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Innosuisse – Swiss Innovation Agency

Spark Works
Strategic innovation company

Design Thinking.

An effective approach to address the fundamental challenges of radical innovation.

Innosuisse is the Swiss Innovation Agency. We fund science-based innovation in the interest of the economy and society with the aim of increasing the competitiveness of small and medium-sized enterprises (SMEs) and start-ups in Switzerland.

Spark Works is Switzerland's leading strategic innovation company. We help organizations drive innovation from within by leveraging their people, processes and resources. Backed by our ETH-based research lab, our multi-disciplinary team fuses research and creativity to explore new solutions and ways of working.

INTRO

How to create radical innovation with the help of design thinking

New emerging technologies and interdisciplinary and cross-industry business models offer Swiss companies attractive opportunities for their future and growth. However, the world today is more volatile and complex than ever before. Product lifecycles are getting shorter, and customers want customised solutions for their everyday requirements.

Product innovations alone are often no longer enough today to ensure companies remain competitive. Radical innovations capable of changing the market and the company significantly are needed. Innosuisse – the Swiss Innovation Agency – supports research-based innovations produced through cooperation between research institutions and implementation partners from industry.

Mixed teams and the combination of research findings, state-of-the-art technologies, market knowledge, strategic factors and implementation experience enable new, targeted solutions to be found to meet increasingly demanding customer requirements. Successful innovation concepts take account of all key aspects from the outset and proactively factor in customer requirements as well as the environment in which business partners operate.

Innosuisse will support the “NTN – Innovation Booster” from 2021. This initiative aims to bring together teams at national level from research institutions, the economy and society to focus on a specific innovation topic and to support the generation and testing of particular innovation ideas. Innosuisse will provide direct funding to jointly develop new innovative ideas and to test them in the early stage. This promotes an agile process and continuously improves the quality of ideas.

Agile innovation development methods include design thinking and human-centred design. They help the generation and implementation of radical innovations. What do these terms actually mean and what lies behind these methods?

On behalf of Innosuisse, Spark Works – one of Switzerland’s leading strategic innovation companies – has outlined the key elements of design thinking methods in this booklet in a clear and concise way.

The following pages aim to provide an overview, give information, help overcome any inhibitions and encourage readers to see innovation as an agile process and to constantly improve the quality of their own ideas.

Kind regards
Innosuisse

CONTEXT

Why we need new ways of working

Do we have the right mindsets and business tools for the challenges of the 21st century? What do our current tools, such as management-by-objectives, return-on-investment, net present value, budgeting, business cases, etc., all have in common?

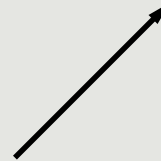
They all rely on forecasting what may happen. Essentially, they are all plans. We plan business objectives, plan activities to reach them, implement them and eventually attempt to plan better next time. Granted, a bit over-

simplified, but it brings out the core assumption of this approach to business: much of the future can be planned.

What is the reality at the start of the 21st century? In many sectors, plans appear outdated before they are even completed: new technologies surge, new product development and adoption cycles are a fraction of what they used to be, business model innovations turn competitive landscapes upside down, consumer preferences

Is planning still the right logic for today's challenges?

Success



What it looks like in the plan

Success



What it really looks like in 21st century dynamics

When does planning work?

Well-structured challenge

- ▶ Defined solution
- ▶ Known system (complicated)
- ▶ Plannable tasks



Ill-structured challenge

- ▶ Open solution
- ▶ Unknown system (complex)
- ▶ Emergent tasks



(adapted from: Foerster, Bubenzer & Brusoni 2019)

are more volatile than ever, and new generations demand radical behavioral change.

To be able to find adequate business approaches for navigating these 21st century radical innovation challenges, we first must develop an in-depth understanding of their characteristics.

Building on the work of Nobel laureate Herbert Simon, radical innovation challenges of the 21st century resemble “ill-structured challenges”. Their essential characteristic is indeterminacy. Simplifying a bit, indeterminacy exists in three areas: solutions, systems and tasks.

- **Open solution:** In radical innovation contexts, we cannot know beforehand which is the best final new product, service, business model, organizational design, etc. Planning only fools us into pretending we understand the future. It comes as no surprise that business plans or cases for most radical innovations fail.
- **Unknown systems:** If we don't know the final solution, how can we derive beforehand which systems (e.g. product, organization, partner and ecosystem architectures) are needed to best deliver that solution? In addition, systems in radical innovation contexts are typically not just

complicated, but complex. Again, planning would largely amount to fantasy.

- **Emergent tasks:** It is, then, also quite impossible to anticipate which specific capabilities and specialized tasks are necessary to tackle ill-structured, radical innovation challenges. Our knowledge about what is needed only emerges on the way.

In sum, we are dealing with unknown unknowns in all three areas – we don't know what we don't know. How can we still manage radical innovation? We need tools which address each area.

Design Thinking and its underlying principles

"If we are to deal with...the 'massive change' that seems to be characteristic of our time, we all need to think like designers."

Tim Brown, IDEO¹

Is it worth taking Tim Brown's above suggestion seriously? Let's look at one of the largest studies on design practices published in 2018 in the McKinsey Quarterly.

Exploring more than 300 public companies over a period of 5 years, it found that companies with the most comprehensively implemented design practices (the top-quartile companies) showed twice the revenue growth of their

industry peers. Over the whole period, they also had 56 percentage points higher growth in total returns. Interestingly, those who did not implement design practices comprehensively, but only partially (the lower-quartile companies) did not outperform their peers.

We therefore propose considering Design Thinking as an effective approach to address the three fundamental challenges of radical innovation outlined above.

To start with a definition, Design Thinking is "a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a

viable business strategy can convert into customer value and market opportunity."² We focus on three of its main principles: empathy, agility and collaboration.

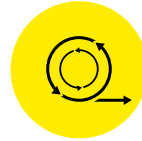
Open solution



Empathy

(radical user-centricity)

Unknown system



Agility

(rapid, iterative, low-cost)

Emergent tasks



Collaboration

(multidisciplinary teams)



EMPATHY

Empathy addresses the challenge of open solutions – and more.

When faced with tough, radical problems, there often is a strong urge to quickly find solutions that are technically feasible and viable from a business perspective.

However, we will not discover truly innovative solutions unless we first develop a different and deeper understanding of the problem. The goal is to reframe our own understanding

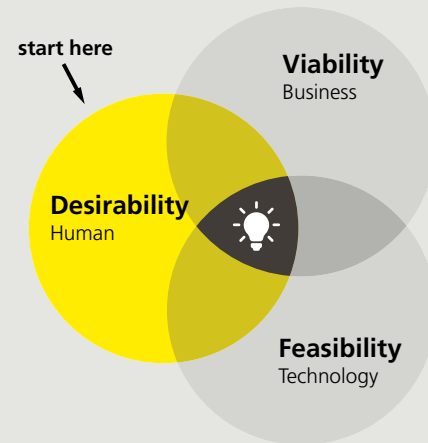
of the problem in a radically user-centric way. How do users or customers truly experience the issue? Here is where empathy comes in: the ability to recognise the feelings of others from the signals they send³. Neuroscience research, e.g. on mirror neurons, tells us we have this innate ability wired into our brains⁴. Do we put our abilities to use?

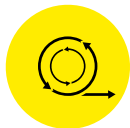
Empathy thus involves becoming something of an anthropologist. Understanding our users not as statistics, but human beings. Learning through

ethnographic immersion and observation what they really experience and want – not what they say they want or what we think they should want⁵. As Henry Ford supposedly said: “If I had asked my customers what they wanted, they would have said a faster horse.”⁶

If empathy must pervade radical innovation initiatives, it cannot be substituted – telephone interviews or weekend brainstorming workshops will not yield truly novel solutions.

Human-Centered Innovation





AGILITY

Agility addresses the challenge of unknown systems – and more.

As laid out earlier, in radically novel contexts, we may be unable to foresee which product architecture, which organizational design and which market or ecosystem characteristics will be most adequate to address the user-centric problems we have identified.

In short, we may have no experience with the material and social systems that we will face.

Thus, we need to maximize learning “on the go” through systematic trial and error and constant experimentation. Iterate, iterate, iterate. This experimental learning approach is at the heart of Design Thinking (and other innovative approaches such as lean start-up, entrepreneurial effectuation or agile project management).

Make no mistake: trial and error flies in the face of the traditional business logic, built on planning and control. It requires letting go, accepting calcu-

lated losses through fast failures and starting with solutions that are only minimally viable instead of being fully developed.

While this experimental approach is a “overkill” for well-structured problems, there is no alternative for ill-structured, radical innovation challenges. Linear process will not deliver truly novel solutions that work.

“Agility is the ability to adapt and respond to change... agile organizations view change as an opportunity, not a threat.”

Jim Highsmith

“Success today requires the agility and drive to constantly rethink, reinvigorate, react and reinvent.”

Bill Gates



COLLABORATION

Collaboration addresses the challenge of emergent tasks, specialization, expertise – and more.

If we do not know what to look for in terms of final solutions and systems, we cannot derive beforehand, which tasks, specialization and expertise are needed.

Consider how NASA tackled the ill-structured challenge of predicting solar storms within merely 3 months. The breakthrough solution did not

come from their experts in heliophysics, but via crowdsourcing from a semi-retired radio engineer in the countryside. He suggested a completely uncommon approach, which exceeded expectations by an order of magnitude.

It turned out the bigger challenge was assuring internal collaboration, as the process questioned the identity of some NASA scientists⁷.

Successfully integrating uncommon backgrounds and ideas thus requires

expertise in managing interdisciplinary collaboration.

This includes managing identities to counter tribal biases, ensuring a sense of psychological safety to freely develop divergent ideas and maintaining alignment between the innovating team and the regular organization.

“Great things in business are never done by one person. They are done by a team of people.”

Steve Jobs

“You can invent alone. You can’t innovate alone.”

Gijs van Wulfen

METHODOLOGY

How to innovate

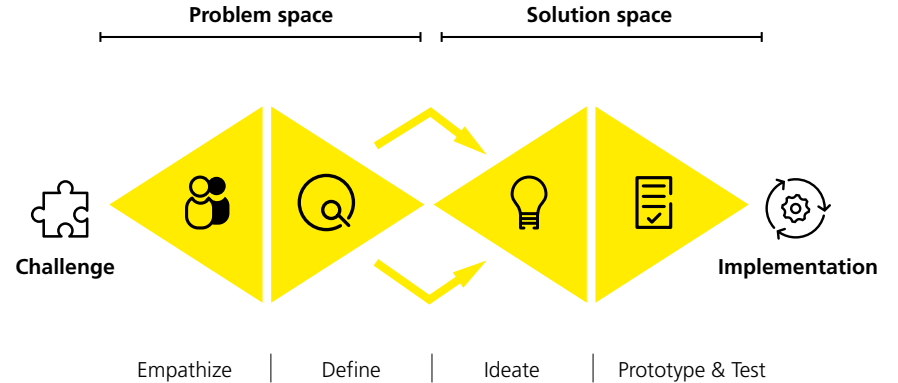
► PROCESS

Solving ill-structured challenges requires integrative thinking, in which we do not rely on one cognitive mode only, but consciously and cyclically shift between two mental states: *divergent* and *convergent thinking*.

Thus creativity and innovation processes like Design Thinking take place as a sequence of four phases, relying on *convergence*, where the brain is in exploitation mode, or *divergence*,

where the brain is in exploration mode. *Convergent thinking* relates to the ability to find the one best unambiguous answer to a question in a direct and precise way, whereas *divergent thinking* relates to the ability to think in novel and unusual ways, without worrying about limitations.

In daily life, most people are well-trained to be analytical and make decisions based on the constraints and limitations at hand, using *convergent thinking*.



Therefore, it can be hard to imagine any possibility, head off in any direction and deliberately diverge from the conventional using divergent thinking. Especially the switch between the two modes at the right time is difficult. That is why Design Thinking can offer a guiding process and tools to take the mind out of its comfort zone and direct it to the different types of thinking required for the different phases of early-stage innovation.

Starting with the identification and clear definition of relevant challenges, the first step of the Design Thinking process is to *empathize*. By gaining a deep understanding of the needs, pain

points and behaviors of the people we are designing for, we can set aside our own assumptions about the problem we want to solve and get insights about what really matters to them. Information is gathered through interviews, observations and immersion, uncovering real issues that are relevant to our users.

Next, in the *define*-phase, the gathered data is analyzed and the findings are synthesized into meaningful insights, leading to the identification of potential solution spaces.

Based on the identified problems, creative and innovative ideas are generated in

the *ideate*-phase, the third step in the process. Using various brainstorming methods, many potential solutions are developed and then evaluated, and one or several promising ideas are selected by the team.

Now, in the fourth step of the process, it is time to go out and test solutions with the affected people. Rapid prototypes help us to validate assumptions to make potential failures early and cheap.

But we should not worry if we do not get it right the first time. As mentioned, the process is non-linear and iterative, so one can always go back one or several steps if necessary.

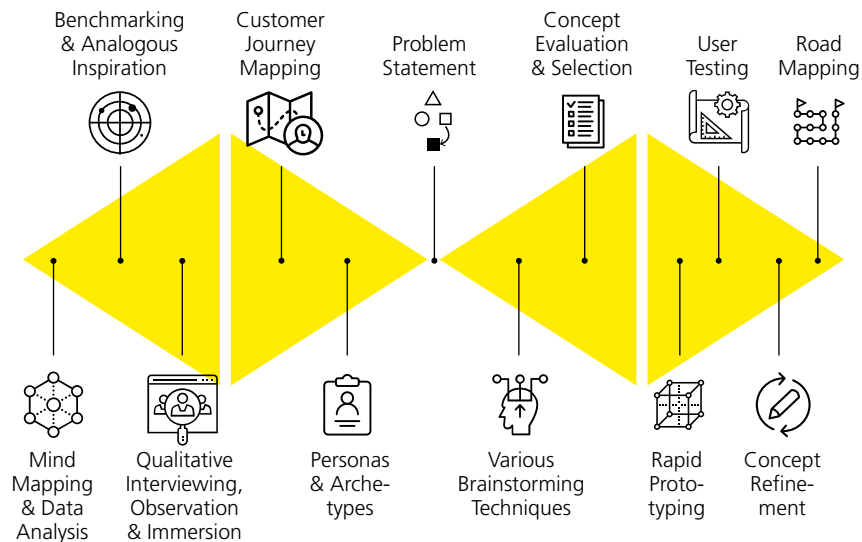
Following this approach, each iteration of the process brings us closer to the optimal implementation.

► TOOLS

Each of the four Design Thinking phases offers various tools that can be applied during the innovation process.

While the methodology is called Human-Centered Design or Design Thinking, many tools draw not only on design, but also on various fields including psychology, sociology, management, engineering, etc. The following image shows a selection of most common tools and practices, best applied by an interdisciplinary team, where diversity of experience and professional and educational background facilitates creativity by bringing multiple perspectives to the table.

For organizations that are new to this way of working, it can be worth consulting an experienced coach and external moderator to navigate the selection and execution of these tools, making sure the envisaged outcome can be achieved.



SUMMARY

Creating value in today's complexity

Design Thinking is a methodological approach to problem-solving, applying principles such as empathy, agility and collaboration to generate innovative solutions with value for users, businesses and society as a whole.

In today's turbulent and uncertain business environment, companies are confronted with short product life cycles, frequently changing customer demands, new technologies and growing global competition. As Patrick

Whitney, director of the Institute of Design at IIT (Illinois Institute of Technology), states "companies and other organizations have traditionally focused on advancing their knowledge of technology and business models in order to be competitive. They are now phenomenal at combining technology and business ideas to create innovations...[But, while they] know how to make anything, they are increasingly unsure about what to make,⁸" as consumers and markets get less and

less predictable. Facing increasingly complex and ill-structured challenges of a social, political and economic nature, organizations across industries are noticing that purely technologically driven innovation is often not sufficient and are thus turning to new approaches like Design Thinking.

Compared with other methodologies such as Lean Startup or Agile, Design Thinking is specifically valuable at the early stage of an innovation process, where the focus lies on exploring the problem space before designing meaningful new forms of value creation. While originating from product design, Design Thinking cannot just be applied

to product or service innovations, but also to process innovations, business and organizational innovations.

Many of today's fastest-growing disruptors are driven not by technological innovations and specialized assets, but by business and organizational innovations. For example, Alibaba has no particular technology or inventory, Airbnb owns no real estate, Instagram sells no cameras, Netflix lays no cables and Uber owns no vehicles. These companies are disrupting their industries by systematically rethinking their interaction with customers (empathy), systematically testing new approaches (agility) and creating unique networks

and ecosystems (collaboration). To sum up, when applying Design Thinking and its underlying principles for various challenges, we should mainly ask ourselves:

- ▶ **What kind of challenge are we facing?**
- ▶ **Do we really know our users and have we systematically started with and continually built empathy?**
- ▶ **Do we foster agility through systematic and iterative experimentation?**
- ▶ **Are we currently using best practices to create active collaboration?**

"We cannot solve our problems with the same thinking we used when we created them."

Albert Einstein

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Authors:
Prof. Dr. Philipp Bubenzer, Spark Works
Linda Armbruster, Spark Works
Dr Daniella Laureiro-Martínez, Spark Works
Eliane Kersten, Innosuisse
Claudia Wyss, Innosuisse

Design:
Weissgrund AG

Innosuisse – Swiss Innovation Agency
Einsteinstrasse 2
3003 Bern

www.innosuisse.ch