DESIGN+

Organizational renewal and innovation through design

DESIGN+

CONTENTS

PREFACE

Design is...

the art of finding the right question to ask

the craft of making insights visible

the imagining of a better solution

the co-creation of the future

This book is based on the work of a two-year multidisciplinary research project, Design+, funded by the Finnish Work Environment Fund. We've collected a rich set of data on design in organizations, drawing from over 220 interviews of designers, design managers and those collaborating with designers across different organizations in 9 countries. We use what we have learned so far to offer an easily-accessible introduction to design and design thinking in organizations. After reviewing the basics, the chapters in this book explore different perspectives, examples and issues related to using design approaches in Finnish organizations, ranging from the contexts of industrial processes and equipment to financial services and telecommunications. They illustrate multiple ways in which design can be effectively organized and used to create new value in organizations.

Although we have some answers already, our work will continue in analyzing the collected data further and sharing our findings. Much remains to be learned on how design can be used to promote organizational renewal and wellbeing - in theory and in practice. Our not-so-secret agenda is to make this a community effort! We hope this book will spark your curiosity and lead you towards a path of

experimentation to renew your own ways of working through design. We could use more innovations and human-centered practices, and we're sure your community and organizations could too.

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INTRODUCTION

The changing role of design

Tua Björklund, Aalto University

The products, services, technologies, ecosystems, and networks of today are much more interconnected and complicated than ever before. Companies must be agile in their operations to keep up with continuously developing technologies and business environments to outperform their competitors. Dynamic capabilities are needed to exploit existing opportunities in mature technologies and markets, while at the same time exploring and competing in environments where flexibility and experimentation are key success factors[1]. Likewise, the public sector and society at large are facing complex, interconnected problems in a shifting landscape, where successful innovations require collaboration across disciplinary and organizational borders[2]. As a result, private and public organizations alike are turning toward design[3].

With the spread of design into new frontiers, the boundaries of what design is and what it is not become increasingly unclear. Theoretically speaking, *design is the act of changing existing situations into preferred ones*[4]. In practice, we often distinguish design by its domain: software design, organizational design, industrial design, engineering design and so forth; each have their own academic and professional communities and traditions. Regardless of its field of application, the current rise of interest in design can be traced to a desire for a more human need-centered, experimentative way to innovate[5], with design having systematically moved closer to users across the design process through the years[6]. Along the way, designers have become advocates for the users and customers in organizations, and efforts to elevate the role of design in organizations are often coupled with attempts to become more customer-centered. Designers are moving upstream in the decision process[7], at times all the way into the executive team[8]. With this increased legitimacy comes access to resources and influence[5].

At the same time, design approaches are making their way to new occupational groups. Design thinking has popularized the mindsets, tools and methods typically used by designers for wider use. While it is a contested construct with different interpretations ranging from individual skills to organizational culture, typically *design thinking is understood as an approach to human- or user-centered innovation, creative problem solving, experimentation, and iteration, used across different occupations*[9]. Design thinking has many proponents[10], but it has also received its share of vocal criticism for oversimplifying and diluting design, and not going far enough in necessitating co-design[11]. We believe this debate is largely due to the plurality of definitions and attributes associated with the concept. No, design thinking does not negate the need for design experts. By the same token, design experts alone will be unable to transform organizations. Call it what you will, but a wide variety of stakeholders is required to tackle the issues we face in organizations and as a society, and we cannot plan ourselves through the volatile uncertainty - rather than relying on predicting the future, design approaches rely on co-creating it.

Indeed, design can play a variety of roles on different levels in organizations, its benefits dependent on the extent and quality of each of these roles and levels. Many companies still have little or no design capabilities - in the last 2016 Innobarometer, 37% of 13 112 European companies self-rated their organizations as using no design at all[12]. When design is used, it is most frequently in product design[12,13]. Warwick Business School professor Pietro Micheli and colleagues define *design as service* as the role of design when its main activity is to respond to briefs and information developed in other departments in the organization and its sphere of influence mainly related to the aesthetic orientation to strengthen existing brands and enhance product quality[5]. In contrast, only 5-12% of organizations are estimated to include design on a strategic level[12,13].

Design as strategy entails having an influence on the long-term sustainability and competitiveness of an organization through informing strategic decision making, such as product positioning or creating new markets, and this influence being recognized organization-wide[5]. For example, Phillips Design describes moving from a global support unit in the company to an integrated function, swapping separate design metrics to examining how the enabled collaboration has an impact on innovation and performance[14]. Design can even become the primary means to determine organizational direction, transitioning from a discrete unit to a crucial component of the mindset of the organization[5].

Rewards are reaped disproportionately by the relatively few organizations where design has been elevated to a strategic level. Based on a global survey of 2200 companies in 77 countries, InVision reports in comparing strategic design to design in a "visuals only" role, that organizations report design as having had a proven impact on their revenue, cost savings and time to market four to six times more frequently, and a whopping 26 times more often on their valuation[13]. These assessments of impact are supported by research on the positive impact of design on innovation, efficiency and profitability[12,15].

There are a wide variety of factors influencing the role of design in organizations, ranging from top management support to inter-functional coordination, from the formalization of processes to organizational culture[5,16]. There will always be more to the story than what meets the eye, but this book aims to provide an overview of key considerations in the role of design in organizations. We begin with a brief introduction to design thinking, and some of the typical approaches it entails, as well as the key organizational building blocks required for developing design-driven organizations. Rather than a comprehensive account, this section lays out a foundation, creating a

Different facets of design:

Design is...

Key activities:

...business strategy

5%

- *Cross-platform strategies*
- *Trendspotting and foresight*
- *Product market fit tests*
- *Vision artifacts*

...a hypothesis
and an experiment

12%

- *Concept testing*
- *A/B tests*
- *Analytics and measures*
- *Formalized operations*

...a standardized
scalable process

21%

- *Daily standups*
- *Planning & prioritization*
- *Design briefs*
- *Written documentation*
- *Integrating to internal
  operations structures*

...what happens
in a workshop

21%

- *Workshops*
- *Rapid sketching*
- *Stakeholder input*
- *Integrations
  between designer and
  developer tools*

...what happens
on screens

41%

- *Wireframes*
- *Comprehensive layouts
  (design comps)*
- *Interactive prototypes*
- *Visual identity*

InVision 2019

shared understanding of what we are talking about. It offers the forest to the trees, the bigger picture of how different efforts connect.

The second part of the book, in turn, dives into a number of specific perspectives and accompanying examples from Finnish organizations, placed into sections related to the broader themes of designing growth and change, designing collaboration and designing the future. This part can be explored in a non-linear manner: feel free to cherry-pick and skip directly to issues timely and relevant to your own efforts. The purpose of these chapters is to inspire new questions and ideas based on a variety of viewpoints and tangible examples. We hope to provide a spark for you to start building your own design experiments. At the end of the day, no matter how big or small a change is, it all comes back to the people in the organizations - design transformations happen when individual steps and experiments come together and begin creating synergies across the organization.

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The foundations of design thinking

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Design thinking tends to evoke strong emotional reactions in opposing directions - excitement, frustration, scepticism. We often find conflicting opinions that stem from very different notions of design thinking. With a boom of literature and case studies in design thinking, a variety of definitions are being simultaneously advocated for in academia and industry alike. Before diving deeper into how design approaches can be used in organizations, it is helpful to get on the same page in terms of how we view design thinking. In a recent review, for example, Warwick Business School professor Micheli and colleagues identified five perspectives on design thinking in the literature[1]:

1] *Emphasizing interdisciplinary collaboration where design thinking practices are considered a starting point toward embedding design thinking across organizations*

2] *Emphasizing design thinking as designers' domain, highlighting the ability to visualize and use different material practices*

3] *Emphasizing resilience in problem solving, offering design thinking with its tolerance for ambiguity and practices of interdisciplinary collaboration as an alternative to narrow analytical approaches*

4] *Emphasizing the holistic and systemic perspective, focusing on the abilities of individual designers to think and visualize*

5] *Emphasizing learning to think like designers, using abduction and aspirationally balancing intuition and rationality*

What these different conceptualizations have in common is a view of design thinking as a user-centered approach to creative problem solving and innovation[1]. We think of design thinking as a way to gather insights, reframe challenges and create effective solutions through emphasizing collaboration, diverse perspectives, concretization and

experimentation. It can be considered a "social technology" of tools and insights into human nature[2]. Rather than relying on the logic of deduction or induction, design and design thinking build on leaps of abduction to create working hypotheses of what might be[3]. University of Sydney professor Andy Dong and colleagues[4] distinguish between two types of abduction in design: explanatory abduction and innovative abduction. Explanatory abduction centers on creating plausible possible explanations for surprising observations. This can lead to innovative abduction, where the intended value for a customer or user is the only known factor in the beginning. Potential strategic options and modes of operation for delivering this value are created and tested.

Similar to lean and agile approaches, iteration and experimentation are central in design thinking[1,5]. However, while some practices and tools are used across these approaches, design thinking has a unique emphasis on exploration[1]. While all three work toward solving problems the right way and testing preliminary insights, design thinking centers on identifying the right question to ask in the first place. In terms of problem solving terminology, lean and agile focus on the solution space, whereas design thinking is its most influential in scoping the problem space[6]. In ill-structured wicked problems, these two spaces co-evolve, and how the problem is framed guides which solutions are considered possible[3,7]. As such, framing and reframing represent key features of design expertise and design thinking[4,8].

SHIFTING SHAPES OF THE DESIGN THINKING PROCESS

While the number of phases or steps and their names vary across different conceptualizations of the design thinking process, each builds upon data about user needs, idea generation and testing[9]. To illustrate these commonalities, we share four well-known examples of design processes from industry, the public sector, research and education:

The double diamond: Perhaps the most well-known process model is the double diamond, found in many models of human-centered design innovation. The British Design Council defines its steps as first diverging from a problem in Discovering and then converging on a design brief in Defining phases (forming the first diamond), and then diverging again to Develop potential solutions and converging to Deliver a solution (the second diamond)[10].

Discover
insight into the problem

Define
the area to focus upon

Develop
potential solutions

Deliver
solutions that work

Problem definition

Problem

Solution

Design brief
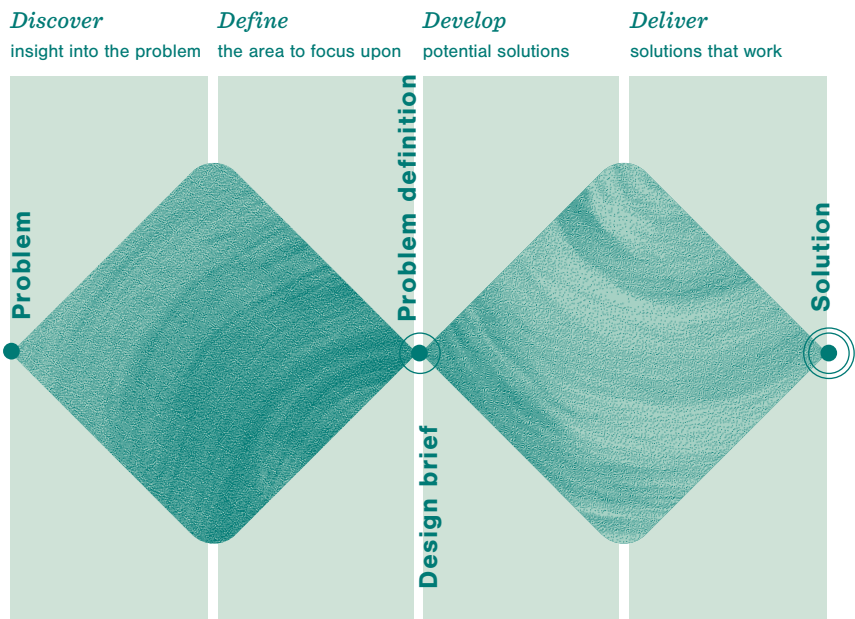
British Design Council

The wave: IDEO is one of the key consultancies behind the spread of design thinking into business[11] and is made up of some of the most highly regarded practitioners in design thinking. Their model has three phases; Inspiration, Ideation and Implementation. Their non-profit organization, IDEO.org depicts design thinking as a wave of alternating divergence and convergence (similar to the double diamond), its scope becoming increasingly focused moving towards the solution[12].

diverge   converge   diverge   converge

Inspiration   *Ideation*   *Implementation*

IDEO.org
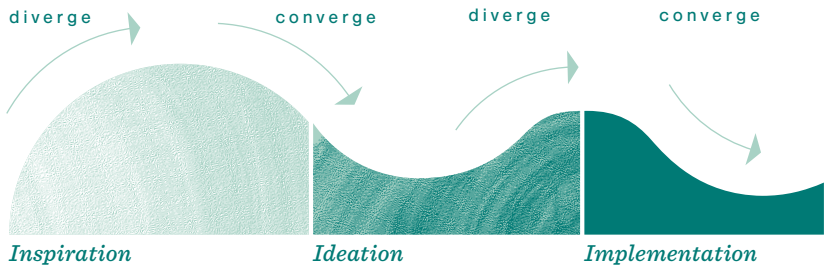
The two-by-two: In the academic realm, UC Berkeley professor Sara Beckman and Michael Barry from Stanford University have built upon the experiential learning cycle of educational theorist David Kolb[13], drawing a parallel between the process of creating innovations and learning. Design activities iterate between four quadrants of creating observations, frameworks, ideas and solutions. These can be mapped on two continuums: abstract and concrete, and analysis and synthesis[14].

Abstract

Frameworks
[*Insights*]

Imperatives
[*Ideas*]

Analysis   **Synthesis**

Observations
[*Context*]

Solutions
[*Experiences*]

Concrete
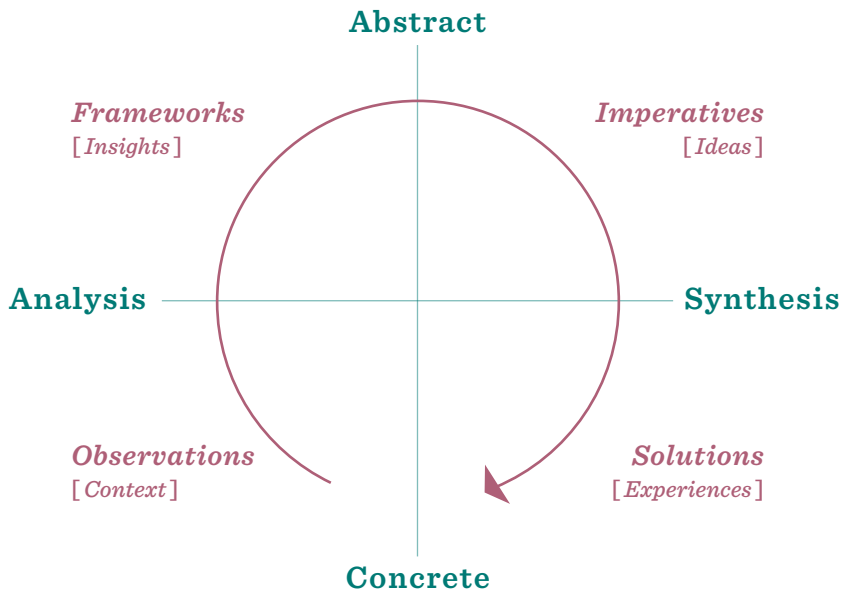
Beckman & Barry

The hexagons: If IDEO is a contender for the most famous design thinking business, d.school at Stanford University is that in the educational realm. They depict design thinking in five steps: empathizing, (re)defining, ideating, prototyping and testing[15]. We often use this model ourselves to structure our design thinking workshops at Aalto Design Factory, as this is one of the models built around more self-descriptive, concrete activities rather than abstract phases or transitions.

Stanford d.school
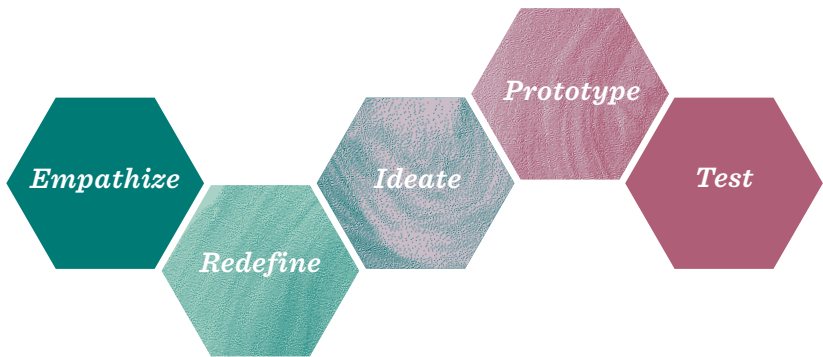
Whichever process model you choose, it should be considered as a guideline and a source for shared vocabulary that smooths collaboration, rather than a depiction of reality. In practice, the design process is "messy", with feedback loops between different phases and some customization for each problem. These models can be considered as recipes that act as reminders of important ingredients and help those newer to the approach get started[16].

KEY PRACTICES AND COMMON TOOLS

How design thinking approaches and tools are used in organizations in practice is dependent on culture[17]. When collaboration and experimentation are valued and the norm, design thinking is easier to practice[17]. In contrast, cultures heavily focused on productivity, performance and siloed specialization have been found to be more resistant to using design thinking[17]. This does not mean design thinking is incompatible with productivity or performance: while user research, problem framing and experimentation take time and can feel like a speed bump, these early investments pay off in reducing

overall time and increasing overall effectiveness[17]. And while some organizational cultures can make it more difficult to practice design thinking, the good news is that using the tools can also craft culture into a more collaborative and user-centered one. The physical artifacts and emotional experiences of using the methods help organizational members understand the underlying values of design thinking[18].

Reviewing literature, Micheli and colleagues[1] found 37 different methods and tools repeated in connection to design thinking. Ethnographic methods, idea generation methods, visualization, prototyping and experiments were present in most accounts[1]. We offer a brief overview of key activities and a few example tools in different phases of the design thinking process: empathizing, reframing and experimenting. In each of these phases, there is a wide variety of methods, tools and approaches you can utilize (and several books exist to guide you through these, such as *This is Service Design Doing*[19]). No specific method is demanded, nor ensures success. Rather, the key thing is to understand why these approaches are used and then use whatever method is feasible and suitable for your own specific context and purposes.

The following pages summarize the key reasoning behind the phases of empathizing, reframing and experimenting, and offer two quick and easy exercises and templates for each phase to provide an effective starting point. Completing them will not magically turn a project into a design thinking project, but you stand very little to lose and much to gain from starting the discussion around these topics.

EMPATHIZE: Bringing in diversity in perspectives and the experiential nature of design thinking

Design thinking relies on gathering insights on the needs of stakeholders connected to the problem or idea at hand. These insights serve as the foundation for all other activities, and often a disproportionate amount of time is spent on this very first phase. Needfinding tools require designers and developers to empathetically engage in learning about the stakeholders' experiences and context[18]. Perspective taking - a cognitive rather than affective type of empathy - has the strongest correlations to innovation[20]. It is prompted by exposure to different perspectives and plays a role throughout the design process[21]. First-hand involvement in the needfinding activities is preferred to both transfer a richer scope of insights into subsequent phases and an increased motivation to use these. Using needfinding methods can help to introduce more user and customer centric cultures in the organization[18].

Needfinding tools range from interviews to observations, from design probes to co-creation sessions, and projects using design thinking usually combine different methods to gather a variety of insights. The focus is on answering why and how questions - what, when and who are good starting points, but need deeper understanding to provide a fruitful foundation for abduction. In this phase, diversity matters more than representativeness. If and when pressed for time, stakeholders and users who are as different from each other as possible are targeted in order to increase the odds of making a surprising observation.

In addition to gathering data on and from stakeholders, inviting stakeholders to co-create insights is a powerful approach. Working jointly to create shared, physical "boundary objects" like journey maps or empathy maps can help to reveal new questions to ask and articulate implicit knowledge on the experience and context that stakeholders might not be able to recount in isolation[22].

Example tools for empathizing:

Crafting and comparing insight statements with the team

After going through user research results, have each project member synthesize data, producing 3 to 5 key insights statements each with the following template (guiding the focus on stakeholder needs and their "why"s). Compare and discuss your statements. Do you see any patterns or underlying dimensions according to which the statements can be grouped together?

[who]	need(s)

[what]	because

[compelling insight]

For example, R&D engineers	need(s)

to understand the design thinking process	because

currently mismatched expectations are creating scheduling conflict between collaborating designers and engineers in our innovation projects.

Co-creating empathy maps together with stakeholders

Select a key experience or topic, and invite stakeholders along to create an empathy map together with the team in charge of the development or design project. Work in groups of approximately five around a large canvas or whiteboard, documenting different experiences and thoughts around the topic being mapped. Different sections serve as different entry points diversifying the discussion; don't worry too much about where something should be written down. The key value is in the discussions around the whiteboard, although the produced map also helps in communicating insights further to others in the organization.

Think & Feel
What occupies thoughts
What matters
What worries

Hear
Others saying
Friends
Colleagues

See
In the environment
On the market
Others doing

Say & Do
Behaviour
Quotes

Pains
Fears, anxieties
Frustrations
Obstacles

Gains
Wants/needs
Measures of success
Hopes and dream

REDEFINE: Surfacing assumptions and trying out different scopes

Framing is a way to make sense of problems, ideas and experiences, selecting which aspects of complex and uncertain features are attended to[23]. Rather than taking design challenges as given, designers reframe them to be more fruitful and actionable[24]. Creating a standpoint ("frame") from which a problem can be successfully tackled is a cornerstone of design expertise and practice[3,8,25]. Sometimes reframing can even take more time than creating the eventual solution[26]. Frames guide what we notice and take into consideration, and thus impact the quality of the eventual design solution[27].

Framing and reframing can be intentional[28], but it can also be implicit and subconscious[29]. Any challenge comes with assumptions and assumed requirements - some of these will be valid, while others can turn out to be ungrounded. Their accuracy will be easier to evaluate and reflect upon if these assumptions are made visible. Here again, a diversity of perspectives is helpful to identify and evaluate assumptions. Different visualizations and artifacts can prompt the discussion through exploring extremes, illuminating implications and simply creating a shared starting point for conversations[30]. Design can be used to question the status quo[31].

To move beyond assumptions and seek alternative frames, raising the level of abstraction can be helpful. Rather than thinking of product, services and solution areas (such as books, office cleaning or education), reframing focuses on the needs underlying them - why would someone benefit from or use such a product, service or solution[4]. High-level questions on reasoning behind goals, expectations and causation are more likely to trigger the creation of new frames than lower-level questions on definitions, specifications and judgement[32]. Similarly,
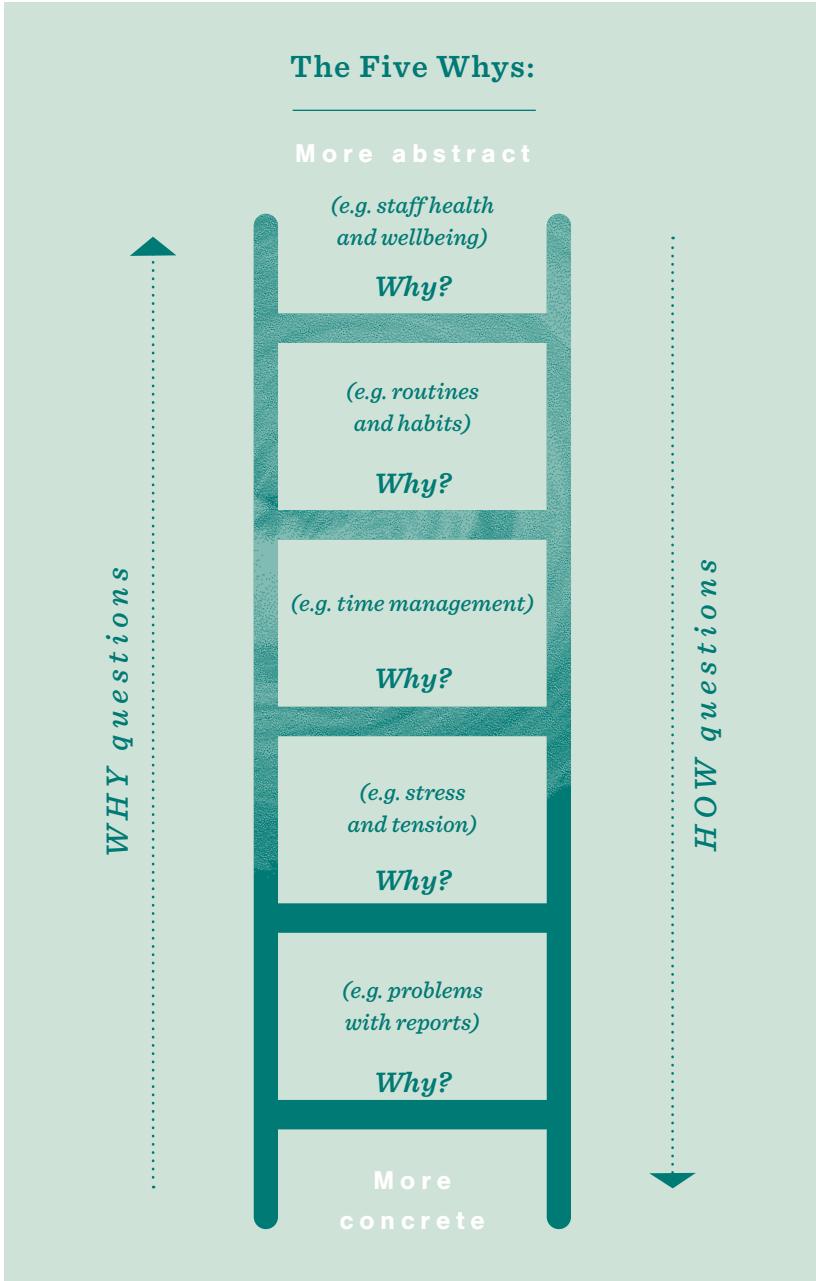
analogies and series of "what if" questions drawing potential parallels between the challenge at hand and different themes and abstract concepts can help[4,33]. Indeed, in order to unearth some of the hidden assumptions, it is important to create multiple, parallel frames from different perspectives and "depths" to explore rather than fine-tune and validate the initial one discovered.

Example tools for reframing:

Exploring different ladders of abstraction with "why" questions

To focus on needs and explore different frames, asking the "five why"s familiar from the Toyota Production System[34] can help. "Why" questions move the frame higher in the level of abstraction, whereas "how" questions help to bring the challenge into more concrete levels.

The ideal foundation is a frame that is neither too abstract (paralyzing idea generation, creativity does benefit from boundaries) nor too concrete (exhausting potential ideas quickly and running around the same circles) - the Goldilocks of frames. In our experience, moving a few steps upward in abstraction from the original challenge is usually called for in order to enable diverse ideation.

The Five Whys:

More abstract

*(e.g. staff health
and wellbeing)*

Why?

*(e.g. routines
and habits)*

Why?

(e.g. time management)

Why?

*(e.g. stress
and tension)*

Why?

*(e.g. problems
with reports)*

Why?

**More
concrete**

WHY questions

HOW questions

Turning stakeholder research insights
into challenge frames

Similar to the insight statements that are produced from needfinding, have each project member reflect on what they have learned and discussed in the project so far and create 3 to 5 "how might we" questions with the following template (essentially flipping over the insight statements, keeping the focus on the discovered stakeholder needs and understanding). Compare and discuss your questions. Do you see any patterns or underlying dimensions according to which the questions can be grouped together?

How might we   *[what: goal]*

so that   *[who: stakeholder]*

can   *[why: insight]*   ?

Gow might we   *, for example, motivate middle-managers*
                      to try out reframing tools to understand
                      the design thinking process

so that   *sales staff*

can   *see constructively questioning initial*
                      project scopes as legitimate in the
   *organization*   ?

EXPERIMENT: Creating and quickly testing potential solutions to pursue

No amount of needfinding and reframing will immediately yield the perfect solution in the perfect form. In idea generation, quantity breeds quality - the aim is to extend the scope and variety of potential solutions while they are still on paper, as it costs virtually nothing. Playing it too safe will yield unsurprising, unoriginal ideas - wild, unrealistic ideas can act as stepping stones for great and feasible solutions. Using idea generation tools not only helps to create diverse ideas, but contributes towards creating organizational cultures open to ambiguity, collaboration and pursuing ambitious projects where success isn't guaranteed[18].

In the initial experimentation phases, the aim isn't to validate solutions, but rather to maximize learning what does and does not work, and why[35]. It is both more resource efficient to construct low resolution prototypes and easier to isolate what caused results when everything from an idea isn't bundled into one prototype or test from the get beginning. Rather, ideas are broken down into subcomponents and assumptions, which can be quickly tested; here, think more paper user interfaces, desktop walkthroughs with building blocks and role plays than CAD models or beta versions. The "low resolution" prototype can test either the proposed function, role and context, or look and feel[36] - try to add a second dimension and it becomes much more time consuming to prototype and more difficult to interpret the results. Thus, the purpose is to create a series of quick prototypes and tests in the initial exploration phases.

Prototyping to understand:

Function

Role & context

Look & feel
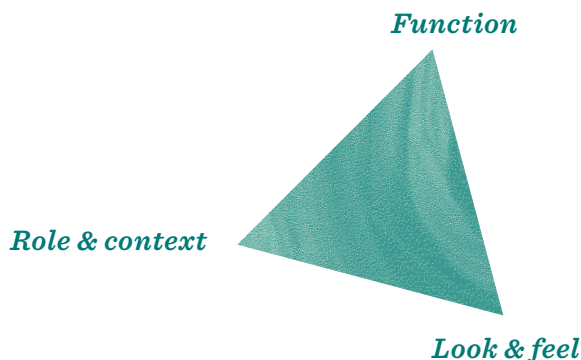
Houde & Hill

Iteration can be one of the hardest things to absorb for those new to design thinking - humans have a natural tendency to converge quickly and design thinking is used to counteract that tendency[37]. Idea testing tools can help to create a culture of experimentation, openness to failure and strategic thinking[18]. In addition to pursuing parallel experiments within the project team, bringing in external stakeholders to co-design prototypes and experiments can also help to prevent fixation on a single solution. As more is learned, experimentation becomes more sophisticated and transitions more towards validation, but it is important to start small. Not only do these initial small bets keep the stakes and costs low, they help to create early wins to build momentum for the proposed solutions[38].

Testing out the most important assumptions in ideas

Once the team has zeroed in on a few ideas to explore, make the assumptions embedded to them visible and think of ways you could test whether these hold true. You do not need to launch into a long and complicated series of testing, but rather review which assumptions are the most crucial ones to explore before proceeding further in developing the idea, and start from there. Asked another way, what does the effectiveness of the idea hinge on? What would make it useless? You want to find these out before you've invested months of your time to develop the idea further.

What to prototype and test:

Idea What is the idea? Problem solved or value created?	Testable components Key components/ element to test?	Questions to ask What questions should we ask to learn?	Way of testing How and with whom to test?

Planning experiments

Keep your eyes on the prize - what do you want to learn, and how will you know what you have learned? This template can be used to plan potential experiment plans. Again, we encourage you to plan more options that you intend to execute, so that you can mindfully select which ones make the most sense with your needs and constraints.

Experimentation plan:

Learning goals
What do you aim to learn with your experiment?

What
Describe what will you test or try out?

Who
Who will you experiment with?

When and where
When and where will the experiment take place?
For how long?

Resources
What resources are needed?

Measuring
How do you measure success?

Regardless of the methods and tools you chose to use, design thinking aims to create a deeper understanding of the issue from different perspectives and to learn how these could be effectively improved upon. The approaches are certainly beneficial on an individual level, helping to open up one's thinking, but practicing design thinking alone is a tall order. Many, if not most, of the practices hinge on collaborating with others, inside and outside of the project and organization. It takes a village to raise a design thinking outcome! Getting the whole organization on board is needed in the long run (as we'll explore in the next chapter), but it is equally helpful to remember that even large changes need to start somewhere. Rather than waiting for the perfect conditions and support before acting, starting to introduce more design thinking even in your own work alone can be the spark that helps to spread a new way of creating value in your setting.

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Building design-driven organizations

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I n recent years, design has become a strategic tool for businesses, helping to translate technological innovation into user value, bringing customers to the focus, and creating compelling experiences that leading firms have, in turn, successfully transformed into business value[1]. Design-driven organizations take a customer-focused, agile, and cross-functional approach and use empathy as a key asset. Design thinking is combined with strategic foresight in order to design the desired future[2]. It is not surprising then, that many large corporations, such as SAP, Target, Coca-Cola, Starbucks, and Ericsson, have turned their gaze to design.

Design-driven organizations look at things from different angles to challenge existing cultures and rituals, to create and experiment with new ideas, innovations and practices, and to engage multiple internal and external stakeholders. As University of Virginia professor Jeanne Liedtka shows, characteristics borrowed from the field of design - synthetic, adductive, dialectical, hypothesis-driven, opportunistic, inquiring, and value-driven - also describe strategic thinking[3]. What distinguishes design from traditional strategic processes is its human emphasis and experimentative process. Rapid prototyping and iterative experiment-and-learn loops make sense in the context of uncertainty, where cause-and-effect relationships can often be defined only in retrospect[4]. Design-driven organizations use design to redefine the problem space, facilitate co-creation between different stakeholders and learn through experimentation to develop solutions that meet human needs in a technologically and economically effective manner.

While many organizations find design topical and important, concrete steps in building a design-driven organization are sometimes difficult to define and execute. Liedtka and colleagues argue that the challenge of building an organization-wide capability, where everybody innovates, lies in the lack of training, confidence, time, support, autonomy to

conduct experiments, and even access to the stakeholders design thinkers want to serve[5]. In our own work, we've seen siloes, power games and a lack of an overall approach as typical pitfalls. In order to tackle these challenges, we find it important to focus on the talent and capabilities, structures, practices, and culture that can enable design-driven organizing. Here, we offer an overview of key considerations in each of these elements*.

Capabilities

Structures

Practices

Culture
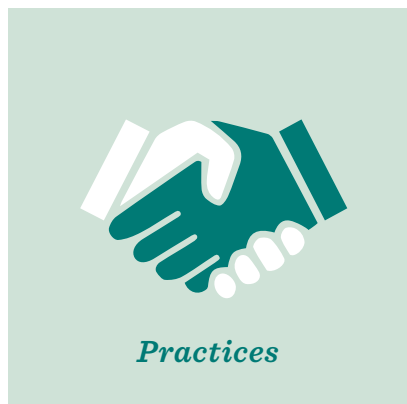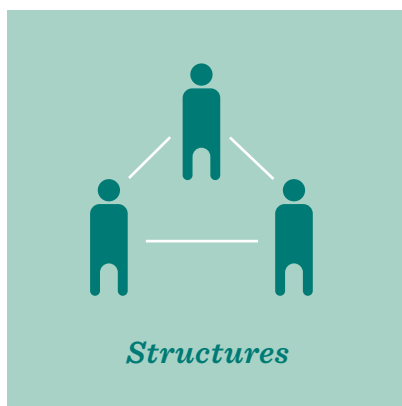
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DESIGN CAPABILITIES: PEOPLE AND TALENT

Building a design-driven organization requires design capabilities at many levels and for many purposes. In these organizations, the CEO and executive team understand the value of design for holistic customer experience, and top management guarantees the resources, the mandate to make decisions, as well as long-term commitment and support. In the beginning, however, the person responsible for design is frequently not in the c-suite, thus the budget and decision-making power around design are often lacking. Having someone in the top management to lead design efforts is crucial to guarantee sufficient resources, authority, and connection to business decisions[6], although the title of this person may vary. Second, design competencies do not necessarily pre-exist in the organization, at least not to the extent needed for true transformation. This is often the case in more traditional organizations that have focused heavily on technology and efficiency.

Recruiting designers or buying design services as a non-designer can be tricky. As design has become kind of a business buzzword, there appear to be designers everywhere, many of them lacking the relevant education, experience, and portfolio. Getting the right competence for the company's purposes is critical for future success. Sometimes even setting goals and drafting new responsibilities and roles can be a significant challenge, especially if there's no first-hand experience on design projects or approaches. Keeping great designers motivated in a context like this can also be difficult. In our experience, one of the best ways to demotivate designers is to give them a bunch of non-design responsibilities or to limit the use of their skills to a very narrow area. This is unlikely to keep designers committed and inspired.

Our research shows that what designers value most are meaningful projects, the freedom to create, and open, good collaboration with different stakeholders resulting in mutual learning. The better the top management understands design principles and processes, the more evident it becomes that design needs a specific type of leadership[7]. In addition to classic leadership skills, the leader has to understand the design process and to be able to leverage and integrate diverse ways of thinking[6].

Finally, in addition to design professionals who bring their expertise to organizations, becoming a design-driven organization requires building design thinking capabilities amongst a larger group of employees. While not everybody in an organization needs to become a designer, everyone can learn and utilize design thinking and appreciate the value that the design process can bring to their organization. Design thinking can be utilized all around the organization, not only on the front lines, where customers are met. Indeed, design thinking is taught to non-designers in many organizations. In addition to training, professional designers are needed to provide support and structures for actually incorporating design thinking processes and tools into day-to-day work. For example, Intuit set a target of becoming more design-driven and wanted all of its employees to think about design[8]. The company increased the number of in-house designers by nearly 600% and created a team of "innovation catalysts" to help managers work on initiatives throughout the organization[9]. In addition, Intuit put in place a set of principles, tools, and training programs for employees across the organization to think more creatively and experimentally in order to enhance value for customers.

Pathways to securing internal and external talent

Design competence can be strengthened in many ways: constructing a design organization from scratch, acquisition, or combining the old and new. All of these options have their pros and cons. No matter which path you choose, there are some key questions to consider: How significant of a change are you looking for? Do you see the role of design in your organization as strategic or tactical? What kind of budget do you have in use? Do you want to maintain the status-quo or change it? How much time do you have?

Creating a design organization from scratch allows one to carefully choose resources without baggage from previous recruitments or decisions. However, this approach is time-intensive and requires long-term commitment. Designers are often hired from the outside to bring in the needed know-how, or sometimes they are employees that are trained in design methods, tools, and facilitation. Scaling up can turn out to be a significant challenge, because it takes time and resources. Furthermore, it is important to clarify the goals. Is there a need for "fresh" or more experienced talent? Both have their strengths and weaknesses; it is more about what you are trying to achieve. With a talent who is closer to graduation, building common beliefs and practices may be easier than with more experienced designers, but there is a lack of deep experience. Often a mix of both would be ideal.

Acquiring an existing design agency or unit allows for a quick start. However, it requires a significant investment in the beginning and a well-planned and proper post-merger integration[10]. In the past few years, this approach has been common in traditional management consulting, with Deloitte acquiring Doblin, Accenture acquiring Fjord, McKinsey acquiring Lunar, and CapGemini acquiring Idean. These acquisitions show that design is no longer considered just something crafty; rather, it has become a core competence at a very strategic level.

Leveraging existing capabilities acknowledges the skill already found in the organization. In many cases, there are already some existing design capabilities. This can be a significant strength: at least some employees of the organization are already familiar with design approaches, have confidence in them, and can act as ambassadors. A key challenge is to align existing resources with new talent in a way that feels beneficial for all parties.

Building your own design organization and buying design services are of course not mutually exclusive: often organizations with strong design capabilities also use external design agencies to bring flexibility, fresh ideas, or specialized expertise. Based on our study, external partners can be helpful in defining the role of design and ramping up the internal design organization. In fact, often a mix of internal and external designers is most promising[7]. Finding good partners from the wide variety of service providers is crucial. You have to know what problems you want to solve, what are your goals and what is your budget. At the same time, agencies - just like any group of designers - need enough freedom to enable surprising solutions and even re-defining of the problem.

STRUCTURING DESIGN CAPABILITIES
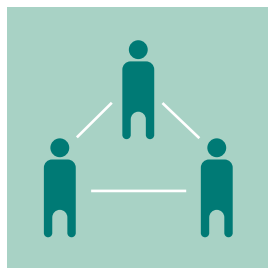
Whether design capabilities have been acquired or built from scratch, they need to be organized in a way that supports collaboration, problem-solving, and creativity. There are multiple questions that need to be answered in order to enable a coordinated and efficient way of working. Where do the project briefs come from? Who makes the final decisions? Who will implement what has been designed? These questions are not only about design per se, but about the structures in place.

Design-driven organizations are not built by having lonely designers all over the organization with limited peer support, coordination, or influence. Nor are they built by siloed design units. It is important to ensure collaboration across silos, by building bridges across multiple functions, and to get different perspectives to projects and tasks at hand[6]. While drawing organization charts may appear easy, in practice, organizing design is rarely a simple exercise. At the very least, the structure of the rest of the organization, existing internal relations, and possible bias against change influence the outcomes.

There are many ways to organize design and each of them has their own strengths and pitfalls. The structure should not be chosen based on current roles, power positions, or personal ambitions. It should be chosen based on current and future customer needs, keeping in mind the context. What works for one organization at a certain time does not necessarily work for the same organization a couple of years later, not to mention other organizations in different industries, countries and so on. In any case, people must understand by whom and how decisions are made, even though the design thinking methodology calls for egalitarian, self-organized teams with a lot of autonomy[11]. One of the most important things is to get the right people to the table in each phase. A typical challenge that designers face when working with organizations new to design thinking is being involved too late in the process, whether working in-house or as external service providers.

Different configurations of design

One of the fundamental dimensions when considering how to structure design capabilities is the level of centralization. A *centralized design function* allows for a holistic overview and can make shared goals, practices, and culture easier to achieve than in fragmented models. Being part of the same function allows peer support and learning from

other designers. However, it can also carry the risks of an ivory tower, separation from the realities of the business units and insufficient contact with clients and end-users. In a *decentralized model*, in turn, designers are typically spread to business units, which allows closer connection to business needs. However, peer support may become limited and there is also a risk for territory disputes and internal competition between designers. In addition, designers may lack a critical mass for pushing the design agenda forward when individual designers are dispersed in the company.

Many companies have a *project-based approach*, in which cross-functional collaboration is embraced. Design projects can be a great opportunity to give members of different departments a common focus and objective outside of their normal work routines[7]. They bring together multi-disciplinary teams and professionals with diverse backgrounds. While designers are often more focused on the design process, others can bring their specific competencies on the subject matter to the table and represent different functions and units with diverse capabilities. It is important that these teams also include people who are directly affected by the identified problem, whether it is internal stakeholders or external stakeholders, such as customers. In a project-based approach, attention also needs to be paid to how capabilities are cultivated within the organization, how decisions are coordinated and that sufficient levels of holistic understanding are secured for their basis.

In large organizations, it is common to have *design or innovation centers* that can provide internal training, workshop spaces, and support for projects where professional design skills are needed. For example, the health care provider Kaiser Permanente established Innovation Consultancy in 2003 to provide internal consultants to the rest of the organization and to teach design thinking to the company's

existing staff. This team brings fresh methods to help Kaiser employees to discover, design and implement new ways to improve the care experience of their patients and the work experience of the caregivers. Any Kaiser employee can schedule a quick 15 minute consultation with two members of Kaiser's Innovation Consultancy team to receive guidance, tips, and ideas to help innovate[12]. Some innovation centers are more focused on new business ideas or early phase product development.

In any of the above structuring options, organizations often use external advisors to inspire and coach their internal designers. Furthermore, in addition to professional designers, there can be an *internal community or network* of like-minded people, who are interested in design practices and willing to learn more from professional designers and one another. In any design-driven organization, it is useful to build design competence across different departments and units, and this type of internal network can serve as one way to establish common language, processes, tools, and methods, thus creating an excellent base for cultural transformation. The internal community of the organization's professional designers is also crucial. Learning from one's designer colleagues has been consistently brought up as one of the best parts of the job by designers in agencies and technology companies alike in our studies, speaking to its importance in business performance and retaining design talent.

PRACTICES FOR BUILDING COHESIVE DESIGN

 Shared routines and practices of design doing help in taking full advantage of both current and emerging design capabilities. Even though designers value their freedom highly, there needs to be a level of systematicity of design efforts within the organization. Having an aligned way of working in large organizations calls for choices that guide the work in the same direction, help differentiation from competitors, and most importantly, enable a coherent customer experience. The same challenge is often faced by smaller companies as they grow: adding more people and complexity increases the challenge of creating coherent experiences exponentially. Based on their research, professor Martin Kupp and colleagues suggest that integrating design thinking into existing processes is crucial[11]. In addition, new routines and practices are often needed.

It can be useful to start from defining company-wide design principles. This helps to create a shared understanding of the role of design, set common goals, speak the same language, and enable efficient collaboration. In addition, incentives in business units need to be in place for collaborating in new ways so that innovation is seen as a path to success rather than a career risk[6]. Otherwise, design efforts will continue to be thwarted by internal competition and politics.

Examples of design frameworks, systems and principles

Company-wide design systems can be essential to building better, faster and coherent output in the products and services that are offered. The purpose is not to limit creativity, but to establish a shared understanding, unified tools and ways of working. For example, in order to become one the world's most design-driven companies by 2020,

Intuit developed its own D4D (design for delight) approach, which articulates Intuit's approach to design thinking and provides the entire company with a common framework, based on deep customer empathy, idea generation, and experimentation[8,9].

Similarly, Cisco has its own design thinking framework that is focused on discovering, defining, and exploring. The company has created a printed book that serves as an inside guide to Cisco's design thinking framework and to practicing the framework in everyday work. It is meant for anyone in the Cisco ecosystem who is interested in learning more about design thinking and how to apply it. It includes the fundamentals of Cisco design thinking, Cisco Design Thinking principles, and exercises and tools. The tools are divided by the Cisco Design Thinking phase where they are most typically used. Moreover, the book encourages to use Cisco Design Thinking Labs.

A third example comes from Airbnb, founded by designers and well-known for its commitment to great design. The company aims to approach every challenge with a human-centered lens, but one-off solutions were becoming a problem as the company expanded. A small group of designers and engineers was assembled to design and build a design language system in order to have unified platforms that drive greater efficiency through well-defined and reusable components. A few principles guided the work: being unified, universal, iconic, and conversational. Now that the system is in place, it enables a shared understanding of Airbnb's style as well as fast prototyping and experimenting. In addition, their product reviews have become more on point, focusing on the actual concepts and experiences of design[13].

When building a design-driven organization, a common pitfall is to start designing such an extensive amount of rules and tools that it becomes a priority in itself - rather than a scaffold for great design. Building an

overly complex and sophisticated system, which either takes forever or turns out to be difficult to implement, will not enhance the customer experience. Sometimes it is useful to start with something simple and scalable. Especially when teaching design skills to non-designers, everything should be easy to understand, remember, experiment with, repeat, and share. After all, the employees' main focus should be on the content, experience, and co-creation, not on the design methods or tools themselves. Having well-planned, well-tested guidelines in place will provide a good internal user experience for both designers and design-thinkers. Moreover, there will be clear business benefit in terms of time- to-market, quality, and customer experience.

CULTURE CHANGES

Maintaining a dynamic balance between structure and flexibility depends on the culture and context of the organization - past, present and future alike[14]. However, most design research has overlooked the potential benefits of incorporating design as a key component of organizational culture[15]. This is unfortunate, as culture plays a key role in building, maintaining, and strengthening design capabilities. Design thinking and doing change how people work together, and will inevitably have an impact on the organizational culture in which they are used[16]. For example, at Huntington Hospital in California, design thinking was used to improve billing routines and processes, but training staff members to be proficient in the method ended up, somewhat unintentionally, boosting employee morale and their sense of innovation and collaboration[17].

Taking a more proactive avenue means intentionally designing the organizational culture. Design thinking fosters a culture that embraces curiosity, humility and questioning, inspires frequent reflection

in action, celebrates creativity[6,14] and navigates tensions between contradictory elements[18]. All of these are required for innovation, and are well suited to complex and fast-changing operating environments. Design-driven cultures typically focus on customer experience, support cross-functional collaboration, and encourage empathy, creativity, fast experiments, and learning from failures. There can also be more specific elements, such as emphasizing craftsmanship, aesthetics, or storytelling.

Any organizational culture can be studied at three levels - the level of its artifacts, the level of its espoused beliefs and values, and the level of its basic underlying assumptions[19]. While artifacts may be fairly easy to replace, even in the best case, it takes years to change shared beliefs, assumptions, attitudes, and written and unwritten rules that have developed over time in large corporations. Top management commitment is crucial - experimentation can be seen as "risky" without a clear mandate from the top, and those new to design tend to resist iteration through action rather than prediction. For example, Microsoft's CEO Satya Nadella has said transforming culture is his number one priority. In addition to empathy, empowerment, and a "learn-it-all" rather than a "know-it-all" mindset, he tirelessly highlights the importance of diversity and inclusivity. The targeted culture should be reflected in design work. To establish inclusivity in all of Microsoft's design efforts, the company has inclusive design principles, a design toolkit for inclusive sessions, and several case examples of inclusive design in action[20].

Before attempting a broad, company-wide cultural change, it is important to make sure that the design team's culture is constructed to encourage the best work[21]. Our research clearly shows that culture is one of the key motivational factors for designers. Cultural artifacts, such as physical space, are important sources of inspiration. Moreover, the

freedom to create, learning from others, and opportunities for personal development are often emphasized far beyond career development in terms of titles and positions. Meaningful work and shared core values may be more important than a big paycheck: having a like-minded group of designers appears to be of utmost importance for many designers. The culture of an organization is never completely uniform across different teams or units, nor stable throughout time. This can be leveraged in building local critical masses of design-driven culture in the process of slower transformations to take hold in the organization at large.

"I wanna reiterate how important it is that there's a culture of skills growth and skill sharing here. I think that's super important and everybody on the team does a good job of keeping that culture alive, all the way from senior leadership down to our interns."

- Designer in a design agency

"It is absolutely critical how leadership act as role models. If they don't live it to the employees, all the effort is worthless. And in fact, it can actually be more painful to the employees because they are feeling like they're beating their head against the wall."

- Innovation manager in a software company

## EFFORTS TO BECOME DESIGN-DRIVEN IN PRACTICE: THE EXAMPLE OF IBM

While one-size-fits-all types of answers on how to build a design-driven organization are impossible, each successful effort entails addressing the four key elements: design capabilities, structure, practices, and culture. To illustrate how these elements can come together in practice, we conclude with a case example from IBM[22]. This multinational information technology company has undertaken a groundbreaking effort to apply design thinking in their business[23]. When a giant corporation aims to become design-driven, the impact is far-reaching; IBM's technology plays a crucial role in several industries, such as health care, transportation and energy. Though the value of good design has been recognized in the company for a long time, IBM has invested more than 100 million dollars to building its design organization to continue to meet customer needs and future-proof the company. Internally, it has meant a cultural shift away from the engineering-driven "features-first" mindset towards a more "users first" mentality. The goal has been to modernize enterprise software for the modern user that demands great design everywhere, both at home and at work.

Developing design thinking capabilities

A shift of gears could be seen in the company in 2012, when IBM set out to recruit hundreds of designers and train its entire workforce — some 380,000 employees worldwide — in design thinking and doing. At the time, IBM had one designer for every 72 software developers; today that ratio is one to eight. In addition, training has been organized for non-designers. A one-day session has been tailored for executives and another week-long training to product managers. All senior managers at IBM have been through design training. For teams, the company has created a 10-week design internship program, and all new designers take part in a full three-month program. In all, over 10,000 IBM employees so far have had some in-person training in design thinking and more than 100,000 IBMers have earned their design thinking practitioner badges by completing an online course.

Structuring design capabilities
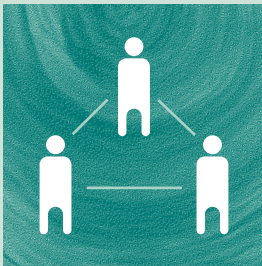
How to organize design was one of the key questions as IBM set its ambitious goal. One of the challenges was that IBM's design resources were fragmented with a lack of a holistic overview. The support of top leadership was key in guaranteeing internal credibility and support for the changes needed to build the new IBM design unit. In order to ease communication across stakeholders and create a coherent user experience, IBM built a global platform of 44 Studios. These Studios provide highly collaborative spaces where clients and IBM teams can co-create with their users in new ways. They also take on the most difficult challenges facing

IBM and its clients. The studios promote design in many forms, from workshops to small group collaboration and from client engagements to product design.

In addition to no one organizational model serving all companies, a certain model may work well in one phase of the change, while a different model may be more suitable for another phase. IBM began by establishing a centralized design organization to construct a shared understanding of design goals and approaches. As the foundation had been created and the power of design thinking had become widely accepted, IBM recently decided that it is time to change its design organization towards a more decentralized model in order to allow maximal support for business units and to keep designers close to customers. The company is now in the process of implementing this change. While there are many benefits, it is a significant transition for designers, who may miss the strong professional support of a centralized design organization.

Creating shared practices

Customer experience should be aligned throughout the company, and achieving this requires creating shared practices that span across functions, units and sites. At IBM, company designers, employees, clients, and other stakeholders all participated in building the basis for the new design approach. As a result, IBM now offers its employees and stakeholders the company's own framework of design thinking, a shared vocabulary, and tools for design research.

IBM Design Thinking is a framework for teams to understand and deliver great user outcomes. Using IBM Design Thinking begins with

a focus on user outcomes, a multidisciplinary team, and a spirit of restless reinvention. A behavioral model and a set of key practices is provided to scale design thinking to even the most complex projects.

The *IBM Design Language* is a shared vocabulary for design. Visual, interaction and user experience vocabularies offer guidance into creating beautiful and useful work, and IBM best practices for how to think about performance, prototyping and content. The IBM Design Language was first made available to IBMers, after which the language was updated based on contributions from the global IBM community. Now, the IBM Design Language is available to anybody. Its main purpose is to enable designing coherent products, services and experiences, yet with more flexibility than set patterns and templates.

IBM Design Research drives actionable user insights in the organization. Teams are encouraged to build continuous knowledge, discovery and empathy through observation, experience and making. They become advocates for the users. Multiple tools are made available for teams encompassing different types of capabilities: "explorers" bring their domain expertise to the forefront and are vital in directing the research needs, while "guides" facilitate research through collection, analysis and producing insights to lead the team towards user outcomes.

While it was a major effort and investment to construct these sets of practices and frameworks, IBM wants to ensure they will continue to evolve to reflect changes in the operating environment and the company as well as deeper understanding and experiences gained along the way to best serve the users.

Building a design-driven culture
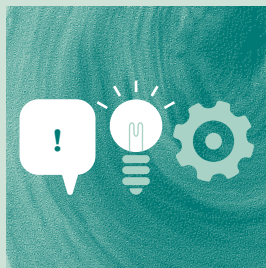
In order to build a strong design culture, IBM practices include seven core habits emphasized across all of IBM's design education programs:

1] *Empathy:* the drive to understand what makes others tick, honor their perspectives, and do what you can to inject delight into their experiences.

2] *Vulnerability:* a willingness to contribute your ideas to the world, open yourself up to criticism, test your assumptions, fail early, and learn fast.

3] *Curiosity:* the drive to see what makes something tick. To understand why why why WHY!

4] *Humility*: the ability to suspend your ego, accept that you don't know everything, and invite others to share their knowledge with you.

5] *Integrity:* to align with your team, adapt, improvise, and be transparent about your failures as well as your successes—in the interest of good work.

6] *Flexibility:* to be open to new ideas, willing to compromise, and able to build a better solution through embracing constraints.

7] *Audacity:* to dive into challenges with enthusiasm and be willing to ask for forgiveness instead of permission.

These core habits ensure that approaches to design thinking are similar and support the IBM way of doing. However, the design approach is applied also to the iteration of core habits as well: as they are tested and reflected on, and understanding of them is refined, changes are made to the programs to incorporate any fresh insights.

Reaping the benefits

A design-driven culture is built on collaboration with stakeholders. Rather than keeping its approach as a secret, in early 2018, IBM made its Enterprise Design Thinking services available online in order to allow the company's stakeholders to harness the power of IBM's design thinking framework. The company also took steps to ensure the new approach was working - major investments should always have measurable outcomes. IBM commissioned Forrester to study the total economic impact of the company's design thinking practices to provide a framework to evaluate both individual projects and the grander organizational transformation. The results from 2018 show that design thinking has paid for itself in the form of IBM having doubled its time-to-market speed, increasing portfolio profitability with a return three times greater than the investment made[24]. When the value of design investments can be shown in the language of business leaders, future steps become much easier.

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PERSPECTIVES INTO DESIGN+

DESIGNING GROWTH AND CHANGE

Tracking the impact of design

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Pia Hannukainen, OP Financial Group

Tuomas Manninen, OP Financial Group

The complexity of tracking the impact of design is well known - how do we isolate the effect of design in a team effort? In an organizational push? Its long term effects? At the heart of measuring design should be the current needs of the organization. After all, you tend to get what you measure.

While still an understudied area, a number of reports have demonstrated the positive effects of design on for example brand, product success, launch times, profitability and innovation[1]. Bringing design into organizations can be tricky enough as is[2], demonstrating its impact should not require a scientific study - or else your change efforts will run into challenges pretty soon.

Much of the pull for design efforts inside organizations is created through interaction - the experiential evidence comes from getting people involved in the process, seeing first hand the challenges customers face, the questions design can help to unearth, the power of prototypes and small wins to energize collaborators. Nevertheless, "how do you measure the effectiveness of design" is one of the most frequent questions we hear. Reviewing research[3], we've found a number of external metrics (market and customer effects) and internal metrics (employee and operations effects) used for design focusing on

1] *The financial performance and valuation of the company*

2] *Customer satisfaction and behavior*

3] *Extent and emphasis of design within the organization*

4] *Project outcomes*

5] *Development process*

6] *Employee outcomes*

Despite the abundance of metrics - or perhaps even due to the proliferation - most organizations do not measure the effects of design in their organization[4]. Selecting the right metrics depends on what you are after. To answer this question, it's worth taking a minute to do some self-reflection on where your organization is right now and what you hope to achieve by the metrics.

WHERE ARE YOU AND WHERE DO YOU WANT TO GO

There are a number of practitioner frameworks for companies to map their design efforts against, evaluating the different areas design is applied to and the systematicity and extent of doing so in each arena*. Go with whatever model works for your organization, or craft your own labels and levels for different target areas and extent of usage. (we'll use the Design Ladder[8] as a reference point in this chapter as it's a simple analogy and widely recognized in the Nordics). However, it's important to realize that particularly in larger organizations, different units will likely be at different steps on the ladder with different needs, and the appropriate metrics will vary accordingly.

STEP 1: NON-DESIGN
- Introducing design to your organization

When there's absolutely no use of design in the organization, metrics come into the picture mainly as benchmarks of other organizations. Typically, the focus is on the external-facing metrics of financial performance and valuation, such as share prices, turnover growth, or amounts of innovations. Publicized case examples, such as IBM[9] can be useful, but testimonials will likely prove more efficient - find local, trustworthy partners who can share their experiences.

However, in most cases you're not starting completely from scratch. If another unit in your organization is already using design, or you've

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* See e.g. the **Design Value Scorecard**[5], assessing how systematically and proactively design is used in aesthetics and functionality of development and delivery, connecting and integrating in the organization and the organization's strategy and business models; and the **Design Maturity Matrix**[6] tracking how integrated design is into company operations in the areas of customer understanding, mastery of design thinking, support for design and consideration of cultural, social and environmental impact, as well as the market response to the design output of the organization; and **The InVision Maturity Model**[7] identifying five levels of design adaptation, ranging from producers (where design happens on screens) to visionaries (where design is business strategy).

used outside design services in the past, these can provide the most compelling showcases. Here you want to track more detailed metrics of financial performance on the project or product level on sales and revenue, as well as customer satisfaction and feedback, to make the case of bringing design in-house in your unit. For example, when OP (one of the largest financial companies in Finland, with cooperative banks and customer-owners) hired its first in-house designers back in 2011, user analytics from the first mobile applications represented the first attempt to measure design, and soon Net Promoter Scores (NPS) were launched to track customer satisfaction.

Evaluative/summative metrics on performance:

If you want to show that it works for design-centric companies:

▼

share prices, turnover growth, amount of innovations, testimonials

If you want to show that your own early efforts have been worth it:

▼

sales, revenue, customer satisfaction, feedback, showcases

STEP 2: DESIGN AS FORMGIVING
- Unleashing design in product design

When organizations bring in design, involvement typically starts in product and service development. Initially, design is often brought into the conversations rather late, as a finishing touch rather than driving force. While this limits the effect design can have, it's important to demonstrate the impact that designers are able to pull off. This can include tracking the performance of the designed products and services, comparing the performance across different levels of design involvement, as well as seeking external validation for their quality in the form of awards, such as the Red Dot Design Award. Having such a public reference can help to create legitimacy internally in addition to generating good publicity externally. On the other hand, when design is able to enter projects in early phases, potential challenges will be caught earlier and in a less expensive manner. Tracking the effectiveness of operations can show decreases in overall project timelines and resource consumption.

In addition to showing that design leads to good outcomes, it also becomes important to understand the extent of design in the organization. How many product or service development efforts involve designers? At which phases? How large is the investment into design, put into the context of other expenditure in the organization? For example, when OP started hiring more designers, a "design percentage" measure was created to capture their reach. Design percentage represented the portion of development projects utilizing designers, design methodology, or design thinking at some point during the project from idea to launch. This made increases in reach visible: the percentage of projects utilizing design grew from 10% to 38 % in 2015.

Evaluative/summative metrics on performance and operations:

If you want to show that your efforts have been worth it:

▼

external outcomes:
sales, revenue, customer satisfaction, feedback, rewards

internal outcomes:
cost savings, reduction in time to market or project budget
comparing KPIs of projects and products that have used
design and those that have not

If you want to understand the reach of design:

▼

Ratio of projects/product lines including designers
Timing of design involvement on project timelines
Ratio of designers to other staff, ratio of design budget
to other expenditure

STEP 3: DESIGN AS PROCESS
- Integrating design to development processes

Once designers start to be commonplace in development efforts, the question becomes how the benefits of design approaches can be scaled in organizations. In order for designers to do their work well, they need input, uptake and collaboration from a number of stakeholders within and beyond the organization. The organization now faces the challenge of not only supporting in-house designers, but facilitating non-designers in working customer-centric, iterative ways. Thus, while external-facing metrics continue to play a role, the focus starts to shift more towards internal metrics.

Tracking the extent of design within the organization expands to examining more nuanced design activities. For example, the percentage of development projects utilizing design at OP rose to 78% already in 2016, and is now close to a 100 percent. This necessitates moving towards more evolved metrics to continue to show progress. OP, for example, now surveys project participants after finishing projects on the impact and quality of design methods and tools in the project. Other internal metrics useful in this stage can include return-on-investments on a project level, internal ratings on the value and novelty of outcomes, as well as metrics tracking the extent of design beyond designer-involvement, such as the number of people in the organization trained in design thinking or taking part in design sprints.

Furthermore, the purpose of measuring transitions to more formative metrics that focus on identifying areas that can be improved rather than judging the overall quality becomes important. This is reflected in the inclusion of more process metrics in addition to output metrics. For examples, organizations can track the amount and frequency of contact with users and customers, responsiveness to their needs, as well as metrics related to testing and iteration, such as frequency of prototyping.

Evaluative/summative measures on performance and operations:

If you want to show that your expanding efforts have been worth it:

▼

internal outcomes:
ROI per project, produced value and novelty, customer-centricity

external outcomes:
brand perception, brand loyalty, growth profitability, market share

Formative metrics on operations:

If you want to understand where you could improve the use of design approaches:

▼

Employee satisfaction with design, frequency of using design methods

Amount and organizational location of employees trained in design thinking or using design approaches

Contact with users in development projects and responsiveness to customers

Frequency and type of experimentation and prototypes

STEP 4: DESIGN AS STRATEGY
- Building an inquiry-oriented organization

Once design enters a strategic level, it becomes a way of doing things in an organization rather than a part of the offering development. The focus becomes identifying new opportunities and models for business and organizational structures and processes to support this. Metrics for these, unfortunately, remain rather scarce, with most requiring either significant investments in the act and analysis of measuring, or, alternatively, suffering from a low traceability of effects back to design. However, on this level, sufficient buy-in is typically no longer a primary concern for measurement, allowing the focus on metrics that are helpful in developing operations regardless of their connection to design-specific impact.

Collaboration in and effectiveness of operations, as well as employee engagement become important metrics for building design-driven organizations. For example, with the financial sector facing disruption, OP measures feature turnaround time, focusing efforts to effectively develop areas that are meaningful for customers and drive business results, as well as design thinking and innovation maturity on an organizational level. Twice a year, OP personnel are surveyed on cultural change, including design. Employees rate statements such as "I find design relevant to my own work", "I have a possibility to learn how to apply design in my own work", "At OP, design is a key ingredient in developing new products and services", "Design is a key element in business development", and "Design gives OP a competitive advantage" to provide an executive view and actionable results for leading cultural change in the organization.

As the role of design shifts and grows in organizations, so, too, do the most useful metrics. While the discrepancy between existing

Evaluative/summative metrics on performance and operations:

If you want to show that design has an impact on strategy:

▼

external outcomes:
entering new markets and the market response

internal outcomes:
seniority/rank of design positions within the organization, design-driven innovations

Formative metrics on operations:

If you want to better target your design investments:

▼

Measuring the effectiveness of specific strategies and their operationalizations
Frequency and quality of collaboration in the organization and with external stakeholders
Employee engagement

metrics and organizational needs become more pronounced as design capabilities grow in the organization, having a chosen few key performance indicators helps to focus and visualize the impact of efforts, fueling further progress. However, it is worth remembering that these metrics will only capture a sliver of the complexity of design. Regardless of the level of design in the organization, numbers need to be complemented by rich examples and first-hand contact. Designing these into the experiences of leaders, employees and external stakeholders should be on the task list of any organization wishing to reap the benefits of integrating design into their operations and offering.

**Tracking the impact of design
on different steps of the design ladder:**

2

1

Design as formgiving

Non-design

*External and internal outcomes
showing progress, e.g. customer
satisfaction, cost saving*

*Benchmarks & external outcome
metrics showing design works,
e.g. sales, share prices*

*Analyzing the reach of design
internally, e.g. ratio of projects
with design input*

Showcases and first-hand

4

3

Design as strategy

Targeting design investments and developing them where it is most needed, e.g. effectiveness of strategy, employee engagement

Showcasing reach of design to strategy, e.g. representation in management team

Design as process

Internal and external outcomes showing increased value, e.g. ROI per project, brand perception

Identifying where design approaches can be improved internally, e.g. employee satisfaction and frequency of prototyping & contact with users

l experiences to persuade

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Internationalizing design service business

Jesse Maula, Idean

The ability to function effectively across national and cultural boundaries is a critical challenge faced by companies in the increasingly global economy. Idean, a Finnish design agency with a strong international presence, offers one example of a pathway to globalizing design services. Growth requires learning along the way, adapting plans and practices.

Asa result of digitalization, many businesses today are international in scope. Globalization changes how work is organized across time and space. With a global network of 22 studios and over 700 digital strategists, designers, and developers, Idean[1] has built a multi-cultural team in which diversity is a true asset. The company's aim is to blend the best of the Scandinavian design ethos and Silicon Valley mindset to deliver business value through human-centered design.

While many existing studies and everyday discussions on internationalization focus on challenges companies face when attempting to adapt culturally, globalization can be also an empowering experience of personal and company growth. For small countries like Finland, it is crucial to find support mechanisms for high-growth entrepreneurship and internationalization and remove obstacles related to it. This does not need extensive bureaucracy, but rather building skills relevant for high-growth entrepreneurship and an encouraging atmosphere. Learning from the experiences of others often provides practical relevance for entrepreneurs who are preparing for internationalization and trying to make sense of what to expect.

FROM FINLAND TO SILICON VALLEY

Legendary innovative startup hubs, such as Silicon Valley, tend to draw entrepreneurs and companies from all over the world. The growth journey of Idean also started from Palo Alto, which is located right in the heart of Silicon Valley[2].

Building a business in one of the world's most expensive areas was a challenge. Idean started its internationalization without external funding, and the first Silicon Valley office could be described as a tiny room without windows. Successful networking, good introductions, and local references played a key role in getting really started. As soon

as we had some big names from IBM to Amazon as our references, sales work became much easier. We have always believed on our people and the quality we're proving to our customer, we just needed a great launching pad.

Of course, in the beginning, a lot of effort must be spent learning local laws and business habits. In such a multi-cultural setting, it is important to speak and act right across the boundaries. While a certain level of cultural adaptation is important, a different background can be an essential part of the company's unique offering. For us, the Scandinavian design tradition has been an asset. Idean's approach to design is lean and focuses on research, experimentation, user feedback and testing, and iterating together with clients. We were forced to be agile, innovative and fast in Finland when operating under smaller budgets, and this became a competitive advantage for us in the Valley. As Finns, we also tend to get straight to the point. The same goes for how we work. We measure success by the impact we create for our customers, plain and simple.

In Silicon Valley, an ambitious and growth-driven entrepreneurial mindset is more of a rule than an exception. When a company grows, one of the biggest challenges is recruitment. Finding and retaining top talent is demanding in the area, because there are always companies that pay more. We haven't been able to compete in terms of money, but we have a unique organizational culture, which is lean, flexible and family-like, especially when comparing to local standards. In addition, the appreciation of design craftsmanship has been a huge cultural asset for us.

Silicon Valley is an extremely competitive environment, but at the same time, the positive and supporting atmosphere is an essential part of the Silicon Valley mindset and business community. The biggest

customers brands for digital design are located here. Success in the Valley gave us a lot of confidence: if you can make it here, you can make it anywhere.

GETTING ACQUIRED

The demand for design for global companies is growing[3]. Tens of acquisitions of design agencies have taken place since 2015, with a typical buyer being a large corporation or a management consultancy. Reasons behind the M&A activity include aims to boost company creativity, to introduce advanced digital skills and to build an understanding of how to transform corporate work places by breaking down divisional silos with the help of new tools and practices[4]. In addition to the acquisitions, technology companies, which have digital skills in-house, are keen to hire design talent: for example, Facebook, Google and Amazon have grown their design headcount significantly[5].

This trend has supported the growth of Idean as well, and led to a one of the biggest changes in the company's history. In February 2017, Idean was acquired by Capgemini Group. The acquisition allowed us to deepen our strategic impact to our clients and broaden our reach. Today, we continue to work under our own Idean brand, but we also act as the digital design and innovation arm of Capgemini Invent to deliver innovative services and drive digital transformation all over the world.

CHAOTIC AND MESSY

While retrospective stories about growth tend to sound well-planned, it is good to keep in mind that growing a business is often chaotic and somewhat unpredictable. In a fast-changing operating environment, the process of growth doesn't operate according to a clear plan. Although we can draw linear timelines later on, a more honest picture would probably be a messy tangle of multiple lines. This also applies

to Idean. The company's growth has been filled with unknowable variables, iterative phases, changes in direction, various starts and stops, and learning from failures – in line with design thinking and our core principles and beliefs.

One of the dead ends was our planned expansion in China, many years ago. It was one of our first internationalization efforts and for multiple reasons it didn't work out quite as planned. Similar types of failures are often unavoidable. In the best case, they turn out to be productive because of all of the lessons learned. In the worst case, they can lead to a bankruptcy. There have been times when we have been close to the latter end result.

In a fast-changing and even chaotic setting, what often makes the difference is your attitude. Success is unusual, if not impossible, without ambition and persistence. Business growth often means growth also in terms of organizational and personal identities.

ADAPTABLE SERVICES

One of the main strengths of Idean has been our focus on user research, which is where our roots are. We believe that digging deep into user needs requires multi-method research. While some players in the design field may sell end user insight without really studying it, we find it important to truly understand what we are talking about. In the existing business environment, selling qualitative research can be a hard task, but at the end of the day, it will pay off and produce great value in the results.

Of course, the services we provide have also changed over the years. When ten years ago the focus was in UX design of certain products or services, today the emphasis is often very strategic, as our clients aim

to transform their organizational cultures and build design-driven organizations. IBM and Cisco are good examples: we have helped them to take a new approach as a company, not only designing certain products, services or features. This also reflects changes in the entire design field - the focus has changed from product design to service design and finally towards strategic, organizational transformation[6].

Today, the human-centered process of Idean is well-established, yet adaptable to the varying needs of the international clients and partners of the company. The clients vary from small startups to giant corporations and non-profits. Similarly, the projects are different, each one of them providing a unique design challenge. With approximately 700 design projects per year, we believe we know what it takes to enable our clients to get to market successfully or to change themselves. Not only have we learned from our projects and our clients, but from our own pathway to growth and internationalization.

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Idean in milestones:

4k+   projects delivered

20   years of experience

22   studios

700+   people

*opened new global
headquarters in Palo Alto*

*founded in Helsinki
as a user research
company*

*hired first designers
100 products shipped*

1999

2002

2012

worldwide Backelite studios join Idean network

Adabtive Lab joins Idean UK

joins Capgemini Hello, London!

expanded to Austin, New York, and San Fransisco

Guten tag, Berlin!

2014

2016

2017

2018

2019
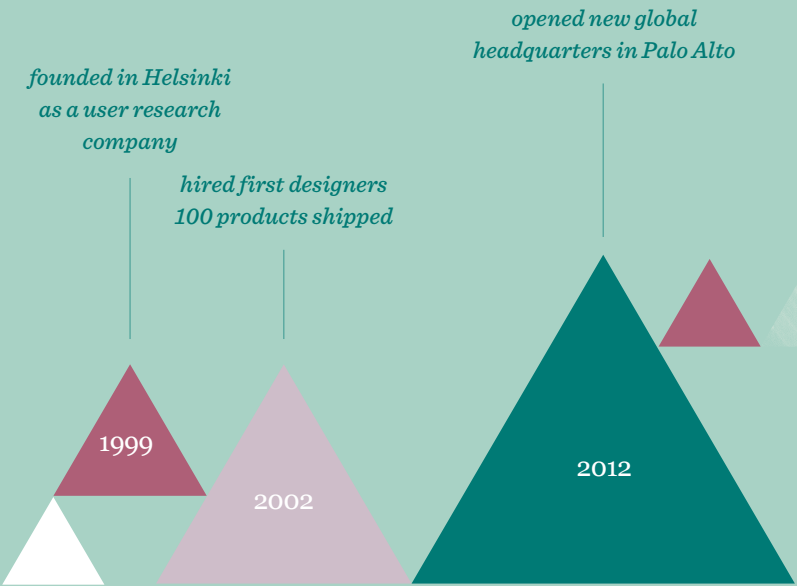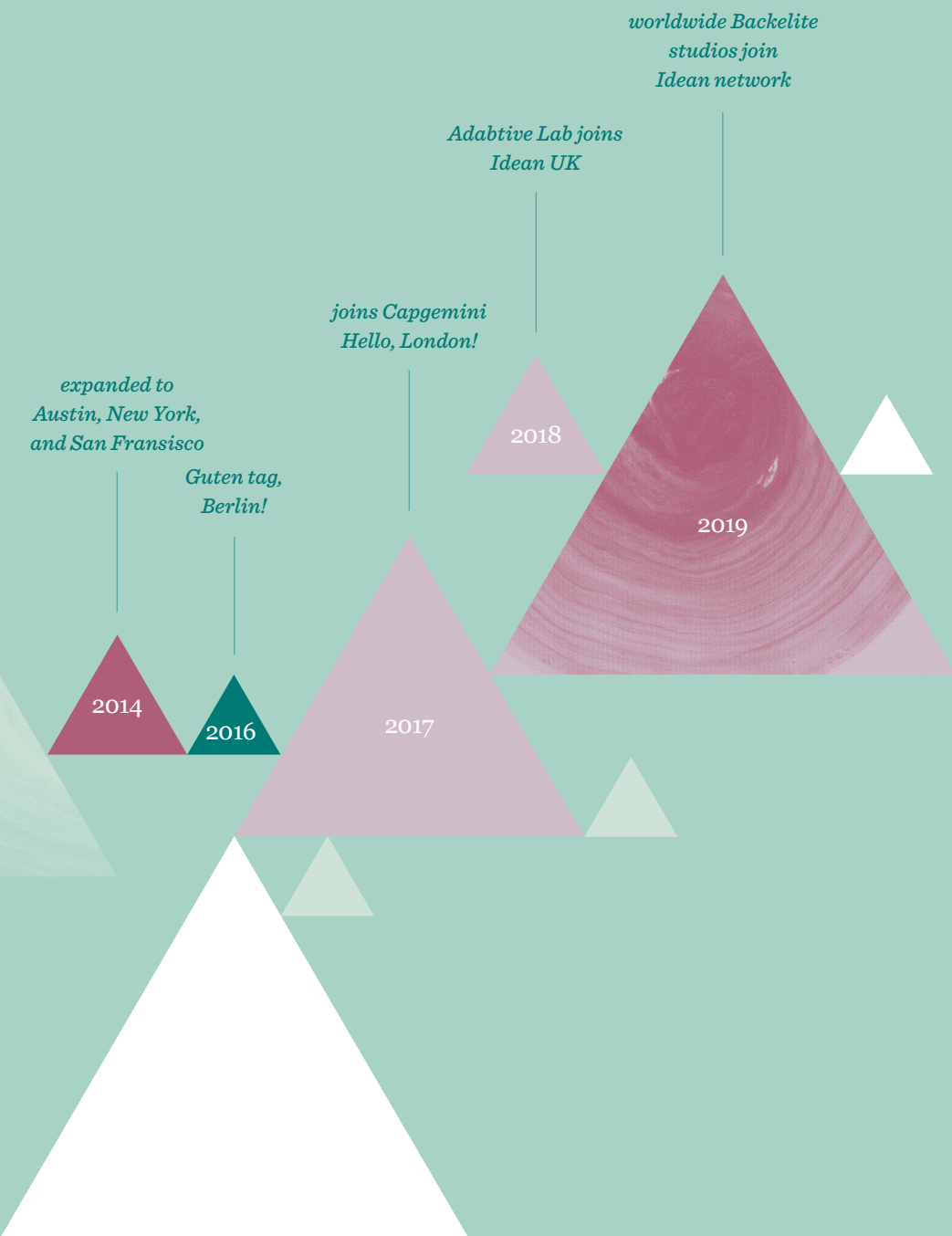
Designers as change agents

Floris van der Marel, Aalto University

Marjukka Mäkelä, ABB Group

In engineering-driven organizations, designers often find themselves increasing design awareness amongst developers, selling the relevance of user research to management, or facilitating design workshops for product managers. Designers go beyond doing design work, and act as change agents creating more design-friendly working environments. Sharing showcases and offering opportunities for first-hand experience help to get the message across.

Design is increasingly recognized as a competitive advantage for companies[1,2] as well as a contributor to societal benefit[3]. However, while a wide variety of organizations are becoming more interested in what designers can bring to the table, they often lack sufficient understanding of the capabilities possessed by designers, in what roles they can flourish and what kind of support they need. To enhance their own design capability at work, designers often need to dedicate time and effort to creating and clarifying their position in the organisation.

Legitimizing and stabilizing the role of design on a strategic level can be particularly challenging in large organizations[4]. In particular, organizations with cultures generally characterized as traditional, engineering-driven or technical, may struggle with the incorporation and advancement of design due to established regulations, processes and norms privileging engineering ways of working, that are not always in line with expectations or needs of design work. Designers thus often end up acting as change agents, engaging with a large variety of stakeholders to bring design to more strategic levels in their organization.

As change agents, designers attempt to influence their environment by using issue selling tactics, which are ways to get people on board with their ideas, changing both people's mindsets and the organization at large[5]. There is an abundance of possible variations in these issue selling attempts, including types of issues sold, reasons for pushing these, ways of framing, choice of medium, and different approaches in terms of whom to involve and who to target, all influencing the success or failure of an issue selling attempt.

Which combinations make an attempt successful is contextual, of course, yet highly dependent on tactics employed by the designer and enablers put in place by the managers. Looking at change efforts at

ABB (a pioneering technology leader working with utilities, industry, transportation and infrastructure customers), we've found three common combinations of issues, tactic and enablers. We share the stories of Anna, Pawel and Sarah* to show how common challenges can be tackled in practice and what managers can do to facilitate and support designers in their change agent initiatives.

ANNA'S CHALLENGE: BEING ISOLATED

A newly hired designer, Anna, struggled with not knowing what happened with her designs after handing them over to a development team. Sometimes a developer would come back if they had a challenge and needed a different element designed, but more often she was left in the dark concerning decisions being made. In dealing with this issue, Anna participated in several on-line meetings with ABB designers and design leads across geographies to exchange experiences. Equipped with success stories elsewhere in the organization, she decided to clarify her design capabilities and responsibilities to her team, both product owners and developers. In particular, she made the case for designing new elements that require new coding by showcasing examples of the ultimate benefits for the user experience, even though it initially seems inefficient and more costly than plug and play. She now enjoys interacting more with the developer teams and is even being recommended by them to other project teams.

ISSUE: Designers being understood and valued

Like everybody, designers want to be listened to and respected for what they can contribute. This is not just to enhance their work enjoyment, but it also very much influences their ability to do their work properly, as their roles and responsibilities are often deeply tied to the work of developers. With project leaders in tech-heavy organizations being

*names have been changed

more familiar with engineering ways of working, they are sometimes hesitant to allocate enough resources to do design work. To increase prioritisation of design work, it is often up to the designers themselves to enhance their superiors' understanding and enthusiasm, which is challenging considering managers' busy schedules.

TACTIC: Showcasing outcomes and ways of working

Through the stories we gathered, it appears showcasing existing projects in presentations with engaging visualisation to superiors most often is successful, as was also the case for Anna. Through this tactic designers show middle managers who else in the organization has adopted design approaches, how it went and what the impact has been. By aligning user benefits with the larger goals of the organization, designers' peers and superiors are equipped with the right information to sell the issue further up in case they have to. Additionally, being very clear on the details of the execution – for example, with guidelines, process visualisations, project walkthroughs or clear milestones – contributes to making managers feel more secure, especially when they are developed collaboratively.

ENABLER: Channels for dialogue

Enabling designers to apply this tactic was achieved at ABB by allocating resources for on-line discussions and face-to-face meetings for the internal design community to listen and learn from each other and benefit from each other's creativity. Exchanging experiences with peers lessens feelings of isolation, while shared best practices can be used as examples to show managers across the organization what the potential value of allocating time and money for design practice is.

Additionally, the participation of a wider audience across the organization in these communities supports designers in identifying allies. These non-designers (e.g. analysts, coaches, scrum masters,
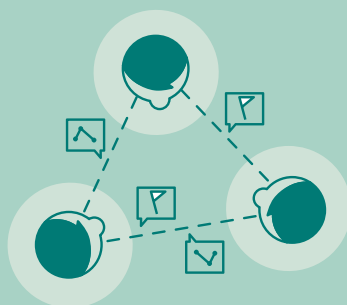
Anna's challenge:
Being isolated

designer   non-designer

ISSUE
Being misunderstood

TACTIC
*Showcasing outcomes &
ways of working*

ENABLER
Channels for dialogue

sales teams) can become issue selling champions who further the visibility and value of design and creating a valuable supportive community.

PAWEL'S CHALLENGE: DOING USER RESEARCH EARLY

A senior UX designer, Pawel, experienced that despite receiving support from higher management and design being a buzzword throughout the organization, several colleagues would still not involve designers from the start of a project and talk to users. With his colleagues, Pawel decided to involve some project owners in guerrilla user testing, quick usability research with just five users. This immediately gave them valuable insights, and opened their eyes to how easy, fast and inexpensive user reach can be. After this, middle managers such as project owners understood the importance of incorporating design work in the development process, and decided to allocate time and money for designers to do user research.

ISSUE: Designers getting involved too late

One of the most often experienced issues for designers in engineering-driven organizations is getting involved too late in the development process. Even if developers are aware that designers can do more than make user interfaces look beautiful, doing user testing on almost finished projects is hardly ever beneficial, as making significant changes at that stage would be very costly. Getting involved early enables designers to gather user needs before the development starts, and work together with product owners and project managers to define the scope and goals. Moreover, they can touch base with users during the development to verify, adapt and develop together. From a process perspective, if designers are included early, they can suggest other design tools, as well, such as service blueprints and user journey mapping together with wireframing, visualizing and prototyping; and thus enhance the development process with their expertise.

TACTIC: Gathering external supports

Pawel is not alone in realizing that middle management needs to be on board if designers wish to be involved from the start. In attempting to achieve this, designers experienced it to be most effective when they share feedback provided by users in the form of quotes or videoclips, or even, like in the presented case, taking middle managers and developers on a safari to do some quick user testing themselves. People were often amazed by the major insights and implications that come from quick user studies.

Alternatively, we found that middle managers' competitive spirit is quickly fuelled by making comparisons with products from competitors, or by showing design methodologies from other major players such as IBM or Google. In either case, clarifying the relation between the user feedback or design methodologies and the business targets pays off in getting middle management on board.

ENABLER: Freedom to explore

Change agents at ABB who had been granted freedom in terms of time and money to conduct quick user studies, as well as having access to users to gather feedback, had a high chance of succeeding, since user feedback is a powerful selling component. They were supported by managers higher up to experiment, without having to request resources or defend the value of their plans prior to executing them.

Additionally, some managers went the additional mile and promoted design work, increasing its visibility throughout the organization. When designers were given flexibility to explore where they would be most useful in the organization, they were able to choose projects or development teams where they were not required to compromise on the design process, generating the best work they could do.
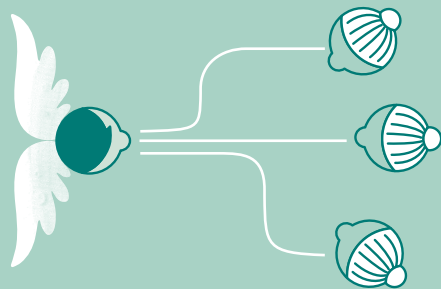
Pawel's challenge:
Doing user reseach early

designer

non-designers

ISSUE
Getting involved too late

TACTIC
Gathering external support

ENABLER
Freedom to explore

SARAH'S CHALLENGE: SPREADING DESIGN SKILLS

When Sarah joined ABB, she quickly realized that even though many had heard of design thinking, the execution was often messy, because some people thought design thinking was just conducting workshops with lots of post-its at the beginning of a project. She decided to do an in-depth presentation of design thinking for project managers, because, "sometimes business, especially people on the high level, they don't know what design thinking is, so you should introduce this idea and of course introduce also the benefits of this approach, so how we can achieve our target". In particular, she stresses the importance of making the presentation easy to understand, aesthetically pleasing, and clearly illustrating financial benefits and other alignment to the organization's goals. Her dual role as a designer and a business analyst support her tremendously in being able to sell the need for more design to both developers and people on the business side. Her presentations are very well received, enabling her to make design thinking tools and processes a more integrated part of the existing development process and execute it together with the developers.

ISSUE: Design being misunderstood

Considering that design is relatively new as a separate discipline, it is no surprise that people with limited exposure to design are not always fully aware of professional design capabilities and thus of the roles and responsibilities designers can carry. Consequently, designers need to spend time explaining how they can bring in the user perspective with user research, a user-centered design process and various design tools. Many designers wish to empower their peers, such as developers, to do user research themselves, know the basics of the process and can utilize some of the tools, so that these developers understand, use and value design and designers more. By sharing the basics, professionally trained designers can focus on the more challenging design tasks.
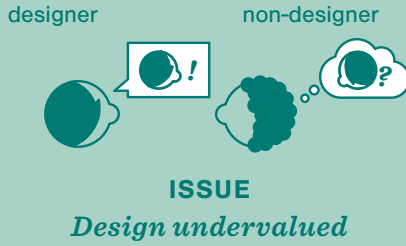
TACTIC: Tailoring presentations to audience

Like Sarah, many designers experience that an effective presentation for developers needs to cover all the basics and use business or technical vocabulary. To be successful, designers need to acknowledge that people's understanding of design thinking varies, thus no assumptions should be made about what people might already know about what design thinking is. Additionally, emphasising hard numbers is more effective, targeting predictions in terms of required time and estimated return on investment. This equips the recipients of the presentation with the materials to convince leads or managers.

In case of a more skeptical or resistant audience, one effective approach is to start small and expand from there. For example, a quick brainstorm or mockup session on an existing project can be done with a team of managers and developers so they can begin to see the potential value. Doing user research with the team is often most powerful, as they experience how easy it is to get valuable insights with just a few short interviews. Subsequently, once initial buy-in has been achieved, people's mindset can be changed over time by engaging in several design sprints.

ENABLER: Providing adequate understanding of the context of design in the organization

Sarah attributed her dual role as a designer and a sbusiness analyst at ABB to her successful design thinking selling attempts. Other designers confirm the importance of multiple perspectives by stating that a good understanding of the goals and values of the organization supports being an effective change agent, as it makes it easier to describe the link between design and other departments in the organization. Additionally, when designers are made aware of the 'languages' used in the organization, they are better able to tailor their pitch and translate design jargon into understandable formats.

Sarah's challenge: Spreading design skills

designer   non-designer

ISSUE
Design undervalued

TACTIC
Tailoring presentations

ENABLER
Knowledge of organizational embedding

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DESIGNING COLLABO– RATION

The role of design in facilitating shared understanding in innovation projects

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Design can provide significant value in helping to create a shared understanding in complex projects. Involving design from the early steps of the project onwards can help to ensure that everyone is on the same page and openness toward alternative development solutions is maintained.

The omnipresent - but frequently less than successful - pursuit of innovation in organizations has driven the search for effective approaches to innovation management. Conventional problem solving based on a linear approach of planning and validation is of little use in the most innovative projects, also referred to as exploration projects. In these projects, the goal and the means to reach the goal are only broadly, if at all, defined at the outset of the project[1]. Where more traditional development projects start by converging to a predefined goal driven by milestones and deliverables directing towards binding decisions early on, exploration projects start by diverging and exploring a variety of ideas to approach the challenge at hand. Knowledge created during the project defines the next steps to be taken, which makes proceeding according to a predefined plan impossible[2]. Innovation is, first and foremost, characterized by uncertainty and complexity.

As design is a field where uncertainty and complexity are well-acknowledged and embraced[3], with elaborated professional practices to handle these[4], design can facilitate innovation in organizations beyond its traditional scope. Although the benefit of adopting design for addressing complex and open-ended challenges in organizations is well documented, the role of design is still often very narrowly understood even in its core application areas. In many cases designers are involved in the development process too late, leaving only little, if any, room for utilizing the core design practices beneficial for understanding and structuring the open-ended, complex problems. Integrating diverse knowledge and finding fruitful directions through creating a shared understanding is often seen as the core of the design profession and hence something where designers should be involved. Shared understanding is preceded with sensemaking, the process of interpreting novel and ambiguous situations[5] where design may provide valuable support. This is echoed in Karl Weick's, one of the leading sensemaking researchers, statement: "Design is clearly a

process of sensemaking that makes do with whatever materials are at hand"[6].

In this chapter, we showcase how design can contribute towards creating a shared understanding through a case study of Pilot Vision, an innovation project of ABB Marine and Ports, where design was involved from the early steps onwards.

PROJECT PILOT VISION
- an example of a design-driven exploration project

Project Pilot Vision was a part of ABB's Intelligent Shipping Program that focused on exploring how global megatrends, such as automation, urbanization, sustainability and digitalization, will affect the marine business. The program started from the premise of the future ship being electrical, digital and connected – and as a result, safer, more efficient and easier to operate. New technology, perspectives and ideas were called for.

Project Pilot Vision started in the beginning of 2017. The core project group was made up of approximately 10 internal and external employees. Design had a central role throughout the Pilot Vision project. For example, the lead designer (one of the authors, Santeri), was involved in the early steps when presenting initial ideas and organizing an ideation session to the management team of ABB Marine & Ports. The lead designer was also actively involved in meeting users and showcasing various ideas to them, as well as interviewing and selecting suitable partners for the project. In addition to the lead designer, additional internal and external industrial designers were working part time in the project. As the project aimed at creating something radically new that did not exist previously, it was impossible to make decisions on the product specifications early on, whether related to the technical or user-specific requirements. Design guidelines were created only after it was clear what the actual user needs were. Designers of the project were also actively involved in creating the marketing and sales material.

The resulting ABB Ability™ Marine Pilot Vision is a situational awareness solution that offers multiple real-time visualizations of a vessel's surroundings, presenting the ship and its environment in ways beyond the capabilities of the human eye. The user can see the real-time environment from the sensor data around a virtual 1:1 scale of a ship model, and see the operations from different point of views as well as different camera views together with augmented information such as sea marks, fairways and other seafarers. The visualization can be extended with predictive motions, obstacle collision alert, and it can combine other auxiliary data from the ship and environment and voyage specific data[7].

The first launch of the product concept was in December 2017 at the start-up and tech event Slush. The product presented at Slush was chosen from a design standpoint so that the usability and wow-effect

were highlighted. The product was well-received, and it succeeded in providing visibility to ABB Marine and Ports as a thought-leader in developing digital innovations, building momentum for further exploration.

KEEPING OPEN-ENDED PROBLEMS OPEN LONG ENOUGH

Development projects are often initiated with a solution that has already been decided on either explicitly or implicitly. While at times this is a justified and sensible approach, projects may also end up proceeding with a very limited space for innovation by attempting to make the predetermined solution fit the needs of the users (or in the worst case, interpret the user needs in a biased fashion to fit the solution). Pilot Vision challenged the traditional approach to many new product development projects in that no specific technology was decided upon at the beginning of the project, but rather the best technological solution was left open to be driven by the user needs. At the beginning, the focus was on truly understanding the challenges users are facing today, and only after that considering the means to try to solve these challenges. This meant that the project team set out to explore user needs right at the beginning of the project by observing them, utilizing the existing products, interviewing the users and other customer stakeholders, and asking them for feedback on different imaginary concepts.

The design process involves both expanding the problem or solution space and narrowing down on what is meaningful, relevant and promising. As the solution space in exploration projects is usually vast and there is rarely only a single possible solution, multiple alternative solutions need to be generated, analyzed, and decided upon in an iterative process. This means that the development team must transition between divergent thinking, i.e. generating alternative solutions (or problem statements), and convergent thinking, i.e. choosing the ones to proceed with[8].

Divergent thinking   Convergent thinking
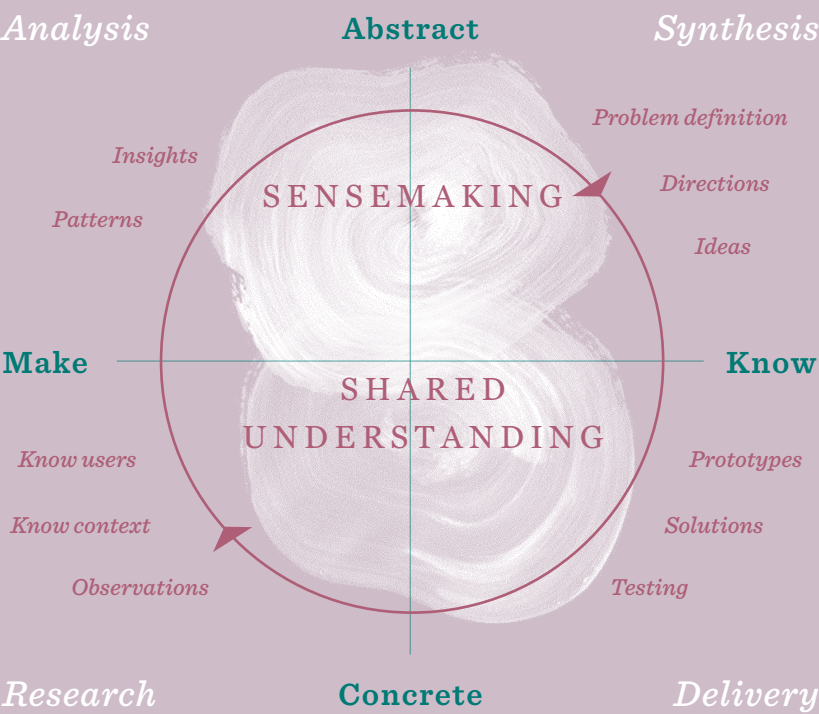
*create
choices*   *make
choices*
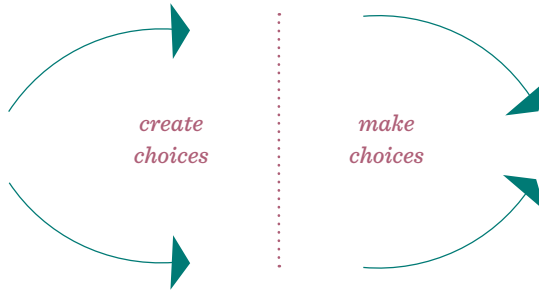
In a divergent phase, the team needs to take different perspectives and be able to openly communicate their ideas and utilize their variety of knowledge and capabilities. In a convergent phase, narrowing down the problem or solution spaces is needed and the team evaluates and selects between possible alternatives to proceed with. A shared understanding is required for making decisions on the direction to pursue. Here, it is important that the different perspectives from different disciplines are considered and that team members are able to explain and rationalize their point of view. However, working in these different modes and moving between them may not be easy, especially for those with limited or no experience with the approach. Design can provide significant value in facilitating the process and providing tools for supporting employees to work in the right modes at the right time. In Pilot Vision, during the diverging phase when ideating for possible solutions, workshops were organized outside the traditional working environment at the Design Factory. Designers (as facilitators) encouraged the participants to not to restrict their thinking nor consider the possible technological limitations, but to 'have the sky as their limit'.

MAKING SENSE OF WHAT'S AT HAND

The difficulty of dealing with wicked problems often involves making sense of the problem at hand and identifying promising directions to pursue in order to come up with a solution. Sensemaking is a process in which individuals or groups attempt to interpret novel and ambiguous situations[9]. This is vital in exploration projects, as they follow a logic of the expansion of knowledge and concept spaces[10], where sense needs to be made of the created knowledge in order to adapt it into a potential solution concept. In design, sensemaking involves seeking relationships or themes in the gathered data and understanding and attempting to uncover hidden meanings relevant to the design task[11]. It is often a collaborative activity, in which teams work together to create a shared sense of the information they possess[12] by exchanging understanding and aiming to agree on interpretations and a course of action[13].

In order to support the interpretive processes of sensemaking, designers often use different types of artifacts, for example drawings, sketches and prototypes[14]. These artifacts support the work of designers or developers as they exchange understandings across different professional groups[15]. Ambiguous situations, such as creating radically new products, require individuals and groups to develop novel and shared understandings in which design can play an important facilitating role in providing forward-looking sensemaking in envisioning what the goal should be[16]. In Pilot Vision, visualizations and demos of what the user could see from sensor readings played an important role in creating a common ground for design, engineering and management.

Analysis　　**Abstract**　　*Synthesis*

Problem definition

Insights

SENSEMAKING

Directions

Patterns

Ideas

Make　　　　　　　　　　　**Know**

SHARED
UNDERSTANDING

Know users

Prototypes

Know context

Solutions

Observations

Testing

Research　　**Concrete**　　*Delivery*

Adapted from V. Kumar (2013). 101 Design Methods: A Structured Approach for Driving
Innovation in Your Organization. John Wiley & Sons, Inc., Hoboken, New Jersey

DESIGN ACTIVITIES SUPPORTING CREATING A SHARED UNDERSTANDING IN DIFFERENT PHASES

Typical activities in design proceed through the phases of research, analysis, synthesis and delivery, although a design process usually goes through multiple - and at times parallel - loops like this. Different approaches can be used in each phase to support constructing a shared understanding.

Research. The process starts with gathering insights on the context, users, markets, trends and current and emerging technologies. The ability of designers to understand and respond to user needs is at the core of the design-driven approach. Hence, when involved in the research phase, designers often have a central role in interpreting user needs and in that way ensuring that there is shared understanding also between the users and the project team. In Project Pilot Vision, design was actively involved in creating a better understanding of the user needs and context by interviewing the customers and observing them using current products.

In addition, rough visualizations were shown to the potential users to stimulate their thinking on how ship operation might be in the future. Without these early visualizations, it might be very difficult for users to go beyond incremental developments in their thinking in envisioning the future. The creative thinking and visualization skills inherent to the profession of design manifest in the ability to imagine how something might look. In the beginning of the Pilot Vision project, designers also used pictures to create a better understanding of fundamental elements of the task at hand among the core project members, e.g. related to the users' needs or desired features of the product. For example, "image boards" with various pictures illustrating anticipated design attributes were created and at times, artifacts utilized to help project group members to achieve a better understanding of users' meanings.

Analysis. After creating a better understanding of the current situation, the process moves towards a messy combination of synthesis and analysis, which are often intertwined and overlapping. In analysis, patterns are identified and connections made in the gathered data. In Pilot Vision, in addition to user interviews, this phase included analyzing data from industry benchmarking (also beyond the marine business), and technology scouting. Designers play an important role in interpreting the data collected with the rest of the project team, as the material and visual practices of design helps to make this phase more tangible. For example, in Pilot Vision, boards collecting visuals and text from the research phase were utilized to create a holistic understanding of the task and the users. Designers also interpreted user requirements, turning them into possible sensor views, and these were then explored and built upon together with engineers. In addition, this phase included integrating knowledge into use cases that further informed the actual use contexts in the operation where the possible new product could be.

Synthesis. From analysis, the process moves to creating various ideas for solutions, selecting what to focus on, and identifying the real need or problem to be approached. The co-evolvement of problems and solutions is a defining and fundamental aspect of design activity and something that distinguishes it from more traditional linear approaches to solving problems[17]. This difference in the approaches is well exemplified in the following comment by the R&D Manager of ABB Marine and Ports:

"Designers are the ones who make up the problems,whereas engineers solve them. Designers repeat the question 'What is the actual problem here?' I have now realized that this is the essential question. That before we rush into solving the problem, we need to spend enough time to consider what is it that we are trying to solve, and do we really understand the problem at hand."

In order to create a better shared understanding of the real need and to select concepts to develop further, several workshops that gathered central actors of the projects were organized during Project Pilot Vision. By applying design-related tools or methods, these workshops aimed at integrating insights and expertise of professionals from various disciplines as well as enabling fruitful collaboration. By utilizing the ideation, visualization and co-creation skills of designers, these workshops helped the project group members to look at things from a new angle, create a shared understanding of the user needs, and transfer knowledge. In order to evoke the thought processes of participants and to provide inspiration on the possible directions, rough visualizations of various ideas were brought to these workshops.
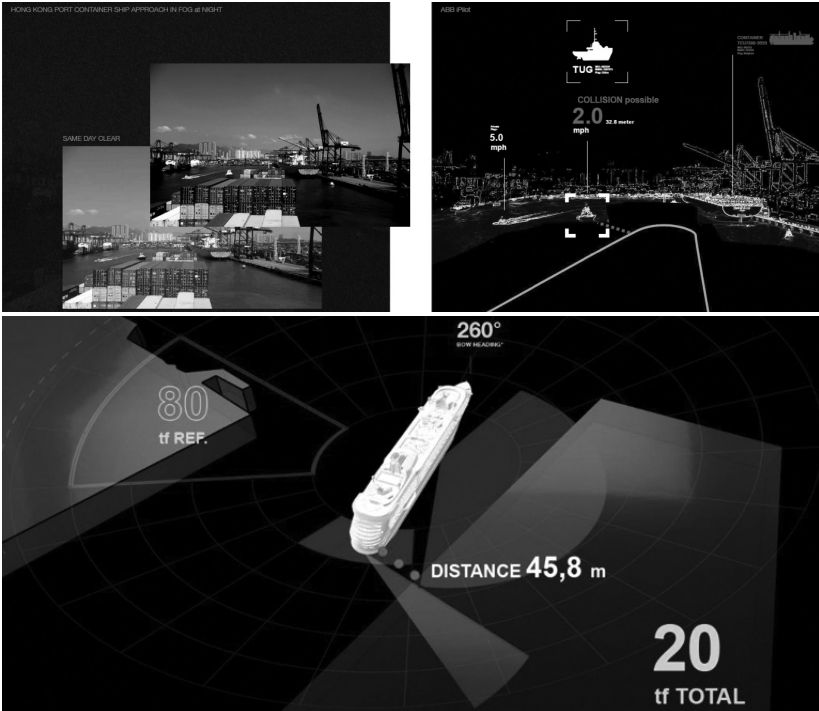
Rough workshop visualizations
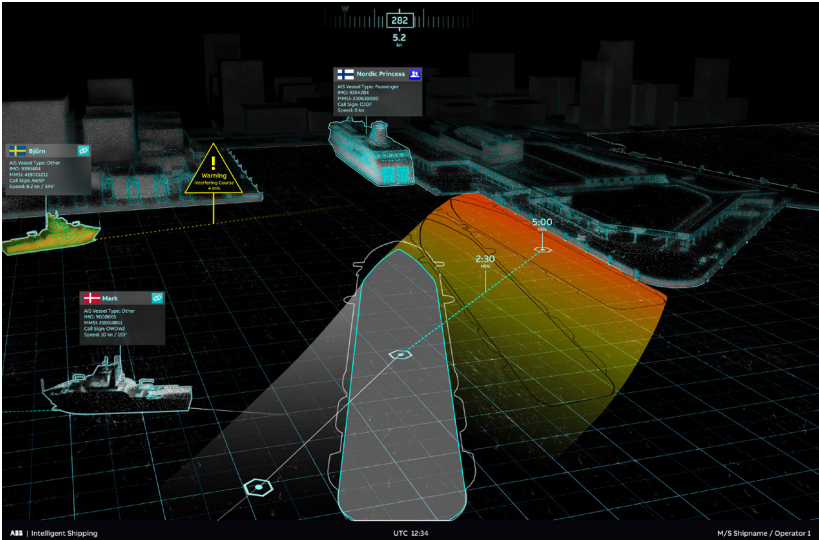
Next-level visualization

In the initial phase of the project, it is important for the designer not to let technologies limit too much of their thinking of what might be. Rough and simple drawings (representing the early visual manifestation of ideas about the design attributes) play an important role in the early phases. The designers' specific training to process information visually rather than verbally is one of the critical elements in supporting creating a shared understanding in ambiguous situations. In Pilot Vision, in addition to individual freehand drawings, designers would draw on whiteboards during meetings based on the input and insight of each group member present. Naturally, it is not only designers who (can) draw. In fact, one important role of designers is to encourage everyone to draw and communicate their ideas and insights in ways other than words. As Santeri notes:

"I always emphasize that everyone can draw".

One good example of successful integration of knowledge happened in a workshop at the early phases of Project Pilot Vision, where the final solution was totally open and no technology had been chosen yet. In the workshop, the idea of masking different sensor views to create the environment for the vessel was brought up. As the lead designer was visualizing inspirational sensor views, he came up with the idea of a free view where user could see the operation from any point of view (in addition to the traditional top view), for example from the race car perspective in video gaming, and convinced to explore further how to achieve it. This prompted further exploration of the idea and became one of the central features of the final product. The next-level visualizations integrating the insights of various experts were utilized to communicate the vision internally outside the project team (e.g. to the management team) as well as to potential partners and users.

Delivery. Finally, ideas to proceed with to experimenting are selected in the delivery phase. It is important to notice that the delivery here does not mean the final delivery of a finished product, but building prototypes and testing them with users in order to know which are worth developing further. It's also worth noting, that as a result of sensemaking in the analysis and synthesis phases, you might not necessarily proceed to prototyping, but rather might need to go back to gather more insights. Design is not about knowing the solution, but about knowing how to look for a solution.

In addition to asking the question "What is the actual question?", design proceeds to experimenting with the ideas without the fear of failing. Sometimes, this means that the time spent developing and designing a concept seems like a waste of time. However, this is all part of the process and eventually will lead to the best possible solution quicker than it would have without experiments. Hence, in addition to the ability to synthesize the information available and to create a better understanding on the critical elements of the task, the project team needs to be able to act on that understanding and to move on to experiments. In Project Pilot Vision, the Suomenlinna Ferry was an important collaboration partner where the project team could conduct user tests and spend time in discussing and observing ship operation. Another critical milestone for Project Pilot Vision was the decision to launch the first version of the product at Slush less than a year after the start of the project. This enabled the project team to demonstrate key functionalities of the product and to receive perspectives and feedback beyond the organization and its existing collaborators.

BRINGING ALL THE PIECES TOGETHER

To solve complex challenges, we need to aim for open and efficient collaboration between various actors of the project; e.g. designers, developers, users, partners. We need to involve people so that they are able and willing to bring their different knowledge and perspectives to the table. The more information the project team has available to build on, the more likely it is to come up with a novel and valuable solution. This heightens the need for collective sensemaking, the process of interpreting what is going on. Only after creating knowledge of 'what is going on', the project team is able to create a shared understanding of what are the next steps to be taken. Having a shared understanding of promising directions to pursue also ensures more aligned communication with customers:
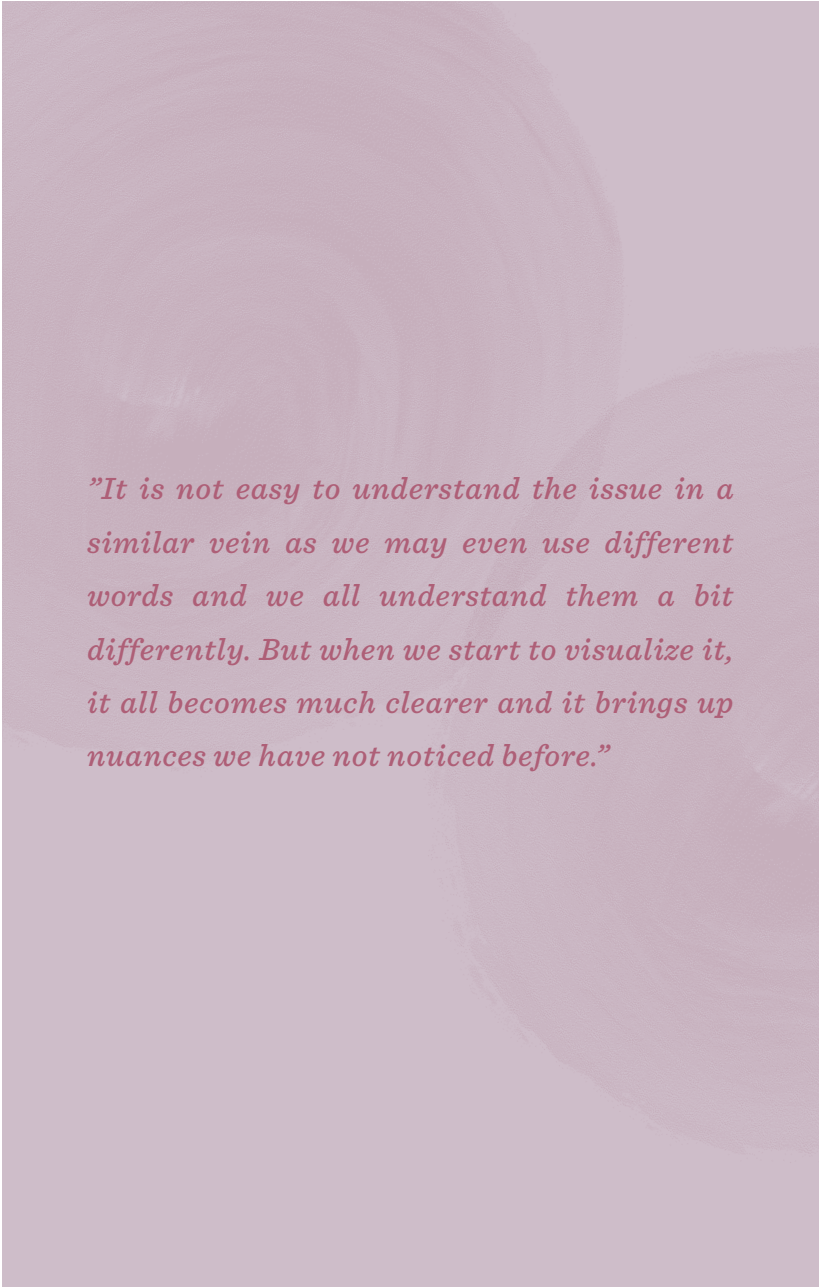
"Design has worked as a glue between different functions in helping us all to understand things in a similar manner, so that we are all going towards the same direction and communicating a unified message to the customers."

- R&D Manager

Solutions to the complex challenges that the organizations of today need to tackle are to be found by integrating differing perspectives of various disciplines. Design can foster involvement e.g. through facilitating workshops (such as sharing findings of the user studies), and the application of design-related methods amongst these various actors, where important information and knowledge are transferred toward creating a shared understanding and vision. Ultimately, by bringing together people from different parts of the organization, the design approach may facilitate and build a foundation for increased internal communication in a lasting manner.

Sensemaking can be considered the more abstract phases of figuring out where the team should go when they have all sorts of information at their disposal. In the abstract space – and in sensemaking – there are no hard facts nor definite numbers but it is based more on intuition, gut feeling and hunches informed by the facts. Therefore, it might be difficult to discuss, justify, rationalize, and finally settle different views. The key component of the 'designerly' method of approaching problems is the gradual restructuring and improvement of the design problem, and through this, the improvement of the solution. This requires maintaining an open mind toward alternative solutions and avoiding a premature urge to converge, which contradicts the way the majority of organizations are operating.

Furthermore, when confronting abstract concepts or unfamiliar products, supporting verbalization with visualizing ideas is necessary. No matter the detail in which one might try to verbalize his or her idea to another person, the images of the idea will most likely be different, and hence, a shared understanding will be missing. Through visualization and concretization, design supports the integration of new understandings among the project members. As Santeri, the lead designer of Pilot Vision, puts it:

"It is not easy to understand the issue in a similar vein as we may even use different words and we all understand them a bit differently. But when we start to visualize it, it all becomes much clearer and it brings up nuances we have not noticed before."

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Increasing customer collaboration through co-creation

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Collaboration with customers and users is essential in order to develop services or products that answer their needs. Introducing co-creation workshops to the beginning phases of product development can help to build long-lasting benefits in customer relations and understanding, as well as spark wider change efforts internally.

In the last ten years, design thinking has established its role in design led industries. It has also gained a foothold in companies that traditionally have not systematically exploited design methods or are heavily business or technology driven. A central concept to design thinking and its human-centered approach is collaboration in all phases of a design process from the very start. In addition to having user-driven criteria in the center of everything, co-creation helps in getting to the heart of the problems that are often impossible for the user to identify and explicate[1]. The reason organizations should embrace co-creation is simple: engaging customers to defining and creating the products and services that bring value to them can lead to competitive advantage[2]. Co-creation is not merely collaboration, but engaging stakeholders with diverse expertise and experiences broadly to find solutions that could not be otherwise found[3]. It is not limited to creating products, but can rather refer to any collective creative action and be applied to pretty much any domain of life[4].

Co-creation can be summarized as having three basic elements: collaboration, development action and creating something, while the tackled issue could be anything [5]. Compared to plain old collaboration, co-creation always includes development action and creating results, and the settings are more symmetrical with all stakeholders as active contributors towards mutual goals[5]. Co-creation moves the focus from managerially led value creation to enabling collaboration to create insights and make meaning in an equal setting [6]. This approach allows businesses to develop solutions that are not based on assumptions of the customers' and users' needs, but instead on solutions that are founded on mutually recognized needs and ideas. Diversity in design teams has been shown to improve the quality of solutions, and involving a wide range of employees to idea generation helps in committing them to solutions[1]. Thus, it is not only the quality of solutions such as products and processes that we should pay attention to, but the quality of the co-creation experience also matters. When the co-creation process is well thought out, the participants can have a valuable co-creation experience where the boundaries of organizations are blurred [2].

Meaning cannot be created alone[6]. Co-creation can be used for any creative action done in collaboration, including creating clearer and more detailed visions for the future than what would otherwise be possible[3], interpreting experiences[6], and setting a foundation for further collaboration. Customers, users and other stakeholders should be included in development actions early for testing ideas and shaping the markets. Through co-creation this shaping can be bidirectional, as customers shape the direction of a profect while businesses can prepare their customers for new ideas. Having co-created these visions positively affects their probability of implementation[3].

Classical:
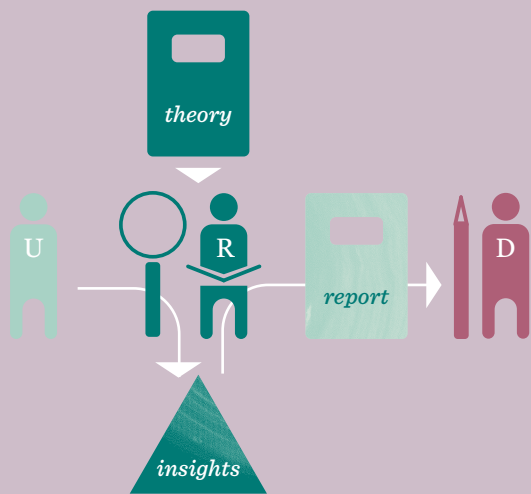
Co-creation:
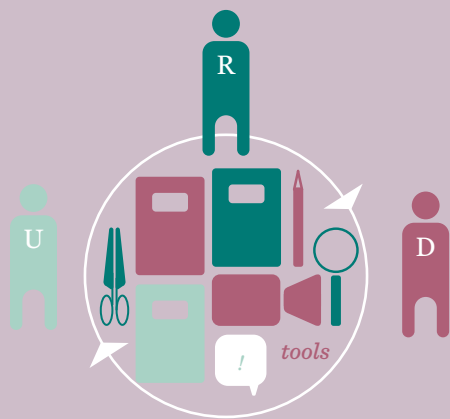
The differences of the roles user [U], researcher [R] and designer [D] have in a classical design process versus as a part of co-creating (adapted from Sanders & Stappers[4])

CO-CREATING TO ESTABLISH RELATIONSHIPS FOR LONG TERM COLLABORATION

There are as many ways to co-crate as there are people and companies doing it. For Outotec (a large minerals and metals processing and technology company), one form of co-creation has been the introduction of co-creation workshops to their service offering. These workshops have been piloted with key customers and further developed based on the learnings from the first trials. Co-creation in these efforts means getting to the core of customers' problems and solving those by either coming up with solutions from the existing product portfolio or creating novel products and services. The need for this type of working was called for not only by Outotec's customers, but also product developers in the company, who recognized a growing need to understand the problems their customers are facing in their processes, the need to reveal the real issues behind those problems, and to desire to generate ideas that address those issues. In order to offer the cutting-edge technological solutions their customers expect, and to remain a forerunner in their industry, the product developers at Outotec had to think of ways to bring their operations closer to customers. Involving the customers early in product development by co-creating with them was one logical answer to this need. This started a change that has been extensive and comprehensive.

After some initial coaching on design thinking from Matti (who works as an in-house industrial designer at Outotec), developing practices for co-creation has been a natural continuum to the introduction of design thinking tools inside the organization, making it easier to serve their customers through creating deep understanding. Dedicating time for co-creation workshops also crafts time for coming together to create that understanding and use it as a base for generating new ideas. The workshops also serve as a platform for deepening trusting relationships between stakeholders and a foundation for fruitful collaboration.

Foundations for co-creation

Based on these initial experiences, there are three elements that make a good co-creation workshop:

- First, *account managers* play an important role with their understanding of the local context and relationship with the customer. In addition to bringing the cultural context to the table, they have the knowledge of previous collaboration and personal contacts in the customer company. These personal relationships enable mutual trust, identifying the right partners for co-creation and finally getting the right people in the customer organization to take part in the collaboration. Similarly, it is also important for the account managers to have internal contacts to be able to gather the right group of Outotec employees with matching know-how to each workshop.

- Second, a *champion in the customer organization* is needed. In all co-creation workshops, there has been someone in the collaborating organization who wants to push collaboration further and works together with the account managers to organize opportunities for co-creation.

- Third, the *customer's needs and co-created future visions serve as a starting point* for successful collaboration. They also put emphasis on reinforcing the experience of mutual benefit, as the collaboration has to give something to both sides.

The workshops have already been conducted around a variety of challenges. Teams from Outotec and the client have spent a couple of days working together near the customer's site and using that time to work intensively to recognize bottlenecks in the customer's processes, map possibilities for collaboration and figure out ways in which Outotec

could solve the recognized issues. In the end, they have produced a roadmap offering an overview of what the next steps of collaboration will be, when those should be taken, what kind of deliverables will be produced, and what enabling actions are needed in order to realize the plans. The participating team has co-created quick demos of how recognized problems could be solved, as well as quick prototypes of new ways of providing solutions to customers' problems, including for example digital services.

By organizing these workshops in fast cycles, a lot of learning has happened and the workshops have been fine-tuned to a more effective and useful direction. One of the biggest lessons had been the understanding that the ways of co-creating and doing creative collaboration cannot be the same in all cultural and customer contexts.

After piloting the workshops, co-creation is now a part of the company's service offering and the workshops have an established role in collaboration between Outotec and its customers. Despite this established role, there is still room for developing the practices further. To take co-creation to a more strategic level, customer relationships are to be developed to widen the scope of applying co-creation as a method for collaboration. Immaterial property rights and practices regarding IP pose an interesting challenge to be solved, as IP plays an important role in the industry Outotec operates in. To be able to create solutions together with customers, clear contracts need to be made egarding rights ownership and what the collaborating parties can expect from the results. This clarity improves the trust between participants in co-creation, creates a feeling of safety, and therefore contributes to the results of the workshops.

Seeing the impact of co-creation

The co-creation workshops Outotec has organized have had a positive impact on multiple levels, and the feedback and experiences have been rewarding beyond the direct workshop outputs. The most important aspect of co-creation, it seems, is the *bond and relationship between the collaborators*, that creates huge potential for future development efforts. Other benefits include:

- forming a good *overall view* on the customers' problems and needs, which later helps in setting guidelines for product development. This kind of insight spanning across business units might not be otherwise created. Forming an overall view might even help in productizing technologies that, with a sustainable level of customization, serve as many customers as possible - a big advantage in Outotec's industry, where products are traditionally highly customized. Co-creation enables this kind of collaborative visioning, and eventually the visions are what convinces people on new directions and possibilities to be pursued. The improved overall view also allows Outotec to match customers' tacit issues to existing products.

- increased *future investment decisions* when customers have been given the opportunity to influence the development of solutions. The process of trade can also change, as the co-created roadmap serves as a basis for making an extensive offer that tackles a variety of mutually recognized needs and problems.

- *qualitative affirmation* for introducing design thinking and user centricity internally. Some customers have stated that the co-creation workshops have been the best workshop they have ever participated in, which gives a strong mandate to push this kind of collaboration further as a strategic change. Being able to produce

qualitative data on the impact of alternative ways of doing product development is a welcomed outcome, as co-creation workshops also represent an optional way of going about the first phases of the existing stage-gate-model to development. It is easier to promote change and get people in the organization to side with it when there are positive testimonials and not only numeric data on e.g. profit.

• *understanding further opportunities* opened up through co-creative ways of working has been one of the biggest lessons that has been gained from the co-creation workshops. These include trusting relationship with customers, new innovative ideas, better usability and novel, high quality technological solutions, to name a few benefits. The understanding of possibilities for collaboration has increased with the understanding of customers' and users' needs, nudging attitudes and the company culture when it comes to experimenting as well as co-creation. Even those who have been skeptical towards co-creation and its methods have taken initiative to take it to other parts of the organization. There are now efforts for enhancing user centricity in company-wide processes and systems and a growing demand for UX as developers want to focus more and more on the users. We attribute this shift to people having seen first-hand what the benefits of collaboration are and how it pays back to e.g. sketch together while talking about ideas and possibilities.

Tips on implementing co-creation

One of the most important tips to others who would like to apply co-creation is to be bold in trying something new. There are multiple references from other companies that offer insights on what might work and what might be better suited for other kinds of collaboration or technological contexts, and you may also find internal know-how from the company's own employees. Learning a new approach and ways of co-creating benefit the company not only during the actual collaboration, but also in the long run. Facilitating co-creation with the help of internal rather than external workforce, tacit knowledge and know-how is accumulated in the organization and relationships with the customer deepen. This kind of collaboration can be recommended to any organization in order to survive and flourish in the competitive global market. Products, in the end, are quite easily copied, unlike the knowledge and understanding behind that technology. Enhanced understanding is a resource that can be turned to value over and over again.

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Three rules of thumb:

1]

Be bold and go ahead!

2]

Look for references, and don't hesitate
to piggyback on others' learnings.

3]

Do it yourself for long-term benefits!

*"When you execute co-creation workshops
yourself together with the customer, knowledge
and understanding of the customer are developed
and doesn't only stay in reports. You get a lot of
material that consultants would not document,
and that is a reserve you can later draw from."*

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Bringing the customer experience to the center of employee experience

Tua Björklund, Aalto University

Miko Laakso, DNA

Creating great customer experiences requires insights on both customers and the people creating those experiences. Opportunities to connect with customers are a foundation for workplace engagement and can help to infuse work with meaning.

B y now, creating superior customer experiences has become a necessity for sustaining competitive advantage. At the same time, many companies are still playing catch-up when it comes to crafting employee experiences. Customer experience and employee experience are connected. In an era when most employees are disengaged at the workplace, customer experience leaders also boast more engaged employees[1]. This translates to the bottom line: employee engagement and experience can double revenue and profit[2]. The reverse can be seen as well: poor customer service frequently causes customers to switch between service providers, affecting the fields of financial services, telecommunications and utilities in particular[3] - necessities which can be invisible when running smoothly and crippling when failing to do so.

So how can one promote engagement and improve employee experience? This is no simple feat. Employee experiences lean on three interconnected environments at the workplace: the *cultural environment* (the feeling employees get from working in an organization), the *technological environment* (the tools they use to get their job done) and the *physical environment* (the actual spaces in which employees work)[2]. Factors which influence these, in turn, include[4]

- *Organizational structures and supports, such as incentives, management and human resource programs*
- *The work tasks themselves and the processes, support tools and information needed to complete them*
- *Internal interaction with people within and across units and functions, and the organizational culture, as well as inter-action and communication with customers and external stakeholders*

As such, employee experience is highly complex with no single approach to be found for tackling the entirety of the issue. However, the same design processes that can be used for enhancing customer experiences can be applied to improving employee experiences. These are two sides of the same coin, and instead of examining them separately, particular focus should be paid to designing "touchpoint" interactions where employees and customers meet[5]. We, as people, have an innate need for experiencing connection with others, intrinsically motivating in its own right rather than as a stepping stone to something else we desire (the basic mechanism on which external rewards rely on to coax desired performance)[6]. Fostering meaningful connections between employees and customers can be a powerful contributor to designing better employee experiences.

Interconnected journey maps:
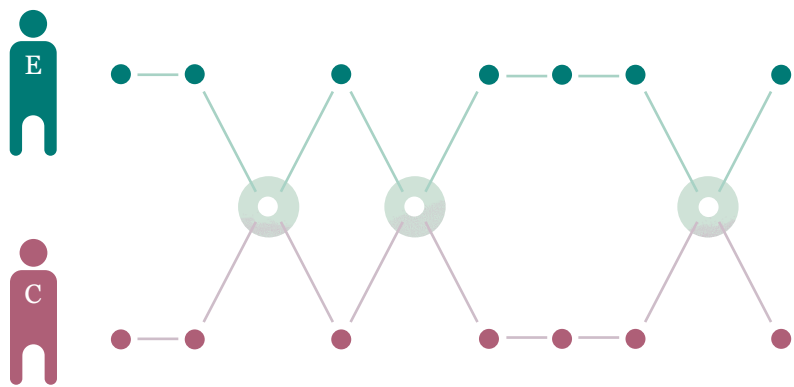
CONNECTING EMPLOYEES TO CUSTOMERS

DNA, a Finnish telecommunications company started in 2001, outlines both customer and employee experience as its top strategic goals. Customer experience has been built as a foundational element of the company's brand strategy, where the brand is considered built to a significant extent on the actual interactions and experiences the customers have with the company and its services. Brand management and customer experience operate within the same team. As a testament of DNA having made employee experience a top priority in its strategy, it has recently won the Great Place to Work award in large companies in Finland, and landed within the 15 best large companies to work for in Europe[7]. To develop the organization to become even more customer centric and build linkages to further enhance the employee experience, DNA nurtures employees' connections to customers in a number of ways.

1] Articulate purpose in terms of social impact

Whether you work in a call center or as a lifeguard, seeing the significance and social impact of your work translates into increased job satisfaction and performance[8,9]. However, one should not assume the significance is loud and clear to everyone in the organization - we all benefit from a little reminding. For example, DNA operates in telecommunications, an area where customers tend to have low levels of passion towards their operators, especially in a context like Finland, where network coverage is high and the differences between operators are small. However, telecommunications represents a necessity in modern society where people are increasingly dependent on functioning communications in all areas of life, from using public services, to entertainment, and being in touch with their loved ones. DNA articulates their goal as making the everyday life of their customers simpler and more straightforward, more enjoyable, and productive by providing products and services that are clear and easy to use.

On the other hand, there is the wider social impact of the services. To tap into this aspect of their operations, DNA conducts studies on digital equality in Finland and according to the most recent study, about ten percent of Finns are experiencing digital inequality to some extent. While ten percent might not at first sound like a huge number, when you consider the actual number of individuals behind that percentage, it becomes evident that the human impact can be huge. While old age predictably correlates with an experienced lack of understanding of technology, we should not assume that the experience of digital inequality applies only to the elderly, as, according to the study, even people under 40 report fearing falling behind on technological development.

However, making the overall impact on the company offering on the customers' lives explicit and visible is not enough. You might still hear someone working in for example technology stating "I don't have a role in this since I am just writing code and not working with the customers". While the impact of frontline employees on customer experience is evident and easily understandable, deliberate effort typically need to be placed in making the impact of the work happening backstage evident. Here, visualizations and purposeful reflection on the pathways between facets of the customer experience and individual contributions of employees are useful tools. Making it easy for employees to grasp both the big picture of the impact on customers lives and how their role feeds into it builds a foundation for meaningful work - we all want the time we spend at work to matter, and the social impact to customers can be an important source for motivation in any line of work.

2] Show in addition to telling when it comes to customer insights

Organizations today have ever increasing amounts of data on their customers, their preferences and behavior. Analyzing a varied and massive body of data yields insight into customer behavior that can fuel innovation and continuous improvement of products and services along with an ability to measure their impact on customer experience. However, this type of extensive data can result in perceiving the customers in terms of facts and numbers. Designers and user researchers typically function as the advocates of the voice of the customer, with multiple tools at their disposal for making the customer experiences tangible, understandable and relatable – or to develop empathy, as we often call it in the present rhetoric. However, this also leads to designers and user researchers acting as gatekeepers of the customer experience and, at worst, can lead to the detachment of other personnel from it.

Personal experience tends to be more memorable and convincing than just throwing around numerical data or even rich and illustrative descriptions. Face to face interaction and meeting specific individuals rather than relying only on an abstract conceptualization of customers can promote both commitment to addressing customer needs and motivation at work[9]. At DNA, design and customer insights activities are not left to the experts alone, even when these activities are conducted by partners. The design and customer insight at DNA strive to involve other personnel in customer research interactions, be they interviews, observation or co-creation workshops. It is worthwhile to always bring along someone who is new to the design approach or has little contact to the customers. In many organizations, it's worth targeting efforts to inviting mid-managers along in particular. Unlike front line employees who tend to gain plenty of exposure to customers in any case, or top management, who can have an easier time seeing across separate units and functions in an organization, mid-managers tend to operate "deep in the organization". As one expert in technology development at DNA remarked in a recent case: "I've known that ten percent of the customers turn their modem off when they are not using it, but this was the first time I actually met such a person face to face." Being able to take the perspective of the customer can fuel creativity[10], and empathizing is much easier when you've seen struggles and improvements with your own eyes. Such experiential understanding of customer needs can energize making changes in the processes, structures and resources of the organization to improve touchpoints between customers and employees.

3] Encourage proactivity through managing the threshold of participation

Customers are ultimately the beneficiaries of employees' efforts, yet most organizations are filled with various "back office" positions in which there is little or no contact with customers. Think of ways in

which you can ensure that everyone in the organization has some contact with the customers, whether it involves going out into the field or bringing a customer inside the organization. At DNA, employees in all positions are required to listen to customer calls and make a field trips to a DNA store as part of learning at work. This helps to keep everyone grounded to the realities customers are facing, as well as keeping the articulated purpose of making the everyday life of customers more enjoyable, easy and productive fresh in the minds of employees in all corners of the organization. This type of exposure to the voice of the customer is a low threshold and does not require any special skills from the employees, as opposed to, for example, running a workshop involving customers.

Managing the threshold of participation and the resources required is important for the longevity of the efforts, as facing the customer can also be intimidating for many employees. Employees invited to join user research and service design in customer interviews at DNA are prepped for the situation and have the role of note taker their first time, with the designer being responsible for being in the driver's seat.

Once employees are aware of the needs of customers and the impact their work has on customers' lives and have some experience in gathering customer insight, we want to empower employees to act on the insights they have gained. Designing new workplace experiences is very much dependent on co-creation[4]. In addition to having design and customer research specialists, it can pay off to teach some basics to everyone in the organization. At DNA, specific projects purposefully act as deeper dives into creating customer experiences for cross-organizational teams, where the participants engage in a range of design activities over a whole process of service design. Many aspects of a human-centered design approach are typically challenging for non-designers, such as making sense of the observations and data to

create actionable insights, along with the overall mentality of accepting the uncertainty inherent to the approach. This type of involvement benefits from support in terms of reflection along the process, with transparency on the rationale behind different activities. In addition to these types of projects, DNA also runs a weekly customer insight and service design "clinic", where anyone in the organization can reserve a time slot for getting advice or consulting from the design team on gathering customer insight or using service design methods - whether the target is improving products, services or the employee experience at the company.

Going forward

Just like customer experiences, employee experiences hinge on a number of touchpoints with people, tools, spaces and processes inside and beyond the organization. Design thinking can be used to improve the innovation process for new products and services; organizational design to promote integration across disciplines, functions and units. The physical environment can be developed in how it supports collaboration and connects to intangible values; while management and organizational processes can stimulate, support and reward the types of behavior the organization wants to see from employees[4]. While this can seem like a daunting list to work through, the employee side of the experience coin cannot be neglected without adverse effects on customer experiences. Rather than shying away from the challenge, invite all hands on deck to pursue a holistic and continuous development of employee experiment. Bringing customer experience to the heart of creating meaningful employee experiences is one of the ways to pursue this goal.

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DESIGNING THE FUTURE

Finding a balance in shifting needs for the future

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The role of design is changing in many organizations, and entire industries are being disrupted. Based on 67 interviews with designers working in 9 countries in the context of large technology organizations, changes in technology and collaboration networks have already had an impact on designers' operational landscape. A framework of needs based on competence, relatedness and autonomy can be helpful in ensuring that individual and organizational needs continue to be met to fuel complementary performance.

The previous chapters have illustrated the highly relevant and growing role of design in organisational effectiveness in a number of ways. Given the innovative, human centred and experimental nature of design[1] and the successful application of its tools and methods to link end users with the production of goods and services[2], the future of design seems to be bright. As technology, consumer preferences, and organizational goals continue to evolve, the relevance of design as a core contributor to company success will be closely linked to designer wellbeing, managing the complexity of new changes within industries and organizations therein and the ability to measure the strategic and market value of design.

In mapping the future from the designer perspective, two key areas emerge: an understanding of areas of influence on designers themselves based on designer needs on a human level and second, considerations central to working within an organizational setting. On the level of the designer, *flexibility* to react to necessary changes in the design process or end product, *collaborative effectiveness* and the *knowledge and tools* needed to apply design methods to new challenges will likely continue to be three primary factors that ensure effectiveness and motivation within complex organizational systems. On the organizational level, the legitimacy ascribed to design, budgetary considerations, upper level support and process effectiveness within company structures are vital areas that will affect design work in the future.

INNATE NEEDS AS A FRAMEWORK FOR SUPPORTING DESIGN

When looking into designers' perspectives on the future based on findings from our research, it is helpful to map the primary need categories within the designer that may be affected. For designers, and people in general, to be happy and effective, three basic need categories should to be met[3]; the need for competence, autonomy and relatedness are all vital to wellbeing and thus also important to keep in mind when looking at the future of design from a designer point of view.

The *need for competence* refers to the need to be able to overcome optimal challenges; from the designer perspective, this is linked to the importance of having necessary information, tools and ability to be successful in solving problems and coming up with valuable solutions within the organizational setting. If challenges are too big for designers to effectively overcome them, motivation, wellbeing and performance all suffer as a result.

Second, the *need for relatedness* refers to a sense of belonging, validation and social effectiveness. In the designer context, this need category can be divided into the designer community and the multidisciplinary collaborative network. Collaborative effectiveness in our research of designer perspectives was central in both enabling and preventing effective design work.

Third, the *need for autonomy* in the designer context is huge; in our research, designers continually emphasize the importance of flexibility in order to be able to creatively react to challenges linked to design. Here, the ability to apply oneself without excessive external limitations is a prerequisite to creative solutions and the preferred application of design methods. This freedom of movement is a significant enabler of designers' effectiveness and highly motivated creativity. However,

unlike competence or relatedness, we've found that autonomy can be a "hygiene factor" in the designers' work - its lack is demotivating, but its presence alone is insufficient to create meaningful moments at work[4].

Ideally, these three needs categories create a balanced formation, fostering an effective and satisfied designer within the organizational setting:
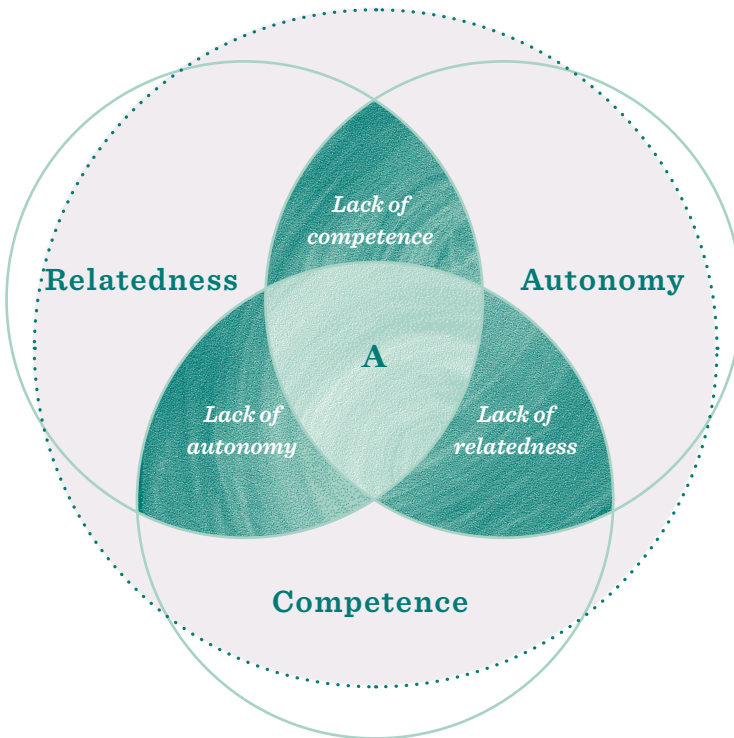
Innate needs
in balance for the individual:

A = *Ideal combination for the designer*
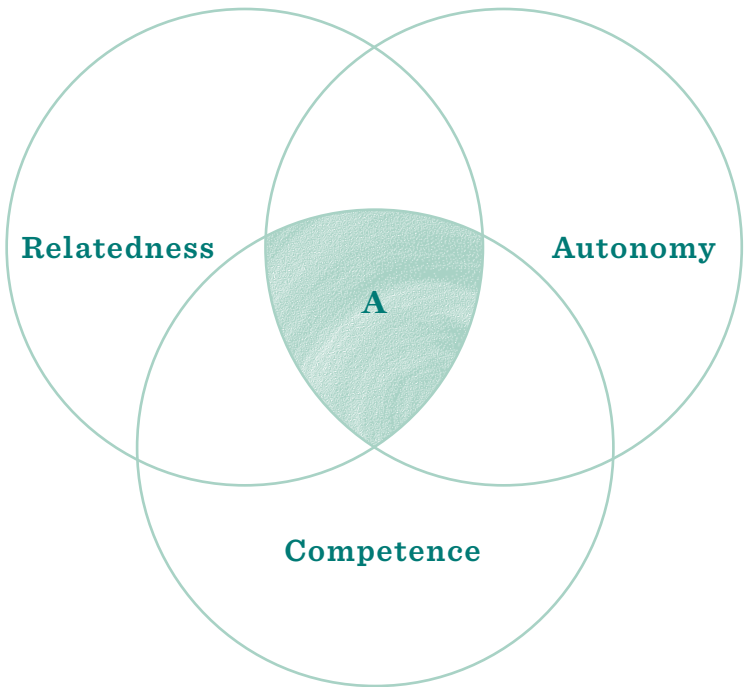
Based on this framework of need categories, we can begin mapping external expectations and changes in the needs for design. In this version of the figure, the dotted circle represents the design context; this could be a project, organizational culture or a collaborative team's expectations. As such, the dotted circle represents external pressure that influences or guides designer goals and relevant behaviors.

Harmonious needs between design and designers:

A *= Ideal combination for the designer and organization*

Lack of competence

Relatedness

Autonomy

A

Lack of autonomy

Lack of relatedness

Competence

In this first perspective into the future, the balance of the needs of the individual coincides with the balance of external expectations. However, this is not necessarily the case always. If external expectations or needs fall into the dark green in the figure, the three needs are out of balance in that one is excluded. These become key when thinking about how future changes might affect designers. We view two potential challenges going forward through the lens of this framework.

## Changes in skills for design work: Two trends in opposite directions

In considering future changes relevant to designers, technological shifts represent a major area of consideration; for example, many of the tools available to designers and end products relevant to users are visual in nature and involve reimagining or improving the user experience. Technological avenues opened up by augmented reality, voice recognition and other digital forms of experience are not limited by past interfaces. In the future, technological shifts mean new spaces to explore and new challenges to overcome. As new domains for the application of designer expertise emerge, so does the need for new knowledge, competence and creative solutions.

Here the framework shows a gap opening up between future organizational needs and current individual needs in design. With the shift in technology, a new externally determined equilibrium emerges and is in conflict with the needs equilibrium of the designer. If designers are not preventatively equipped to tackle the technological challenge, there is a period of high reliance on collaborative networks and the ability to leverage autonomy to learn new information. The distance between the two ideal points represents the area that the designer must compensate for; competence may, for a time, be limited due to the need to adjust one's expertise to a new set of tools.

Potential external shift away from the zone of competence:

A = *Ideal combination for the designer*

B = *Ideal combination for the design work*

Relatedness

Autonomy

Competence

B
Lack of competence

A

Lack of autonomy

Lack of relatedness
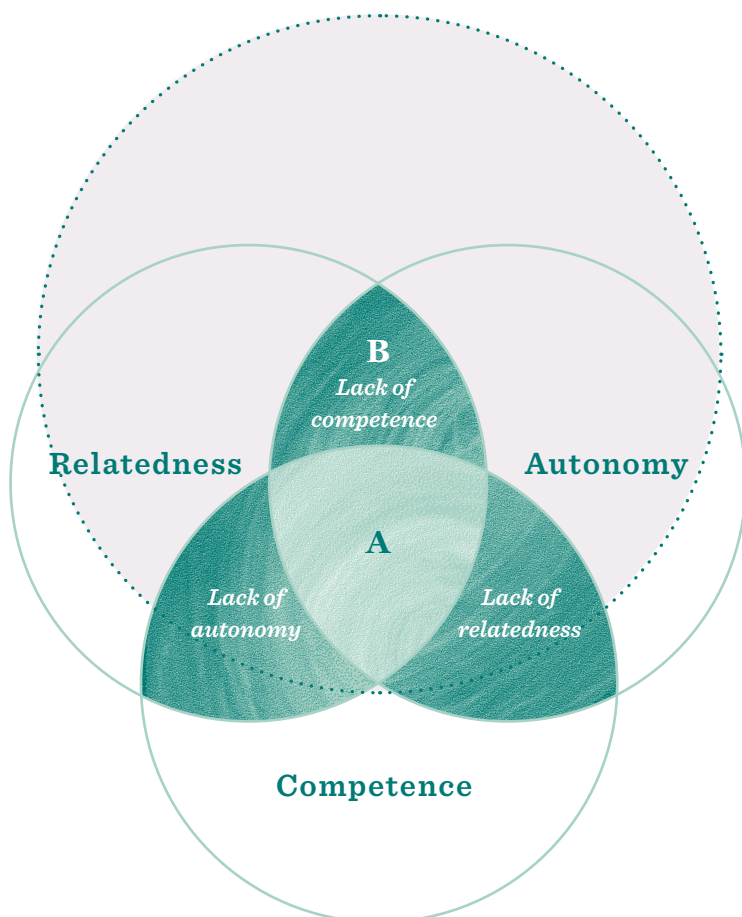
While changes in technology may broaden (at least temporarily) the gap between skills that designers have and the skills needed in design work, there is, however, another change underway simultaneously. The expectations placed on designers influence the scope of design work they can pursue, and these expectations are changing. Our research shows that designers have experienced empowerment as upper level managers, for example, have understood the multi-dimensional capabilities of designers that go beyond aesthetic contributions. In the future, as expectations of designers continue match better with actual designer capabilities, the dotted circle here representing external expectations and assigned designer roles will move downward, bringing external needs toward a fuller appreciation of designers' potential contributions and closer together with the competence designers already have. For example, this movement to a balance between design and designer was evident where designers described easier access to resources for user research along with having more strategic projects where focus was placed on creating requirements rather than on designing to predetermined specifications. As this greater understanding of design and designers takes place, assignments and projects given to designers will be increasingly multidimensional, opening the door for new creative solutions from a design perspective while also providing designers with optimal challenges and therefore a high degree of constructive motivation.

Shifts in organizing changes the picture

Designers also reported highly dynamic changes in collaborative partnerships, in terms of new sources of expertise relevant to the overall goal that the designer's work contributes to and designer networks within organizations that foster designers' sense of community. This can play out in a number of ways where there is a risk of dampening relatedness. For example, who designers work with toward shared goals is shifting in many organizations. New project partners or end

users who bring new expertise or outcome expectations can introduce a level of uncertainty due to a lack of shared work history. This can motivate an overreliance on designers' personal competence and autonomy if extra effort is not taken to move the equilibrium to include the network value. Designers emphasized the significance of a mutual understanding of roles and expectations in situations where changes were introduced into shared efforts; uncertainty linked to roles and collaborative expectations was associated with lower confidence in personal efforts.

Potential external shift away from relatedness:

A = *Ideal combination for the designer*
B = *Ideal combination for the design work*
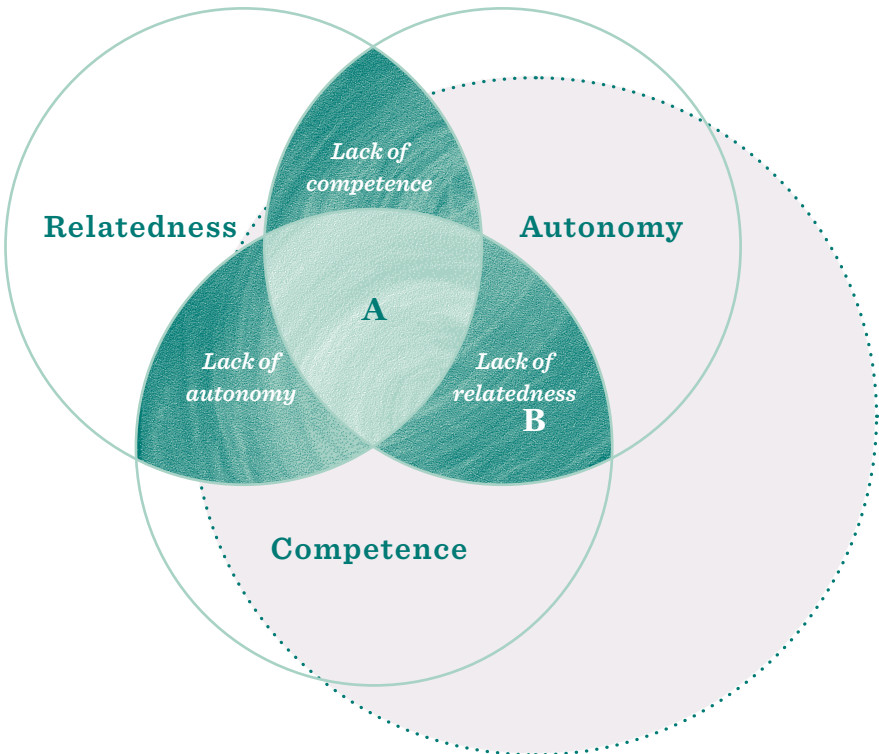
Another scenario comes from organizational changes that affect designers' sense of a familiar designer community within a company. These communities are highly valued by the designers, and act as sources of support, learning and ideation. When organizational structures change, a move toward the original equilibrium of matching individual needs and organizational conditions might mean creating a new designer network that fosters valued design contributions and a sense of community. These could take the form of joint post-mortems on projects, regular joint calls across sites or time dedicated to tackle internal design challenges together every now and then. As such, feedback, a sense of validation, communication and team dynamics are all affected by future changes in this area.

Here, designers must be able to react to collaboration changes in order to ensure the continued contributions of one's own professional competence and autonomy. Given the complexity brought about by the mix of organizational dynamics, business models and innovation, designers occupy a unique space when it comes to connecting people, organizing technical information and making that information understandable on a wider scale. Designers in our research emphasized the value of understanding the organizational context within which work takes place; who is involved, what goals are being pursued and how success is measured. Similarly, they saw the importance of understanding technological opportunities for design to be able to effectively collaborate with developers and engineers.

Shifting realities related to technology, organizational actors and customer expectations can present unique challenges that designers are particularly well equipped to tackle. Benchmarks of success may be less about creating completely new technologies and more about innovating and refining the user experience, a key area of designer proficiency due to a relatively human centered focus. As the network

of participants in an effort changes, and opinions on how to measure value shift, designers will continue to be a bridge between silos and a valuable link to understanding the needs of customers. The benefits of designers' relatively strong focus on the end user may not be as easily quantifiable as other technical metrics, but as the appreciation of design's contributions spreads within organizations, the role of designers becomes increasingly validated. Furthermore, as factors considered in benchmarking develop with the growing appreciation of design, resource allocation evolves toward fuelling new high impact efforts.

Designers as translators and bridge builders

Understanding complexity and translating it into an understandable form enables more effective collaboration and improves outcomes; the role of designers as translators and bridge builders is due in no small part to contrasting approaches to problem solving that they bring to the organizational table. Maintaining flexibility to react to challenges, the necessary knowledge, skills and tools to function in the collaborative setting, and the health and functionality of the collaborative network and its processes will continue to be vital in the future of designers' work.

Being inspired and excited by understanding something new brings an aspect of play into the pressure of the professional setting; fuelling motivation by unravelling challenging mazes of information, expectations and collaborative dynamics can make all manner of goals more feasible. These characteristics described by designers in our research seem to be a strong and beneficial match for the expertise gaps brought about by the pace of industry and marketplace evolution.

The areas of potential change that affect designers present significant challenges for the future. But, by the same token, new contrasting expertise, technological change, wider awareness of designer capabilities and new collaborative partnerships can combine to produce unexpected and valuable outcomes. Regardless of the new challenges and enablers that the future brings, the curiosity, creativity and technical skill of designers will be a source of valuable progress, given the opportunity.

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Cultural change in education

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Knowledge hubs in educational institutions experiment with exploring new forms of education, challenging established ways of preparing students for the world. For the teams running the hubs, this is a balancing act, as they need university resources and legitimacy to operate effectively, while seeking autonomy to design freely. This causes representatives of these hubs to employ various strategies, at times pulling away from their institute, shielding their initiatives from existing procedures or norms, while simultaneously building traction across the university for their alternative ways of providing education.
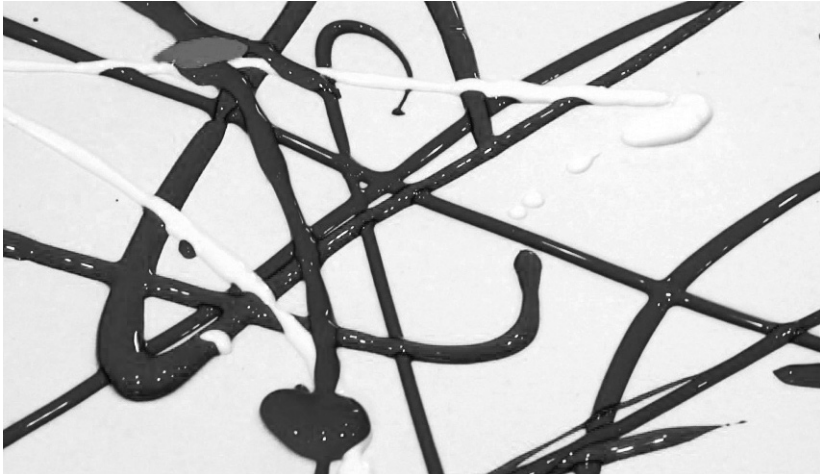
Adapting to changing societal complexity is a key challenge for higher education[1]. To explore new ways of delivering education, design thinking is often mentioned as a valuable approach, as it is effective in opening up fixed mindsets and increases collaboration[2]. By taking advantage of the various perspectives and knowledge present in interdisciplinary teams, design thinking has been found to support people with diverse backgrounds to push for innovation in their field. Traditional norms and regulations at large higher education institutions however, can stand in the way of nurturing a creative culture that is both innovative and supportive.

In the past decade, innovation and knowledge hubs have been popping up in educational and research facilities[3]. While the way they operate depends on the context of these hubs, typically they include at least a physical environment, resources and facilitation[4]. These hubs facilitate the exchange of experiences and information between students, teachers, researchers and industry representatives, less constrained by existing ways of delivering education. Knowledge hubs

at universities thus have the capability to act as design studios offering space for different types of knowledge and interest communities, with core activities revolving around designing and experimenting with new forms of education with different parties.

One example of a design-oriented network of knowledge hubs within education and research institutions is the Design Factory Global Network (DFGN). Identifying as platforms for passion-based co-creation driving change in their local context, the first Design Factory was established at Aalto University in 2008 and has since then spread to 25 institutions across the world, creating a network of autonomous yet connected Design Factories. These entities bring together students, educators and academia with a larger community of businesses, government bodies and non-profits, to co-create and design solutions to wicked problems. Each entity is based on similar values and ways of working, yet largely influenced by the local context - the surrounding society and culture, institutions, and design, business and engineering disciplines. Key activities of Design Factories target both the host organization and the wider ecosystem it operates in[5].

Design Factory representatives shared stories describing the essence, struggles and future plans of their Design Factories. Many discussed the complex relationship between the host organization and the knowledge hub, especially in regards to challenging the existing norms, striving for autonomy, while relying on resources and legitimacy from the host to get students from across the university for interdisciplinary collaborations. The shared challenges are often experienced by various Design Factories across the world, and occur at different times, sometimes even in reversed order due to organizational changes in support.

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GN

**DESIGN FACTORY
GLOBAL NETWORK**

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1] *Aalto Design Factory*
Aalto University, FINLAND, 2008

2] *Sino-Finnish Centre*
Tongji University, CHINA, 2010

3] *Design Factory Melbourne*
Swinburne University of Tech, AUSTRALIA, 2011

4] *Duoc Design Factory*
Duoc UC, CHILE, 2012

5] *Ideasquare @ CERN*
Cern, SWITZWERLAND, 2014

6] *Design Factory Korea*
Yonsei University, KOREA, 2015

7] *Porto Design Factory*
Porto Polytechnic, PORTUGAL, 2015

8] *Nexus Design Factory*
Philadelphia Univercity, USA, 2015

9] *Frisian Design Factory*
NHL Uni of App Sci, THE NETHERLANDS, 2015

10] *Metu Design Factory*
Middle-East Technical U. TURKEY, 2016

11] *Design Factory Javeriana | Bobotá*
Pontificia Universidad Javeriana, COLOMBIA, 2016

12] *NYC Design Factory*
Pace Univercity, USA, 2016

13] *RTU Design Factory*
Riga Technical U. LATVIA, 2016

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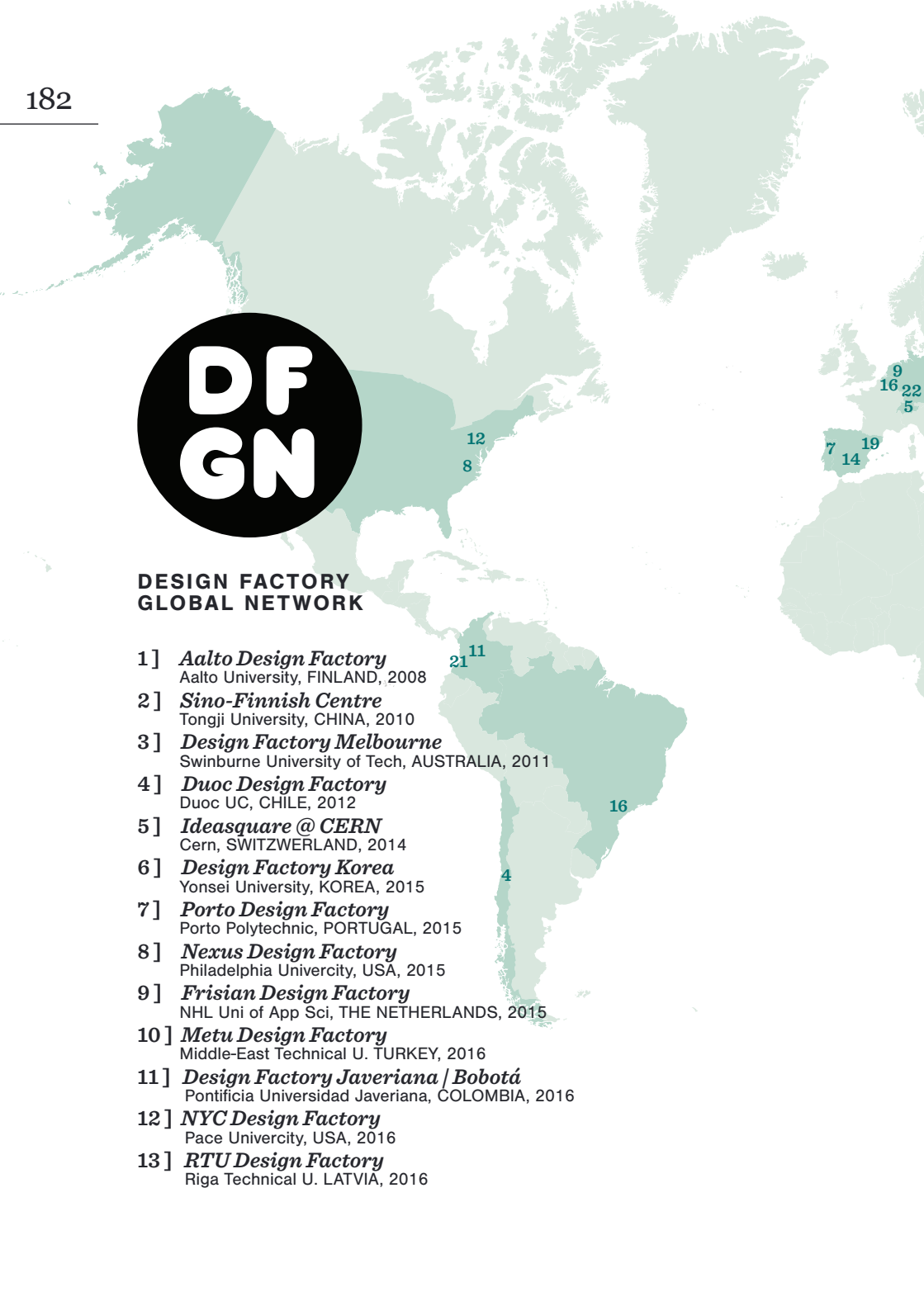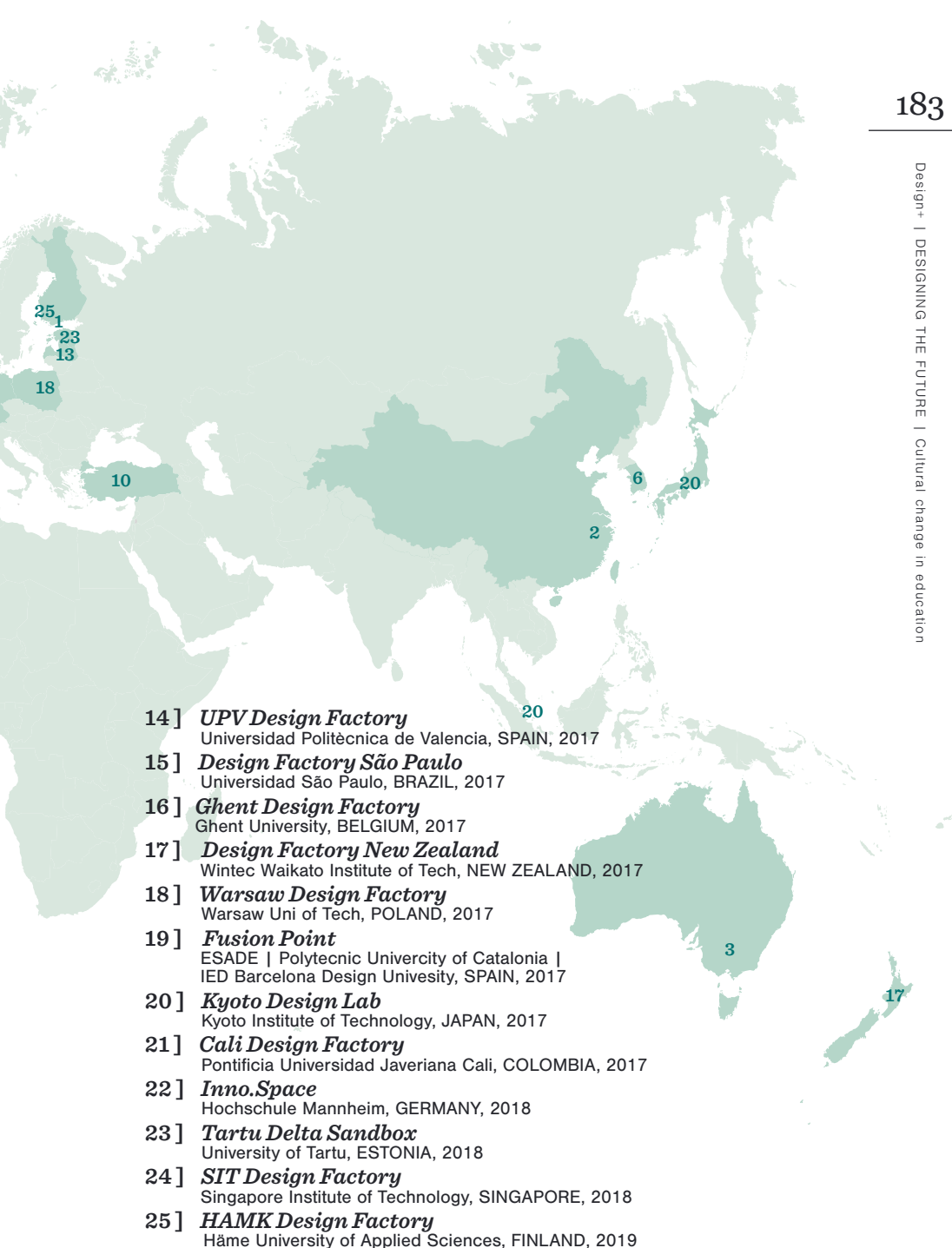
14] *UPV Design Factory*
Universidad Politècnica de Valencia, SPAIN, 2017

15] *Design Factory São Paulo*
Universidad São Paulo, BRAZIL, 2017

16] *Ghent Design Factory*
Ghent University, BELGIUM, 2017

17] *Design Factory New Zealand*
Wintec Waikato Institute of Tech, NEW ZEALAND, 2017

18] *Warsaw Design Factory*
Warsaw Uni of Tech, POLAND, 2017

19] *Fusion Point*
ESADE | Polytecnic Univercity of Catalonia |
IED Barcelona Design Univesity, SPAIN, 2017

20] *Kyoto Design Lab*
Kyoto Institute of Technology, JAPAN, 2017

21] *Cali Design Factory*
Pontificia Universidad Javeriana Cali, COLOMBIA, 2017

22] *Inno.Space*
Hochschule Mannheim, GERMANY, 2018

23] *Tartu Delta Sandbox*
University of Tartu, ESTONIA, 2018

24] *SIT Design Factory*
Singapore Institute of Technology, SINGAPORE, 2018

25] *HAMK Design Factory*
Häme University of Applied Sciences, FINLAND, 2019

CREATING A SAFE SPACE FOR UNICORNS

MOTIVATION - A quest for craziness

"A big collection of different and special personalities", in one way or another, this is how many Design Factory representatives label their community. Students, educators, researchers and other staff share a passion for having fun while working like crazy. Working at Design Factory is about exploring your interests, enjoying what you do, and celebrating each other's evolutions and successes. Design Factory gives space to the *"unicorns"* that could be considered misfits in other places of their organization.

Student-oriented attitudes are often considered the greatest asset of a Design Factory, the ultimate goal being student autonomy, personal development and meaningful experiences. Inspiring, motivating and *"life changing"* ways of teaching equip students struggling with failing due to perfectionism with methods to be innovative and make big ideas come true in every workspace.

Design Factories focus on community and team spirit irrespective of whether people are students or staff. Closeness is among other things achieved with *"open DF Slack, having meals together, helping each other with the different problems, celebrating each other's successes and just spending time together outside of DF activities."*

BARRIERS - Battling against bureaucracy

Bureaucracy is most often mentioned as a hindrance towards running a Design Factory, *"forcing to do many things in a tiring and roundabout way"*. Design Factory ambassadors need to be willing to push for change, since acting *"differently from others in the university"* results often in a lack of fit with existing structures. Convincing the board or

managers can be time-consuming, and can stand in the way of receiving a budget *"to do all the things they would like to do"* and *"make more opportunities available to students"*.

Strong regulations demand requesting approval for activities outside of existing protocols, and can hinder rapid experimentation. Many therefore advocate for more financial autonomy and less dependence on the school calendar and varying priorities. However, attempts to go around the bureaucratic processes can cause Design Factories to become more detached from the university, complicating collaboration with teachers, who are employed in faculties and not in Design Factory, as well as keeping enthusiastic students, dealing with demands from their curriculums.

DESIGN SOLUTION - Community first

In response to these challenges, Design Factories often opt to focus on building the community, adapting to changes, and be welcoming and accommodating to anybody who wants to join.

"We have grown based on people's desires and capabilities. In an organic, not so predefined way. So our development is more a journey, more than a schedule."

One of the most effective ways to make people feel welcome has been creating a space that is cozy and encourages prototyping. Additionally, the adaptability of the space is often a key component, both on a daily basis to make sure different activities, such as workshops, presentations and meetings, can be run, and throughout the year responding to changes in the team and way of working.

Another way people feel at home is through designing welcoming rituals, such as a homecoming party where students are given access

cards, Design Factory t-shirts and a hug; or fun, informal events with music to keep everybody engaged. Both staff and students are also given the freedom to develop ideas, for example *"to move forward with ideas as long as they relate to Design Factory in some way"* and to *"do something crazy every now and then"*. Additionally, Design Factories show they care about their community by training staff so they can excel, shielding them from bureaucracy and supporting them in challenging rules.

GETTING DIFFERENT DISCIPLINES INVOLVED

MOTIVATION - Inclusive growth

Co-creation being at the core of the Design Factory, many aim *"to get interdisciplinary teams of students working together with industry and professors"*. Design Factories want *"inclusive growth"* and increase diversity in their collaborative projects by involving students from different departments all over the university and beyond. Different ways of advertising are explored to invite students and staff to come to the Design Factory space, to *"educate all new users to the DF culture and spirit"*, and to have them *"join the family"*.

BARRIERS - Proving value again and again

Many experiences were shared where it has been hard *"to encourage other people to join, due to the silo structure of the university."* When Design Factory projects are not accepted for credits, it is difficult to promote its benefits in other faculties. Faculty outside of the Design Factory might not *"understand the purpose or function of Design Factory"*. Convincing university authorities and academic staff that also students without a design background can come to Design Factory, and that it is *"a very valuable thing for their students to do"* can be challenging. The validity and legitimacy of the Design Factory might

be discussed over and over again due to *"confusion and politics"*. This causes unexpected changes in resources, financial, human, or spatial, and spending time and energy to continuously *"prove our existence"*.

DESIGN SOLUTION - Hosting existing courses

In order to gain legitimacy at the host institute, Design Factories collaborate with or integrate existing university activities into the Design Factory space, for example by *"hosting several courses"*, *"running existing modules"*, and by enabling *"every undergraduate degree in our institution to offer the Design Factory module in their programme"*.

Additionally, by *"hosting several courses, but also external events, like hackathons, and workshops in collaboration with industry, we often get compliments for how great the spaces are for this kind of activities: well-designed and well-equipped in terms of technology, tools, furniture and design"*. Almost every Design Factory organizes events related to research, education and design, such as prototyping and testing workshops, student entrepreneurship coaching sessions, technology talks, and hackathons in which students and professionals come together to tackle wicked problems.

Furthermore, Design Factories also engage potential new users in informal ways. Popular examples include a shared breakfast, games to boost interaction, a news wall, weekly tours, all supportive of getting more people to see and experience the Design Factory way. This is supported by a dedication *"to making it very open to students from all the university. If they need to build something, they can just pass by and ask for help."*

SPREADING THE DESIGN FACTORY WAY

MOTIVATION - Becoming part of the core

Design Factory representatives share a vision of their Design Factory growing, expanding and integrating into the entire university, making its way of working accessible for all students from all different programs. To do so, they want to raise awareness amongst university staff and higher levels in the university, so that their way of working will be accepted by the host at the core, to *"be more of a service to the whole uni"*. Some explore setting up *"multiple physical spaces in different dependencies"*, others focus on *"a bigger team and more infrastructure"*. The majority, however, shared initiatives to *"cultivate Design Factory culture to other departments"* through *"bespoke workshop courses"*, so that more people see and feel the value. When faculty, communities and businesses have a better understanding of the Design Factory culture, it is believed, more *"resources, ideas and synergies"* may be made available to contribute to the development and embedding of the Design Factory.

BARRIERS - A disrupted community

Some Design Factories focused on spreading of the Design Factory culture across campus experience a *"general lack of presence, support and shared excitement in the team"*, since *"some days there is barely anyone from the team in the office"*. This decreases opportunities for collaboration, communal activities and fun, despite everybody working very hard.

Simultaneously, other faculties start implementing similar ideas. Spreading new ways of working is a core goal and can lead to valuable collaboration. However, sometimes space and course solutions can be copied without acknowledging or collaborating with the Design

Factory or its community, resulting in competing for scarce resources rather than learning from each other.

DESIGN SOLUTION - Finding allies near and far

Various Design Factories engage more with other Design Factories in the network. Sharing experiences both in terms of success stories and struggles supports local Design Factories to advance new ways of working and collaborating more successfully. When local team members are spread out, the network also offers much needed understanding and team spirit.

Alternatively, some Design Factories invest more in their own university structure and make themselves an indispensable component of other initiatives at the university, for example at disruptive *"activities that are not so common in our university"*. Another representative mentioned they decided to expand their advisory committee to other disciplines and schools, to *"be more open to our students."*

Design Factories also secure their position by becoming a vital part of the ecosystem around the university. They involve elementary school students, researchers, scientists outside their host institution, and people of all ages to co-develop startup ideas and co-create new education with the industry. Additionally, they show off by highlighting that Design Factory *"students stand out in job interviews because of the experience they have had working with international teams, communication, learning on our feet, conflict resolution, business plans, etc."* and taking part *"in an official parade at the culture capital of Europe project"*. This way they show they have an *"influential role in their surroundings"*.

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From growth to responsibility: Changing conversations in Silicon Valley

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With the rising complexity and reach of technology, the work of designers can have global consequences. We need to be open to talking about the dark side of design and prepare for some difficult discussions on responsibility and who do designs include, exclude and advocate for.

During the past couple of years, design and design thinking have engaged a growing number of people and gathered a lot of positive attention. Design organizations have expanded, design-driven organizations have been built, and success stories written. It looks like we have fallen madly in love with design, for many good reasons. In the middle of all enthusiasm, however, there is also a need for critical thinking and discussion on the dark side of design.

The questions of ethics and responsibility are becoming increasingly important as artificial intelligence, the internet of things, and robotics play a greater role in our societies and everyday life[1]. Smart devices that can listen to and watch everything we do in our homes or elsewhere can be used to help us – or they can be used against us. There is much discussion on the technical complexity related to these products. Unfortunately, that can lead professionals from many fields to ask themselves whether we can make something rather than whether we should. We need a lot more reflection around how ethically complex many of the systems being designed actually are, why we are designing what we are and what could be the consequences in the worst case.

Let's face the fact: design doesn't always make things better. It can also make things worse. Most of us have witnessed, engaged in or read about poor or unethical design decisions, all under the banner of human-centered design or design thinking. Either by action or inaction, through fault or ignorance, questionable products, services, and systems have been designed. They are not beneficial for any of us or they only benefit a small group of people. One could say that this is not only the designers' fault. Leaders, engineers, and other professionals

have a significant role, too. That's true. For the purpose of this chapter, design in understood in the broad sense – if you play a role in designing solutions, you can be considered as a designer irrespective of your professional title. You don't need to see yourself as a designer to be able to design something that can have a huge impact - positive or negative impact - in your community or society[2].

ALGORITHMS AND HUMAN ACCOUNTABILITY

Design and design thinking communities tend to celebrate small failures as a way to learn and develop. That's great in many ways. However, not all failures are acceptable, even when "small". In the digital era, even small failures can have enormous effects. Think about Facebook changing their code: the impact is immediate and global. Failures can be costly for the company behind them for sure. But we should be even more concerned about their impact on users or the whole society. Can we risk the mental health of young people? Can we risk democracy? Can we risk peace? As Victor Papanek said in the 80s, "You are responsible for what you put into the world. And you are responsible for the effects those things have upon the world."[3] He referred to designers as gatekeepers, reminding them of their power, agency, and responsibility.

When celebrating creativeness, innovativeness, and an experimental mindset, we often fail to pay enough attention to ethical considerations. Silicon Valley tends to value speed and growth, but are they something to be celebrated if they blur one's purpose? When we talk about algorithms, it is easy to ignore human accountability[2]. Even the most complex products, services and systems have been created by human beings. Someone has designed social networks without a way of dealing with abuse, harassment, and spread of disinformation. Someone allows hate speech on the platforms because it counts as engagement. Someone has designed all those features that trick the users into doing something they don't want to in the first place. Someone designed and

installed a software into around 11 million Volkswagens to detect and deceive emissions testing (yes, he was acting on orders, but still ended up in prison for it!). In the latter case, there was clear, intentional fraud within a highly regulated industry. That's not always the case.

When you access Google, you are in dozens of experiments without knowing anything about it[4]. In many other industries, involving human beings in experiments without asking their permission would be illegal. Furthermore, often the systems being created are so complex, that even the designers themselves are unable to consider the full ramifications of their work, and they certainly don't know how to deal with the consequences, some of which may be far from intentional or manageable. Still, human beings cannot blame algorithms for something that they have designed. In the same way, most of us have a sense of what is right and what is wrong, no matter if it's illegal or not.

DESIGN IS A POLITICAL ACT

One aspect of design is that it is unavoidably political and that's why there should be more discussion about power in the design community. Important questions to be asked include what to choose to design and what to choose not to design, but also who to include in the design process, and equally importantly, who to exclude from it. Perhaps the most important question is who do you and your design advocate for? Politics are involved, whether we are aware of it or not.

Many successful products have been created by privileged white males, who are unable to see things from the perspectives of minorities. Would the products be different if a more diverse group of people would have been involved in their design? We don't know for sure. But what we do know is that all human beings are affected by their own experiences, creating biases. If people designing a social platform have never been

harassed, chances are that the possibility of harassment, abuse or threats doesn't even come to their minds[2].

The work of designers has a direct impact on the individuals and families exposed to the products, services and organizations created. In addition, there are indirect impacts on many different levels. The power of designers goes beyond their own labor, or the company they work for, to the level of the entire ecosystem they are designing within. The scale of many products, platforms and organizations today is global. At the same time, the power of design is unprecedented.

CODE OF ETHICS FOR DESIGNERS

When you become a designer, you don't have to take an oath, pass the bar, or get a license to practice, nor is there any regulation on who can call themselves a designer. Doctors, for example, take an oath before they begin practicing. This doesn't of course ensure they don't face constrains or make mistakes during their careers. However, in all circumstances, they are supposed to do their job as defined by the code, to the best of their abilities. If doctors violate their oath, there is a good chance they will lose their license. Designers, on the other hand, can create addictive products, collect extensive user data for unclear purposes, enable fake news or more. There is no oath or official ethical framework in place that would guide them. There is little external demand for making the ethical qualities of their practices more explicit[5].

Many designers have proposed ethical principles for their field. Mike Monteiro is one of them and he has drafted his version of a Code of Ethics for designers[2]. It includes several elements, each of which has been explained more in detail in Monteiro's book:

Monteiro's Code of Ethics for designers:

1] A designer is first and foremost a human being.
Every human being on this planet is obligated to do their best to leave the planet in a better shape than what we found it in, and to respect every other human being on this planet..

2] A designer is responsible for the work they put into the world.
The work you bring into this world is your legacy.

3] A designer values impact over form.
We need to fear the consequences of our work more than we love the cleverness of our ideas.

4] A designer owes the people who hire them not just their labor, but their counsel.
Asking ourselves why we are making something is an infinitely better question than asking ourselves whether we can make it.

5] A designer welcomes criticism.
Criticism is a gift. It makes good work better. It keeps bad work from seeing the light of the day. It is your responsibility to ask for criticism.

6] A designer strives to know their audience.
Empathy can be a pretty word for exclusion. The more a team includes the audience it is problem-solving for, the more thoroughly it can solve those problems.

7] A designer does not believe in edge cases.

We shouldn't marginalize people. We shouldn't decide that there are people in the world whose problems are not worth solving.

8] A designer is a part of a professional community.

A designer seeks to build their professional community, not to divide it or to earn one's living at the expense of other designers. This includes public redesigns of someone else's work, spec work, unsolicited work, and plagiarism.

9] A designer welcomes a diverse and competitive field.

Throughout their entire career, a designer seeks to learn. A designer welcomes and encourages people who come from diverse backgrounds, knows when to listen, is aware of their own biases and welcomes having them checked, and fights to make more room for those who have been silenced.

10] A designer takes time for self-reflection.

No one wakes up one day designing to throw their ethics out of the window. It happens slowly, one slippery slope at a time. Your job is a choice. Please do it right.

Monteiro sees his code of ethics as a living document and invites everybody to contribute to it. A similar need for ethical principles has been discussed also amongst coders, who face the same challenges: building increasingly complex products and systems in a fast changing industry without any ethical framework to lean on.

YOU GET WHAT YOU MEASURE

It's easy to understand why speed, growth, and market share often matter more than asking difficult questions. It's also easy to understand why asking "why" can cause problems at work, or even lead to losing one's job. We all need money for living and most of us would gladly welcome big bonuses. However, there needs to be a balance between making money for ourselves, making money for those who hire us and doing work that delights the people who use it[2].

Doing unethical design just because your boss asked you to do it is a bad excuse, but we human beings are biased when it comes to our own work. Upton Sinclair wrote about problems in the meat packing industry over a hundred years ago and concluded: "It is difficult to get a man to understand something when his salary depends upon his not understanding it."[6] The same goes for business today, and in particular to the highly competitive, growth-driven, and venture capital intensive areas, such as Silicon Valley. Once you get funding, the investors start pushing. If you succeed, your reward will be enormous.

Designers carry a huge responsibility, but anybody having an impact on the products and systems created – especially leaders and investors – need to reflect on their actions and commit on building sustainable solutions. There's nothing wrong with making money, but there are other, greater values. That's why we need to measure more than profit.

Monteiro throws a challenge also towards design schools[2]. Students are not taught enough ethical skills, neither are they trained to have difficult conversations around ethics in design. Many young designers confuse solving design problems with personal expression. They pay more attention to creativity than measuring the effectiveness of their own work. And effectiveness, of course, should be seen not only in relation to their employer or business growth, but in relation to the society at large, including those in need[7].

In the era of artificial intelligence and other advanced technology, the consequences of getting things ethically wrong are massive. Maybe the most important skill that young (or any!) designers can have is not linked to creativity or experimentation at all. Maybe it is seeing themselves as moral gatekeepers, just like Papanek proposed almost 50 years ago.

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THE WAY FORWARD

"Design creates culture.

Culture shapes values.

Values determine the future."

- Robert L. Peters

The scope of what design can bring to organizations is broad, as illustrated in the examples presented in the different chapters of this book. This collection of topics represents a combined effort from a team with backgrounds in both industry and academia to bring experience-based value and practical perspectives on the application of design and design thinking within organizations. The hope here is that this toolbox of various models, theoretical frameworks, concrete organizational examples and recommendations translates into effective leveraging of design within a variety of organizations, with the potential for creating new value.

The interconnected nature of organizations, whether in the public or private sector, creates complexity; this complexity is rarely static, as partnerships, collaborations and organizational goals tend to require the ability to react to new challenges and to create new opportunities. Competition is growing in many sectors and stakeholder expectations are evolving in ways that can be difficult to predict. As such, dynamic capabilities become a vital component within organizations in order to facilitate the exploitation of opportunities and experimentation necessary to prepare for new ventures. Together, these characteristics of the organizational ecosystem have motivated the inclusion of design within organizations in a variety of ways.

Whether in terms of software, organizational, industrial, engineering or some other form of design, the shared goal tends to be a push toward human need-centered and experimental methods of innovation. Designers have, in turn, become key advocates for both end users and customers within organizations valuing a customer focus. Notably, designers are involved in various levels of decision-making, from project teams to the executive level, which affects resource allocation and strategic influence of design in organizational goals.

"Design is intelligence made visible."

- Alina Wheeler

ORGANIZATIONAL SELF-AWARENESS

Developing new questions and ideas regarding the use of design can inspire useful perspectives on how to define problems, the facilitation of co-creation among both new and well established stakeholders and learning through familiar or novel experimentation. These next steps can lead to meeting strategic needs effectively insofar as capabilities are in line with desired goals. Of course, making sure the right competence is in line with new goals related to design is necessary before clarity is possible regarding roles and responsibilities. Clarity can be a significant challenge when venturing into new territory, and as such leaning on examples from peers can be a valuable resource, a central theme of the chapters thus far. Here, the hope is that a map of diverse methods can be used to determine a variety of routes to reach similar goals.

Furthermore, design capability and competence requires structure that complements a collaborative approach where problem solving and creativity are encouraged. Who makes decisions, determination of responsibility, resource allocation, and benchmarking success and failure are all key components of effective collaboration that frame the context within which great design work can happen. How centralized is the process? How effective is communication? To what extent are goals, culture and practices shared? What does the balance between designer flexibility and necessary organizational structure look like? Answering these types of questions creates an awareness of organizational context that can be used to avoid potential pitfalls.

The output, values and assumptions of organizations illustrate the culture within which design takes place. Do the metrics used to measure design contributions leave room for second and third order economic effects beyond those most easily identified in the business model? It is important to track the impact of design, but how it is measured becomes vital in understanding how its benefits are being felt, especially in terms of the end users and customers involved. The development, production and delivery phases with which design is involved may all be holding hidden gems of how design is or could be beneficial for the organization. Awareness of these pockets of potentially significant value can and should be taken into consideration when determining the return-on-investment of design.

Furthermore, being inquiry oriented as an organization is particularly valuable when nuance is necessary in finding nuggets of value in well-established systems or operations. The examples presented in earlier chapters show that legitimizing and stabilizing the role of design can be particularly challenging in larger organizations, especially those with long traditions of technical or engineering driven focus. Established processes, regulations and norms that naturally foster

more engineering-focused efforts can hinder design work, which can result in designers taking up a role as agents of change connecting various stakeholders to further strategic efforts. Ideally, these efforts complement the organizational structure and potential flexibility therein to meet new innovations or methods half way.

As such, issue selling by designers can be both highly frustrating and highly rewarding, depending on how well various disciplines sync in efforts toward shared goals. How is creativity rewarded? How much room is there to question the status quo? Designer efforts to influence the organizational environment can be a tricky proposition if toes are stepped on, but if the right conditions and effective communication are in place, learning the dance can be enjoyable for everyone involved.

"It's not 'us versus them' or even 'us on behalf of them.' For a design thinker it has to be 'us with them'"

- Tim Brown

All you need is
Love
Design
Business
Engineering
& Co-creation

BEING NEED-FOCUSED

Efforts involving collaboration always have a current in which output is directed. The end goal at the organizational level in terms of the customer or end user that is linked to economic returns has a certain set of needs at its core. The meeting of these needs, whether fulfilled through a product or service, requires a nuanced understanding of preferences and expectations. Here, collaboration with customers and end users is essential in order to meet or exceed expectations and ensure a valued outcome. Given the focus of the design approach on the human element, understanding needs is absolutely vital in the process.

The examples in past chapters illustrates how paying special attention to the human element in terms of customer satisfaction yields not only maximally beneficial economic outcomes in the short term, but also motivated designers and longer lasting customer relations in the longer term.. Being less driven by pre-determined assumptions of customer or end user needs and more by mutually determined needs and ideas to satisfy them is a significant progression toward ideal solutions; diversity in perspectives within design teams has been shown to improve the quality of solutions, as value is less likely to be identified in isolation. Furthermore, insights from both customers and the organizational team are necessary to create an ideal customer experience. Here, engaging with customers tends to be a key motivator and source of inspiration in design work. As such, co-creation in the development process can ensure that the shared journey toward ideal solutions is guided by the needs of those who will ultimately be most affected by the end product or service.

It is clear that the needs of the customer or end user are a valuable source of motivation for designers. Ideally, the professional needs of the designer align well with the capability to meet customer needs.

Here, communication, flexibility, resources and organizational support are particularly significant in ensuring effective design work. The motivation of designers is closely linked to the effectiveness of organizational collaboration, the ability to effectively perform in terms of competence and the flexibility to apply oneself creatively. When these motivations are fed a steady diet of need fulfillment within the organization, designers' ability to understand the needs of customers and end users can flourish.

> *"Design is not just what it looks like and how it feels. Design is how it works."*
>
> *- Steve Jobs*

RESPONSIBLE CREATIVITY

Despite the great positive contributions that design and design thinking can bring, a balance between effectiveness and responsibility is important to keep in mind. Needs and motivations of various kinds are the fuel of design and organizational output in general, and as such include biases and tendencies that may be a hindrance to others associated with completed outcomes. It is important to note that being human-centered can be harmful insofar as exclusion of one party is the cost of advocating for another through design.

The effect of a digitally connected world is that the experimental nature of design, through produced iterations, may be visible far more broadly than has been likely in the past. Here, small failures that are part of the

positive design process can have far reaching negative consequences, as noted in a previous chapter. As such, ethical considerations should be in balance with the creative motivation and need-fulfilling outlet for designer competence that organizations can provide. To what extent might a celebrated design solution be a detriment to others, due to ethical considerations? What precautions are in place to create an awareness of less obvious second and third order effects of design decisions? This links back to the value of organizational and team self-awareness in the shared effort toward ideal solutions.

WRAPPING UP

Hopefully the content of this compilation of experiences, models and examples of design and design methods has inspired new questions and ideas to enable even more effective personal or organizational efforts. The variety of ways in which design can be applied are virtually limitless, which is an exciting prospect given the potential solutions that are out there waiting for creative minds to tackle them. New ways of thinking, novel perspectives on problem solving and fresh self-awareness in terms of needs or motivations can be great enablers of transforming work into effective and profitable play. Design can be a powerful and nuanced facilitator of new or improved ways of doing within organizations. The passion, fun, and fulfillment borne out of overcoming ideal challenges is a valuable driving force of progress and personal meaning, and we hope that this book has contributed positively to the unique imprint you will have on your organization in the future.

The design to-do list:

designing growth and change

designing collabora-tion

designing the future

Design actions:

translate ideas into shared artifacts

advocate for the usert perspective

gather insights

mediate across functions and stakeholders

learn from experiments

observe

interview

visualize

test

prototype

facilitate

draw

reframe

question

Organizational outcomes:

organizational self-awareness

need-focused

responsible creativity

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The products, services, technologies, ecosystems, and networks of today are much more interconnected and complicated than ever before. As a result, private and public organizations alike are turning to design to find new ways to create value, manage uncertainty and innovate in a sustainable manner. Design can play a variety of roles on different levels in organizations, with different effects. This book offers an overview on how design and design thinking can change our organizations, drawing from academic research and company experiences in different industries. We showcase different perspectives and approaches, and hope to inspire you to explore the opportunities through which design can help to renew your own ways of working.

A! **Aalto University Design Factory**

Työsuojelurahasto
Arbetarskyddsfonden
The Finnish Work Environment Fund