the hiring efforts not on the number of hires but on the retention rates. For retaining the talents, it created a career path for designers within IBM, that was infused in the HR system. In past, designers have also been seen as part of operations, and had no possibilities to join the strategic apex. Now, the career path for designer could lead up to the highest echelons of the company. Moreover, the performance reviews for them were done by managers, who were not aware of the characteristics of the design practice. Thus, the IBM Design team introduced a board of professionals to conduct the performance reviews. It also keeps collaborating with the HR department to trace the development paths of new designers after they have joined the product teams.

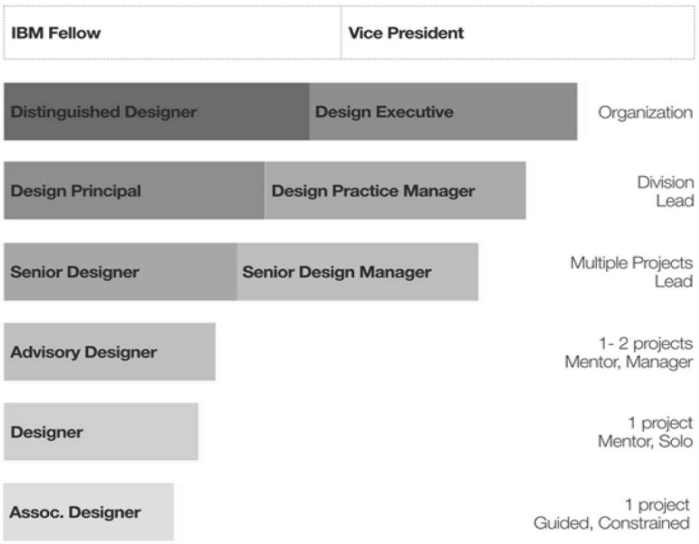


Figure 21 Career path for designers in IBM

WORKSPACES

As in the organizational chart, IBM Design company stands separately from the business units, it needed to have a cultural home of the IBM Design program. That idea was to create IBM Design Studios as supportive hubs for teaching and training design talent, cultivating their careers, and helping product teams to enter in contact with the new ways of working. The first, original, Design Studio has been opened in November 2013 in Austin, Texas. As for today, IBM has built 42 design studios around the world.

The layout and functionality of design studios has been carefully studied, also with the intent to use create a template and roll out other studios around the world. The walls of the studios display in a transparent way different design tools, so that everyone can see and give feedback on them. There are large gathering spaces, flexible work areas, and adjustable desks to permit creative brainstorming and teamwork. IBM has collaborated with Steelcase to develop custom, easily movable whiteboard walls and panels, in order to enhance visualization and reflection. There's a special attention to the functional devices (e.g. stationery, 3D printers, 60-inch monitors). There are also informal spaces, e.g. a kitchen, a ping-pong table.

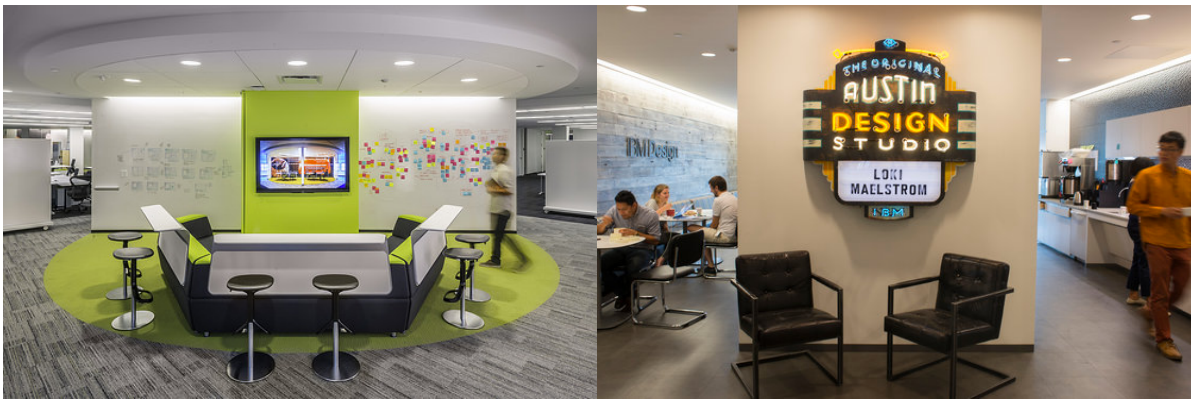


Figure 22 The original IBM design studio in Austin, TX, USA

When the first design studio was opened, Adam Cutler and his team built around the concept of semi-autonomous design teams working in close proximity. But as the space started to be used, teams continued to re-arrange the space in a manner that Adam Cutler and his team could hardly imagine. Therefore, they switched their strategy toward creating a circulatory flow of the studio. Instead of creating a defined template, the effort was directed toward optimizing for possibilities and permitting a self-sustaining culture of curiosity and collaboration. In this sense, the IBM Design Studios serve also as prototypes for what the rest of the IBM offices might be in the future.

WORK ORGANISATION

After the launch of the IBM Design Program, designers were intended to join established product teams to work on software and hardware, or in consulting services via the IBM Interactive Experience (IBM iX). As the design process in IBM occurs in a very complex organizational environment, a set of manageable and sustainable work formats was necessary for people at all levels. The goal of IBM Design team was also to create links between problem solving and solution execution in real projects.

Some of design projects are initiated from future visioning and exploit the fresh perspective brought in by designers. For instance, during incubator sessions, newly hired designers define the user problem to be solved, and the product management (or "offering management" in IBM's parlance) use these findings to rethink existing project portfolios and to refine the overall activities road map. In some cases, the existing projects in pipeline are re-written in new language, and whenever some of these are found out to work on same problems, they may be combined into a new one, or a linked to feed one another. Just to make an example, IBM's new Bluemix cloud development platform was conceived in this way.

Since the beginning of IBM Design program, new hires have contributed to create real projects to target key business imperatives. Some of these projects ("Signature Projects") are selected as strategic, so they are sustained by IBM experts and investments. Other projects are developed according to "do-it-yourself" philosophy ("Hallmark Projects"). The Hallmark program today is made of 100 projects, which is available to all teams that meet specific criteria: using IBM Design Thinking practices, conducting open meetings, allocating a certain number of designers in the team, attending a 1-week Designcamp. In this case, projects are initiated by young designers, who continue working on them together with product teams. Designers focus on the new customer experience, while product teams focus on how it gets implemented.

As the day-to-day collaboration between designers and product teams is a hazardous effort, a series of new practices were introduced to create a common platform. Each team was given the possibility to find its own unique way to combine talents. Moreover, IBMers may apply to internal projects in a way that complies with their utilization rate. This is a mechanism of flexible job design: people can give up some of the things that they don't like in their job, and go deeper on the things they're more capable and desirous of doing. This makes everyone more valuable to the team, and the teams perform higher, with happier people.

IBM Design Thinking framework

The IBM Design team has put a lot of effort into promoting the design philosophy and language within the company. Yet, they were aware that in a 400.000 employee company, only a small percentage will actually work as designers, while the majority of employees will continue doing their job as they have always done. Thus, to make different organizational functions fruitfully work together with designers, not only the culture but also the practices should change. For this reason, a series of DT practices were studied by the IBM Design team and published online as the "IBM Design Thinking framework". The main goal of IBM DT framework was to help IBMers understand people's needs, form innovation intent, and deliver outcomes at speed and scale. The invitation of the IBM DT framework is to learn from designers' way of working. The IBM Design team defined

design in this way: "design is the purpose, planning, and intent behind an action, fact, or material object. In other words, design is the intent behind an outcome."

Creating IBM DT framework was functional in different ways. First of all, normative, because it's the way for creating a shared understanding of DT, with a series of standard principles, tools, and practices. Second, pragmatic, because it's the way to move people from the domain of knowledge to the domain of application by providing tools, instructions, and take-back tips. Third, motivational, because it is intended to motivate the DT application by showing success cases. Finally, it is as an instrument of corporate storytelling, as the framework is publicly available and can be easily retrieved by customers as well.

In order to reach big audience, IBM DT framework was also published as a field guide and distributed through the corporate intranet W3, along with a series of communication initiatives. IBM DT framework starts by bringing together a series of traditional design techniques and tools (e.g. personas, empathy maps, scenarios, 2x2 matrices), but goes further with particularization. On top of traditional techniques and tools, the framework regard 3 extra topics: DT principles, DT behavioral model ("loop"), and DT practices ("keys).

Figure 23 IBM's Design Thinking Field guide and poster

The role of DT principles is to instill a new culture. They should frame the way IBMers problems and regard three main points: focus on user outcomes, work in diverse empowered teams, and restless reinvention.

Figure 24 The three principles of IBM Design Thinking framework

The IBM Design team invites teams to consider their values and make users their north star, i.e. "focus on user outcomes". As the IBM Senior Vice President Bridget Van Kralingen puts it, "The last best experience that anyone has anywhere, becomes the minimum expectation for the experience they want everywhere." Hence, teams should align around user needs, measure success on the value they bring to users, and involve them in the work. "Restless reinvention" means treating everything as a prototype. Because fundamental human needs don't change, but only the ways we address them change. Hence, any innovation is just another iteration. Seeing everything as just another iteration empowers IBMers to rethink solutions to even the oldest problems. By "diverse empowered teams" a new culture of teamwork is intended. To be fast with development, teams should be able to quickly share insights or ideas, decide quickly whether to reject or commit to them, and collaborate in real time. This requires a shift in mindset: trust, respect, and empathy amongst team members. It also requires putting the team objective higher than personal own.

The company's version of DT centers around "the loop." The loop is an infinity symbol punctuated with four dots: the yellow dot represents the user, the green dots represent the various actions of "observe," "reflect," and "make." The loop represents the process of solution creation, which idealistically begins with user-centered research and goes all the way through prototyping, building and delivering a solution. However, in the iterative process that should never cease, the journey can begin at any point.

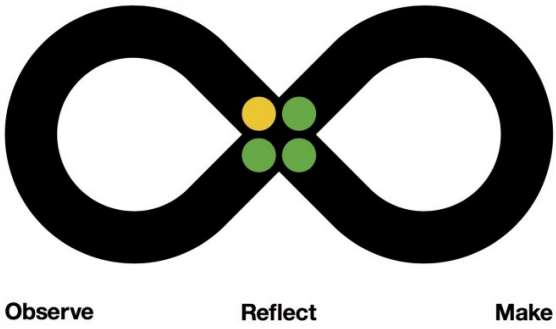


Figure 25 IBM's loop

In "observe" point, IBMers are invited to immerse themselves in users' world, know users better, uncover their needs, and test ideas by putting them into users' hands. Here, empathy and non-judgmental attitudes are important. In "reflect" point, IBMers are called to come together and converge on a point of view. During the reflection, teams can find common ground, understand what they can and can't do as a team, synthesize what they all know to find hidden wisdom, get everyone aligned, and decide on next moves. This perhaps is the loop's most important point, as it permits to form the intent, commit to it, or take another loop. Finally, in the "make" point, IBMers are called to action. Here, teams communicate concepts through visual aids, explore ideas by hands-on activities and simulations, and drive outcomes. Throughout the whole loop, teams are invited to keep reflective position and answer continuously the guiding questions.

Table 10 The IBM Design team's suggestions on reflexive questions

Loop point	*Reflexive questions*
Observe	• WHO ARE OUR USERS? What are their values and beliefs? What are they seeing and doing? What are they thinking and feeling? What brings them pain or enjoyment? • WHAT ARE THEIR NEEDS? What problems are they solving? What does success mean to them? What do they stand to gain or lose? What's blocking their success? • WHAT ELSE IS OUT THERE? Who has solved similar problems? What has succeeded? What has failed? What can we learn from them? • WHAT'S THEIR FEEDBACK? How do they feel about our involvement? How are they responding to our ideas? What feedback do they have for us?
Reflect	• WHO ARE WE? Who are our stakeholders? What are our values and beliefs? What can we control and influence? Who do we rely on who relies on us? WHAT HAVE WE LEARNED? What do we know? What did we observe or make? What worked and what didn't? What insight do we have? • ARE WE ALIGNED? Who are our users? What problem are we solving? What do we stand to gain or lose? What's blocking our success? • DO WE HAVE A PLAN? What will we do now? What will we do later? What do we need to be successful? Are we ready to commit?
Make	• WHAT'S POSSIBLE? What can we make? What can't we make? What ideas can we combine? How else might we make it? • WHAT'S THE CONCEPT? What does it do? What is its form? What are its parts? How do they relate? • WHAT'S THE STORY? What's the intended outcome? What's the big idea? How do we show it to others? • HOW DO WE DELIVER IT? How do we build it? How do we deploy it? How do we maintain it?

In IBM, DT should have been scaled to very large, complex, and sometimes geographically dispersed teams. Depending on the project and its duration, there can be teams of 100 people working together contemporarily or in sequence. The challenge of the IBM Design

team was to create simple and universal practices, that could be applied in different contexts and for teams of all sizes. For this, they developed 3 new practices, namely: hills, playbacks, and sponsor users.

Hills are statements that define the scope of the project by rooting them in customer needs and desires. They are called to provide a new business language for aligning team around customer-centric outcomes. Hills serve to focus the design and development work on desired, but at the same time measurable outcomes. Therefore, they are composed of 3 elements: who (e.g. a sales leader), what (e.g. can assemble an agile response team from across the entire corporation), wow (e.g. in 24 h, without management involvement). Hills are supposed to be non-definite, as the understanding of the problem evolves, Hills should evolve too. In this way, they give teams the creative space they need to come to breakthrough ideas, without the need for detailed requirements.

Playbacks are milestone meeting sessions to align teams, stakeholders, and customers around the project unfolding. They provide a safe space for giving and collecting feedback, are useful to reveal eventual misalignments in a team, or to break down the organizational silos and hierarchy. Playbacks can be organised anytime teams need feedback, but are also useful to setting up milestones. Milestone Playbacks are critical moments in the project, as they permit teams and stakeholders come together and agree on how to move forward. Early playbacks may be used to align a team on a hill and ensure that everyone understands how to achieve a hill's specific outcomes. In later playbacks, teams may demonstrate the progress on delivering high-value scenarios. The IBM Design team suggested 4 types of playbacks: Hills Playbacks (to confirm that all stakeholders agree on the intended outcomes), Playback Zero (to commit to the user experience that teams are going to bring to market), Delivery Playbacks (to measure the progress against intended outcomes), and User/Customer Playbacks (to communicate to clients what's coming next).

Sponsor users is the practice of bringing real customers into the design and development process. The direct interaction with users can help to focus real needs and deepen the relationship. Sponsor users can be engaged when personas are created, or throughout the entire design and development process for observing the world through their eyes, for reflecting together, or making collaboratively. People from outside the organization, who represent common or the most extreme use cases of a given targeted persona can be invited. Every interaction with sponsor users helps to close the gap between assumptions and reality. The IBM Design team recommends recruiting at least one sponsor user per Hill.

So, IBM DT is a scalable framework to help teams understand and deliver innovation. The journey starts from making a conscious commitment, as a team, to prioritize users over other business concerns. In order to move faster and smarter in service of users, the

journey is made by a multi-disciplined team. Teams consider their work and the work of others as a prototype, and restlessly reinvent them to re-think how user problems can be solved. A series of practices help them to make the process scalable, and extend it to more people if necessary.

As the company works on users' complex and open-ended problems, the collective effort is necessary to solve them. For this reason, the IBM Design team propose different project management frameworks to handle complex problems. One way to manage a project is to split up the team and creating more subteams or workstreams. Each subteam can use the loop to tackle their part of the problem. Another way to manage a project is to split it up by time and work on different sub-problems in different sprints. Each sprint may use the loop to tackle these subproblems, one by one. Most often, the combination of splitting up the team and splitting up the time is used. This helps to turn big problems into smaller problems that can solved, piece by piece. The most important thing is not to lose sight of the big picture, and stay rooted in the user problem that is being solved.

IBM Design Thinking praxis

All good theories should drive to good praxis. This is the biggest challenge of all educators and trainers. When any framework is translated into praxis, it faces a wave of disbeliefs, contaminations, adaptations of meaning, and so on. In case of IBM DT framework, the same developmental pattern can be observed. The main reason for skepticism arises from the erroneous understanding of the nature of DT praxis: workshop instead of ongoing networked activities. Limiting DT praxis to a single event creates an illusion of "magic" that may be very harmful. This is typical of human reasoning: we want to have things, without paying price for them. Instead, as DT experts in IBM underline, DT praxis requires daily effort.

> *"Many people equate DT with simply doing a workshop. Some see it as a shiny new method that is in vogue at present and makes the team look modern. I contend that simply doing a DT workshop without follow through and use of the methods pervasively can do serious harm. An expectation is set after doing a workshop that if nothing happens and nothing changes then it is worse than not having held the workshop at all. If it isn't used pervasively, it can also lead to a conclusion by participants in a workshop that it doesn't really work. DT, and IBM DT in particular, is amazingly powerful if it is practiced pervasively end-to-end on a project and by all key team members." (Karel Vrendburg, IBM Design Director)*

The reason why people are reluctant to conceive DT as a daily practice can be linked to the general problem of conceptual inconsistency. Indeed, some IBMers in their narratives tend to describe their practice by words of doing (e.g. methodology, process), while others – thinking (e.g. attitude, perspective, approach). The skepticism is the same as in the scholarly discourses. People recognize that DT is a buzzword and seek major clarity. In

an attempt to find it, they report to have frequent conversations among colleagues on what DT is and is not. This notwithstanding, IBMers recognize value in DT and declare that for them it's crucial that DT won't become just a mass market word.

> *"I would like to say that a concept of DT is a bit confusing for me. DT is a buzzword, like Cloud, IoT, Agile. So, everybody speaks about it, without knowing the exact meaning of it. Rarely you will find the situation, where people know what DT exactly is, and where to apply it etc". (IBMer, GCS, IBM Italy)*

Putting together the different ways of how IBMers describe their practice, it was possible to recognize 3 main elements, namely: mindset, toolbox, and agency. According to IBMers, these three elements are guided and linked together by DT principles. When such multidimensional representation of DT is observed in practice, people tend to refer to it as an "approach", as compared to a simple method or framework.

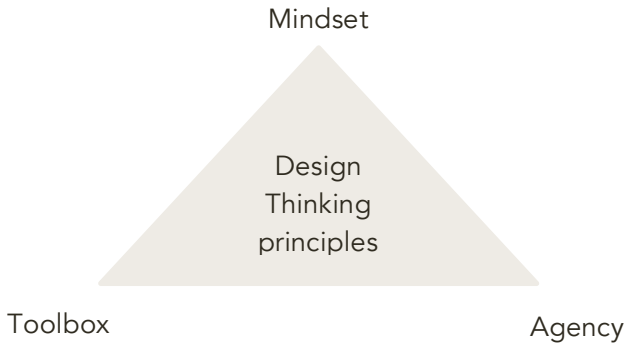


Figure 26 The elements of DT according to IBM practitioners

DT AS AN AGENCY

The *"Agency"* narratives describe different behaviors and activities linked to DT by giving them a certain order and frequency - sequential or circular, continuous or sporadic. Moreover, IBMers use metaphors of "journey, steps, path" to refer to their DT experience.

> *"So, you have a set path that you work on. Of course, the path changes from time to time and depending on the needs of the clients. And you don't need to carry out every step of the process, you can skip a few steps, but the whole DT process makes everything centred: so, you know when you carry on a project, you don't have to work on a lot of things all together; DT coordinates project together." (IBMer, iX, IBM Italy).*

The majority of IBMers recognize that this journey has the beginning and the end, and they usually link the time boundaries to the duration of project that they work upon. Basing on the quantity and quality of DT-like activities applied in a project, IBMers describe their projects as "whole" or "partial" DT process. They also struggle in evaluating whether partial DT can be still considered a DT process.

"For example, we brought end users into the design process, when we did process reengineering. Another example, we had iterations of the design output, and tested right way to see if it works instead of waiting for the end of the functional analysis to test it. But I have to say I haven't applied the whole DT process in my work" (IBMer, GCS, IMB Italy).

If DT is a journey, then there should be a direction. Hence, for IBMers order is an important characteristic of the DT process. They also recognize that this characteristic of DT transmits security, reduces anxiety, and gives order to the creativity of the group.

"I refer to DT as to a methodology, because it has some frameworks that you have to follow. [..] But, if you are not fierce in following the methodology and the process - that is strictly connected to frameworks -, you will never arrive to the end. And probably you will lose attention". (IBMer, iX, IBM Italy)

In their narratives, IBMers describe DT agency by means of 4 working modes: explorative mode, sensemaking mode, imaginative mode, and generating mode. In explorative mode, IBMers are concerned with information gathering and processing. This working mode is adopted more frequently on the early phases of any project, but is not limited to it. It's the momentum of the curiosity.

"We start by analysing what the client is all about: their brand values, their brand requirements, their needs." (IBMer, iX, IBM Italy)

"When I understand the client's situation very well and I get close to their needs, I can prepare [...] a very good path to follow during the workshop." (IBMer, iX, IBM Italy)

In sensemaking mode, IBMers analyse and structure information, put it into a coherent picture. In some case, this is done by a single person, other times – collectively.

"I usually don't do any analysis after the workshop. I take really good pictures, and I store all outputs. I leave them there, and I don't think over too much. Let's say that I sleep over them. Maybe the day after I lazily put them in Excel or any other software. Then I switch off and do other things. And then maybe one day I talk with someone on a similar topic and suddenly it comes to my mind that it has been already raised in that workshop, so I take those outputs and I go back to analysis. It takes a lot to reflect and analyse." (IBMer, GCS, IBM Italy)

In imaginative mode, IBMers think without constraints and produce ideas. This mode is usually associated with deep focus, transcending energy, freeing up oneself, and disruptive moments. This mode is also frequently associated with conversation, and building on ideas of others is recognized to be a crucial element.

"With DT, everyone can propose any kind of ideas, say something interesting, share the opinion, at the end we can arrive to have a big idea, which is built on the ideas of others. And it's the creative process, there's a lot of brainstorming and collective work." (IBMer, iX, IBM Italy)

In generating mode, IBMers realise their ideas in life. It's not necessarily about the final solution, it can be any kind of delivery that at the certain point in the process is a tangible artifact that helps to move the process on. It may be a prototype, a proposal, a map of meanings, etc.

"Before designing an interface in programs like Illustrator, I sketch and try to create a prototype. [...] Then I test and retest it again with a colleague of mine, until the flow is user friendly. Then I start with graphics. At this point I need to have brand guidelines in order to represent a brand's mission and brand's values. I do different proposals, and when the client accepts one, we move on with UI." (IBMer, GCS, IBM Italy)

DT AS A TOOLBOX

The "Toolbox" narratives are more typical for novice DT practitioners. They tend to describe their practice by means of artifacts, techniques, instruments (e.g. post-its, personas, customer journey maps, empathy maps, stakeholders' maps, big ideas, storyboarding, brainstorming). More expert practitioners recognize that tools are good especially for those people who don't know how to address the problems, as they help them to change perspective. Moreover, expert practitioners admit that they frequently adapt tools or invent their own.

"If there is something that is missing to me, then I invent my own way of applying DT to get to that result, and I invent my own exercises. The more experienced you are, the more you take your own, and you experiment with new things. When you try things, and they don't work - you don't repeat. If they work - then you do that again" (IBMer, iX, IBM Italy).

The DT toolbox of IBMers is rather rich. Based on people's narratives, it was possible to find 4 different categories of tools: methods, techniques, frameworks, and digital software. It was possible to organize them in different sub-categories, according to the function they serve. The use of digital software is case-specific. The use of frameworks is recognized to be rather intuitive and easy, for everyone. The use of techniques was associated with mastery level, and people recognized that it takes time and effort to execute them correctly. Whereas, the use of methods was recognized as the highest level of mastery, which is usually associated with plurennial experience in the field.

Table 11 DT tools

Methods	• Explorative (e.g. interviews, observations, digital ethnography, desk research, mystery shopping) • Sensemaking (e.g. hermeneutic analysis, data visualization) • Imaginative (e.g. conversation facilitation methods) • Generative (e.g. agile methods, roadmapping)
Techniques	• Knowledge elicitation (e.g. brainstorming, ideation techniques, creative thinking techniques) • Knowledge organisation (e.g. sketching, modeling, categorizing, prioritizing) • Knowledge sharing (e.g. prototyping, storyboarding)
Frameworks	• Maps (e.g. empathy maps, mindmaps, stakeholder maps, big ideas) • Flowcharts (e.g. customer journey maps) • Diagrams (e.g. feedback grid, prioritization grid) • 2x2 matrices (e.g. assumptions & questions framework • Narrative frameworks (e.g. personas, scenario maps, storyboards)
Digital software	• Idea collector (e.g. Mural) • Prototyping (e.g. InVision, Bluemix, Axure)

DT AS A MINDSET

The "Mindset" narratives describe DT as a mental approach, mind perspective, attitude, way of thinking, etc. When IBMers talk of DT as a mindset, many of them can't differentiate what is DT and what is their personality, or talk in terms of embodiments.

> *"For me it's normal thinking. So, every time I face a new project, I analyse who are the users, what we can offer them, If I were the user what would I do. It's really already in my DNA" (IBMer, iX, IBM Italy).*

> *"I think that my personality is based on the concept of DT. It's all about searching the origin of the problems, knowing the source of needs, and building experience starting from what a user needs etc. This is how I face every day my work." (IBMer, iX, IBM Italy).*

> *"It's my personality, I would say the truth. Even in my personal life, I make part of many groups to promote an open dialogue. And I am a creative person - I draw, I write, I have lots of hobbies. So, I kind of have already this openness, and it facilitates my job. With DT, I feel like I am authorised and sponsored to be like that." (IBMer, iX, IBM Italy).*

Other IBMers recognize that DT is not their typical mindset, and when they try to practice it, they describe it as "applying/using DT", "changing a hat", "shifting perspective".

> *"It is quite difficult to change completely your approach, but it is important to gain good habits. For example, I have noticed one improvement in the way I think. I've started to think freely and big at the beginning and then narrow down my thought. Sometimes I feel I search for the right solution already from the starting point. So, it is about tolerating the uncertainty in the meanwhile and tolerating the fact that maybe I need to*

do more steps." (IBMer, iX, IBM Italy).

"You need to shift the perspective. Then, I don't care if you do it by writing on post-its or drawing. I can apply DT sitting here and using no post-its. For me, it's the way you address an issue or a problem" (IBMer, iX, IBM Italy).

Moreover, IBMers describe the mindset of a DT practitioner though 3 different categories: learner, inventor, and doer. These categories describe just some natural inclinations, but are not descriptive of one person. In fact, some people encompass all three inclinations, but in different degree. A learner is information-driven. He/she is oriented towards observing, understanding, seeking different points of view, unveiling hidden links, etc.

"I write a lot - not just on my laptop, but also in my paper notebook. So, I put down a lot of information, notes, sketches. [..] I also reserve some blank pages for each project, because I usually add notes afterwards. So, when I have more time, I go back there, highlight what I have to clarify, write the most important points, and so on. So, for me this is part of DT". (IBMer, iX, IBM Italy).

"I always put a lot of attention on open items, I call them "parking lots", these are empty post-its that I usually put on the wall. If during the conversation, something comes up, even if not really related to what we are discussing, I can't leave it there. If it comes out, there should a reason, and I need to investigate it or address it somehow." (IBMer, GCS, IBM Italy).

An inventor is creativity-driven. He/she is self-aware, prefers to "bend" the reality according to one's point of view, personalizes working tools, and proposes new ideas.

"There is a lot of creative back drop, so for that to happen you need to give personal space to people who are on the project. And you will always see the reflection of the person, who is working on the project, there. You can distinguish that this project was done by this person, and that project by that person. Of course, the DT path is the same, but there is a certain personality imprint in the project as well." (IBMer, iX, IBM Italy).

Finally, a doer is result-driven. He/she is able to translate any insight into operational language, and is comfortable in moving across different levels of conceptual evolution.

"I'm a dual SIM. [..] I've got the chance to have two sources of things to learn. I've worked a lot on IBM core business projects. These are hard competencies; they are really interesting. But when I worked in the iX projects, it was too conceptual, too high level. [..] I really liked that. [...] The thing is that you need competencies to do DT, and you need competencies to do the core IBM work. [..] You are like half and half. (IBMer, GCS, IBM Italy)

DT PRINCIPLES

Because of the conceptual difficulties, people tend to describe DT as a metaphysical phenomenon and refer to it as in third person, i.e. "it". They recognize that DT acts as a coordinator. However, they are not able to identify what DT element actually act as the focal points.

> *"For me DT is a way of addressing problems or issues. Then, I can call it a "way of working, a methodology, a box of tools". There's something on top of all these "names", which is how you address problems. Then, the way you address problems, is the way you implicitly define a way of working, and you implicitly define your set of tools." (IBMer, iX, IBM Italy).*

Compared to other DT elements, that can change according to different contingencies, these coordinating elements are considered by IBMers to be stable. In our analysis, these coordinating elements are called "principles", and it was possible to identify six principles. They are: humanocentrism, focused improvement, diversity-driven collaboration, holism appreciation, continuous learning, multimodality. These principles are inherently assimilated and are used to orient the cognition and behavior toward what is good, correct, useful, helpful, essential, etc. Indeed, IBMers refer to them as "drivers" or "perspectives".

The principle of humanocentrism expresses sympathy for people (i.e. users or customers), the will to come closer to them, to solve their problems, and offer them valuable solutions. It recognizes the supremacy of human needs over technology, and attributes to the technology the sole function to solve human problems. The next principle, focused improvement, is rooted in the deep conviction that there are solutions for any kind of problems, and that the intention of improvement can be "crowned with success". The principle of diversity-driven collaboration expresses the idea "together is better", but links "better" to the fact that success arises from the diversity of opinions, personalities, skills, etc. This principle also recognizes the importance of trust, respect, and humility between people. The principle of holism appreciation refers to the big picture and system thinking, on one side; and active seeking of being part of the bigger whole, on the other side. According to this principle, "silos" shouldn't exist, and everyone should be accountable for the final outcome. The principle of continuous learning celebrates curiosity, openness, willingness to get updated. Finally, the principle of multimodality attributes importance to use multiple forms of communication (e.g. drawings, body movement), and highlights the importance of the interaction with a space in creating those forms.

In the following table, it is possible to get acquainted with IBMers' citations, in order to tap into the meanings associated with each principle.

Table 12 The six DT principles

Principle	*Description from practice (selection of IBMers' citations)*
Humano-centrism	• "You need to understand first client's needs, and emotions and feelings of users. And then, not trying to impose the solution, but come slowly to the solution together with a client." • "We select users, we interview them, and we start spreading empathy by creating a conversation with them. I mean final users - nurses, maintenance operators. Usually they are hidden, they work hard, sometimes they don't have a high salary, and nobody listens to them. [..] So, when you listen to them, let them feel that you are empathic, you understand their problem, and show them that that IBM works to solve their problems, they feel excited". • "Now I see more satisfied with my work, and the reason is not economical, but social. We bring value to the community because we care about the society, understand the needs of our customers, rather than just creating and delivering a software without caring if they use it or not. [..] And I remember all people I was in contact with. I will remember them all my life." • "For me, it is important that everybody could be aware of the pain points of the customer and want to resolve them. Then, we can identify 3-4 ways to do this, but we will work on this in a second moment - by ourselves or together with the client". • "You have to forget for a while about you and your role, and really live in the shoes of the user, and see everything from their perspective. "
Focused improvement	• "With DT, we can find solutions both for actual and future problems." • "For me, a problem doesn't mean that something is broken, but the topic that you work on. [..] we are used to think of problems like clients asking us to resolve something. But there is a different kind of problem, if you want, you can call it a scenario." • "I think that the most useful thing in DT is coming with some really good data, that you can analyse and translate into business opportunities." • "DT approach helps to look at the problem and try to solve it [..]. For example, it can help me now to understand how the digital payment can change the customer journey, or how in the future cognitive operations can change the customer journey." • "If I know that I there are people, who speak in social media 50% in a negative way on my products, I have to find a solution"
Diversity-driven collaboration	• "I think that good ideas can come when you unite people from different backgrounds. It is common that people prefer to cooperate with people with similar backgrounds, but not me. I always liked the idea of combining different points of view - the results then are richer." • "The result is a success, when it's really a shared work, and when you have the perception that having done that work together made you arrive at the point in a shorter time, and that you could not have done it alone." • "It is essential to build on others' ideas. If we work in a team, you propose your idea, I propose my idea, and the team chooses my idea, you shouldn't be upset or offended, but you should be able to take my idea and treat it like it was yours. And do your best to improve that idea and make it successful." • "I think that I and all people, who started with me, we are more collaborative. We have no fear of sharing our ideas, and putting them on the table. We are not afraid that some else will steal our idea. We don't care about it." • "It's very important to increase your knowledge by having different insights from your colleagues, who have a different perspective from yours."

Holism appreciation	• "Now I am more demanding with my work, I ask myself continuously "Are we doing the right thing? Are we seeing the big picture?". • "Everybody has the same responsibility in the project: if I am a developer, I care not only about my own work, but also that of my colleagues. So, as a project manager I apply DT to sensitise everybody of the main goal of the project, because everybody is responsible for the success of the project, even if the problem is not technical and you are a technical person. DT is about being accountable and not specialising only in one area." • "There is always something that I may be missing on my project - something very small, that somebody else did on another project, which I can pick up and use to move forward with my project." • "There are some people who do only their work and are not open to know what others do. So, one of the most common problems is to make them work together with people who are not comprehensible for them. Usually they act as tribal people: when you say something unknown, I can't understand if you are a friend or an enemy, so I take my knife and try to kill you." • "Through DT, you are able to change your mind from seeing your work like a closed box to thinking of people who are on the other side."
Continuous learning	• "The mindset of people is essential (in a workshop). Because if they are open to change and to new learnings, the output of the day will be very good. Otherwise, if they are close-minded, if they don't appreciate our work, and if they are not willing to know something more, it won't work." • "I think what we need to focus more on dialogue. If I work with a designer, and she needs my opinion about her work, she shouldn't do that because I am her supervisor, but because she feels that this dialogue can improve her work." • "I want to have a personal growth, and to keep on learning, learning, learning. If I could I would take at least 15 university degrees. [...]I think I can learn from every person I meet. [..] If you come to me, you say you are not convinced about this part, I will take your suggestion and I start thinking over, trying to understand why you said that. And will consider your suggestion when I develop the project." • "With DT, you can't live in the same way, each day is not like the day before. If you always do the same things, you get older in a faster way. Whereas with DT, you try to change small things each day, you try to look at things from a different point of view - in this way, probably you break the routine." • "People do things in a definite way because they have always done things in this way. And then, they have prejudices. So, this makes up their mentality, which is actually contrary to the DT one. DT is about openness. [..] Some people do not even notice they are not open. "
Multimodality	• "With DT, you share information in any possible way. You can draw, you can stick them on a wall. If people are ready to work in this way, it will probably change the cultural heritage of the organisation. Because you don't have to think about the form, but you have to think about the result." • "Having all the staff on the wall it's my way to reflect. Even if there's something that is not completely related to what I did yesterday, but it comes to my mind, I put a post-it, I prefer to have all my things visualised." • "(talking about Intranet) It's different if I come into a room, and I notice something with the corner of my eye. Digitally I never go there to see what is there inside, and open documents that are unknown to me." • "Big spaces are essential. Maybe it's my personal thing, but I need big spaces because I need to walk, I need to stand up, to move." • "The thing about writing on the glass is interesting. Everyone can see your writing, even if he passes by. So, it's sort of becoming more confident on what you want to say, but at the same time you feel protected, because your colleagues passing by are not allowed to say stupid things on your work, while you are in the process. So, this kind of tricks help. And I find them disruptive."

IBM Design Thinking and innovation

By 2017, more than 10,000 employees have gone through the IBM DT Bootcamps, where they learnt about tenets of IBM's DT framework. In total, the company has developed around 100 products using the DT schemes of work. IBM consultants apply DT in their daily work with clients to find custom solutions. Following DT, IBMers combined forces to create one of the most successful IBM products today, a cloud platform Bluemix that reimagines the cloud app development experience. Since the launch in 2014, Bluemix has attracted more than one million developers and emerged as one of IBM's most important software platforms. Moreover, DT is practiced for resolving the issues of strategy, management practices. Indeed, numerous workshops for C-level managers have been held with the purpose of rethinking the future of IBM. The new performance system has also been developed with the help of DT formats of works and methods. In many ways, IBM's newfound focus on DT is an admission that a good customer experience isn't always simple, it can take a total overhaul of corporate culture to get it right.

There are also intangible results brought by DT. For instance, IBM's design-led software-development efforts in the cloud, analytics, and cognitive products have recorded higher-than-before user acceptance. Numerous IBM's DT workshops with customers (i.e. numbered in the thousands over the last few years) have fortified customer loyalty and brought in new business opportunities worth billions of dollars. IBM hopes their overall revenues will soon reflect the value of DT approach, and validate their massive investments in it. Moreover, IBM is now taken as an example of designful transformation. According o Karl Vredenburg, there is a growing interest among the largest IBM's clients in doing a similar transformation in their own companies. And IBM has started working with a few clients to help them do just that.

DT has also changed IBM standards of quality. Now IBM leaders state that they don't look for absolute statements of quality. The philosophical position of management is that there will always be a better version of something, thus whatever you deliver tomorrow is imperfect. As a consequence, the conviction rooted in the product and services development is that an objective "good" doesn't exist, but there is a "better." The new success metrics became solving more problems for customers and delighting customers more than IBM did previously. For this, mechanisms to collect the metrics have been developed, to understand where IBM is improving or not.

However, most of IBM's development projects are very ambitious and may last months, in some cases years. Basing on IBMers' narratives, it was possible to recognise different project phases, where DT could contribute in a valuable way. These are: (1) identification of the opportunity for change, (2) strategy formulation, (3) roadmap planning, (4) crafting the final output.

Intentional identifying opportunities for change is considered to be the beginning of the innovation process. It may be the most crucial phase, as the shared understanding and collective effort in defining the opportunity is a warranty of further high engagement of all stakeholders in the process. The ways of identifying opportunities may go in two different directions – factual reality or desired reality. In the first case, the inspiration is taken from observations, evidences, facts, conversations with customers; and the goal is to solve immediate problems of the reality. The most important success factor in this approach is to have really good data, and translate them directly into business opportunities.

In the second case, the inspiration is taken from subjective wishes and inter-subjective visions. The second approach, indeed, is a way of future thinking, and in IBM it is mostly used internally. Such future-oriented DT is in all senses a way of learning for the organisation, based on the social construction of meaning. Indeed, in many cases the results of future-oriented DT workshops need further working on and a sensemaking effort. Many IBMers recognise that they use the results of such future-oriented DT workshops as a compass in their work, they frequently go back to check the results and use them in other projects. An important issue for this way of identifying opportunities is to have right people involved in the process, i.e. with great knowledge, experience, and personality.

> *"The point is that with clients you need to be very pragmatic. Most of the time you need to think in short-term and make things happen very quickly. That is the reason why we look into actual problems, the issues that the clients have to resolve, because we have to bring them to the next step. Whereas internally we may be more focused on long-term, because we need to have a direction in order to know where to drive a client. In order to show yourself as reliable, you need to show that you know where the future is heading. Or at least you can propose a direction, even if it might be wrong." (IBMer, iX, IBM Italy)*

If or when the opportunity is identified, the next step is developing an innovation strategy to reach it. Here, the understanding of contingencies is considered to be the most important element. For instance, IBMers report that many projects that may seem close to each other at first sight, at the end take completely different strategic approaches to better fit the situation. An important part is a convincing and evidence-based storytelling. The output of this phase is a shared decision on choices to make, without going into technicalities.

> *"At the beginning, you don't have a clear idea of what you will deliver at the end. In fact, we offer to our clients 2-3 days of DT workshop to define the strategy. And at the end of these days, we have a document where it's written that we have understood that we want to go in this direction. So, we can start." (IBMer, iX, IBM Italy)*

> *"When we design a strategy, we don't use prototypes, because the level of our output is higher than a prototype. It's more conceptual. But one of the outputs of our work can be a decision to design a new app. So, we do the next workshop and design an app, and there we use prototypes. But, it's another phase already." (IBMer, iX, IBM Italy)*

The phase of the innovation plan is about giving form to intentions. In this phase, DT is used as a project management tool. Here, the roadmap of activities is defined, main streams of work are split by priorities, and decisions are made about concrete actions and deliveries for the short-term.

> *"Then, we design a roadmap of activities - these are all the materials that we create, and the roadmap helps to understand better where the activities will bring us. So, when I design the roadmap, I see that some channels are really relevant to the business, whereas there are some other topics that we can address later. So, there is the short-term and the long-term vision. With DT, we try to understand what is the part that we can start now, and what are the parts that we can start in one year, two years, etc." (IBMer, iX, IBM Italy)*

Finally, crafting the final output is the most technical phase of the process. The output of this phase is a product or solution ready to be delivered. Prototyping is recognized to be a very important element, and the guiding principle of this phase is a delightful customer experience.

> *"In some cases, DT has been applied internally with a short-term perspective. For example, within an internal contest "Cognitive Built", we were invited to build some teams and apply the cognitive platform Watson to do some prototypes with the help of agile techniques and DT. In this case, as you see, we were addressing short-term issues." (IBMer, iX, IBM Italy)*

In the narratives of IBMers, each innovation phase followed the typical design process, even if its characteristics changed from phase to phase. Indeed, for the need of each phase, a DT workshop could be organized, and the development process followed typical DT working modes. This consideration helps us to imagine that innovation phases and DT working modes can be put into a dynamic relationship. If we imagine that the innovation process has a dynamic unfolding similar to a spiral, and put this spiral on top of the Design Innovation Process model by Prof. Kumar (2012), we'll note that each working mode can have at least 4 different manifestations, based on the semicircle of the spiral.

Such a dynamic understanding of the DT-driven innovation process helps to understand the process benefits that IBMers usually ascribe to DT. For instance, they recognise that DT practice fastens the innovation process and brings to more creative and desirable results.

> *"Normally DT helps in short time to arrive to a result that initially you could not even expect; because it unleashes some energy that, as a side effect, boosts your capacity to re-imagine things. And the level of innovation, that you are able to bring when you come up with a solution, is much higher." (IBMer, GCS, IBM Italy)*

"Maybe a project normally takes 6 months, but it can be done with DT in 4-5 months. So, it saves a lot of time as well. The results are always better, [...] even if the core result of project depends on many factors. [..] However, with DT, the projects that I could observe, had good results and implementations." (IBMer, iX, IBM Italy)

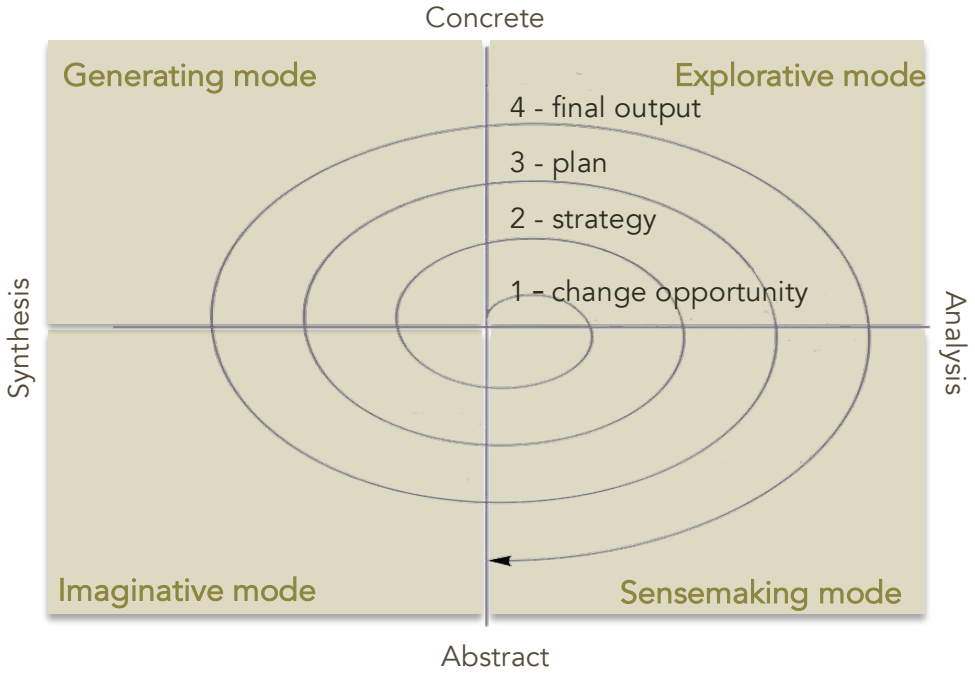


Figure 27 The innovation spiral
(elaborated on basis of Design Innovation Process Model by Vijay Kumar)

As a rule, the innovation process is understood to run successfully when several events take place. These are: (1) building team cohesiveness (e.g. creating the climate of openness, establishing rules); (2) deep focus (e.g. dedicating special time, abstracting oneself from the routine); (3) the internalization of the collective intention by all stakeholders (e.g. collective embracing of the decision, the project is the "baby" of everyone); (4) the transformation of the intention into action (e.g. committing to and vigorous working on the goal). As a rule, a facilitator or a project manager is responsible for creating the conditions for these events to happen. Space characteristics are also recognised to heavily influence the DT-driven innovation process. For instance, IBMers highlighted such important spatial characteristics as: (1) rich visualization facilities, (2) noise isolation, (3) sunlight, (4) flexible layouts, (5) presence in a space of other creative people.

PART V. DISCUSSION

The thought that is beared in mind and refined in work is always happy and optimistic (Vasyl Sukhomlynskyi, humanist educator)

Insights on Design Thinking from the IBM case

The insights and descriptions, that the IBM case offers, make it possible to interpret the nature of the DT phenomenon in a more critical way. Now we can go back to the question whether DT is just a fad and try to read the situation by adding more details. In multiple narratives held in IBM, different actors recognized that the value of DT is self-speaking, and when people practice it, they appreciate the value and feel motivated to repeat the practice.

> *"If you go through more than one DT workshops, you may understand that your daily job could be enriched and empowered by ideas coming from others, that are apparently not related to your job. [..] That is the reason why I understand perfectly why they teach DT in business schools. I think this is the value. It works. It works for everyone in the company, not only for managers. I am trying to understand if it's something that will last for years or will change soon. But so far, so good." (IBM manager, IBM Italy)*

> *"Well, I attended a 1day course on DT, and I found it really interesting. Intuitively you appreciate it, you want to apply it, you want to use it to improve your work, you feel empowered" (IBMer, GCS, IBM Italy)*

> *"Personally, I see value in DT. Maybe because it's the 21st century, and we are more open to tools of learning and etc, and I think DT is to be a part." (IBMer, iX, IBM Italy)*

On the other hand, multiple people recognize that there is lack of clarity about the need behind the DT practice, and the contextual conditions that help to make it efficient:

> *"I think that there are some moments when you can apply DT in order to do better your job, but it is not that everything you do requires to follow that process. Then, if you say "Ok, it can help me now", then being in the right environment - where you feel open to express your ideas, where you have the opportunity to learn, where you have the right flexibility and the right comfort level - can give you the right energy and the right mood*

to be more effective on it. But, I think, that it is something that you have to have clear in your mind: working in a different way can help you to have a different and more effective result, but it's not useful to apply DT for everything. It doesn't function for any kind of things." (IBMer, GCS, IBM Italy)

This lack of clarity about the nature of the DT phenomenon is at the basis of the raising skepticism. The premise of my research is that the lack of clarity doesn't necessarily mean the practice itself is not valuable. If organisations continue to apply DT practice, and see value in it, without being able to explain it, we don't necessarily need to call it a "fad". There are multiple phenomena in the world that follow the same path. The philosopher Daniel Dennett explains this point as a "competence without a comprehension" (Dennett, 2005). According to the scholar, who studies evolution and consciousness, we are sort of "teleofunctionalists", and notwithstanding our consciousness is still a black box, it continues to enable some functional competences that help us to pursue our goals. A similar position is the departing point of my research: if we are not yet able to explain the "why", is doesn't equal that the "why" is not correct. Instead, what we as researchers can do is to collect in-depth descriptions about the "how".

Based on rich empirical descriptions of the phenomenon of DT, there is a series of insights that were possible to draw about the nature of the DT practice. I managed to arrive to 7 main conclusions that are briefly illustrated hereinafter.

1. DT practice is a bundle of different practices; thus, it holds a number of smaller micro-activities.

Contrarily to the diffuse approach of referring to DT as a as discrete, substantial entity (turning it into a "discursive object"), DT is an activity. And it is made of and organizes a series of micro-activities, tasks and behaviors. These micro-activities are set together for fulfilling a certain goal. Taken separately, it would be difficult to say whether they make part or not of the DT practice. Indeed, many IBMers referred to their DT practice as a facilitation, radical collaboration, user interviewing, etc. but were not sure whether for those cases they could use the tag "DT". It is impossible to set the boundaries of the DT practice, because, as any other kind of practice, it is a dynamic phenomenon (Nicolini & Monteiro, 2016). Hence, it is not possible to clearly answer to such questions as "When does DT end?" or "When DT is no more DT?". Even if people are used to think of DT practice squeezed in a 1-day workshop format, and attribute to it the beginning and the end, but as for what we could observe in the IBM case, the DT practice is more a network of activities than a single event.

"Earlier in my professional path, I get to know DT, but I hadn't the tag to say it was DT. The way I was using DT earlier, in my opinion, was in the way we were running workshops, in the way we interacted with users and clients, in the way we used post-its and other creative techniques. I would tag it as DT, even if it was not so structured as DT

wants to be. But the flavour was already there, definitely." (IBMer, GCS, IBM Italy)

2. DT practice exists in configuration with other practices.

DT practice relies on a series of other practices within an organization. Therefore, it also creates an ensemble on a higher level (Czarniawska, 2007; Gherardi, 2006). For instance, in IBM DT practice depends on the alignment of other practices that are not directly part of it, e.g. in IT consultancy it may be contract signing with clients, deciding the deadlines of the project, agile development, etc. These practices just occur in the approximately same time and space, and may be bound by a harmonious or conflicting relationship. In any case, DT practice can't be studied in a complete isolation. Indeed, some IBMers have highlighted that too short deadlines can be harmful for their work, and pre-established contract agreements may significantly obstacle the success of the project. This consideration also explains the mutual relationship between the DT practice, the strategic practice, and the innovation practice.

There are always tensions among different practices. These tensions may arise from the competition between old and new ways of doing things. As practice scholars posit, the resolution of tensions often triggers the expansion of the practice, the development of different ways of doing things, the introduction of new artefacts, the importation of new elements from other practices, the dissolution of traditional alliances between practices, or the establishment of new ones (Engeström, 1987; Nicolini, 2007). These dynamics keep practices in constant movement. This is quite in line with what some IBMers expressed in the interviews regarding the future of IBM DT:

> *"I think that DT is the path that takes companies to be even more open in their network of relationships - not only with clients, but also with other actors in the market. So, DT stands in between the path and shows that we are changing. [...] And I think that in the future we will have a different situation, that will be even more open, but it will exist because we have built today a better way to communicate. I don't have in mind what will the next step after DT, but probably it will teach us respect and working in a more fluid ecosystem." (IBMer, iX, IBM Italy)*

3. DT practice acquires sense only if organized around an intent to change.

As any other practice, DT practice has an implicit end, which permits practitioners to acquire sense of their activity. This means that the practice drives towards a certain end, that in case of DT is the innovation output (or any delivery of the meanwhile phases). But it doesn't mean that we follow blindly the end, it only describes our performative understanding of the reality (Latour, 2005). Different scholars have explained this characteristic of practice in different ways. For instance, Schatzki suggests that practices are guided by a teleo-affective dimension (Schatzki, 2002). Engeström suggests that practices have their object, and this object is partly given, partly negotiated with others,

and partly beyond our control (Engeström, 1987).

This assumption explains why IBMers refer to DT as a path, that brings them somewhere. On the intuitive level, many practitioners understand the direction, even if they are not able to describe it:

> *"I know where I need to get. If a have a clear brief, then maybe I don't know the contents of the final result [..] but I know the journey, in which I need to take the client. And I perceive that. So, when I see that the client is going on this journey with me, it's ok. [..] When you have experience in driving workshops - in different ways, in different contexts, with different people, and with different tools - you understand where each exercise is going to take you, even if the exercise in itself is new to you. But it doesn't matter, because you know where you need to get." (IBMer, iX, IBM Italy)*

4. DT practice has a normative nature.

DT practice is associated with a given constituency, which keeps the practice alive by reproducing it (Lave & Wenger, 1991). The 3-dimensional conceptual model (i.e. agency, mindset, tools), created based on IBMers' narratives, permits to understand this constituency. The mindset describes practitioners as carriers of a possible practice, and explains how their internal resources and procedures (e.g. values, beliefs, attitudes) produce intentions and courses of action (Atkinson & Heritage, 1984). The agency describes practitioners as active participants to ongoing behavioral regimes (Reckwitz, 2002). In this sense, practitioners not only are carriers of practices, but also carry out the practices. Finally, the tools application describes the way to routinize behaviors (Feldman and Pentland, 2003). Moreover, tools play a crucial role in habituation to new practices. This 3-dimensional conceptual model invites scholars to change the traditional perspective on human behavior. Instead of searching reasons of certain behaviours inside people, it invites to look how different regimes of actions are blended together.

The group of DT professionals provide the milieu to socialise newcomers and pass competencies to others, and form the conversational space where debates are held on what is acceptable and what is not. Such mutual accountability among practitioners establish a sense of right and wrong and restrictions. Thus, practices and their normativity are learnt together. In case of IBM DT, there are two level of professionals who are in charge of normativity of the practice. The first level is made up by people from the IBM Design company, who have created the IBM DT framework and continue to teach it during different bootcamps.

> *"We had the chance to talk about our experiences with DT, and listen to others' experiences, knew about how they used it, how it brought benefits to their work etc. And the trainers were 2 designers. [...]. They said that IBM DT is made according to a specific methodology, and something that goes beyond this methodology is not IBM*

DT. You can call it in another way, but it's not IBM DT." (IBMer, iX, IBM Italy)

The second level is made up by DT champions, who have attended special courses and now are intended to guarantee the normativity of the practice in all projects.

> *"We were doing a DT workshop, and the client said "I don't care about personas, I know nothing about that, I have no information to give you". So, our sales person said "Ok let's move forward. Let's leave personas outside". And we were saying "No! We must think about personas! If not, it can't be a DT project!". (IBMer, iX, IBM Italy)*

5. DT practice allows for contingencies.

In IBM case, you could observe that DT has a double face: normative (i.e. IBM DT framework) and performative (i.e. IBM DT applied by practitioners). Performing the DT practice requires adapting constantly to new circumstances, therefore the DT practice is neither a mindless repetition nor a complete invention. However, as in all practices it is possible to recognise more or less stable background (Rouse, 2007). This is an important point that explains that the existence of a DT practice does not equate to the action of an individual, but results from different regimes of activity. Because of the fact that people miss this understanding, the biggest myth on DT has been born: that DT is a methodology that brings creativity, and the outcome is always great.

> *"If the session doesn't go well, people immediately lose trust, and don't give you the second opportunity. If something goes wrong with software, for example, people are more likely to give you the second chance. Maybe, because they expect something, they know they may rely on strict and formal KPIs to measure everything. Whereas, in DT you can't have given KPIs, every session is so different, so you can never know what comes out at the end." (IBMer, GCS, IBM Italy).*

To boost the myth, we can name one of the factors that critically intervene in the regimes of activity – materiality. Like all practices, DT practice occurs through a specific material arrangement (Beunza & Stark, 2004). DT practitioners' bodies also take part in the enactment of certain behaviors. Under this perspective, practitioners "absorb" practices by their perceptual system, but are also absorbed in a practice wholly with their body (Gherardi, 2006). Indeed, some IBMers recognized that it's always a matter of multiple factors interaction:

> *"Already having the idea of entering somewhere that is called "studio" gives you the impression of staying in a different place, where you can expect something different from yourself. So, you know when you enter there that you can find something new. Also, the furniture there is different: there is a coach, there is a table football - it helps you to have a different perspective. Then, when you are in that perspective you need to find people with the right skills that will help you to develop something new. So, it's a mix of elements that, when they are present, I think, can make it work." (IBMer, GCS,*

IBM Italy).

6. DT practice is historically situated.

As all practices, IBM DT practice has a history and is historically situated (Nicolini & Monteiro, 2016). However, it is important to underline that the past does not determine the future outcomes of any practices. This is possible because any practice is both context perpetuating (i.e. it confirms the existing regime) and context renewing (i.e. it sets up new conditions). Indeed, there is always the interaction between the regimes, coming from the constituency of practice, as the conditions, coming from its relationship with other practices. In this sense, all practices are different each time they are executed. As a consequence, DT practice is also inherently local and history-dependent.

In the IBM's case, it was possible to observe the chain of events that brought to the IBM DT implementation. First, the acquisition of the design-driven software company, then the re-consideration of designer's work, a decision to take a design turn, the research of design episodes in the history, etc. The whole process of IBM's transition toward a DT-driven culture entails elements of perpetuation, obtained through a series of strategic initiatives, cultural reforms, training courses, etc.

Artefacts played an important role for the perpetuation of DT practice. For instance, the IBM Design team has gathered all working materials of IBM's outstanding designers from 1960s, to create a cultural heritage of IBM Design. Whereas nowadays, the studio spaces are used as "cultural homes" to allocate different memories concerned with the DT practice. In this way, artefacts encourage the durable nature of DT practice.

7. DT practice is different from the design practice.

The IBM case helps us to find distinctions about the nature of two practices – design and DT. There is a general confusion about these practices, and some people arrive to conclude that DT practice is actually just mimicking a design practice. In contrast to this statement, in the IBM case we can note that design practice is defined by practitioners by means of the verb "craft". Indeed, the design practice is considered a professional field, and design practitioners can be defined as having a series of applied skills (see the five field of design in IBM). Hence, the design practice is organized around the implicit end of producing a concrete tangible product.

Instead, the DT practice is organized around the implicit end of a producing an intangible product, i.e. intent to change. As changing in inherently a human prerogative, we as human are all potential carriers of the DT practice. What differentiates the DT practice from others having the same implicit end is the normative nature and its constituency. The carriers of the DT practice in organisations is the whole population, who actively

participate in defining the teleo-affective dimension of the practice (Schatzki, 2002).

We should also underline that DT practice partly overlaps with the design practice in the initial phase of its enactment. Indeed, the IBM Design team defines design as "the purpose, planning, and intent behind an action, fact, or material object." Hence, the material and artificial object is the differentiator between the two practices.

Theoretical contribution and future research

As it was outlined in Chapter III, my theoretical mode wasn't aiming at building a theory but just providing some theoretical insights. Instead, this study was guided by the intent to provide contextual descriptions and multiples perspectives on DT phenomenon. The complex ontological nature of the phenomenon was a great limitation for the study. Therefore, the main effort was to advance the conceptual clarity by proposing categories and their characteristic. The main reason for this is to "open up" the complexity of the phenomenon and propose possible ways for continuing the future research. Because we are not able yet to address appropriately the complexity of the phenomenon, it was not possible to draw any conclusion regarding the complex causal relationships. Hence, the outcomes of the DT practice in this study were described in terms of process, and the influence of the context was intended as the interaction with the process.

The main contribution of this study is to the field of DT and organizational evolution, but there are other fields that may benefit from this study or build on it. This study consolidates the field of DT in different ways. First of all, it proposes a more comprehensive view of the DT phenomenon by putting it into a bigger historical, social, and business picture. As the DT practice takes origins within the boundaries of small creative agencies or individual practitioners, the analytical limits of the field have for years remained limited to individuals, groups or small organisations. Instead, in real life the DT practice is now being expanded into large organisations, where the complexity of processes and practices is much greater. Therefore, this study extends the boundaries of the DT field by bringing the organizational perspective, and analyzing the phenomenon on different levels in organizations. In pursuing this goal, the study contributes furtherly to the empirical effort of Rauth, Carlgren, & Elmquist (2014) and the theoretical effort of Buchanan (2015).

There are multiple directions how scholars in the DT field may build on this study to continue advancing knowledge in the field. First of all, scholars may continue the empirical efforts and propose other contextual descriptions of the DT practice in organisations. The comparative studies may contribute to understand whether there may exist some recurrent patterns or characteristics. Then, scholars may enhance the theoretical effort in two ways. The first one is by continuing to explore the constitutive nature of the DT practice and verifying whether the components that I found in the IBM case (i.e. mindset, agency,

toolbox) are present in other representations of organizational realities, and whether other constitutive elements may be found. The second way is by continuing to explore the normative dimension of the DT practice. The principles underlying the DT practice in other realities may be analysed and confronted with this study.

The DT principles may be studied under the different interdisciplinary perspectives. For instance, philosophers and sociologists may contribute to the discourse by explaining the emergency of humanocentrism movement. It may be useful to understand whether and how this principle expresses the "Zeitgeist" of the contemporaneity. The principle of focused improvement may be studied by means of theories of future thinking. Different disciplines may contribute to explain the principle of diversity-driven collaboration. For instance, the psychodynamic theories of organizational behavior can explain interactions in a team. Semiotic theories may provide insights on how the meaning is built through tensions in a group. The principle of holism appreciation can be studied through system and system thinking theories. Learning theories may be used to explain the peculiarities of the learning processes in the DT practice and the scaffoldings of the principle of continuous learning. The theory of mind may be applied to bring light on the principle of multimodality in organisations.

The constitutive elements of the DT practices may be furtherly studied by other disciplines. For instance, the psychodynamic theories may try to explain the DT mindset, and show how and when different mindsets are activated. The mindset enactment in a team can be also studied, in order to understand how the networked flow is possible (Gaggioli, Riva, Milani, & Mazzoni, 2012). The theories of socio-materiality may try to explain the role of DT tools. Finally, the element of agency can be explained by the theory of reasoned action.

It would be great to continue exploring the role of the context in the DT practice. For instance, the cultural context. Cognitive psychologists and sociologists may contribute to this discourse by explaining how culture conditions our perception, and cognition, and action (DiMaggio, 1997; Nisbett & Miyamoto, 2005). Scholars in this field has already explained that the culture, which resides in our memory, not only provides standards for perceiving, believing, evaluating, communicating, and acting, but also for alterative and future thinking. Indeed, recent findings of neuroscientists proved that imagining the future depends on much of the same neural machinery that is needed for remembering the past. (Schacter, Addis, & Buckner, 2007). Hence, scholars may try to explain how cultural heritage influences the DT practice.

The role of space and materiality in the DT practice may also be further explored. For instance, scholars who embrace the idea of embodied, extended, and integrated mind can explore the interaction between cognition and context in the DT practice. Similar studies have been already done for what regards the design practice. Indeed, they recognized that design practice includes also spatial/kinaesthetic and pictorial/visual interactions with

our environment (Lakoff & Johnson, 1999). The research has demonstrated that designers off-load cognitive work onto the environment and use it to reduce the cognitive ambiguity. It would be interesting to find out if we can find same patterns in the DT practice in organisations. Moreover, studies of organizational sociomateriality (Orlikowski, 2009) may try to explain how material elements perform in the ensemble of DT micro-activities.

This dissertation also brings light on the way DT practice interacts with innovation practices in organisations. It contributes to the innovation literature by taking the process perspective and explaining the dynamic interaction among the two practices. Here, our study contributes to the theoretical efforts of such scholars as Verganti (2013), who explains the DT and innovation practices from a discourse perspective, and Hatchuel & Weil (2002), who explain the reasoning behind DT and innovation practices.

As the DT practice has the same implicit end as the innovation practice, it inevitably contributes to the evolution of the organisation. Therefore, this study contributes to the theories regarding the organizational change and evolution. As we could observe in the IBM case, the DT practice helps strategizing managers and employees to learn collectively how to form the intent of innovation. It's exactly the focus of teleological theories of organizational evolution. This school of thought explains development by relying on the philosophical doctrine of teleology, where the main idea is that the purpose is the final cause for guiding any effort of an entity. The list of theories that belong to this stream of research in business and management studies are: functionalism (Merton, 1968), decision making (March & Simon, 1958), epigenesis (Etzioni, 1963), voluntarism (Parsons, 1951), social construction (Berger & Luckmann, 1966), adaptive learning (March & Olsen, 1976), and most models of strategic planning and goal setting (Chakravarthy & Lorange, 1991).

Scholars from this school of thought study in the organisations the ongoing process of goal formulation, implementation, evaluation, and re-formulation, based on different learning obtained from the external environment. The main assumption is that organisations are purposeful and adaptive, and they learn by themselves or in interaction with others. Theories in this field explain how different actors in an organization, both on individual and group levels, arrive to be sufficiently like-minded to act as a single collective entity and form a collective organisational goal in a form of envisioned end state, take actions to reach it, and monitor the progress. Moreover, teleology puts a special attention on the role of creativity in these processes, because individuals or groups are free to set and enact whatever goals they prefer. From this point of view, the finding from this study propose concrete examples of how different organisations actors combine their efforts in finding the best direction for the organizational development by exploiting their creativity.

Moreover, this school of thought recognizes that there is no sequence of events trajectories of development that organizations should follow. Instead, some teleological models incorporate the assumption of equifinality, taken from the systems theory. This

assumption is based on the idea that there may be several equally effective ways to achieve a goal. Consequently, there is no prefigured path, no logical direction, or set sequence of phases that could bring the actors to achieve the final goal. This is exactly the assumption of the DT philosophy, which posits that there is no optimal way of finding solutions or pursuing innovations. From this perspective, this study offers examples on what actions are taken to fulfil the goal, and what are the components that orient the behavior and resolve tensions.

Scholars in the teleological school of thought of organizational evolution may build on this study in different ways. For instance, they make take inspiration from the discursive nature of the DT practice and open a perspective on organizations as creators of social meaning, where individuals share a model of the world, the organization as well as their roles within them (Weick, 1969, 1995). They may furtherly explore how different actors in organisations recognise emerging novelties in the market environment and readily respond to them. But maybe the most fascinating question to be answered in future is how organisations resolve the tension whether to embrace the emerging novelty or try to influence it. Indeed, this study has shown that at the early stage of the innovation process, this tension is present.

Practical implications

This study offers multiple suggestions for practitioners. First of all, the detailed description of the IBM case itself is a useful example of best practices in the field. Managers and practitioners can take inspiration from the strategies, tools, and initiatives adopted by the IBM Design team. As long as the IBM DT Framework is publicly available on the Internet, practitioners can analyse it and compare it with their own professional situation.

This study creates scaffolding for the realistic expectations toward the DT practice, and shows possible way to take advantages of DT. Before starting to introduce DT in your organisation, it can be useful to make an internal research to understand whether there are similar or compatible practices adopted. Introducing a change from zero may be very challenging, whereas building on something existent – much easier. Moreover, it is necessary to understand whether there exist some strongly conflicting practices that clash with DT. Strategic practice is one of the most probable conflicting practices. Instead of being oriented toward innovation, it can be concerned toward maintaining the status quo. Instead of being driven by market, it can be driven by internal resources. Strategists continuously address tensions, just like DT practitioners, hence you should assure tensions are resolved by keeping a unified vision.

For what regards the tensions inherent to the DT practice, possible ways of their resolution should be addressed. Just to name one, at the beginning of the innovation journey there is always a decision on the way how to identity the opportunity for change - future thinking or actual real problems. As there is no right or wrong decision, such tensions may become

harmful for the organizational climate. The good practice may be engaging the strategic management and discussing collectively the directions to take.

The expected level of creativity is another crucial topic to be addressed among DT tensions. Sometimes people erroneously think that DT practice automatically delivers creativity. While expert designers say that the DT practice, on contrarily, kills it. So, what position is correct? When DT is practiced collectively, and some contextual conditions are favourable, there are high chances that the mechanisms of networked flow are activated, resulting in a collective creativity. However, it's important to keep in mind that different people have different degrees of creativity, and for some particular tasks it may be necessary to involve highly creative people.

The role of professional designers, who are usually more trained on creativity (but not always), should be attentively studied in organizations. As long as we know that (1) practices may be in conflict, and (2) have the power to influence one another, (3) depend on contextual factors, there are high chances that the creativity of few people may be killed by a dominant creativity-adverse culture. Indeed, this is the eternal problem of the ambidextrous organization. However, IBM show us an interesting strategy for coping with this problem. In IBM, designers work with product teams, but they have a design studio as a "cultural home", where to come whenever they need to recharge the forces. So, it's about keeping the balance.

As the study has shown, DT is more cultural phenomenon than a simple methodology. It is essential to remember that DT principles are primary. Practitioners may use IBM DT principles to assess the readiness of one's organization to this kind of cultural shift. If the strategic intent of the organization goes in the DT direction, it can be a good strategy to start implementing cultural changes from a small scale to prepare the background and reduce possible obstacle to the DT practice. Moreover, practitioners may create their own DT framework, personalize the ethical code, working practices, tools, etc. and make them closer to the organizational context and identity.

It is also important to ask oneself what is the real need behind the introduction of the DT practice. When DT practice loses its original end, it may create numerous disillusions. For instance, if a company needs to enhance the culture of humanocentrism, but there is no designing occurring in the company, the introduction of the DT practice may only confuse people. The word "design" may seem to them too distant, too creative, and too discouraging. In this case, it is better to decouple the idea of humanocentrism from the process of designing. Humanocentrism, as any other DT principle, is also a stand-alone principle, that can be exercised and practiced in many different ways.

Another important take-away message derives from the 3-dimensional constitutive structure of the DT practice (mindset, tools, agency). Keep in mind that it is possible that

some people could have already a DT-mindset. Thus, if the real intention of the organisation is to change peoples' mindset, there is no need to "induce" it by practicing with DT tools or following DT process models. For instance, in case of humanocentrism, it can be enough to empower people to tap into their innate capacity be empathic and express sympathy to customers. The typologies of DT mindset may be useful when teams are created. It's good to have the right balance of different in teams, i.e. learners, inventors, doers. For understanding types of mindset, observations or special self-assessment tools can be applied.

The introduced typology of working modes (explorative, sensemaking, imaginative, generative) may help practitioners to understand the dynamic nature of the DT process, and to take the maximum of each moment. Indeed, every type of these working modes can significantly improve in presence of some contextual factors. For the explorative mode, the contact with people is important, and the use of analytical tools, and of course open boundaries, flexible schedule. The sensemaking mode may be boosted by the provision of high visualization facilities. For the imaginative mode, an inspirational atmosphere is necessary, a place where to connect with oneself, calm one's mind, etc. Depending on the problem or phase of the project, the generative mode can require prototyping facilities, or special places to collect feedback. The DT-driven organisations may also decide to organize their spaces according to these four working modes, or use third spaces when it is necessary.

The typologies of tools that was advanced in this study (methods, techniques, frameworks, digital software) is useful for skills assessment and for preparing training plans by different levels of difficulty. Organisations may create and distribute different fieldguides to promote the appropriate use of tools. Moreover, creative combinations of tools can be stimulated for enhanching the development process.

To conclude this dissertation, I would like to invite all scholars and practitioners to be reflexive, and to approach any theory, model, or suggestion with a deep and critical thought. In such a complex world, there would hardly be any theory capable of resolving our specific problems. Instead, as DT teaches us, there is always part of subjectivity in resolving the problems. I would like to close this chapter by a famous IBM's CEO Mr. Watson Sr.:

> *"And we must study through reading, listening, discussing, observing and thinking. We must not neglect any one of those ways of study. The trouble with most of us is that we fall down on the latter - thinking - because it's hard work for people to think, And, as Dr. Nicholas Murray Butler said recently, 'all of the problems of the world could be settled easily if men were only willing to think.' " (Mr. Watson Sr.)*

APPENDICES

APPENDIX 1

INFORMATION SHEET FOR PARTICIPANT - A RESEARCH PROJECT

INVESTIGATING DESIGN THINKING IN IBM

Dear IBMer,

my name is Iryna Prus, and I am writing to invite you to take part in the research project entitled "Design Thinking for Innovation". The research project makes part of my doctoral dissertation and is organized by the Doctoral School in Education and Communication Sciences, University of Milano-Bicocca. It has the support of the IBM Company and I hope to have your interest to participate in it. This information sheet explains the purpose and procedures of the study.

WHAT IS THE AIM OF THE RESEARCH?

The study investigates how Design Thinking is conceptualized and applied in organisations. Moreover, the particular interest is dedicated to investigating different features of the Design Thinking ecosystem (i.e. work organization, cultural issues, workspace). Your organization may benefit from this research by gaining insights into how to better configure different work & HR practices, organize space, and devise training and development programs in order to promote Design Thinking and maximize your creativity.

WHAT DOES PARTICIPATION IN THE RESEARCH PROJECT INVOLVE?

Once you agree to participate, you will be involved in an interview session that lasts about 40-60 minutes. You will be consulted to find a time that causes least disruption of your work. Before the interview, you will be asked to sign a Consent Form. The interview will be semi-structured, conducted by me, and audio registered. To organize the interview, you will have three options: (1) use a quiet location in IBM site; (2) meet at the café or co-working space; (3) organize a Skype interview.

WHAT WILL HAPPEN TO THE INFORMATION COLLECTED?

All interviews will be transcribed from audio files and imported into the research software NVivo for the analysis. All data will be kept confidential and stored securely in the Department of Educational Human Sciences at the University of Milano-Bicocca. The audio of the interview will be destroyed at the completion of the study. After closing the research project, the dissemination of findings will take place. The results will be first published in my PhD thesis, and later presented at academic conferences and/or submitted to academic journals.

HOW IS CONFIDENTIALITY GUARANTEED?

Only pooled results will be documented; individual results of this study will remain absolutely anonymous. The identity of interview participants will not be disclosed at any time. Your name and any other identifying details will never be revealed in any publication of the results of this study. Moreover, all "Confidential Information" observed during the research project (e.g. technical drawings, algorithms, know-how, prototypes, models, processes, ideas, inventions, discoveries, methods, forecasts, strategies and techniques etc.) will be kept secret and won't be disclosed to third parties.

TO WHAT EXTENT IS PARTICIPATION DUTIFUL?

There are no risks associated with your participation. However, if you agree to participate and later change your mind, you are free to withdraw from the study without reason or prejudice and without any consequences. All contributions you have made to the research will be destroyed if this is requested.

WHO IS FUNDING THE RESEARCH?

This research is funded by the Italian Ministry of Education, Universities and Research, as a part of the Doctoral Schools Program (XXIX cycle).

IS THIS RESEARCH APPROVED?

The study has been reviewed and received a favorable opinion from the Council of the Doctoral School in Education & Communication Sciences, University of Milano-Bicocca, in accordance with its ethics review and approval procedures.

WHAT ARE THE ADVANTAGES OF PARTICIPATION?

You may find the project interesting and decide to share your experience. No prizes or gift vouchers will be delivered as a token of our appreciation for your participation. Once the study is finished, it could provide information about positive innovation initiatives for supporting design-based ways of working. The final results will be shared with IBM's HR department and senior management, along with a series of improvement suggestions.

WHO DO I CONTACT IF I WISH TO DISCUSS THE PROJECT FURTHER?

If you would like to discuss any aspect of this study, please contact me on +393477088943 (cellular) or i.prus@campus.unimib.it.

Thank you for your time and precious support.
Kind regards,
Iryna Prus

APPENDIX 2

Iryna Prus, PhD Candidate
Doctoral School in Education & Communication Sciences, University of Milano-Bicocca
e-mail: i.prus@campus.unimib.it

INFORMED CONSENT FORM

Upon a review of the Information Sheet for Participant, I have received a complete description of the research project entitled "Design Thinking for Innovation" and agree to participate in it.

By signing this form, I confirm that:

- I have read the Information Sheet and understand the aims and procedures of this research project;
- I understand that participation in the project is entirely voluntarily, that I can refuse to answer any question, and that I am free to withdraw my participation at any time;
- I understand that the research team will guarantee the confidentiality of the data provided to them by me.

☐ I would like a copy of my interview transcript.
☐ I would appreciate to have a copy of a summary of the results when the study is completed.

_____	_____	_____
Name	Signature	Date

General background	• How long have you been in IBM? • What is your educational and professional background? • What is your present role and area of expertise? • When and how did you get involved in IBM DT? • How important for you is becoming an expert in DT? • Do you have any goals in the coming year related to DT? • How important for you is becoming a DT champion?
DT meaning	• What is your personal definition of DT? • Have you changed the way you think about your work or your workplace since you've started to apply DT? If so, can you describe when and how?
DT practice	• How do you apply DT in your work? • Can you make some examples of when you practiced DT? • What are the kinds of projects where you usually apply DT? • What personal challenges do you face in applying DT? • What contradictions/paradoxes have you encountered when practiced DT?
DT consequences	• What impact did DT have on you? What changed since you've started working with DT? • How did DT affect your work experience and work attitudes? • How did your relations with colleagues, clients, and supervisors change since you started to apply DT? • What changes did you note in IBM and in your team since the IBM DT Program has been implemented? • In your opinion, what are the norms/routines/practices DT is revolutionizing in IBM? • What changes do you expect DT may bring in the long-term future of IBM?
DT context	• What stands out when you think of your best/worst experience in applying DT? Could you think of a concrete episode and identify key factors that made the difference? • What factors most help/hinder your DT practice? Why? How? • If you were given the opportunity, what would you organize differently from your nowadays workplace to foster DT? • In your opinion, what are the major challenges IBM faces in switching to DT?
Benefits of DT for innovation	• What results did you manage to obtain due to DT? • How is "good" DT practice evaluated in your work? • In your opinion, what are the major opportunities that DT brings to IBM? How opportunities can be maximized?

INFORMATION SHEET FOR PARTICIPANT - THE MOBILE ETHNOGRAPHY STUDY "IBMERS' DESIGN THINKING EXPERIENCE"

Dear IBMer,

this information sheet explains the research project "IBMers' Design Thinking Experience", you were invited to participate in. This study will investigate your experience in working with DT. It will be based on the use of the mobile app ExperienceFellow, with the help of which you will be able to share your emotions, images/video, notes in a completely anonymous way.

You will decide on your own how frequently you will use the mobile app to report the information you consider important/useful. Sharing your experience takes some seconds, but for researchers these are very valuable insights. Your organization, as well, may benefit from this research by identifying areas for improvement, in order to promote the design culture and maximize your creativity.

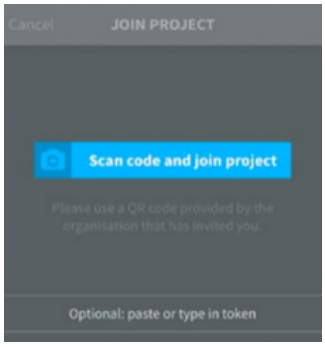
WHAT SHOULD I REPORT?

The mobile app ExperienceFellow will enable you to document any moment of your DT experience you consider important/useful. You can also report information on the DT context. Maybe there's something that particularly enables your work with DT? Or slows it down? Or influences positive results? Or seems paradoxical? Or encourages/discourages you to use DT? etc. It also helps a lot when you use photos, videos, or text to describe your experience in detail. In this way, researchers will be able to interpret your experience in a meaningful way.

WHAT IS EXPERIENCE FELLOW?

ExperienceFellow is publicly available as Software-as-a-Service solution provided by More than Metrics GmbH (Austria). The software is based on extensive research and numerous academic research projects and prototypes. The founders, Marc Stickdorn and Jakob Schneider, have been working in the field of service design for years and published the award-winning book "This is Service Design Thinking". They founded ExperienceFellow as an academic spin-off.

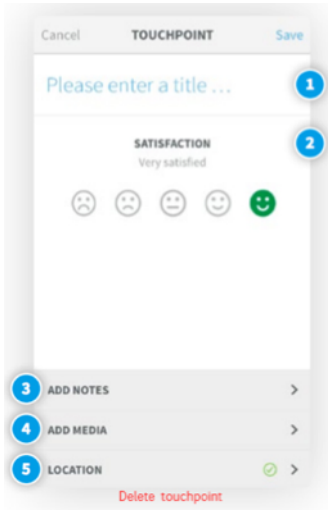
HOW TO GET STARTED?



In order to start you need an iOS/Android mobile device or tablet, and the internet connection. Then follow these steps:

1. Download the app Exp.fellow (available for iOS and Android) for free on the App Store or Google Play.
2. At first use, the application will ask you the authorization to track your location and send you push notifications.
3. Join our project by scanning the QR code or by entering the alphanumeric access token manually (XXX).

HOW TO USE THE APP?



In order to insert a new experience/touchpoint, follow these steps:

1. Click on "New experience/touchpoint". Give a short name to it.
2. Indicate your satisfaction with the experience by choosing 1 of 5 smiley faces (from very bad to very good).
3. You can add a description of what exactly happened.
4.You can add pictures and videos to illustrate what happened.
5. Share your GPS data.
6. Click on "Save". You can update/delete your touchpoint at any time until the project is definitely closed. To update, just edit the information. To delete, click on "Delete experience/touchpoint".

Until you decide to transmit your experience/touchpoint (i.e. to sync), it will remain stored only on your mobile device. If the mobile device is connected to the internet, syncing will happen automatically. The application will show you a reminder in case you have unsynced items. You don't have to be connected to the internet all the time – you can sync your experience later when they are online again.

WHY TRACKING MY LOCATION?

GPS will save the location data for each touchpoint that you will create. Tracking GPS data allows us to understand what location you are using for your work. Please note that when you are inside a building, the app will remember roughly where you are (based on connections with satellites and WIFI), but it can't recognize your exact position. Moreover,

it might happen that you want to share your experience once it has ended, when you already moved to another location. In this case GPS data won't reflect the place of your experience. Therefore, it's important that you could capture and share your impressions during the experience. However, you can always go back and edit the touchpoints after their initial logging.

WHY SENDING ME NOTIFICATIONS?

With the help of weekly push notifications, we will try to call you for action, remind you to sync the data, and provide tips on important situations to report.

WHAT WILL HAPPEN TO THE INFORMATION I PROVIDE?

The researcher will see the list of anonymous participants with a unique identifier, as well as all touchpoints/experiences created by them. On the aggregated level, the researcher will see the summary of employees' "journeys", their emotional curve, and the geographical distribution of experiences on the map. The data obtained will be stored in the Experience Fellow system, and the researcher will be the only person to have access to them.

Thank you for your time and precious collaboration.
Kind regards,
Iryna Prus

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