Let's Dance!

Applying Innovation Adoption Theory and Human-Centered Design to Get More People Dancing Together With Systems Thinking

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Abstract

In this post-COVID environment, we are experiencing increasing complexity, rapid broad-impact change, an increase in wicked problems, a major reconfiguration of work, and surging public expectations to address long-standing social, economic, and environmental issues. Many have described our current context as volatile, uncertain, complex, and ambiguous (VUCA). In this pivotal moment, we must think and act differently and change the dominant approach of over-simplifying problems and "quick-fix" solutions. Yet, complex problems in this VUCA environment require models and tools to manage and interact with complexity. Systems theories, models, and tools offer us the ability to understand and respond to complexity, operate within our environment more sustainably, attend to critical problems through innovation, gain new perspectives, and acknowledge interdependencies and yet they still are only used at the margins of most organizations, if at all. This major research project asked how we might address the challenges of adopting systems thinking and using systems theories and tools. To support addressing this question, we applied a human-centred design approach where existing and potential users' needs, pains, and gains were explored and addressed. The project also explored how we might apply innovation adoption and diffusion theory and practice to facilitate the acceleration of the adoption of systems thinking theories and methodologies. This project set about to understand the current level of systems thinking awareness, literacy, and adoption, where successes and challenges lay. And proposed a prototype of a new approach to adoption that both meets the needs of potential users and aligns to the processes that support adoption success. Finally, through testing and feedback with experts, this project proposes next steps that would enable implementation. With this project, we have devised an open ecosystem for systems thinking learning, use, and adoption that is powerful enough to create long lasting change that users will find both user-friendly and useful in their sensemaking and decision-making, thereby contributing positively to wider collective effort of accelerating the adoption and use of system thinking in our society.

Who We Are

Suesan Danesh

Suesan Danesh is an experienced change management practitioner. She is equal parts a communications strategist, a change leadership coach and advisor, a stakeholder consultation and engagement designer, a facilitator, a change impact assessor, and a project manager. Suesan holds a Bachelor in Political Science from the University of Ottawa. She has experience in both the public and private sectors, and primarily around change and transformation initiatives and projects. Suesan is currently working in the Canadian federal government, providing change management expertise to complex enterprise-wide modernization programmes. Through years of helping make change happen, she emphasizes the importance of the process of determining what should change, why, and the true nature of change to its eventual impact and success. She hopes to use her experience and knowledge, and the tools she has acquired through SFI to help organizations better identify, define and design meaningful and sustainable innovation and transformation opportunities.

Qian Feng

Qian Feng is an experience learning & development professional who is passionate about cultivating a culture of learning to unlock our collective potential. She has extensive experience building large-scale capability transformation programs for top companies in the life sciences industry. Qian holds a Master of Science in chemical biology from McMaster University. She brings scientific and strategic thinking, creativity, design, and strong execution to her work. She is passionate about helping organizations create meaningful and fulfilling work and is always looking for ideas to engage people in learning.

Jeremy Vandermeij

Jeremy is an entrepreneur, designer, arts administrator, business strategist, and marketer. He has designed and co-founded several organizations including the social enterprise Public Displays of Affection, the charity World Design Weeks, and the nonprofit DesignTO. In his spare time he appreciates art, design, meditation, dodgeball, making furniture, building campervans, and illustrating. Currently, he is the Co-founder and Executive Director of DesignTO, Canada's most prominent design festival, and part owner of The Van Dads, a custom campervan design and build company.

Team Story

A public sector change manager, a private sector learning innovation consultant and a non-profit business strategist walk into SFI and fall in love with the viable system model (VSM)... The truth is that the three of us with our unique perspectives, education and experience equally recognized the model's ability to illustrate the complexity of the world around us, seemingly in every aspect, across many fields of activity and enterprise, and at every level. This is what brought us together.

In the final semester of SFI, our class was introduced to the VSM, a somewhat obscure systems theory-based method and tool to map an organization from its operations, to its management, and its interactions in both internal and external environments. We were challenged to use the VSM to diagnose the real-life organizations we were working with. It wasn't easy for most, and those of us who were drawn into its potential needed to take time to study it, to talk it out, and to play with it before we understood it enough to use it to guide our strategic and innovation work. We will refrain from going into detail about VSM in this introduction (however we enthusiastically invite our readers to seek it out) and will suffice to say that for the three of us, it is very powerful and compelling, and will without a doubt be part of our future practice. VSM's ability to capture our interest so completely was our starting point for this project. We each asked ourselves why it was not more widely used and decided that it should be better known. At the outset, we were two teams of two wanting to focus our projects on the VSM. Each team sought to better understand what forces were at play in the adoption of the VSM, and furthermore to contribute to advancing its adoption in some way, by employing an innovation design process to come up with a conceptual solution. We were cognizant of the mounting volatility, complexity and uncertainty surrounding organizations, including and even more so in the post-COVID19 era and felt strongly that the time was right for the VSM to be known and used more broadly. The two teams met separately with our primary advisor (PA) and through a series of events came to understand that we were walking down the same path, albeit equipped with different skills and knowledge. This presented us with an unique opportunity to work together for part of our MRP. It meant we could do more, go deeper or broader with the research. We were excited and deeply committed, but also very much open to what direction our research may take. Unforeseen circumstances caused a member of one team to go their separate way, and this along with advice from our PA about narrowing down the field to VSM too early in our process, opened up new possibilities to broaden out from VSM to look at systems theories, tools, and experts from across the field of practice. We became a team of three and leveraged our skills and expertise, experience, knowledge and interests to explore what you see here, an application of human-centered design and change and innovation adoption theories, a glimpse of what's at play in the use of systems thinking today, and an innovative approach to the growth of the practice.

Acknowledgement

Thank you to our primary advisor Dr. Peter Jones; first, for teaching us about systems thinking, systemic design, and equipping us with its many tools and techniques; and second for his guidance in our MRP process, especially given its subject matter. His experience and wisdom were invaluable.

We would like to thank our secondary advisor Lorraine Randell for believing in us, sharing her expertise, and inspiring us from the start.

We are also grateful to our systems thinking experts, some of whom were also our SFI teachers. All were forthcoming and shared their experiences and insights into the application of systems methodologies. Beyond providing data for this project, their stories also gave us a glimpse of what's possible as we set out to put into practice what we have learned over the last 2.5 years.

We thank our families, friends, and colleagues who have supported us along the way.

A special thank you to our friends in the 2019 SFI cohort, learning alongside you was an honour and a privilege, we look forward to sharing our journeys beyond the program with you in the months and years to come.

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Introduction

Context Rationale

Our World and Environment Is Rapidly Changing

We live in an increasingly complex world (Drucker, 1981). Some describe our current environment as volatile, uncertain, complex, and ambiguous, or VUCA in short (Bennett & Lemoine, 2014). This VUCA environment is shaped by many systemic forces such as climate change, resource deficiency, technology advancement and integration, and shifting societal values that drive the pace of change to an unprecedented level. Our context also includes increasing complexity, rapid broad-impact change, the increase in wicked problems, and surging public expectation to address long-standing socio-economic (racism, sexism, colonialism) and environmental issues.

Sociologist Amitai Etzioni wrote in the 1960's that "Our society is an organizational society. We are born in organizations, educated by organizations and most of us spend most of our lives working for organizations. We spend much of our leisure time paying, playing and praying in organizations" (Etzioni, 1961). Nearly three decades later, Glenn Morgan wrote "Since Etzioni (...), the power of organizations over our lives has continued to increase" (Morgan, 1990). The organization is one of the most powerful entities on the planet. Organizations affect systems more than any other human system and as such have greater capacity to improve our lives and our environments. Therefore it can be said that people in organizations, as functional forces within organizations, under the right conditions and equipped to do so, can change the world.

In order to adapt and thrive in this highly complex and VUCA environment, many organizations are also undergoing significant overhauls to examine their identities, business models, strategies, structure, and workforce management. Further, it is as much about the nature of change as it is about how change is happening (Hollingworth, P. 2016). According to a 2021 Gartner survey of 800-plus HR leaders, there is a growing trend towards a switch from designing for organizational efficiency to designing for resilience to respond to change and correct course quickly (Wiles, J. 2020). At the same time, there is the emergence of the next generation of systems thinkers and design practitioners with different expectations and philosophies about innovating and solving problems.

We Are Not Able to Manage the Complexity of Our Environment and Thrive in a Sustained Way

The futurist Bob Johansen of the Institute for the Future remarked the following about the complexity of the environment in 2013: "the stakes are high, and the beginning of figuring out how to win in that world is to assume that it is an extreme VUCA environment. It's going to get worse, and that's going to require us to think and act differently (Johansen, B., & Euchner, J. 2013)". More recently Johansen reconfirmed that “It’s going to be a VUCA world in a negative sense, and if we can flip that into a positive, that is the way to make the world a better place” (Johansen, 2020).

Anderson and Tushman found that since the 1950s, organization design has focused on building organizations with the ability to operate efficiently and cope with unpredictability. These researchers hypothesized that environmental complexity contributed to uncertainty and that the two together, when not effectively understood or managed, contribute to the failure of organizations (Anderson, P., & Tushman, M. L. 2001). Arrive and Feng also found that a dynamic and turbulent environment contributed to organizational uncertainty, making it increasingly difficult for organizations to respond with the necessary innovations and adaptations that the environment required (Arrive, J. T., & Feng, M. 2018). The unprecedented cycle of changes in our environment has inevitably led to growing incidences of failure (Amankwah-Amoah, J. and Wang, X. 2019).

Systems Thinking Explains the Complexity and Interrelatedness of Environments

Increasingly, it is beneficial to see ourselves as part of dynamic environments that we affect and that affects us (Hurth, V. 2017). It is by perceiving the synergistic whole and the parts, how they interact and perform together, and in relation to each other, that we can understand the complexity of our environment and why things are the way they are, and why they may or may not change, that will allow us to design positive change and achieved desired outcomes. Systems thinking is about seeing the world in this way and systems theories provide a framework for understanding.

Systems thinking and tools have the potential to help us manage but they are not yet widely used. We believe this phenomenon could be explained by a number of ideas and theories, including Rogers' diffusion of innovation theory and process, in which a new idea, activity, behaviour, or product “is communicated through certain channels over time among the members of a social system” (Rogers, 1962); as well as other writings and theories of change, and also, by Laloux’s evolutionary model of organizations based on stages of human consciousness (Laloux, F 2014). We posit that critical conditions for the adoption and diffusion of systems thinking are not in place. The "quick-fix" continues to be the dominant approach to problems, requiring over-simplification of

the problem itself. Complex problems in a VUCA environment require a way of thinking and analyzing that can manage and interact with complexity and as such must be systems-based.

Systems theories, models, and tools offer us the ability to understand and respond to complexity, operate within our environment more sustainably, attend to critical problems through innovation, gain new perspectives, and acknowledge interdependencies. So, we asked why they are not being adopted more readily and how we might address the challenges of adopting systems thinking; learning and using systems theories and tools. Another important question we investigated is, in a context where society's need for systems theory tools and models may not be understood and it may not be ready to use them, how do we accelerate the adoption of systems thinking, models and tools?

In fact, we believe that we are at a pivotal point in the adoption of systems thinking theories and practice. We are at a turning point of accelerated, broad adoption under the right conditions. Our research explores the favourable conditions for adoption and applies a human-centered design process to conceptualize a solution that would allow the creation of these conditions.

Our Original Research Questions

The following describes the original research questions that guided the start of our exploration. However, as with any design and research process, the answers we obtained from exploring the following questions helped reframe our thinking that we unveil in later sections of this report.

Main Research Question

How might we make systems theory and methodologies more accessible for today's organizations, decision-makers and strategists to accelerate their adoption and integration into strategic planning and innovation processes?

Supplementary Questions

- What is the current level of understanding and practice of systems thinking in organizations across industries right now? What trends and/or signals are emerging?

- What are the current applications of these theories and methodologies? What is their usability? What are some successes as well as challenges?

- How might we fill the gaps with the application via human-centered design?

Research Approach and Methods

Introduction

The goals of this research project are a) to understand how to accelerate the integration of systems thinking theory and methodologies in order to increase systems literacy and practice, b) by understanding current systems thinking practice, their related application, and their success or failure to be adopted widely, and c) to use the lens of change and innovation adoption theories and practices. We believe that the problem of systems theories not being widely adopted is a complex systems problem, just as any change, more broadly, requires systems thinking (Visser 2011).

Therefore, we explored the problem using elements of the Systemic Design Toolkit (Systemic Design Toolkit, 2021) to understand the unique complexities and opportunities within this problem area.

Finally, we tested all of our learning by conceptualizing an innovative approach to adoption.

Overview, Approach and Methods

To reach our goal, we utilized a design research and development approach. We first researched the practice of system thinking focusing on North America and Europe by conducting expert interviews with those who regularly use its approach, methods and tools. We researched and analyzed systems thinking practice. Furthermore, with an understanding that systems thinking is innovative and represents a change, we set out to understand more broadly through research what makes an innovation popular, or widely used. We explored the concept of change, innovation adoption and diffusion theories/models and their critical components. To this research we overlaid the practical experience of system thinking experts to derive the critical success factors and conditions for adoption of systems thinking. We used this information to develop a solution, which we explored further through prototyping. We tested our prototype against our research, and experts in the field who agreed to participate in our study.

The specific design methodology we used is the Double Diamond (DD) and consists of four main iterative phases; Discover, Define, Develop, and Deliver, as shown in the figure 1 below. As described later in this section, we also used specific systems thinking research tools and activities within each of these phases. According to the British Design Council, the DD “represents a process of exploring an issue more widely or deeply via divergent thinking and then taking focused action via convergent thinking (Design Council, 2005). The DD design process involves a continuum of data capturing,

therefore we established a means for recording and organizing the data, and for analyzing it. Data analysis was part of each phase in the DD process. To guide our analysis, we used Ackoff's Data, Information, Knowledge, and Wisdom (DIKW) model (Ackoff, 1989), as well as other analytical tools adapted and described in the Convivial Toolbox (Sanders, E.B.N & Stappers P.J. 2012.

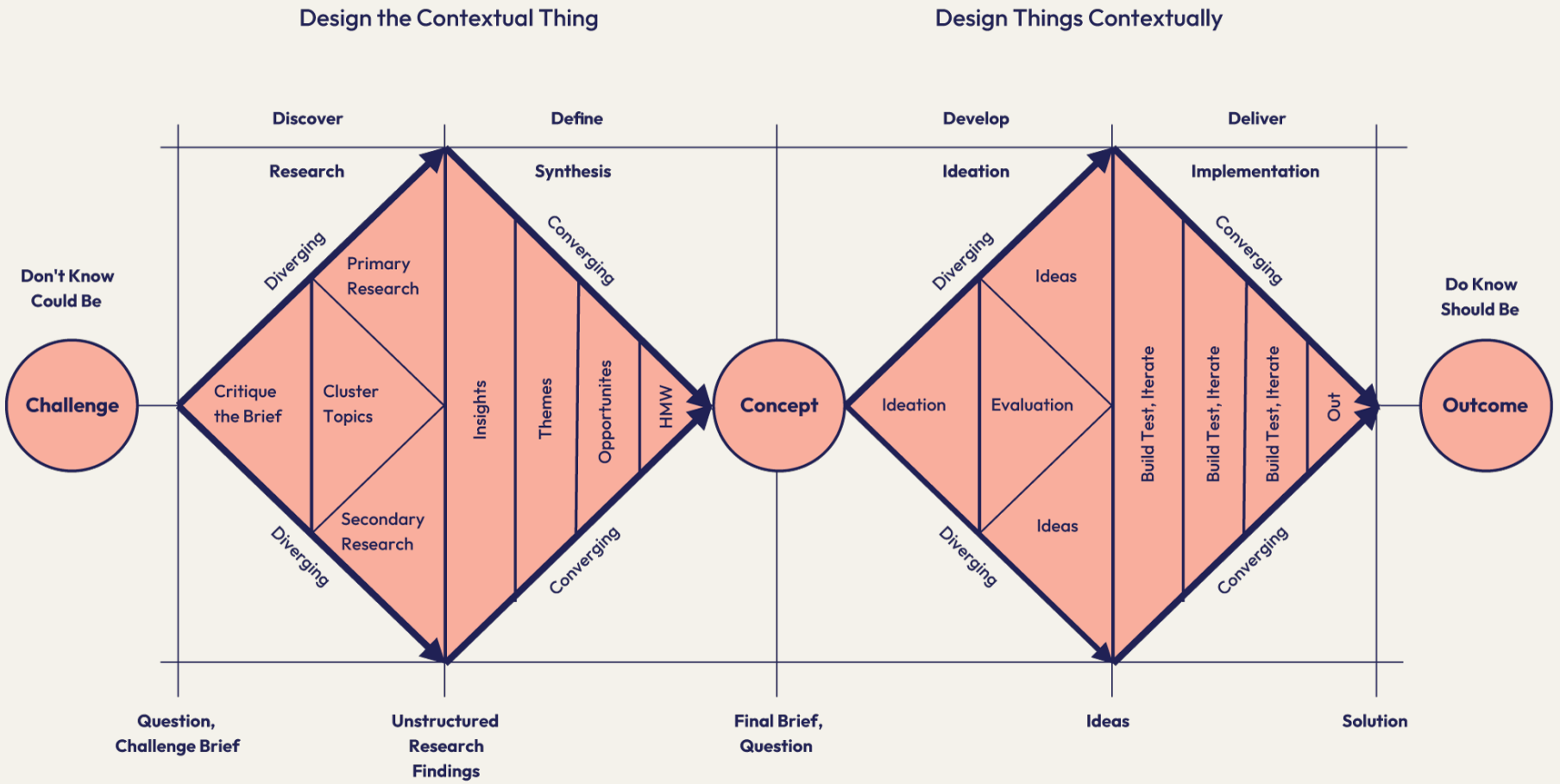


Figure 1. The Double Diamond design framework. Adapted from original Image Source: British Design Council (Design Council, 2005).

Rationale for Design Method

We chose the DD framework for several vital reasons. First, the DD framework is a design framework, and we sought to use a design method. Design offers the opportunity to understand, synthesize, conceptualize, and create something new. The Double Diamond is a process that articulates all of these design processes. Second, DD has been conceived to achieve significant, positive, and long-lasting change, all qualities that we believe are needed to tackle wicked or systemic problems. Since we believe that the issue of systems thinking being widely adopted is a systemic problem, we believe that the qualities of DD would be helpful in tackling it. Third, despite the phases being visually represented sequentially, we chose to tackle different phases simultaneously to test assumptions, build concepts, dispose of incorrect assumptions, and synthesize appropriate ones into an ever-expanding and useful whole. Considering our goal and our time constraints, we determined that this approach would contribute positively to our research and learning objectives. Many designers use a nonlinear approach to complete their work, building conceptual models while simultaneously conducting their research. This generative approach allowed for a more cohesive and tested whole to be formed at the end of the process (Marin-Garcia, J. A; et al. 2020). We describe our approach and methods in further detail below as they relate to the DD phases of design.

Discover (Research) Phase

Through this early discovery phase, we used literature review, and primary data gathering using publicly available data (such as Google Trends) to learn more about Systems thinking, its applications, intentions, and how it has been absorbed or not absorbed for use. Along with this general review, we explored the secondary research questions regarding the critiques of the adoption of systems thinking theories, methods and tools. In addition to literature review, we explored the assumption that the problem of systems thinking adoption is a systemic one, by using the Systemic Design Toolkit (Jones and Van Ael, 2018) and specifically, timeline, causal layered analysis, actor map, systemigram, causal loops, and value proposition maps.

To complement this, we conducted primary research expert interviews with twelve systems thinking academics and industry experts to elicit greater findings, including existing systems thinking pain points, value propositions, and personal anecdotes and critiques of the methods, tools and theories. A detailed interview guide supported these engagements (see appendix A). During the initial interaction, we established the parameters for a continuing relationship with experts that enabled a subsequent engagement with them at a later research and design phase.

Finally, to complete this discovery phase, we deployed broader scanning activities, such as trend scanning, signal detection, and mapping of drivers that apply to systems thinking, to understand the complexity management field as a whole. Using Ackoff's DIKW scheme, we took an "On the wall" analysis approach that allowed us to take summarized data from the twelve interviews and data from literature, and visualize the data (Sanders, 2012). We chose this path in order to be able to manage and analyze the data together as a team, use it in multiple ways and across several systemic design tools, because it allowed us to draw insights and sensemake collectively, and it provided us with information and inspiration at once. This analytical approach is what we required to move through a non linear application of the DD. Through analysis, these sensemaking activities and data capturing enabled us to tell a story of system thinking application and adoption, what is happening today and what has happened in the past. Furthermore, data analysis at this phase led us to identifying innovation opportunities supporting our theory. A list of findings and the supporting evidence and analysis was reviewed and resulted in guidance into the second phase.

Define (Distillation) Phase

After a discovery and research phase, we synthesized the completed research and information into themes, trends, gaps, maps, and other patterns that arose and which formed our knowledge of the area of interest (Sanders, 2012). This process was iterative with Phase 1, and multiple tools and activities were revisited after different research events. The tools we used helped us to understand further and define the system of systems thinking while identifying how complex the problems and leverage points were. At this stage, we created a conceptual model of the problem. We also established an evaluation process and analysis for our solution (see section 6).

Develop (Ideation) Phase

In this phase, we acted on our evolving hypotheses with possible design innovations, understanding the opportunities and shortfalls of systems thinking and its adoption to develop some prototypes. We used the findings from the research phases to develop an innovation that can positively affect useability, adoption, understanding, range of application, learning curve, and attitude towards systems thinking and its theories, methodologies and tools. We used value mapping, journey mapping, viable system modelling, and business modeling. The application of the evaluation process and analysis led us to the prototype we moved forward with. The evaluation process and all the other data and findings from phase 2 and 3 were analyzed into a framework for what we are looking for, and was carried through to the implementation phase.

Deliver (Implement) Phase

In this final design phase, we iterated on our ideas to create a final adoption intervention prototype applicable in a real-world setting. Using an evaluation framework developed from research analysis in phases 2 and 3, we

tested our prototype through feedback from experts from Phase 1.

After a round of deployment and testing with 2 experts from phase 1 and 2, we provided considerations for further development of the prototype to a much more refined or complete product. It is our aspiration that this final solution have real-world impact and recognition amongst the SFI and systems thinking community.

Innovation Adoption and Diffusion

Innovation and Change

The term innovation is difficult to define in a way to satisfy all possible contexts of use. There has been a fair amount of research done on innovation and each study has proposed a way to define it (Baregheh, et al. 2009). Innovation can be an invention, change and creativity (Jayaratna & Wood, 2008). Christensen proposes a model of innovation that distinguishes between incremental, meaning modest change that is generally meant to enhance performance and is built on existing knowledge and users, and disruptive innovation, modifying key underlying conditions and may very well be for a new or different user (Christensen, 2003). Various research has also attempted to define other categories of innovation, such as, architectural, meaning systems-level change; and radical, as a change of nature (Jayaratna & Wood, 2008). It would seem therefore that innovation is a very broad term applicable in almost all human systems and contexts. In order to avoid minimizing the term's application in the framing of our research project, we chose to see innovation as synonymous with change, and furthermore, as more along the lines of a disruption, according to Christensen (2003) and involving a "fundamental philosophical paradigm shift, i.e. a change in the underlying principles'' on which something is based (Jayaratna and Wood, 2008). Rogers' study of innovation adoption and diffusion provides a more user-centered definition of innovation as something that is "perceived as new by an individual or another unit of adoption"(Rogers, 1962). The perception of newness is an interesting idea that serves our project. Rogers explains that "if an idea seems new to the individual, it is an innovation" and that this perception will in turn determine their reaction to it (Rogers, 1962). However, Rogers (1962) also contends that newness of an innovation may be related to knowledge of the change, persuasion or argument for the change, or a decision to adopt or reject the change, none of which may align to when the idea was actually introduced to the world. For the purpose of this research, we are exploring the concept of innovation subjectively as well as objectively, given that in order to accelerate the integration of systems thinking as a common or usual way of thinking or seeing the world around us, and thereby increase its benefits and help it to achieve its purpose, we propose to seek its adoption by people who have little or no awareness of it and for whom it is in fact "new", or who have not developed a positive attitude towards it, and/or who have chosen thus far not to make use of it.

How Change Occurs

In order to answer the question of how to increase the adoption of systems thinking methods and tools, we sought to understand how innovation, new concepts, ideas, behaviours or even products get adopted. While there are many theories, the one that is widely used is Rogers' innovation diffusion theory (Rogers, 1962). The theory explains innovation adoption and diffusion process via a simple S curve, that shows how over time, as more individuals adopt a given change, it allows for the innovation to take hold (Rogers, 1962). Rogers categorizes those adopting change by how early or late they adopt a particular change, from the first individuals to do something differently in a new way, called the innovator, to early adopters, to the early and late majority, and finally the laggards. Adoption and diffusion is a process, and is supported by certain conditions; at the individual level, in terms of those adopting the innovation, and at the broader level, in terms of the environment in which the innovation is being introduced (Rogers, 1962). We felt it important to examine and understand these conditions in order to then look for them in relation to systems thinking adoption. Using Evan Staub's *Understanding Technology Adoption: Theory and Future Directions for Informal Learning* paper, which provides a clear and simple articulation of three adoption theories, namely Rogers' innovation diffusion theory, the Technology Acceptance Model and the Concerns-Based Adoption Model, we examined system thinking adoption through a number of lenses (Staub, 2009). First, the characteristics of the innovation itself, such as how easy it is to use and how clear are its benefits and how relatable or applicable are its benefits. Second, how individuals adopt change, which can be a function of their attitude and mindset, a previous experience with change, and their perceived personal capability. Finally, what are the conditions present in the context in which the change is being introduced for adoption. Do these conditions, including what Rogers calls the social system (i.e. the culture, social norms and structure), support and enable adoption (Rogers, 1962)? Further, we examined the overall process of adoption of systems thinking by individuals over time and assessed the progression against Rogers' innovation diffusion curve (see figure 2).

The journey a change takes through the adoption and diffusion process is not a smooth and steady one. Geoffrey Moore introduced the metaphor of a chasm referring to a critical stage that appears between the first two groups of adopters and the next groups (Moore, 1991). While Moore's theory first published in 1991 speaks largely about how innovative and disruptive products and technologies move into the consumer mainstream, built on Rogers's theory and adopter categories, it has been applied to a wide range of innovation and change contexts. Moore (1991) describes this chasm as particularly applicable to a discontinuous change, whereby an innovation requires additional changes, especially in entrenched behaviours, common processes, and/or traditional structures, for the benefits of the innovation to be achievable. The chasm can be likened to a waiting period until the

conditions for adoption change in a way that enables the other categories of users, with their specific needs, to adopt the change. The chasm slows down adoption and in time, should the conditions not change, may cause the innovation to fail given that more users would contribute to its sustainability, and viability over time. As such, 'crossing the chasm' is important to the successful implementation of innovation.

Figure 2. Roger's innovation diffusion theory curve and Moore's chasm.

We believe another interesting and radically accessible model of change adoption is present in Derek Sivers's 2010 TED talk about a dancing man at a festival. We were able to draw strong parallels between Rogers' innovation diffusion theory and its adopter categories, and what SIvers calls "how to start a movement" and its leaders and followers (Rogers, 1962; Sivers, 2010). In a simple succinct way using metaphor and storytelling, Sivers offers a stripped down version of Rogers theory that we chose to use as an interesting and additional frame for our solution. While showing in real time a dance party form around a solitary dancer, Sivers examines and dissects the winning conditions that enable people to adopt something new. Sivers's "lone dancer" becomes Rogers's "innovator", Sivers's "first follower" becomes Rogers's "early adopter". His "second follower", which he calls the "turning point", becomes Rogers's "early majority," and finally Sivers' "tipping point" exemplifies the "late adopters" at the top of Rogers's innovation diffusion curve, as shown in figure 3 (Sivers, 2010; Rogers, 1962).

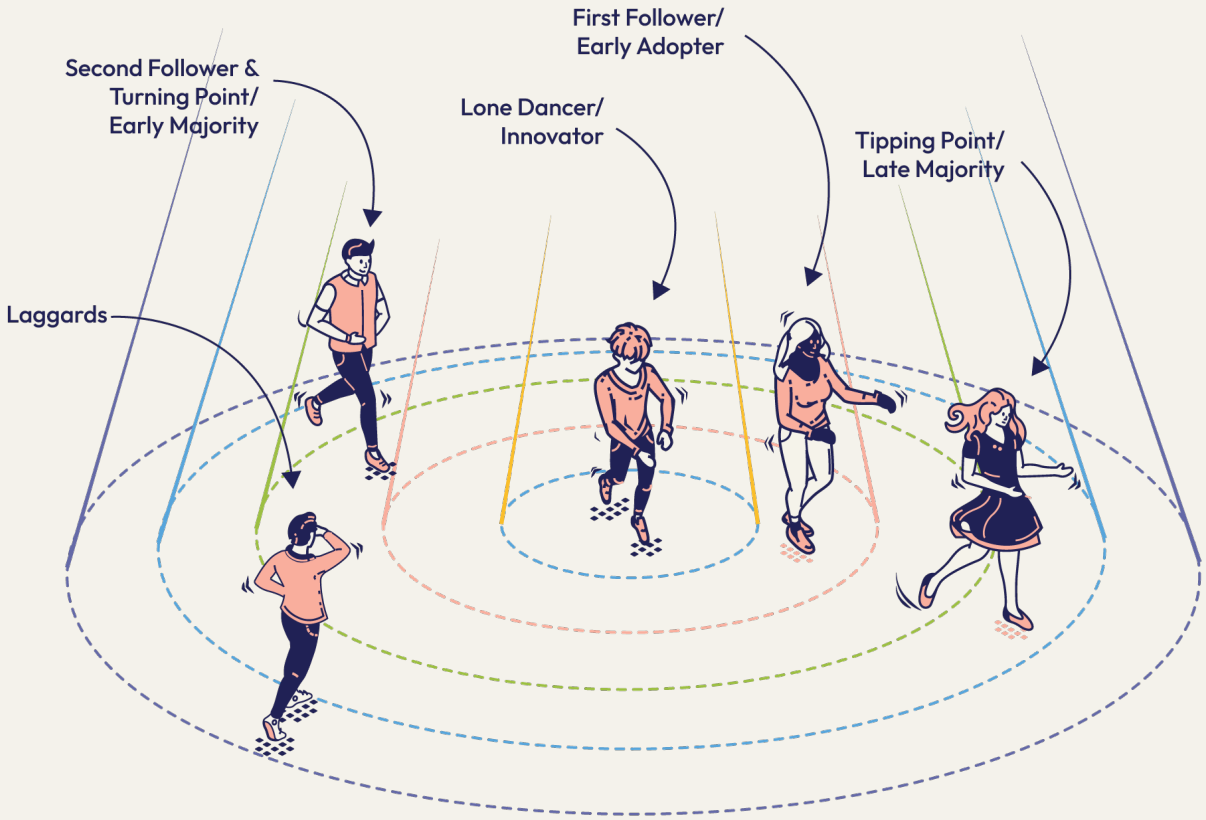


Figure 3. Dance analogy of Rogers's innovation diffusion theory. (Rogers, 1962; Sivers, 2010).

The followership conditions that Sivers extols from the video can be translated into a simple set of criteria for change adoption. First, the change should be easy to follow, in other words understandable by people on the outside. Second, innovators should be generous allowing early adopters equal footing and space; it's not about the innovator anymore, "it's about them, plural" (Sivers, 2010). Third, early adoption should be out in the open, to allow others to see what it looks like to adopt the change.

"Outsiders must see more than just the leader", as Sivers (2010) explains, "everyone should see the followers, because new followers emulate followers, not the leader". The presumption of the so-called "late" adopter is explained by the fact that it is no longer risky to join in the innovation. The later adopter and laggard having a greater fear of failure or ridicule and being more susceptible to social norms, will adopt only once it's clear that the new way is now the acceptable way.

Underpinning Sivers's engaging story is Rogers's theory that a new idea, activity, behaviour, or product "is communicated through certain channels over time among the members of a social system" (Rogers. 1962). These so-called channels have to be open and working effectively. In the case of the dancing guy, everyone could visibly observe what he was doing i.e. dancing, which was different from what everyone else was doing i.e. sitting. This communication, called by Staub (2009) the "vicarious observations of peers and models" as well as other means of communication, are how a particular innovation is passed around and becomes part of the common vernacular. According to Rogers (1962), this process is a critical condition for innovation diffusion.

Deeper Dive Into the Conditions Required for Innovation Adoption

Innovation Characteristics as Conditions for Adoption

The nature of the change or innovation contributes to its adoption in so far as how the change looks, feels, and is generally presented and perceived can have an effect on adoption (Staub, 2009). The two key characteristics that are described in Staub's review of adoption and diffusion theories are ease of use and usefulness. Staub shared F. Davis's research on Technology Acceptance Model's definition of ease of use as "the degree to which a person believes that using a particular system would be free of effort" and usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Staub, 2009). Both of these have to be understood by individuals in order for them to decide to adopt the innovation. The individual's judgment and subsequent belief in these characteristics plays an important role in this process.

Individual Conditions for Adoption

In change management theory and practice, it is often stated that people change, not organizations. By that it is likely meant that for an organization or social group to change, the individuals in that social system must adopt the change, or change. Rogers discusses this in his "innovation-decision process", which explains in a number of steps how an individual evaluates, decides and finally integrates something new (Rogers, 1962). It can be a behaviour, a tool, a process, or a way of thinking and doing. Management theorists and consultants have sought to

articulate and codify this process of change. Prosci, a Project Management Institute partner organization, has developed a model called ADKAR, acronym for awareness, desire, knowledge, ability and reinforcement (Prosci.org), and has argued that these are the essential building blocks that must be present for people to change. Prosci aligns with models by Kotter (8 steps), Jick (10 steps), and General Electric (7 steps elucidated by David Garvin) (Mento, et al. 2002). These individual change models also relate to Rogers' theory as well as to social cognitive theories which speak to individual agency, cognitive processes, motivators, and decision-making factors that enable people to change (Bandura, 2002).

Environmental Conditions for Adoption

Rogers' theory provides some insight into the external conditions that enable adoption through consideration of what he calls the social system in which the innovation occurs (Rogers, 1962). This system or environment has a social structure that affects adoption. Rogers contends that the structure can act as a stabilizer in times of change. A predictable structure, layed out roles and responsibilities, and associated behaviours provide strong conduits for change adoption, as does the extent to which there is a hierarchy and a dynamic of leadership and followership. Rogers also refers to informal social structures with networks linking people. As well, among the connected people are different levels of influencers and associated patterns of behaviour or norms that can predict when people in that structure adopt change. The concept of social influencers has grown in recent years with the rise of social media, which is considered by some as an important component of people adopting something new or behaving differently (Vyatkina, 2019). Referred to as opinion leaders and change agents in Rogers' theory and as connectors and mavens in Malcolm Gladwell's book on social epidemics, *Tipping Point*, these actors can make or break innovation adoption (Rogers, 1962; Gladwell, 2000). Rogers cautions that the most innovative members of a system are not its greatest influencers towards adoption as they are often accorded low credibility (Rogers, 1962). It is telling that Sivers affectionately calls his lone dancer / innovator the "lone nut" (Sivers, 2010). This fact is worth noting as we attempt to use these concepts and lenses in the context of systems thinking adoption. Ultimately it appears that environmental conditions, including social structure, norms and influencers, can have a greater impact on adoption, both positive and negative, than the conditions surrounding individual adopters.

Application to Systems Thinking Adoption and Diffusion

Systems Thinking as an "Innovation"

For the most part, today, organizations, decision-makers, and strategists still rely on traditional ways of thinking and doing.

There are undoubtedly many reasons for this. Jamshid Gharajedaghi wrote about the challenges to the integration of new thinking, especially in organizations. Specifically Gharajedaghi outlines a five level hierarchy describing certain forces that keep organizations from moving away from their previously successful ways of doing things, in order to adopt new ways that will enable them to be successful in the future (Gharajedaghi, 2011). Management theory, while relatively new as an academic discipline, has not kept up with the pace of change in the world, both in the marketplace and in society. Jorgen Hesselberg (2018) explains that born of the industrial revolution, the theories and practices were established to enable organizations to function like machines, and that Frederick Taylor's seminal work from 1911 on *Scientific Management* deeply rooted this particular approach to management. Taylor maintained that management function was to "optimize throughout so you can maximize output" and according to Hesselberg is still very much a part of today's management mindset and behaviours (Hesselberg, 2018). However, we understand that systems thinking requires that individuals and organizations evolve their ways of thinking and doing, reinforced by a supportive environment or structure (Laloux, 2014). Further, Gharajedaghi states that system thinking is aligned to a shift in paradigm that is currently taking place and that results from a series of events challenging the validity of conventional wisdom (Gharajedaghi, 2011). This shift of paradigm, according to Gharajedaghi, includes a profound change in the "method of inquiry, the means of knowing, from analytical thinking to holistic thinking" (Gharajedaghi, 2011). It can be said therefore that systems thinking is a major change to how people think and how organizations are managed and operated, and, as an innovation, it requires adoption and diffusion in order for organizations, society and the world as a whole to realize its systemic benefits.

Using Rogers' theory and other ways of understanding how innovation takes root and grows, we can identify the critical conditions for adoption of system thinking methods and tools and gauge the extent to which these may or may not in place today, and further we can seek to enhance certain conditions or elements that are weak or missing through designing a solution to do so.

Systems Thinking is a New Tool for a New Problem (or a New Hammer for a New Nail)

When thinking about what distinguishes humans in the living world, tool use figures prominently. Humans' ability to solve problems through the use of tools is a result of our unique process of indirect thinking. To use tools to solve a pressing problem, we must be able and willing to solve another problem or set of problems first (Haidle, M. 2010). Therefore to solve the new problems of our increasingly complex world, we must first be willing to solve another problem, that of having the requisite understanding and analytical skills and processes, in other words the appropriate thinking tool.

Wright, Paroutis and Blettner assert that decision-makers resort to the aid of management tools and techniques to deal with uncertainty and change so that their decisions can lead to better processes, products, services, and superior performance (Wright, R. P., Paroutis, S. E., & Blettner, D. P. 2013). However, as our consciousness and our understanding of our environment evolve, management and sensemaking tools to deal with this new perspective must evolve to match it. We must consider changing the tools we use to understand the world in order to perceive the changes happening around us, including how we organize ourselves and work together, identify and analyze problems, and innovate differently (Laloux, F. 2014; Gharajedaghi, 2011).

We no longer have the luxury of dealing with a few priority issues at a time. Instead, we must deal with a multitude of issues from different directions simultaneously. New strategic tools and techniques that help us deal with these complexities and uncertainties are needed (Berisha Qehaja, A., Kutllovci, E., & Shiroka Pula, J. 2017). Systems thinking is that new tool (or set of tools) designed for a context that is just now emerging in people's mind, and perhaps not yet fully recognized to exist, i.e. a change in the game (Gharajedaghi, 2011). Environmentalist Paul Gilding discusses this issue in *The Great Disruption*, where he states unequivocally that economic growth, which has been the world's tool for solving all its problems, is broken, that the current era of denial about this is passing fast, and that it will be complicated and messy (Gilding, 2011). Therefore we need new tools, ones based in systems thinking, and we need to put them in place soon.

Dancing On Its Own: Systems Thinking Adoption Today

System of Systems Thinking

Introduction

We cannot hope to address the issue of systems thinking adoption without looking at systems thinking as a system, and within a system. To understand what causes and effects are at play in who, how and why systems thinking exists and grows or changes, to identify what levers could be leveraged to make change within and around systems thinking, we need to look at the system of systems thinking.

Systems Thinking Systems

Looking Inside Systems Thinking

Arnold and Wade proposed one model to examine systems thinking as a system in order to better define it, stating that a more comprehensive definition would support greater “mainstream educational attention” and in turn address a growing need for systems thinkers globally (Arnold & Wade, 2015). Arnold and Wade (2015) show a view of systems thinking as a system, with a purpose, characteristics and interconnections between its characteristics. Their research also proposes to define systems thinking in a systemic way in order to ensure that it effectively encompasses these three key components of a system. The Arnold and Wade (2015) definition is: “Systems thinking is a set of synergistic analytical skills used to improve the capability of identifying and understanding systems, predicting their behaviours, and divisions modifications to them in order to produce desired effects. These skills work together as a system” (Arnold & Wade, 2015). Using this definition, the authors share a systemigram built from various writings on systems thinking from Barry Richmond to Peter Senge and others (Arnold & Wade, 2015). While only one perspective on the broad field of systems thinking, an adaptation of their systemigram of systems thinking as a system (as shown in figure 4 below) enabled us to identify areas within its very nature that may impact its adoption. Focusing inward, we sought to examine system thinking's characteristics, and following innovation adoption theory, we assessed whether the degree to which it is easy to understand and learn, and whether its usefulness is apparent to those who would adopt it and increase its diffusion.

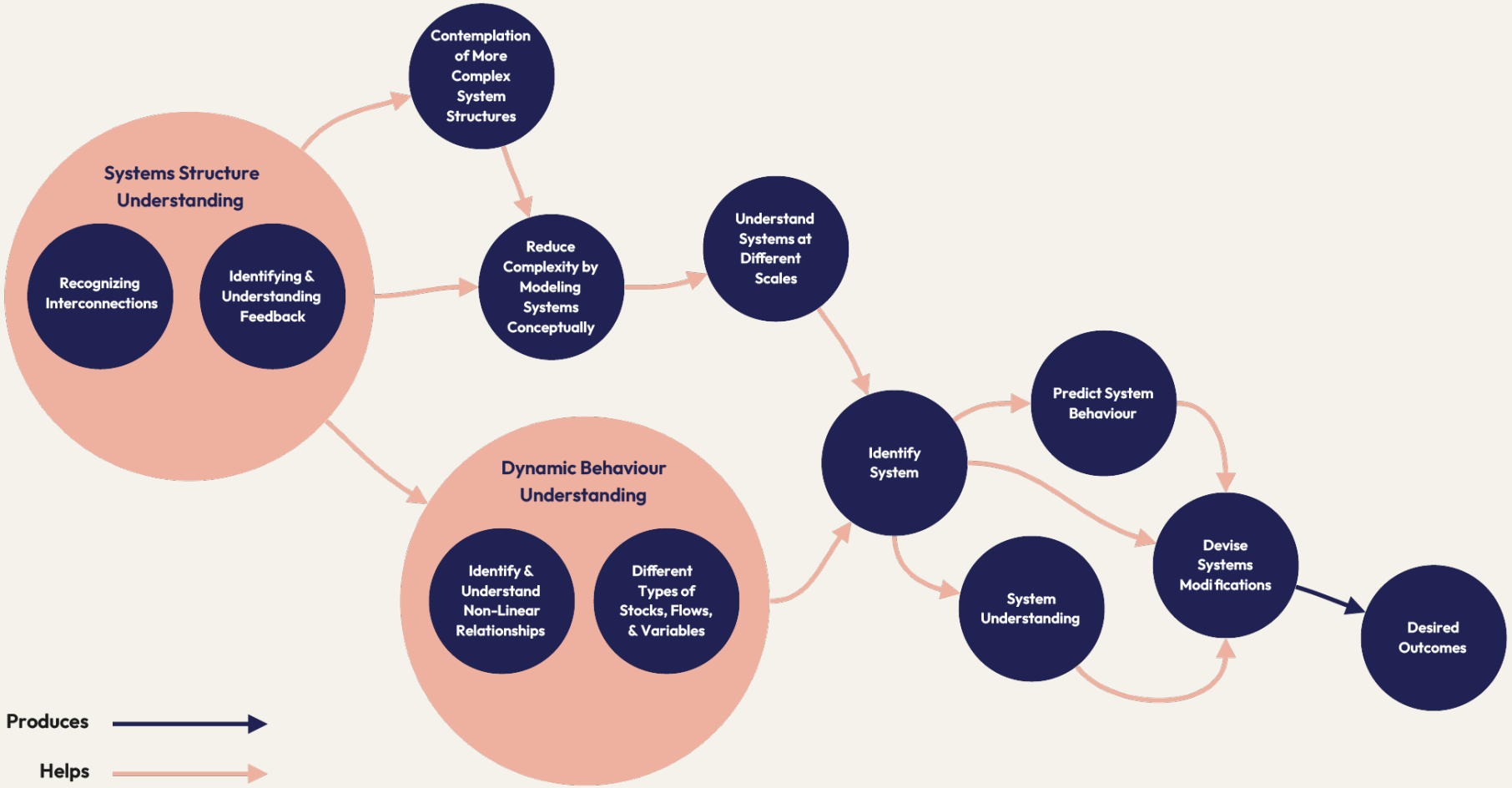


Figure 4. Systemigram of the systems thinking process (adapted from Arnold & Wade, 2015).

Looking Outside at the System Within Which Systems Thinking Exists

The system within which systems thinking exists includes a purpose, characteristics and elements, and interconnections between them. If the purpose of systems thinking is to identify, assess and understand systems (i.e. dynamic complexity) in order to solve problems and innovate, then perhaps the higher-order purpose of the system in which systems thinking exists is to solve complex problems such as climate change, to create desirable futures for people, organizations and the planet, which can include sustainability, and to help them achieve their purpose. The characteristics or elements include academia, practitioners, organizations (which include decision-makers, employees, and partners), stakeholders in the system, problems, solutions, innovation, value and purpose, and the interconnections between them (see figure 5).

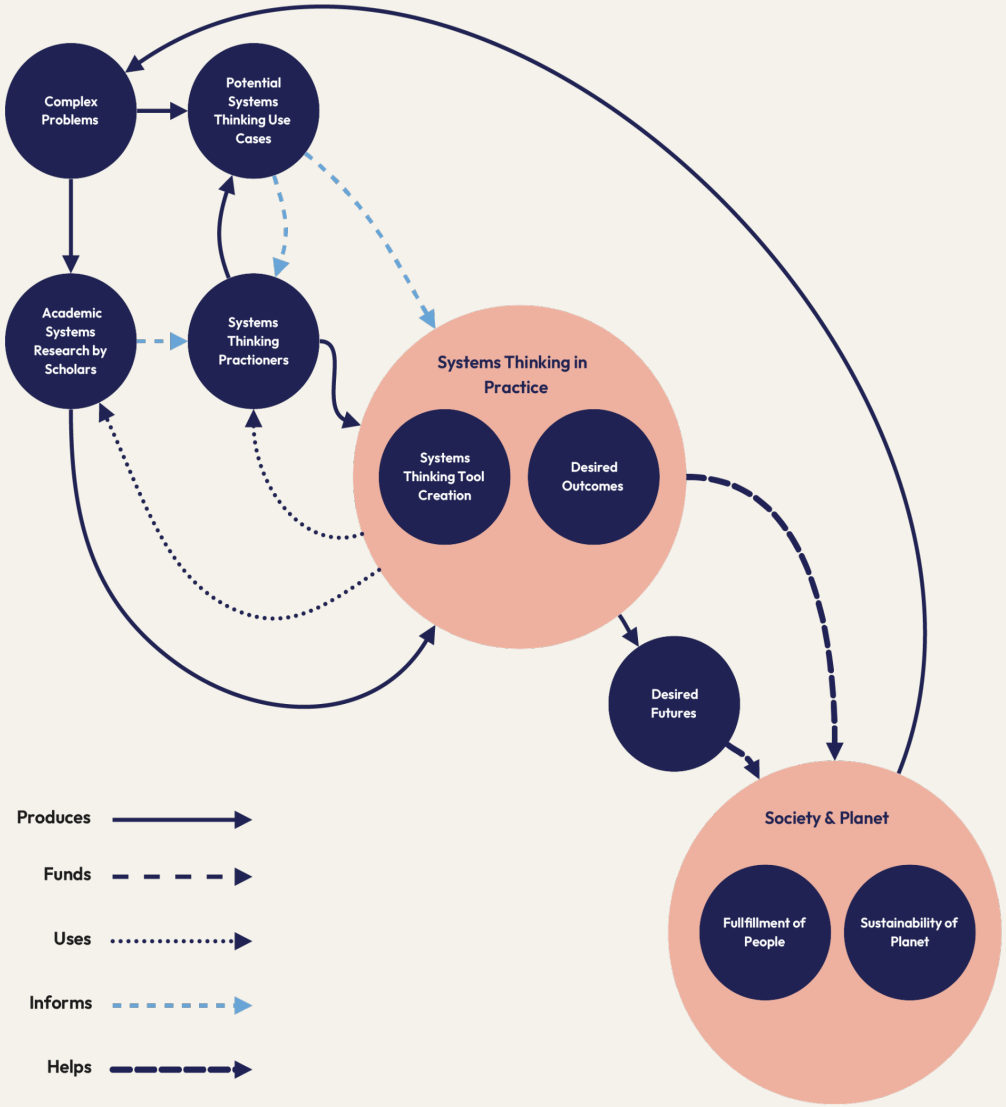


Figure 5. Looking outside at the system within which systems thinking exists.

In order to increase adoption we sought to use primary and secondary research, including interviews with systems thinking experts to learn more about the elements of the system thinking process, for what in them that may need to be addressed in our solution. We also sought to learn more about the elements of the system that includes systems thinking.

Evolution of Systems Thinking Practice

Where Systems Thinking Came From

The field of systems thinking is diverse and multidisciplinary. It spans across domains such as social sciences, engineering, business and management, computer science, and healthcare (Hossain, et al. 2020). To understand how to accelerate the adoption of system thinking, we must examine where it came from, where it is today and what lessons we have learned.

The beginning of systems thinking can be traced back to the early part of the 20th century, when experts in diverse fields such biology, chemistry, physics, mathematics, social sciences, and computer sciences began to understand the need for 'seeing in systems'. It was also around the same time when people realized that the 'cause-and-effect' way of linear thinking is no longer sufficient to solve more complicated issues (Hossain, et al. 2020). Around the 1940s, Ludwig von Bertalanffy, an Austrian biologist, was the first to propose the idea of a General Systems Theory. Bertalanffy argued for an unified foundation for science, with a set of universal laws and language that are applicable across multiple disciplines (Bertalanffy, 1968). From here, a rich body of research and innovations led to many branches of related yet distinct theories in the systems thinking community—from the cybernetics era from Wiener to Ashby's Law of Requisite Variety (Wiener, 1948; Ashby, 1961) and Beer's Viable System Model (Beer, 1979), to Forrester's System Dynamics (Forrester, 1994), to Ackoff's Idealized Design (Ackoff, 1993), Checklans' Soft Systems Methodology (Checkland, 2000), Senge's Learning Organization (Senge, 1990), to Complex Adaptive Systems (Holland, 1987) and many more.

Today, discussions and applications of systems thinking are largely rooted in the theories and tools developed by the pioneers mentioned above between the 1950s to 2000s (Ing, 2013). Now roughly two decades into the 21st century, where is systems thinking today? Where and how can we move systems thinking forward? These are the fundamental questions that we sought to answer in this research.

Systems Thinking Adoption Today

In Ludwig von Bertalanffy's book on General Systems Theory, he characterized the interest and attention around systems thinking at the time as "if someone were to analyze current notions and fashionable catchwords, they would find 'systems' high on the list. The concept has pervaded all fields of science and penetrated into

popular thinking, jargon and mass media." (Bertalanffy, 1968). Roughly 50 years since this statement was written, has the level of interest, attention, and application of systems thinking declined, sustained or increased over time?

The answer is not what the system thinking community might have hoped. As shown in the figure below, an analysis of the Google Search trends over time between 2004 to 2022 suggests that the interest for systems thinking or systems science has stayed stagnant over the years, with a slight decline between 2004 to 2022. For reference, interest in design thinking—a field closely related to systems thinking—has increased over time, especially in the last 5 years.

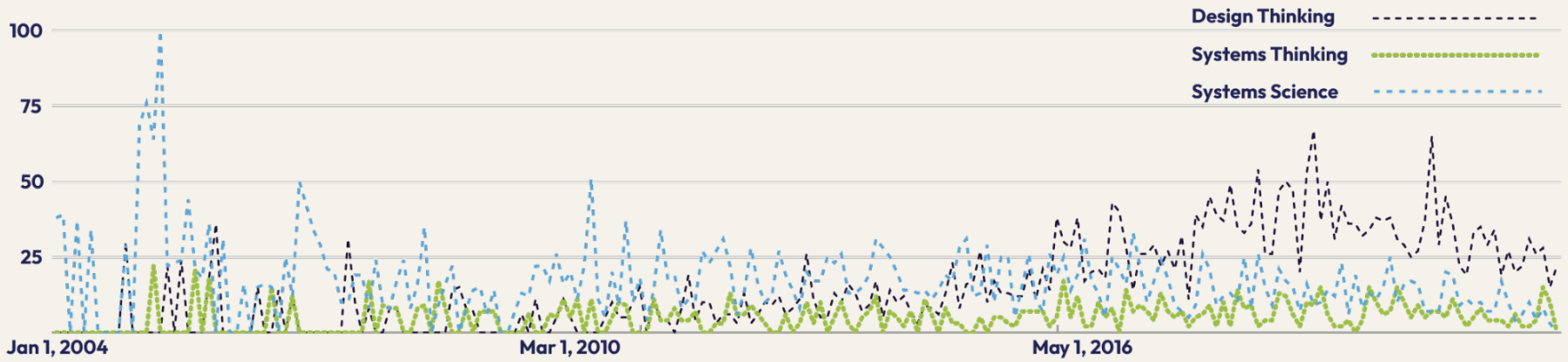


Figure 6. Google Search interest in systems thinking over time. The graph shows Google Search interest in the terms "systems science" vs. "systems thinking" vs. "design thinking" from 2004 to January, 2022. Numbers on the interest over time axist represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means that there was not enough data for this term (Google Trends, 2022).

The Google search trend is just one indicator of the interest in systems thinking in the public today. Interviews with twelve experts from various domains within systems thinking revealed that while organizations and the general public understand systems thinking in a general and intuitive sense (i.e. the need to see the big picture, holistic thinking, etc.), the actual application and integration of systems thinking theories and tools into problem solving, decision making, and innovation is low. Experts also suggested that the adoption is variable—or 'lumpy' as described by one expert—depending on geography, the type of organizations, and who you talk to. There is also a general perception that systems thinking is not attractive or innovative because it mostly grew out of research in the second half of the 20th century and didn't quite deliver on its promises. Interestingly, many concepts such as design thinking, agile, and holacracy that have roots in systems thinking have gained popularity and adoption in the last few years.

Literature research also suggests that system thinking has not yet been widely adopted. In 2006, Ackoff published an article outlining reasons why few organizations adopt system thinking (Ackoff, 2006). Fred Collopy, a student of Ackoff, argues that systems thinking "despite its wartime successes never really captured the imagination of business leaders" (Collopy, F. 2009). In response to Collopy's article, Jones argues that system thinking in itself in terms of usefulness is not a failure because it has not been wholly adopted (Jones, 2009).

It is also worth mentioning that while systems thinking may not have gained widespread adoption up to this point, there is a trend towards its increasing application in different disciplines, whether it is called systems thinking or not. For example, the British Design Council recently published in April 2021 a systemic design framework, aimed to help designers with solving major complex challenges. The Systemic Design Framework identifies systems thinking as a key catalyst for systems change and being a systems thinker a key role for any design team (British Design Council, 2021). There are also many more systemic design innovations that integrate systems thinking and its methods to guide human-centered design, such as creation of the Systemic Design Toolkit by Peter Jones, Kristel Van Ael, and collaborators (Jones & Van Ael, 2018). In addition, there are various ideas that have been popularized in recent years and have roots in systems thinking, such as the movement of holacracy and teal organizations (Laloux, 2014; Robertson, 2015).

Why Systems Thinking Has Not Reached Wide Adoption

Causal Layered Analysis of Systems Thinking Adoption

Expert interviews and literature research suggest that there are many factors that contribute to the adoption of systems thinking. We have synthesized the factors using causal layered analysis (Inayatullah, 1998), as shown in figure 7 below. In the causal layered analysis, we also mapped the factors to the three conditions required for innovation adoption based on the innovation diffusion theory. Detailed rationale is further explained in the section below.

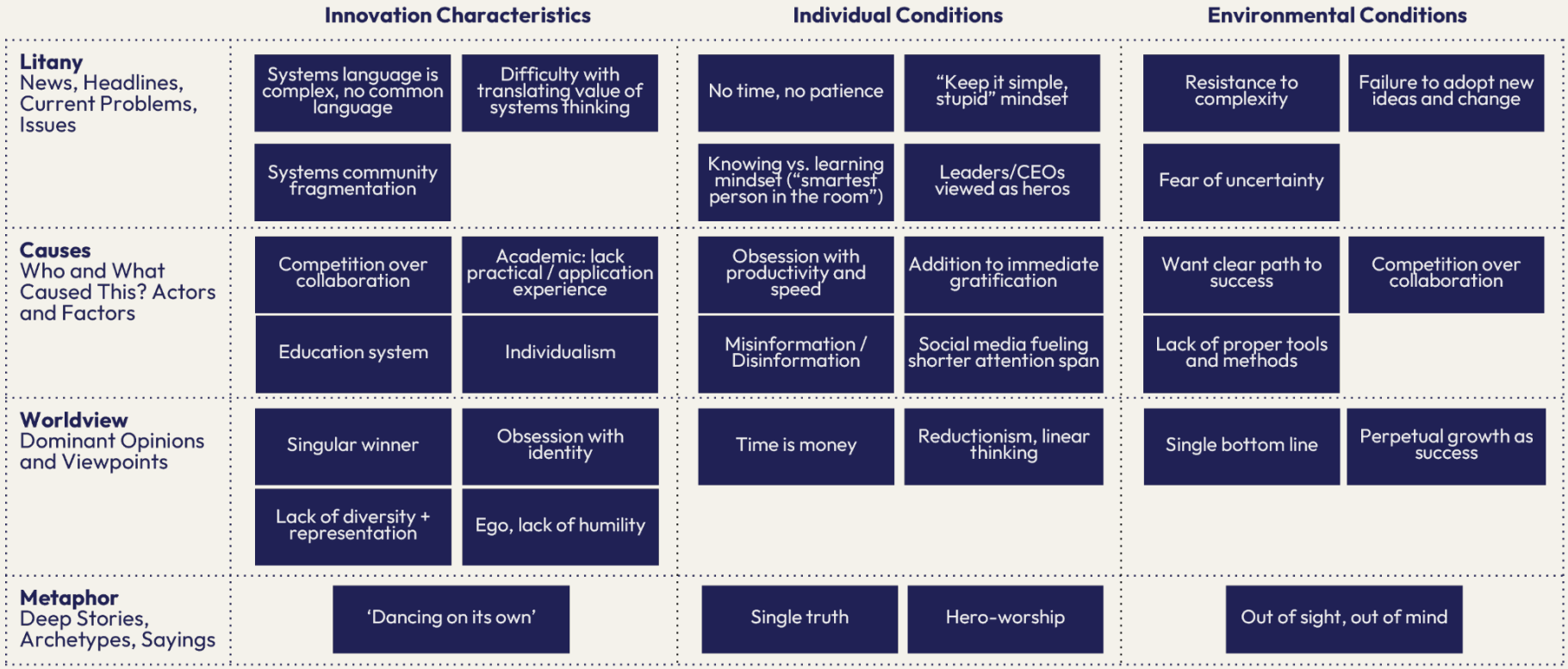


Figure 7. Causal layered analysis of systems thinking adoption today.

Systems Thinking's Characteristics as Conditions for Adoption

As described previously, ease of use and usefulness are two key characteristics that must be understood and believed by individuals in order for them to adopt an innovation (Staub 2009). Let's examine these two characteristics in relation to systems thinking to understand why systems thinking has not yet been widely adopted.

The perceived ease of use is a key barrier to systems thinking adoption. There is a significant cognitive overload in the process of learning systems thinking. Chen (2016) states that systems thinking provides an abundance of concepts and models, which creates information overload. This is supported by Collopy's argument that the way systems thinking is being introduced requires the users to master a large body of concepts and techniques, and subscribe to a system of thought. This is at odds with how we accept new ideas, which is to learn a little bit and try it out to see the benefits (Callopy, F. 2009). This is further demonstrated by Richmond's proposition that the 'thinking' in systems thinking is actually seven different types of thinking skills, ranging from dynamic thinking to system-as-cause thinking, scientific thinking and so on (Richmond, 1997). To master these different thinking skills requires a significant cognitive shift that takes time and dedication to achieve, which can be quite challenging for new users of systems thinking.

Expert interviews revealed that the systems thinking language is also complex, hard to understand, and sometimes lacking unity. This is supported by Ackoff's argument that systems thinking is an "introverted profession" where systems thinkers "do most of the writing and speaking to each other" and therefore the language often does not resonate or is not understood by potential users (Ackoff, 2006). This could explain why new systems thinking users often describe the process as learning a completely new language. Ackoff also observes the lack of common language in the community where "different terms are used to explain the same thing and the same term is used to describe different things" (Ackoff, 1971). This could be related to the fact that the systems thinking community is highly multidisciplinary, resulting in a diverse body of research that is dispersed across different domains that make it harder to track and scaffold on top of each body of work (Ackoff, 1971).

As a result, the challenge with the adoption of systems thinking demonstrates the 'limits to growth' archetype (as shown in figure 8 below) where the growth in the adoption of systems thinking is limited by the time, effort and cognitive capacity that an individual has for learning and using it. And there is a balancing process between the effort to learn systems thinking and the perceived ease of use, causing a limit to the growth of adoption.

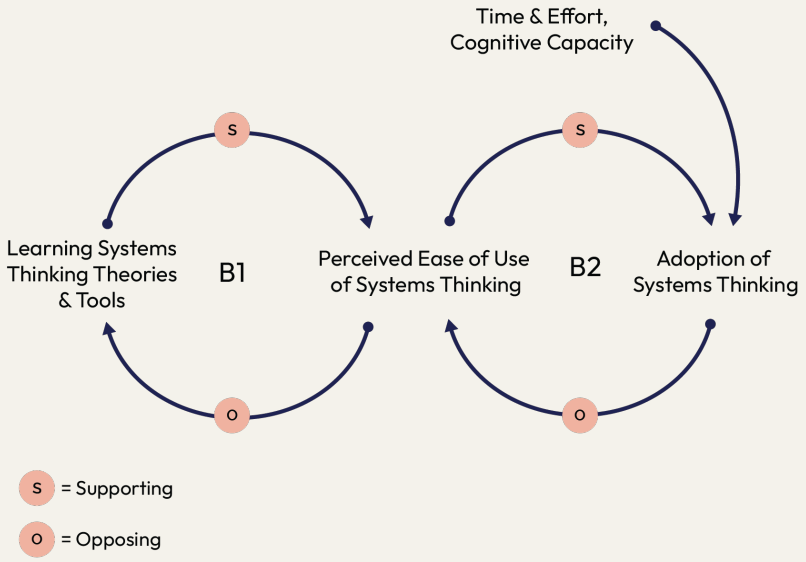


Figure 8. Limits to growth archetype.

The degree to which a person believes in the usefulness of systems thinking is also a significant barrier to adoption. First, without ease of use, it is hard to adopt systems thinking and without the adoption, it is hard to see the usefulness. Currently, there are various solutions to this challenge such as re-framing or repackaging systems thinking into something that's easier to understand, closer to the language and context used in different applications in order for it to resonate with the audience. Many of our experts revealed that in many cases, they use the methodologies and tools in systems thinking in the back end without ever using the term systems thinking and the relevant theories/frameworks with their clients. While this approach is helpful for solving problems without having to go through the trouble of teaching people systems thinking, it is a 'fixes that fail' solution. In the long term, it creates the unintended consequence of untethering from systems thinking that prevents further understanding of it.

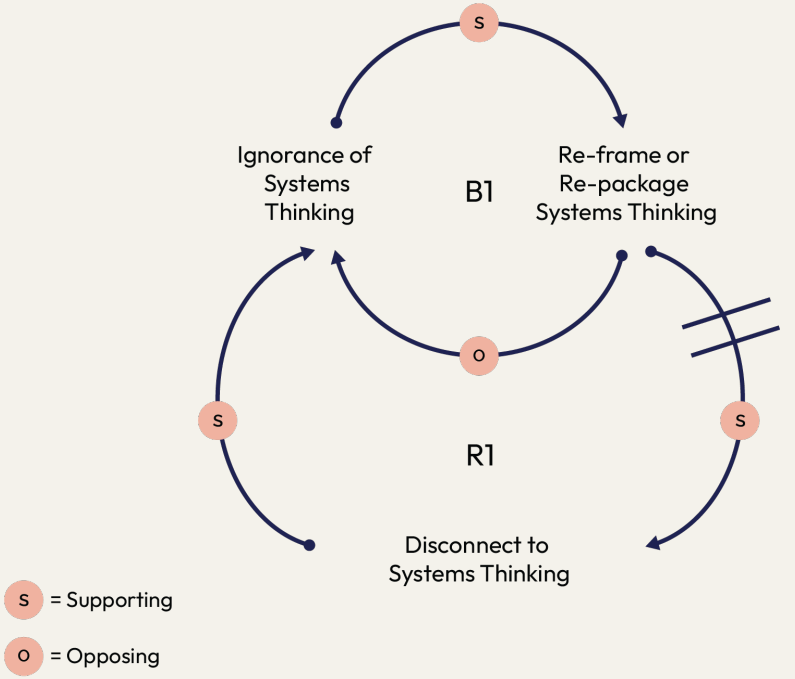


Figure 9. Fixes that fail archetype.

In addition, it is also very difficult to translate the value of systems thinking. The underlying mindsets and ways of working in systems thinking are often at odds with the current state of thinking. For

example, we live in a world where “fast and quick” are equated with success. But system thinking requires time, reflective thinking, and working with complexity before solutions can emerge. This creates the perception that systems thinking is slow and may not guarantee success upon using it. Ormerod (2014) and Chen (2016) both advocate for more concrete examples demonstrating the applicability and usefulness of system thinking. Collopy suggests that we should create “trial-size” access to systems thinking knowledge and tools so that users can easily apply and test the usefulness in their own context (Callopy, F. 2009). In addition, while there is a growing body of research focused on the application of systems thinking in different industries, this evidence remains closely linked to the academic community and is not widely distributed in the public.

Our causal layered analysis suggests that issues in our traditional education system—such as the reductionist approach of breaking down disciplines into silos, the competitive academic publishing incentive system, and the lack of connectivity with real-world applications—could be contributing to the underlying cause. There is also a sense of competition and lack of collaboration within the existing systems thinking community. There are many sub-branches of systems thinking that are all trying to carve a path and recognition for themselves as opposed to coming together and building on top of each other's work. There is also this ‘accidental adversarial’ relationship between the academic side of systems thinking and its practitioners who are trying to apply it in the real-world setting, as shown in the causal loop diagram in figure 10 below.

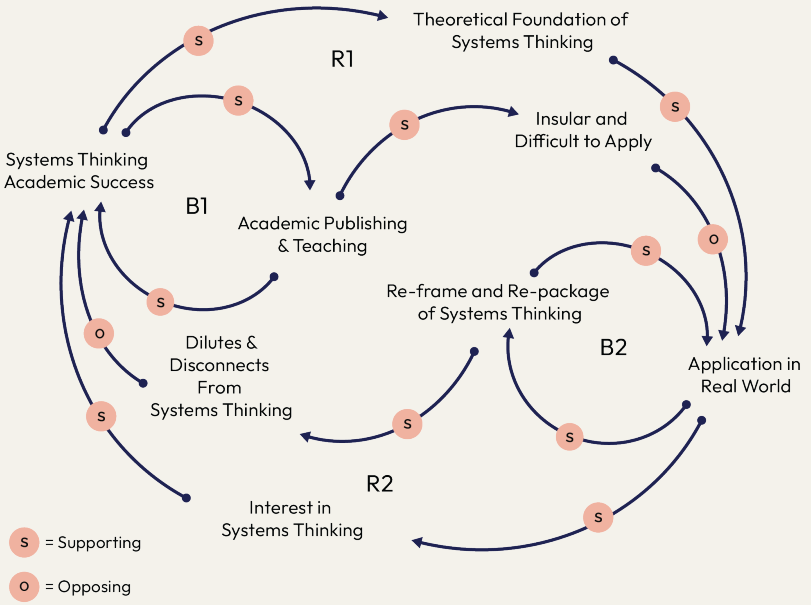


Figure 10. Accidental adversaries archetype.

In conclusion, using Derek Sivers’ dancing analogy to innovation adoption, systems thinking’s innovation characteristics can be described as ‘dancing on its own’ because it is not easy to follow (not understandable by the people outside of the systems thinking community) and the usefulness and benefits or value of adopting systems thinking is not well articulated and communicated openly for people to follow.

Individual Characteristics for Adoption: Actors Map

Besides the innovation's own characteristics, individuals or potential users of the innovation must also change for adoption to occur. We explored the actors who are currently involved in the adoption of systems thinking. Figure 11 below illustrates the actors mapped according to their level of influence on the adoption and their current level of awareness/desire for system thinking.

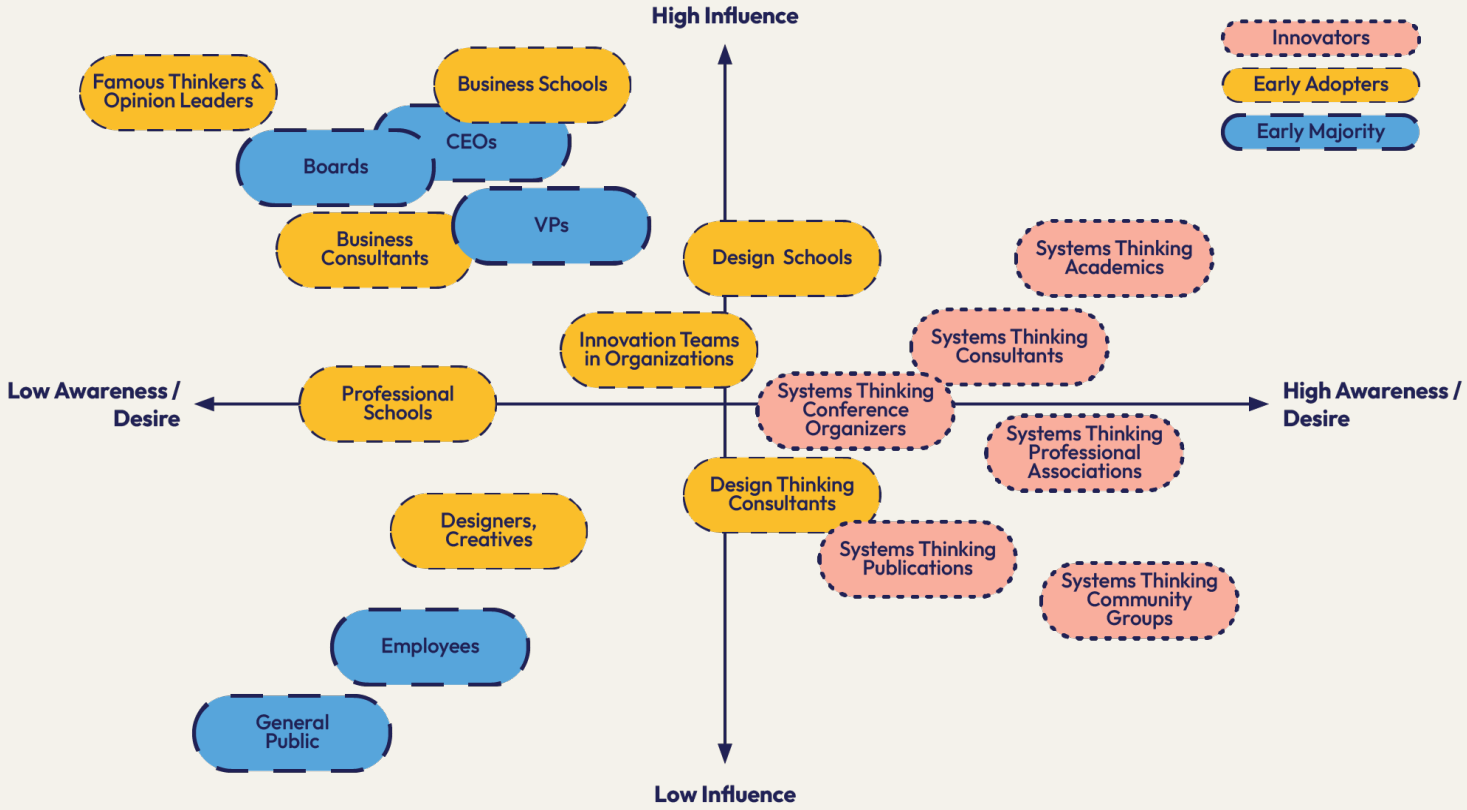


Figure 11. Actors involved in the adoption of systems thinking. The X axis represents level of awareness and desire for systems thinking. The Y axis represents the level of influence on the adoption of systems thinking. Actors are also labeled based on Rogers' innovation diffusion theory.

Innovators

The innovators are the systems thinking academics, theorists, consultants and their associated professional associations (International Federation for Systems Research, Systemic Design Association, American Society for Cybernetics, Forum for the Future-School of Systems Change, etc.), publications (Systems Research & Behavioral Science, thesystemsthinker.com, etc.), conferences (Relating Systemic Design Symposium, Systemic Leadership Summit, etc.) and community groups (Systems Thinking Network, Systems Thinking Ontario, Metaphorum, etc.). This group of actors are the first to conceive of and embrace systems thinking and are often the ones innovating new theories, techniques or tools that advance the field. While the innovators have high awareness and desire for systems thinking, their influence in its wider adoption is limited on their own.

Early Adopters

The early adopters are the renowned thinkers/opinion leaders, design/business/professional schools, business/design thinking consultants, designers/creatives, and innovation teams in organizations. This group of actors have the ability to raise awareness and desire for systems thinking and influence the adoption. They have vicinity to decision making and problem solving/innovation practices which are places where systems thinking needs to be adopted in organizations and communities. While there are a few in this group that have awareness/desire for system thinking right now, the numbers are far from what we need to generate momentum for wider adoption. Rogers suggests that roughly 13.5% of individuals need to be early adopters in order for the adoption to cross the chasm or reach a tipping point into the early majority. Any strategies to raise more awareness/desire for systems thinking in this group of early adopters would generate momentum for wider adoption.

Early Majority

The early majority refers to the CEOs, VPs, board members, employees and the general public that would follow the early adopters. As leaders in organizations, CEOs, VPs and board members have high influence on the adoption of systems thinking but they currently have low awareness and desire for system thinking as suggested by our interview insights. With regards to the border public and employees, they have low influence on the adoption and low awareness and desire for system thinking at the moment.

Causal Layered Analysis of the Individual Conditions for Adoption

As mentioned above, individuals or potential users of the innovation must change their behaviour and mindset for adoption to occur. Based on expert interview insights and literature research, we found that the current ways of working and mindsets—such as the need

for simple quick fixes, the need to have the right answers, and the idea that CEOs and leaders are our saviours—are barriers for systems thinking adoption. These can be attributed to our shorter attention span, obsession with productivity/speed, with the underlying worldview of time as money and the linear, reductionist way of thinking. The metaphor of the current state can be summarized as the obsession with singular truth and reliance for a singular entity or 'hero' to provide the answers and greater sense of security about the future. While these current mindsets and behaviours need to change in order for adoption to occur, we also need to satisfy these needs from the potential users while also introducing new ways of working and thinking. These current conditions are key considerations for our solution design criteria that will be explained in a later section.

Environmental Conditions for Adoption

Beyond the individual conditions, there are also environmental conditions in the wider social system in which the innovation occurs (Rogers, 1962). These environmental conditions can act as either conduits or barriers for change adoption. We consider two types of environmental conditions: the micro organizational environment and the macro societal environment.

In the local organizational environment, there are factors that are creating barriers for systems thinking adoption. Ackoff argues that organizations have trouble adopting transformative ideas in general, and systems thinking is part of it (Ackoff, 2006). This is because many organizations fail to identify and learn from mistakes, especially mistakes related to not doing something that is supposed to be done. For example, if an organization decides not to adopt systems thinking and if they do not have a way of analyzing this type of mistakes, then they would never learn the consequences of not adopting systems thinking and therefore never adopt systems thinking. Expert interview data also suggest a general fear of complexity, uncertainty and resistance to change that can be attributed to the desire for a clear path to success, the competitiveness in our environment, and the metaphor that what's out of sight is out of mind.

In the macro societal environment, there are also many factors that are either working for or against systems thinking adoption. These conditions are further explored using foresight key trends analysis that are described in detail in a later section.

The Viable System Model as a Case Study in Systems Thinking Adoption

Stafford Beer's Viable System Model (VSM) based on cybernetics and systems theory provides us with an opportunity to apply our research on innovation adoption to a specific case. The VSM is an innovative model of an organization, transcending the traditional image of organizational management models by providing sensemaking to structures, functional roles, workflows, and autonomous communication pathways (Beer, 1979). It is considered by the systems thinking experts we interviewed and whose practice includes VSM as the most powerful generalized model of an organization that is currently available. The model outlines how an entity can achieve self-organization to enhance viability (Beer, 1979). The use of the VSM in the diagnosis and design of organizations is particularly interesting in today's world as the operating conditions have become increasingly complex, and classical organizational models are not enough to cope with the increasing complexity (Lowe, 2020; Pfiffner, 2010). Yet, the VSM is not a model being widely used in organizations today. Pfiffner suggests a challenge in that the VSM requires people to have a significant change of mindset from the typical view of an organization, beyond the model of a hierarchical organizational chart as a series of business units, and instead look at the system agnostically as a whole and what it does and achieves (Pfiffner, 2010). It is safe to say therefore that VSM, although conceived nearly 40 years ago, still constitutes an innovation, but one that has not progressed successfully through an adoption process.

While the use of the VSM has been documented in a variety of areas such as strategy management, operations and supply management, information management, governance, sustainability, knowledge management, performance management etc, and across private and public industries, it is still not a “mainstream” organizational management tool and there are a few challenges associated with using the VSM (Lowe, 2020).

Through our interviews with systems thinking experts and through literature review, we have found the following conditions to be present in VSM, that together constitute a chasm preventing its progress towards greater diffusion and adoption.

1. VSM lacks key characteristics for adoption

a. Its metaphor, language and visualization are hard to understand. VSM presents as abstract and complicated. Many experts we interviewed acknowledged that VSM has a steep learning curve. The challenge with the cognitive accessibility of the VSM has also been recognized in literature (Jackson, 1988; Ulrich, 1981).

b. While being a model of an organization, VSM does not connect to an existing organizational model and because of this, its purpose is easily misunderstood. It can be seen as a challenge to the existing structure, and therefore a threat to the core of an organization, rather than seen as a tool for increasing efficiency, improving relationships, problem identification and solutioning.

2. VSM is still only in the hands of a few systems thinkers and practitioners

a. Many experts shared that those who practice and use VSM constitute only a small part of the systems community (which is itself quite small as we have shown earlier). We can deduce that VSM has only been adopted by its innovators, and that it benefits from very few, if any, early adopters.

b. As several experts put it, VSM depends a lot on how it is taught. It requires its innovators to be very effective at communicating its core concepts at the right level in the organization.One expert explained that VSM required positioning and marketing, as well as applied examples and endorsement. Without more application research, its use and usefulness is largely invisible. To increase its adoption, its application must be out in the open for others to see.

3. A number of external conditions work against VSM adoption

a. VSM was qualified by several experts we interviewed as being dynamic, with a lot of capacity for deep analysis. One expert also explained that “you can get carried away very quickly”. As such VSM requires time and patience, two things that seem to be in very short supply in our current business climate.

b. The systems thinking community has not rallied behind VSM as it has with other models and tools such as design thinking and systemic design. VSM lives in the margins and can be divisive within the systems community. Experts were fairly consistent in saying that they use the models and tools they are comfortable with or belong to their chosen school of thought within the field of systems thinking.

c. VSM tackles and questions concepts of organizational structure, while being introduced in and useful to those very structures. It's not likely that the existing structures, cultures and norms will be

supportive of this type of deep and possibly existential questioning.

While Pfiffner argues that the VSM provides a uniform language to communicate effectively about organizational questions (Pfiffner, 2010), the resistance to using the VSM has been connected to the laborious effort it requires to learn the model, together with the fear of ultimately failing at understanding it (Pfiffner, 2010). Its usefulness is not clear even to those within the systems thinkers and practitioners community much less to others, making the effort required to learn it even less desirable. The environmental conditions are not good and similarly to systems thinking in general, VSM application is intensive, requires time, and a shift from current thinking. In addition, in order to be popularized across organizations of all kinds, the VSM must be communicated in such a way to resonate with the needs of potential users. Until now, this has not been done well (Pfiffner, 2010). VSM is assuredly stuck in the chasm (Orengo, 2018).

Exploring Environmental Conditions for Systems Thinking Adoption

Overview of Key Trends Impacting Systems Thinking Adoption

Introduction

Our solution space needs to consider the trends working for and against adoption, in particular the desire for a quick fix and the lack of resources and time. Systems thinking needs time, resources, reflection, deeper thinking and cannot deliver a quick solution to a problem. Given our understanding of these trends and their relevance and impact on systems thinking adoption, our solution will need to find workarounds. Additionally, our solution will need to leverage trends working for systems thinking, particularly the need to understand a complex environment and interdependencies, and the pursuit of purpose and meaning.

How We Chose the Trends

Our engagement with systems thinking expert scholars and practitioners yielded a number of trends for us to consider, as well our research on the context for the practice of system thinking and the application of its tools and methodologies. Specifically, we asked experts to share what challenges do organizations face that require their expertise, we also asked them what trends were at play in the interest in and adoption of system thinking, and finally we asked them to share what they thought the barriers were to greater engagement with system thinking methods and tools. Their answers to these questions and our secondary research provided us with information on trends to further explore. We organized the data into a simple X/Y grid borrowed from Rhydderch's Scenario Building toolbox (2017) that enabled us to rank the information by importance to system thinking and by uncertainty (the degree of predictability).We determined the ranking based on instances the driver appeared in our data (for importance) and research (either explicitly or adjacently).

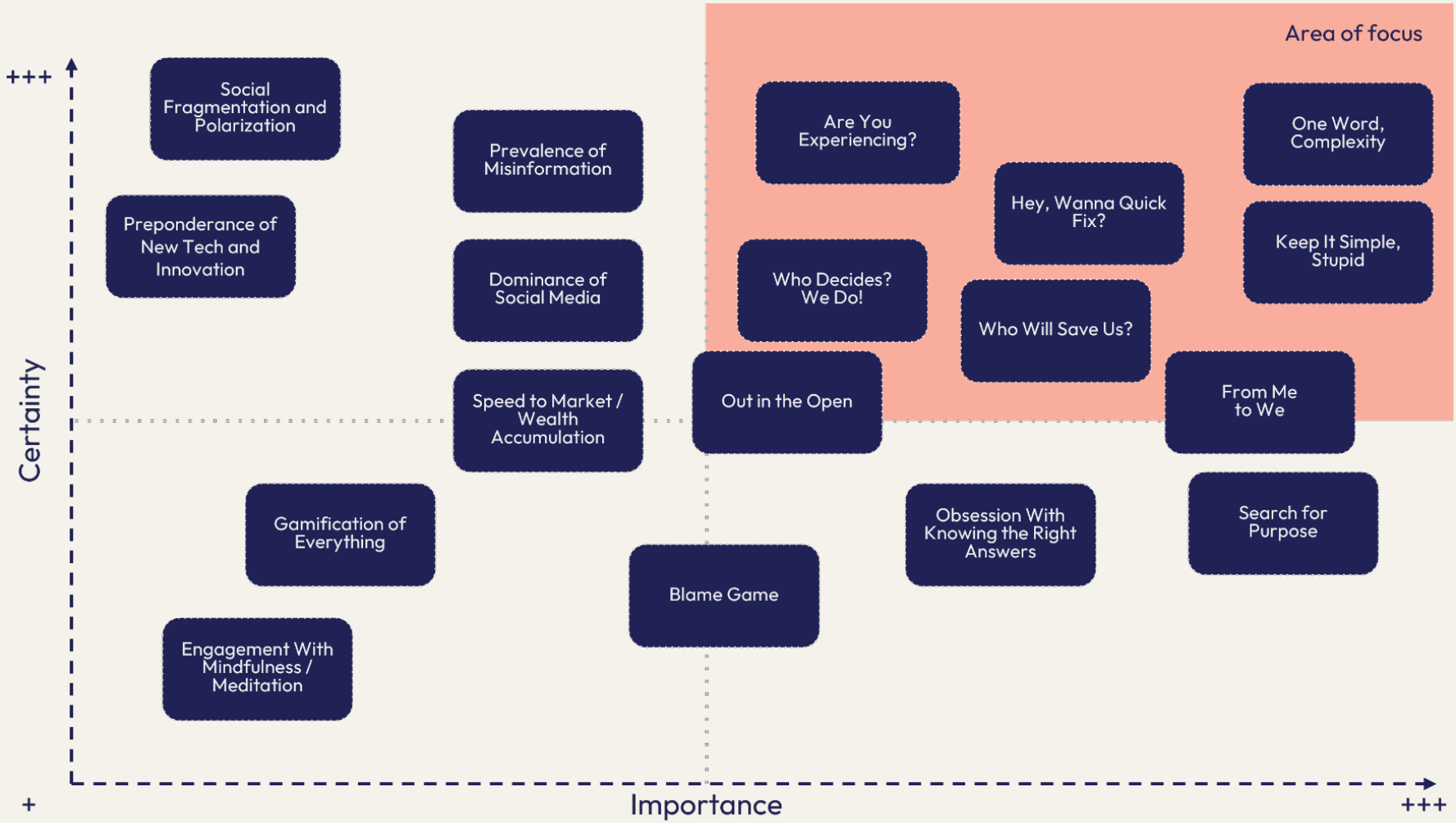


Figure 12. Trends for and against systems thinking mapped onto an XY grid. X axis represents the level of importance to systems thinking adoption; Y axis represents the level under certainty that each trend exhibits. The top right quadrant represents trends that are both very important to systems thinking adoption with high certainty—this is an area of focus where additional research is conducted to articulate trends that fall into this category in more detail.

Key Trends At-A-Glance

Table 1. Key trends at-a-glance. The following table provides a snapshot of the key trends identified above, including their description, trend type, and maturity level.

Name	Summary	Type	Maturity
One Word, Complexity	We are at a tipping point where unprecedented levels of complexity we face necessitates a new way of problem solving.	Social, Technological, Economic, Environmental, Values	Stable
Keep It Simple, Stupid	As the world becomes more complex than ever, many are feeling overwhelmed by the amount of choices, information, and technological advancements. This is driving a growing desire to keep things simple in work and life.	Social, Economic, Values	Growing
Hey, Wanna Quick Fix?	With the increase in the speed and access to vast amounts of information via social media and the internet, human attention span and depth of engagement with information has shrunk to the point of causing us to know only the surface of anything and to have little patience to wait for an answer (as shallow as it may be), while pressure to act is increasing.	Economic, Social, Values	Growing
Who Will Save Us?	The legacy of the saviour and related hero-worship is today's expert or aptly coined "guru": the all knowing, super smart person who will swoop down and provide the solution or strategy that will sustain an organization, or a way of life. This myth keeps us from engaging collectively in building our future.	Social, Economic, Political, Values	Stable
Who Decides? We Do!	Traditional top down, hierarchical decision-making models are no longer working in today's rapidly changing environment. Organizations and employees are redefining new ways of decision making centered around autonomy and shared responsibilities that enable agility and adaptability.	Social, Economic, Values	Emerging
From Me to We	The emergence and rise of social networks over the past 15 years underpins a new mode of working, one that of collaboration as well as the power and benefit of accessing the wisdom of many, versus the few. Wikipedia is a massive global collaborative effort of knowledge sharing and has become emblematic of the power of collaborative working.	Social, Economic	Emerging
Are You Experiencing?	An evolution of the economy introduced the "experience" as something that can be sold and bought, and as a higher order value, than a product and service - and because humans lived shared experiences in distinctly unique ways, providing an experience to a client is deeply personal and can be just as meaningful and memorable.	Economic	Emerging
Out in the Open	As our societal challenges are becoming ever more complex and interconnected, solving the issues alone is no longer enough. The open innovation movement offers a way of working and methods for communities and organizations to band together to solve mutual issues affecting business and society.	Social, Technological, Economic, Values	Stable in software development, emerging in other sectors

Definition of Trend Type

When conducting trends scanning, we categorized the trends using a common framework called STEEPV: social, technological, economic, environmental, political, and values (Morrison, 1992).

Definition of Trend Maturity

- Emerging
- Growing
- Stable
- Declining

Trends in Detail

Detailed trend information is provided on pages 48-55

Trend 1

One Word, Complexity

We are at a tipping point where unprecedented levels of complexity we face necessitates a new way of problem solving.

Trend Type: Social, Technological, Economic, Environmental, Values

Maturity: Stable

We live in an increasingly complex and interconnected world that is shaped by many systemic forces such as climate change, resource deficiency, technology advancement and integration, and shifting societal values that drive the pace of change to an unprecedented level. In addition, the global coronavirus pandemic and resurgence of the social justice and environment movements have further accelerated this shift. In organizations, rapidly evolving workplace location, practices, and process expectations are demanding new ways of working. The emergence of the next generation of system thinkers and design practitioners are pioneering new philosophies about innovating and solving problems.

Signals: According to a 2021 Gartner survey of 800-plus HR leaders, there is a growing trend towards a switch from designing for organizational efficiency to designing for resilience to respond and correct course quickly with change (Wiles, J. 2020).

Organizations are becoming more complex in size and management due to the acceleration of mergers & acquisitions and the nationalization of companies seeking to mitigate and manage risk in times of disruption (Wiles, J. 2020).

The COVID-19 pandemic has shown the world the epitome of complexity and interconnectedness. It has revealed the interdependencies and weaknesses of our systems beyond public health, into areas that touch every aspect of our lives such as business operations, international relations, supply chains, politics, information/misinformation, etc (Zieba, 2021).

At the height of the 'Black Lives Matter' movement in the summer of 2020, there was widespread public awareness and discussions around the systemic nature of racism embedded in the political, economic and social structure of America (Wordland, 2020).

Implications: Increasing complexity, the need to understand the world and its interdepencies, global crises (such as COVID19), awareness of the threat of climate change, and the impacts of inequality can support greater engagement with systems thinking as it provides a way forward into greater understanding. Our ability to deal with increasing complexity will depend on our ability to see it, understand it, and act within it. This requires a level of widespread adoption of systems thinking like never before.

Counter Trends: 'Keep It Simple, Stupid': there is an interesting paradox between the need for simplicity and the requirement for us to manage complexity as we thrive in this world.

Trend 2

Keep It Simple, Stupid

As the world becomes more complex than ever, many are feeling overwhelmed by the amount of choices, information, and technological advancements. This is driving a growing desire to keep things simple in work and life.

Trend Type: Social, Economic, Values

Maturity: Growing

The term 'Keep It Simple, Stupid' is a popular maxim that can be traced back to the U.S. Navy in the 1960s. It is a design principle that emphasizes the importance of simplicity while avoiding unnecessary complexity. Underneath this principle is the idea of breaking problems into smaller and smaller understandable pieces in order to design manageable solutions. While this reductionist approach continues to dominate our ways of thinking and problem solving in the Western society today, many are also recognizing the complex, interconnected, and systemic nature of the biggest challenges facing our society. At the same time, people are bombarded on a daily basis with new choices, products/services, and information powered by rapid technological advancements. The desire to keep things simple is stronger more than ever.

Signals: In a 2020 study, 63% of global participants wish their lives were simpler. 52% feel overwhelmed by the multitude of choices in our daily lives—a rise of 4% since 2013 (Ipsos Global Trends, 2020)

The desire for simplicity can be seen through growing movements such as tiny houses (CBC, 2020), vanlife, as well as the success of Marie Kondo's 'The Life-Changing Magic of Tidying Up'

In recent years, inspirational speakers such as Simon Sinek have gained widespread popularity by employees and organizations across the globe. In part, this success can be attributed to how well these speakers can communicate their thinking into simple frameworks like 'the Golden Circle' or 'Start with Why'. A scan of such speakers' social media platforms (LinkedIn, Twitter, Instagram, etc.) shows a common trend of highly simplified messages such as quotes, short from video content that are gaining popularity.

Implications: The reductionst way of thinking underlying the 'Keep It Simple, Stupid' maxim offers immediate benefits to applications like product design and the communciation and marketing of soltuions. However, it is counter-productive to efforts needed in making change in any of our wicked problems. Addressing these problems requires a deep understanding of the complex context within which the problems exist and the solutions are rarely simple fixes.

The desire for simple solutions and answers will continue to persist in our time. This is a key barrier to the adoption of systems thinking. Systems thinking requires time, collaboration, and reflective thinking that often will lead to more complexity in the process, at least at the beginning, before solutions emerge. However, the solution that would help accelerate the adoption of system thinking must work with this trend as the design constraint and must be able deliver simplicity for our target users.

Counter Trends: Complexity: there is an interesting paradox between the need for simplicity and the requirement for us to manage complexity as we thrive in this world.

Trend 3

Hey, Wanna Quick Fix?

With the increase in the speed and access to vast amounts of information via social media and the internet, human attention span and depth of engagement with information has shrunk to the point of causing us to know only the surface of anything and to have little patience to wait for an answer (as shallow as it may be) Anderson and Rainie, Pew, 2021), while pressure to act is increasing (McKinsey, 2021).

Trend Type: Economic, Social, Values

Maturity: Growing

The speed of information and amount coming at us at any given moment has forced us to reduce the amount of time we engage in any one idea or issue. Also, new information keeps coming, updating the previous information, incentivizing us to make quick decisions and take immediate action in a "seize the moment'' that is increasingly fleeting. FOMO (fear of missing out) is real, as is the worry that something new will come along. The constant feed from disparate areas of our lives, be it messages and updates from friends and family (facebook); work related email and messaging threads (Slack); local, regional or international news (Google & Apple News, Twitter); advertising and marketing (Instagram) also mean that we are constantly multitasking and moving from one issue, idea or problem and activity to another without fully grasping it.

Signals: Many executives reported that they moved 20 to 25 times faster than they thought possible on things (McKinsey, 2021)

Increase in ADHD in youth and adults (Psychiatric Service, 2016)

Rapid adaptation in business is widely considered a competitive advantage (HBR 2011)

Implications: The shallow engagement on issues hinders our ability to find real understanding and meaning, or effectively relate to both the issues and each other. As we try to keep up with the pace of information we drive ourselves further and further away from connecting to the problems facing our planet and each other, and in so doing become less and less likely to find real solutions or to make lasting change. The concept of "lasting" is becoming increasingly vague and irrelevant as we keep seeking opportunities to take immediate action or to shift our attention to the latest and fictitiously "greatest".

In a world where fast and quick are equated with success, however fleeting, there is little or no chance to solve deeply rooted and complex issues and problems that by their very nature take time to not only understand but to bring about change for. Climate change, social inequality, racism, and discrimination, poverty, disease, income inequality will continue to be issues that fall by the wayside as we continue to seek and thereby value quick wins and superficial gains. In business terms, companies will come into being faster and then will subsequently fail at a higher rate than ever before. This churn will be costly both environmentally, economically and socially. The ripple effect could also be felt politically with people being easily swayed.

Counter Trends:The 2019 global pandemic has increased our awareness of complexity and interdepencies, across spheres and industries, across borders, how something solved here makes another problem there. This increased awareness has also provided ammunition against shallow, shortsightedness across sectors, and the addiction to quick fixes that do nothing. There has been a backlash against social media, its problematic algorithm, that can elicit hate, addiction, polarization, adhd, and many calls to take SM breaks, to disconnect, and even close their accounts. A reduced engagement with social media may allow people to slow down and re-engage more deeply and meaningfully with people and issues that they care about.

Trend 4

Who Will Save Us?

Trend Type: Social, Economic, Political, Values

Maturity: Stable

The legacy of the saviour and related hero-worship (Brattin & Engel, 1993) is in today's expert or aptly coined "guru" (Girn, 2021): the all knowing, super smart person who will swoop down and provide the solution or strategy that will sustain an organization, or a way of life. This myth keeps us from engaging collectively in building our future.

Heads of state, politicians, celebrities, big name consulting firms, and CEOs are modern-day equivalents to saviours and heroes of our historical and religious past (HBR, 2021). The legacy keeps us looking for someone, who has the answer to provide it so that we can carry on into the future. This search for the person with the answer, equally in the political realm as in the social and business realm works against collaboration and the participatory mindset. The idea that someone else, knows better, is smarter about those things that impact us everyday means that we look outside ourselves, our community, or our teams for innovation, for solutions and we refrain from spending the necessary time to solve for ourselves. Hierarchical organizational structures are built on this idea, as is corporate governance. Salaries paid to CEOs also reflect the idea that they are somehow singularly responsible for the organization's achievement(s) and should be compensated as such. Concentrated decision-making in one or few people continues to be the norm. If the hero or saviour is not found within the organization, it in turn will seek saviours from outside in the form of big consulting firms, who presumably know the secret and for a price will bestow it on the organization (Belsky, 2013).

Signals: Trump presidency and MAGA showed the willingness of the American electorate to seek a larger than life character to "Make America Great Again", an outsider in the political arena but one who would play the hero and saviour (Ronald Hill Professor of Marketing, 2021).

CEOs such as Warren Buffet, Bill Gates, Steve Jobs, Elon Musk, Zuckerberg exemplify the place these men hold as heroes in our modern-day fables and quests (Aeonmag, n.d.).

The big five consulting firms do very big business (ASP, n.d.). A recent press release and special report - "The US Consulting Market in 2017" by Source Global Research highlighted how the need for expertise is apparent as the consulting market grows.

Implications: Faced with increasing complexity, volatility, and uncertainty, and decreasing trust in ourselves, we continue to seek a singular entity to provide the answers and greater sense of security about the future. The lack of trust and confidence in our own ability to understand complexity and deal with it, means that we will readily accept someone else's vision of the world, of what matters, of what the problems are and what to do about it, and their singular perspective can eclipse hundreds if not thousands of other valuable perspectives. These singular worldviews will do little to solve complex problems or address long standing issues, and will further exacerbate them. The pressure for the few to be right and to have the right answer can also oversimplify issues so that the singular perspective is enough to address them, or negate or render certain complex problems invisible, see climate change deniers, or "colour blindness".

Counter Trends: The emergence of humbleness and humility as desirable and effective leadership qualities (Scoggins, et al. 2019; Nielsen & Marrone, 2018). Increasing complexity (Berkana Institute, 2020): incidence of global crises such as climate disasters that cannot be ignored and that no one can solve alone. The rise of humanism (Holtom, 2014): an acceptance of the fallibility of people, no matters what strata of society they have acceded to.

Trend 5

Who Decides? We Do!

Traditional top down, hierarchical decision making models are no longer working in today's rapiding changing environment. Organizations and employees are redefining new ways of decision making centered around autonomy and shared responsibilities that enable agility and adaptability.

Trend Type: Social, Economic, Values

Maturity: Emerging

As today's organizations weather through rapid changes, volatility and uncertainty, one of the biggest challenges has been to balance the need for structure with the need for agility and adaptability. Organizations are also growing in size and complexity, with larger workforce, wider customer reach, more complex business models, and growing bottom line beyond economic benefits. Traditional top down and hierarchical decision making models are not sufficient to meet these needs—they slow down agility and adaptability by imposing communication delay up and down the decision making chain, adding the risk of distortion of information (Suzaki, 1987). Newer models of decision making are growing in popularity—they are focused around empowered autonomous teams where the decisions are made together with workers who carry out the functional activities or with potential customers/end users in the case of co-design. Distributed decision making allows teams to be more nimble in adjusting to the changing customer needs and environmental shifts. Employees are also demanding for more autonomy, seeking shared purpose and humanness in workplaces. As it turns out, the 'heros'—CEOs and traditional decision makers, or so-called experts—don't have all the answers.

Signals: The rise of new organizational/ management paradigm such as the 'Teal Organization' by Frederic Laloux and the 'Holacracy' by Brian Robertson shifts from traditional top-down hierarchical management practice to distributed teams, self-management, and shared purposes (Laloux, 2014; Robertson, 2015)

The rise of participatory design or co-design methodologies in various design disciplines across industries (Muller & Kuhn, 1993) signals a shift from expert-based to user-based design principles that involves empowerment of the end users and other key stakeholders through consultation, shared decision making (Trischler et al, 2019)

In healthcare, there is growing emphasis around patient-centered care and patient engagement where patients actively participate in their own care and are empowered to participate in the decision making with the goal to improve healthcare quality and patient outcomes (Chen, et al. 2016).

Implications: Distributed decision making allows teams to be more empowered, leads to better organizational performance, agility, and viability in the long run. It aligns with one of the principles of the Viable Systems Model in system thinking, wherein each operational unit needs to be clear about its role within the whole organization and should therefore have autonomy to fulfill its roles. This trend is also mutually reinforcing with the trend around collaboration. As we progress to solve big, complex systemic challenges, distributed decision making and collaboration go hand-in-hand in ensuring that we bring diverse perspectives and use our collective power to solve the issues at hand.

Counter Trends: The 'Who Will Save Us' trend associated with the hero worship mindset undermines shared decision making and collaboration. It removes participants as agents of change and shifts the power to the so-called experts of more capable individual(s) to come up with the answers.

Trend 6

From Me to We

Trend Type: Social, Economic

The emergence and rise of social networks over the past 15 years underpins a new mode of working, one that of collaboration as well as the power and benefit of accessing the wisdom of many, versus the few. Wikipedia is a massive global collaborative effort of knowledge sharing and has become emblematic of the power of collaborative working.

Trend Type: Social, Economic

Maturity: Emerging

As connections between people across the world continue to expand and strengthen, they provide tremendous potential for people to come together around issues that matter, and to work together to express important ideas from combating climate change, to increasing economic equality and social justice. The possibilities surrounding intensive cooperation extend into organizations and across organizations both in the private sector and public sectors, and internationally (e.g. Bcorp, global response to Covid19 pandemic).

Signals: The future is collaborative (Slack, n.d.): As complexity increases and global events shape the way we live and work, we will increasingly seek to work together (slack.com, April 2021).

We're "connected" in an unprecedented way, with the potential of reaching others that has grown exponentially (BBC.com, 2015)

COP 26: Countries are increasingly pushed to come together to deal with climate change (ukcop26.org).

Implications: Collaboration leads to increasing diverse perspectives on problems, allowing new ideas to emerge. Ultimately, increasingly relying on collaboration over command and control as means of working and doing will lead to breaking down silos and competition within organizations rendering them more innovative, and less hierarchical, and between organizations building sustainability. (nbs.net 2017). This in turn increases the opportunities for people inside the organization to contribute, feel engaged and valued, thereby unlocking human talent and potential (MIT Technology Review, 2013)

Counter Trends: An increasingly polarized world puts the ability to collaborate across divides under threat. Politicians, realizing the opportunity to gain favour, double down on societal wedges as a way of setting themselves apart. This tactic is gaining popularity and achieving the desired outcomes, but works against a more cooperative and collaborative culture. Any counter trends to sustainability is underscored with anti-collaboration and anti-cooperation. As we continue to be willing to live in the moment, create companies only to sell them off for a quick financial gain, or make short term decisions that disregard long term effects.

Trend 7

Are You Experiencing?

An evolution of the economy introduced the “experience” as something that can be sold and bought, has a higher order value than a product and service, and because humans live shared experiences in distinctly unique ways, providing an experience to a customer is deeply personal and can be just as meaningful and memorable.

Trend Type: Economic

Maturity: Emerging

The experience economy, a term first coined by B. Joseph Pine II and James H. Gilmore has seen rise since the 90’s. Today’s experiences transcend the physical world into the digital realm. Experience provides a unique value proposition to customers that engages all their senses and leaves a lasting impression as well as a distinct value in the moment. As economies around the world grow, competition increases for products and services, making it harder to translate what makes each organization do something different and uniquely valuable for customers. In a world demanding sustainability, maintaining value over time is increasingly important. Putting a new service or product on the market that does not actually have a meaningful purpose or that does not add value is risky, costly and a burden to our planet. An experience creates value through the participation of people, is in fact a co-created value and delivers outcomes that are unique “each time” the experience is had, and then continues to give back over time by literally changing people (i.e. “ I was changed by this experience”), and imparting lasting memories.

Signals: Continued shift of customers seeking experiences over goods with an increase of 6.3% in 2019 (Biegel, 2020)

The pandemic emphasizes the need to understand customer experience as a UVP. e.g. theme restaurants, retail experiences, innovation labs (edX.org, 2020)

Understanding the value generation that is “experience” is built on a corporate innovative and learning mindset (Epsilon.com, 2020)

Implications: The relationship between creating experience and innovation is very strong, organizations that create experience are the most innovative and have the most evolved mindset that allows them to survive and thrive, others will disappear.

Experience creation as an economic driver moves the needle on more than customer experience, it impacts the organizational DNA and ensures that the concept of positive experience includes employees, partners and all stakeholders. Experience is deeply human and humanizes organizations in a hyper machine-enabled world.

Counter Trends: Rise of the machine. As we rely more and more on machines to do work, including highly sophisticated AI enabled systems, we may move to forgo unique multi-sensory experiences for what machines can deliver in efficiency. Hyper efficiency as a means to address challenges associated with sustainability may negate the value of “experience” as a luxury we cannot afford.

Trend 8

Out in the Open

As our societal challenges are becoming ever more complex and interconnected, solving the issues alone is no longer enough. The open innovation movement offers a way of working and methods for communities and organizations to band together to solve mutual issues affecting business and society.

Trend Type: Social, Technological, Economic, Values

Maturity: Stable in software development, emerging in other sectors

Originated in software development as "Open Source", Open Innovation has become a new way of collaborative working that is decentralized and relies on peer review and community contribution (Chesbrough & Appleyard, 2007). While open source technology solutions have become mainstream through platforms like Github, today its movement has transcended the software industry as organizations and communities are realizing it can be a way to tackle broader systemic change (Red Hat, 2021). The adoption of the open innovation philosophy has many benefits including offering teams the ability to experiment safety and fail fast without being committed to a proprietary tool, dismantling silos, and ultimately leading to better quality solutions and innovations as a result of community collaboration (Alvares, 2019).

Signals: In 2020, Facebook launched a new open-source AI language model called M2M-100 that can translate any pair of 100 languages without relying on English data (Meta, 2021).

Open as a design-philosophy: for example, fashion designers making patterns available to consumers (Chen, 2018)

The MIT OpenCourseWare is a website of virtually all MIT course content that is open and available to the world (MIT, 2021).

Open design furniture: Opendesk is a London-based furniture design company that allows customers to select and download digital furniture designs that can be made with local craftsmen (Ikea, 2018).

Open innovation to address systemic issues: for example, publicly sharing washing machine filter designs that capture microplastics (BV, T., 2020)

Implications: The open philosophy fosters collaboration, transparency, sharing and empowerment. This trend will continue to mature beyond the software development industry into every aspect of our lives. While patent development, Intellectual Property, and R&D won't go away, organizations/ communities will need to be more collaborative when there are mutual needs that can be met, especially surrounding systemic changes.

Trust and transparency will be table stakes. Organizations will seek to make transparent what they stand for and how they are creating value for customers, self, and society. Collaboration will be the new norm as people come together to solve mutual issues affecting business and society.

Open innovation could act as a key lever for driving the adoption of systems thinking, enabling widespread knowledge sharing and building collectively. Participants from different arenas of systems thinking and those with interests in systems thinking could come together to collaborate on different projects, build on top of each other's expertise, and test and improve systems thinking tools for better application and adoption.

Counter Trends: Individualism and competitiveness undermine the move towards open. As many industries continue to mature and undergo market consolidation, many have vested interest to keep innovation and solutions to themselves for their own economic gain.

Dancing Together: Towards A New Future

Our Reframed Problem Statement

Through our attempts to answer our initial research questions, we came to a better understanding of the problematique we needed to explore through our project. The information gathered through literature, and certainly the experiences and insights shared by systems thinking experts we interviewed, led us to a further refinement. Specifically, information related to the realities of current conditions, the needs of systems thinking's current and potential users that influence their adoption and its diffusion. We were able to synthesize this information and use the new knowledge to guide us more deliberately in the conceptual solutioning we conducted. The resulting new problem statement is:

How might we apply key elements of innovation adoption and diffusion theory and practice to the design of a new approach to systems thinking adoption that would create better conditions for adoption, enable it to cross the chasm into early majority, and reach a tipping point.

Our Design Criteria

With our reframed problem statement and the innovation adoption conditions in mind, we developed a set of design criteria to guide the design of our solution so that it will not only be embraced by the potential users (i.e. in line with human-centered design principles) but it will also help create favorable adoption conditions. The list of criteria is shown in table 2 below.

Table 2. Design criteria for our solution.

Design criteria: the solution must...	Human-centered Design Alignment?	Favourable adoption conditions?
Make systems thinking easier to follow using user-centric language that is understandable to people outside of the systems thinking community	✓	✓
Allow systems thinking to be out in the open, allowing others to see what it looks like to adopt the change		✓
Be an ongoing problem and solution finding process	✓	
Help users find solutions and make change such as creating more resilient strategies and steering organizations	✓	✓
Deliver values to users in a reasonable amount of time	✓	✓
Be agnostic of industry, problem space, systems		✓
Creates a sense of joy and satisfaction to encourage continued usage	✓	✓
Delivers emotional and personal resonance	✓	
Fosters collaboration across diverse fields and allows the collaboration to be seen so that the spotlight is not just centered around the innovators in the systems community	✓	✓

In addition to the criteria listed in the table above, we also tested our concept through the lens of desirability, viability, and feasibility—a common framework used to evaluate a solution's chances at long-term success that's based on the Vitruvian Triad (Orton, 2017; Chisholm, 1911). The definition of desirability, viability and feasibility are shown below:

- Desirability: Do people want it? How badly do they want it? What's the unique value proposition? Does it make sense for them?
- Feasibility: Can we do it? Is it functionally possible in the foreseeable future?
- Viability: Should we do it? Can we build a sustainable business? What has to be true for this business to work? What are the costs? How will we pay for it?

Our process for evaluation involved first evaluating a list of our initial concepts using the design criteria in table 2 above. This first evaluation informed the desirability of these initial concepts. We then selected the most desirable concept to develop further into a prototype solution. This solution was further tested by feasibility and viability using methods such as the Flourishing Business Model Canvas.

Our Solution Finding Journey

Initial Concepts

As we looked at the criteria and the user journeys, we began to generate ideas that would address the conceptual model of the problem, and could potentially meet our list of criteria. Narrowing in on VSM, as emblematic of systems thinking methods and tools and clearly lagging in adoption, we pursued three concepts and evaluated them. Our first three concepts focusing on VSM adoption include a business strategy, a new metaphor and corresponding toolkit/guide, and using the VSM as a container for other systems thinking methods and tools. Below are brief descriptions of each concept and a cursory overview of their pros and cons.

a. Business strategy for VSM including branding and marketing, market analysis and tools. We saw a strategy as providing VSM with a better market position and appeal, something that was highlighted by experts as being a barrier to adoption.

b. New metaphor / language for VSM, including a new set of highly usable/user-friendly tools and guidance for the application of VSM for practitioners. The challenge of the current language of VSM and how it is communicated has been documented in literature and validated by the experts we interviewed. A new language and approach to

the model in terms of a more relatable metaphor that is engaging and meaningful to users, could go a long way towards increasing adoption, certainly with the early adopter group. VSM innovators must be willing to let go.

c. VSM as a container or framework for systems thinking and design thinking tools, allowing it to serve as a much-needed integrator thereby removing some of the competitiveness barriers. VSM is a powerful enough organizational model without boundaries in terms of its application, that it could be used as a framework for systems thinking methods and tools. For example, the value proposition map is also a tool for managing variety. The mapping into the VSM of systems thinking tools would still require the establishment of a new metaphor for VSM and would need to be positioned not as a VSM 'takeover' but rather as an opportunity to come together. This concept may meet with some resistance from the community.

After an initial concept generation session focused on enhancing VSM adoption, we broadened out the boundaries of the solution, and pushed our creativity. We re-examined the conditions for adoption, and re-considered the key characteristics of positive user experiences. In doing so, we came up with another concept (D below), which proved to be the more robust of the four.

d. An open ecosystem for the broad practice of systems thinking so that new potential adopters can freely explore its ideas, approaches, methods and tools with the guidance and support of its more knowledgeable advocates and experienced users.

Evaluating Initial Concepts

We assessed each of the four concepts against our design criteria to see how well they satisfy each criteria (as shown in table 3). The nine criteria together constitute the dimension of desirability of the solution. Other dimensions of viability and feasibility are assessed at a later stage based on the winning concept from this initial round of evaluation.

Table 3. Initial concepts evaluated against design criteria.

		Concepts			
	Design criteria: the solution must...	**A**	**B**	**C**	**D**
1	Make systems thinking easier to follow using user-centric language that is understandable to people outside of the systems thinking community	H	H	L	H
2	Allow systems thinking to be out in the open, allowing others to see what it looks like to adopt the change	M	L	M	H
3	Be or include an ongoing problem and solution finding process	L	M	M	H
4	Help users find solutions and make change such as creating more resilient strategies and steering organizations	L	M	M	H
5	Deliver values to users in a reasonable amount of time	H	H	M	H
6	Be agnostic of industry, problem space, systems	H	H	H	H
7	Creates a sense of joy and satisfaction to encourage continued usage	L	M	L	H
8	Delivers emotional and personal resonance	L	M	L	H
9	Fosters collaboration across diverse fields and allows the collaboration to be seen so that the spotlight is not just centered around the innovators in the systems community	L	L	M	H

Legend: H=Satisfies; M=Partial satisfies; L=Does not satisfy

Our fourth concept, the open ecosystem satisfies all our design criteria while the other three concepts only satisfied some, therefore we decided to explore the ecosystem concept further. Given its inherent flexibility, we chose to combine and reconfigure some of the initial ideas together into the open ecosystem concept. We also chose to carry Sivers' poignant story of a lone dancer inspiring a dance party into our solution (Sivers, 2010).

Introducing holos

What Is holos?

Taken from the Greek word meaning whole, i.e. having all its proper parts or components (Miriam-Webster, n.d.), holos is a festival with art installations, talks, workshops, experiences, parties, and more, all centered around systems thinking.

holos is an ecosystem built around existing systems thinking communities. holos extends out from those communities, has more variety, is joyful, inclusive, and accessible, thereby increasing the likelihood of adoption with a much larger group and providing the opportunity to bring down competitiveness barriers.

The holos Festival and its content are designed to be accessible to the widest group of people by providing a variety of content mediums, messaging, and knowledge levels.

holos is built with a keen understanding of the objective of bringing more people into systems thinking methods, tools and approaches, i.e. to have more people engage with systems thinking in a way that satisfies their unique needs both in terms of being potential users and benefactors of systems thinking and also in terms of their individual approaches to change and their preferences when it comes to change adoption.

holos' purpose is to make the world a better place for all (animals and people and plants) by accelerating the adoption of systems theories, tools, and practice by all people, specifically by building systems learning and practice experiences that draw all people to iteratively network, learn, and collaborate.

How Does holos Work?

Festival Experience: The Future Is Everyone Dancing

The biennial Festival will take place over 14 days in a different host city each time. To keep the Festival accessible, most events will be free, however some events will require registration or ticket fees.

The Festival has a theme and subthemes for each year, starting with *Emerge*. Sub themes are meant to draw a variety of people and include topic areas like complexity, variety, energy, economy, social justice, environment, work, play, and more.

holos breaks down barriers and establishes neutral space, enabling various systems

thinking communities to come together on a common ground that is inclusive of their many ideas and perspectives.

holos welcomes complexity, design, and general systems thinking under one umbrella.

Requisite Variety

In order to increase adoption for systems thinking, we need to engage with a high variety of people, mediums, and knowledge levels that are equal or greater than the complexity of systems thinking.

Program variety informs how the festival is communicating its content, what it is saying and who is doing the talking. Specifically holos programming will consider the range of knowledge levels of people. It will also make use of a wide range and forms of communications, art and media. Programming will touch on subjects across many fields of knowledge and areas of interest. Finally, programs will include a diversity of voices and perspectives.

Knowledge accessibility is a cornerstone of holos. Using a framework of concentric rings, the festival will have programs that meet the needs of different education levels, learning types, and medium-needs (Figure 13). The centre ring has the least accessible, highest-education knowledge. It also has the deepest knowledge available in most mediums. The middle ring has a mix between deep and accessible knowledge for secondary education in all mediums. The outer ring has the most accessible knowledge for primary levels in most mediums.

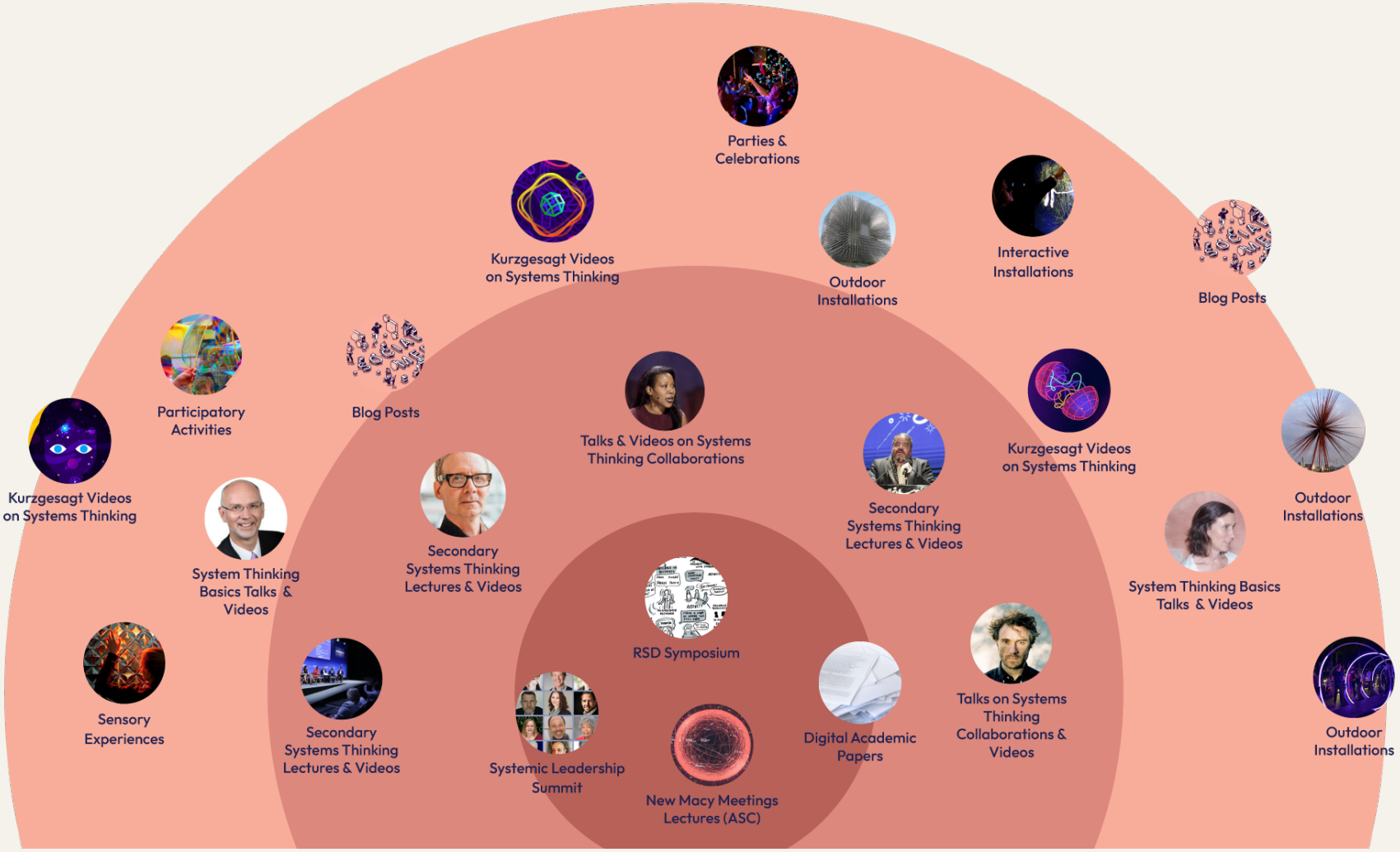


Figure 13. holos programs organized by knowledge accessibility rings.

Project team variety ensures that holos festival projects bring multi-disciplinary teams of people with diverse experience together to learn systems theories, apply methods and models, analyze issues, share perspectives, and solve problems.

Table 4. holos project team variety.

 Systems Experts	 Artists, Designers & Makers	 Students, Learners & Teachers	 Storytellers & Writers	 Change Seekers & Makers
as teachers, facilitators and guides	as knowledge translators and interpreters	with a broad range of skills and perspectives, eager to apply their new knowledge	with communications skills and experience, using language to increase understanding and invite more people in	within organizations, communities and interest groups

As an illustration of this approach, we outlined an example of project team variety (Figure 14). In our example, a multidisciplinary team would collaborate on a holos project that seeks to understand racism and caste through the lens of the Viable Systems Model (VSM). The team would include: a VSM expert theorist and practitioner; an accomplished theorist and writer on caste and racism; an experimental installation architect; and a student illustrator. The project outputs would include a main stage talk about VSM and caste; a blog post series; a VSM + Caste Kurzgesagt Video (i.e in-a-nutshell); an RSD Symposium Lecture; and an installation. Each output addresses different knowledge levels and offers diverse experiences through the use of a range of media. An example customer journey for each member of the team is shown in appendix C.

Figure 14. Example of the application of project team variety: An academic, a writer, an architect, and a student, walk into a bar.

holos Social Platform

The holos festival will have an initial technology component, namely an app to house festival scheduling information, to support programming and host virtual engagements during the festival. Additionally, by year nine, holos will launch *holos web* that will enable it to extend its engagement with its growing community online beyond the 14 days of the festival.

holos web will include project team space and the ability to propose and develop projects, recruit team members and collaborate online. It will also act as a learning hub for systems thinking, and include learning modules in a variety of formats and mediums for a range of knowledge levels, as well as systems thinking tool library and reusable templates. holos web will also be a resource for project case studies, including comprehensive documentation and project artifacts (including behind the scenes videos and team member testimonials), as well as academic and application research. Over time, the platform's built-in AI will assist users in applying systems thinking in a variety of contexts and problems.

holos web's purpose is to further increase systems thinking adoption, pushing it past the early majority and help it reach the tipping point. The platform will extend the winning conditions into the online sphere. holos web will be open and accessible, allowing people of all knowledge levels to engage with meaningful content in many forms, and will offer unique and exclusive online events, including virtual parties and VR installations.

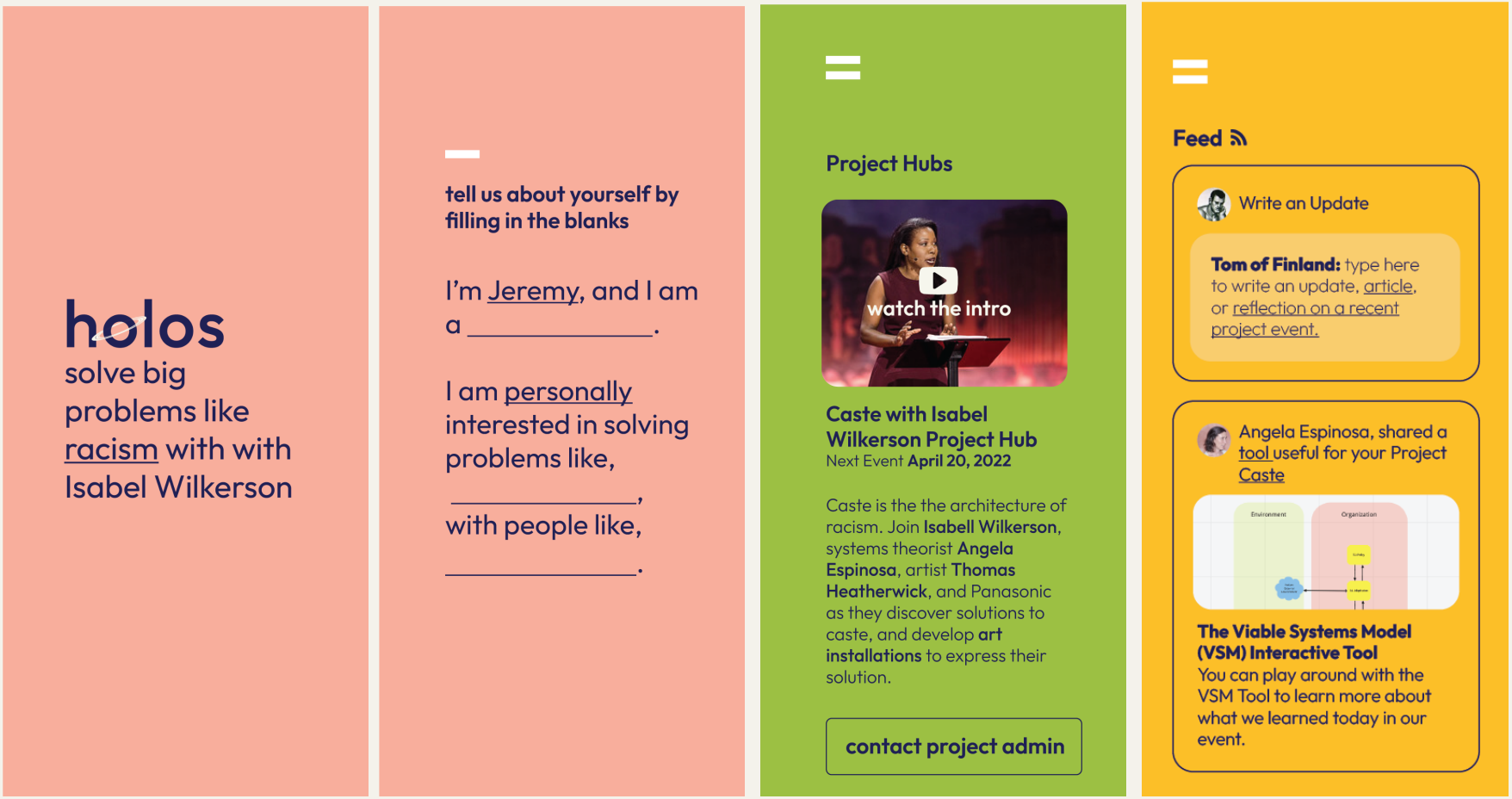


Figure 15. Conceptual illustrations of holos web.

How Does holos Support Adoption of Systems Thinking?

Satisfying the Needs of Each Dancer

Through the process of identifying users and exploring their needs, and subsequently developing value proposition maps (see appendix B), we were able to determine what would make for unique experiences that would satisfy them, while creating the winning conditions for adoption.

Lone Dancer (Innovator)

- Experiment with new ideas
- Build and apply their knowledge
- Test their theories
- Add value to their domain of expertise
- Ensure proper dissemination of their work

First Follower (Early Adopter)

- Contribute to the organization and solve problems
- Show leadership and value
- Apply their knowledge
- Understand and be understood
- Feel a sense of purpose and meaning through their work

Second Follower (Early Majority)

- Avoid failure
- Belong / fit in
- Contribute to the organization
- Demonstrate their value
- Build & apply their knowledge
- Maintain their status
- Feel a sense of purpose and meaning through their work

Creating the Winning Conditions

1. Enabling Open Exploration

Getting out of the innovation lab and putting the practice of systems thinking out in the open for everyone to see what it's about, and how and why it works. Holos is built on principles of openness, inclusion and accessibility. These principles serve systemic design purposes, and are aligned to effective problem solving in a VUCA context, however, they also support the conditions required of early and late majority adopters for seeing and understanding systems thinking in practice and thus lowering barriers for their adoption. As the risks of failure decrease, relatability and the desire to be a part of something meaningful increases.

2. Creating Experiences at All Knowledge Levels

There are early adopters at all knowledge levels that are looking for opportunities to learn new thinking and analysis skills, and there are others, also at all knowledge levels

that simply need to be exposed to systems thinking in a way that is interesting and meaningful, but also fun and joyful. They also need to see the early adopters in action, as they are more able than innovators to translate complex systems thinking processes and theories into practical steps for looking more closely and purposefully at the world around them.

3. Leveraging Growing Trends

Although a number of trends impact systems thinking adoption, as shown in section 6, we've identified a few key emerging trends that we feel work for the holos concept such as the growing experience economy, the increasingly palpable complexity of the world in which we live and the desire to better understand it, and the increasing need to work together. Should these trends continue on their trajectory, they will enhance the viability of the holos concept. holos is first and foremost about experiencing systems thinking beyond a cognitive pursuit, it includes elements of joy, belonging and purpose. holos is built to foster collaboration and co-creation, with a goal of supporting people in facing complexity and the negative impacts of a changing world. As people's consciousness of the interrelated world grows, they may feel limited individually to understand and to make a difference, holos gives them a means to connect with others and to expand their sensemaking capabilities and thinking skills in a tangible and purposeful way with real outcomes.

The Feasibility and Viability of holos

holos Business Model

In order to determine the viability and feasibility of holos, we constructed the business model for holos using the Flourishing Business Canvas (Upward, 2013). The Flourishing Business Canvas was prefered over the Business Model Canvas (Osterwalder & Pigneur, 2010) because of its inclusion of not only the financial considerations, but also the social and environmental considerations. This aligns closely with holos' mission, which is to accelerate the adoption of systems thinking by helping more people from diverse fields and with different experiences to understand and apply systems thinking. Ultimately, we hope to help people solve problems in a sustainable way, contributing to making the world a better place. holos offers various societal benefits such as breaking down barriers to collaboration, helping people find inspiration and new ways of thinking/working that would contribute to solving complex, systemic and wicked problems. holos is intentionally a for-profit business that aims to generate tri-profit: social benefits, environmental regeneration and financial returns. We believe that the for-profit business model will enable holos to gain access to a wide range of investment and funding sources in the startup stage while the competition in the marketplace will force it to be viable. The details of the holos' business model is shown in figure 16

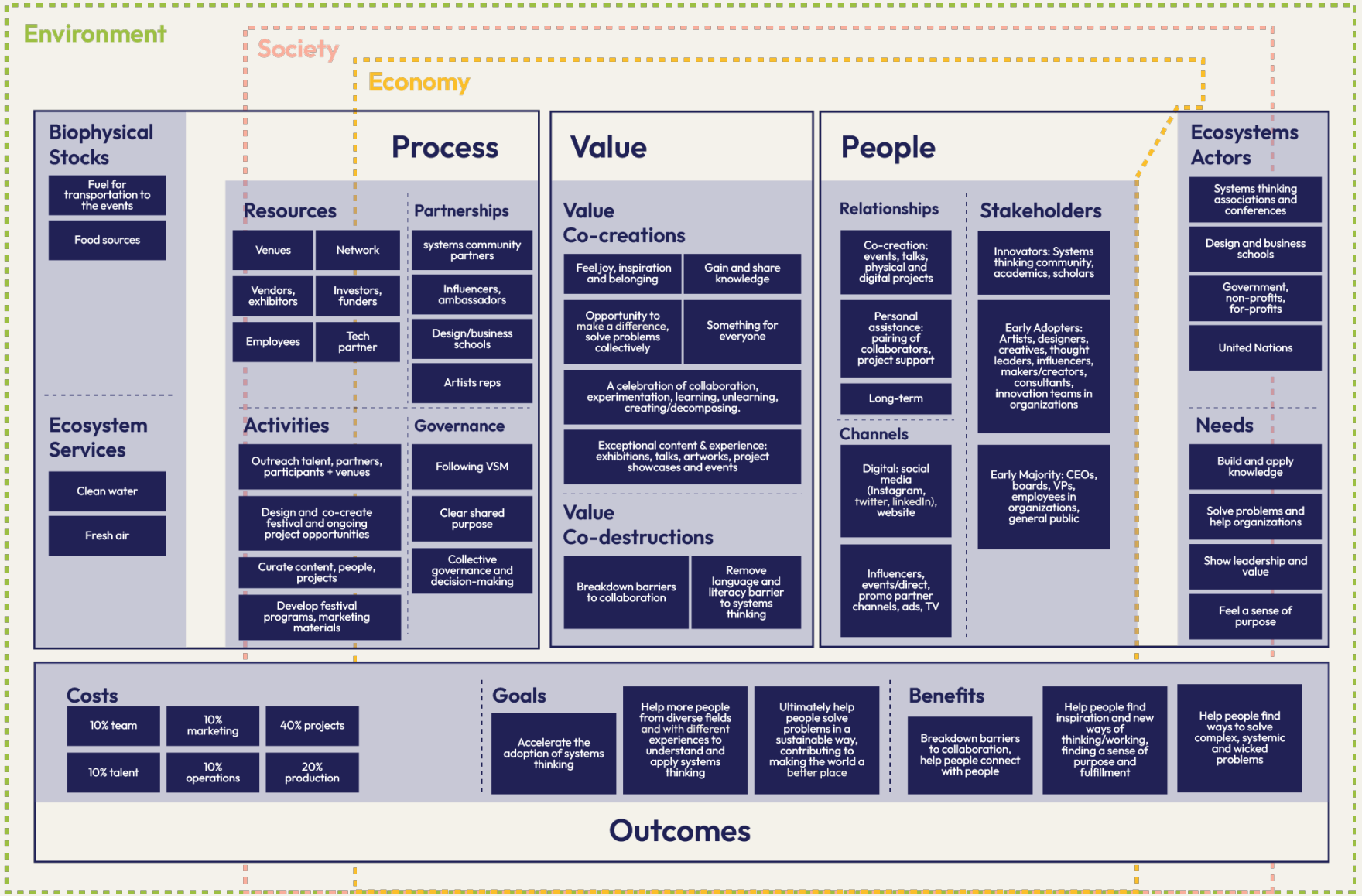


Figure 16. Flourishing Business Canvas for holos.

holos: a Viable System

We used the VSM to design an organization for holos that is highly collaborative, values and principles-based and non-hierarchical to meet the needs of holos as it grows (see appendix D). The VSM supports holos in establishing a functions-based structure where strategic decision-making is shared and where appropriate balance between its systems-functions can be achieved, with the objective of sustaining holos, enabling it to deliver on its purpose, and scale when the time comes. Creating the holos organization using a systems framework will also allow it to serve as a model of systems thinking itself, to learn and grow its own systems practice, and ultimately to benefit from this way of thinking and problem solving in its goal of making the world a better place for all through increasing the diffusion of systems thinking across a broad, diverse, and growing community of practitioners.

Feedback and Next Steps

Expert Feedback

We tested the merits of our concept with a shortlist of two systems thinking experts from those we interviewed in phase 1 of our project. The testing took the form of a "pitch" presentation of the concept, included a brief context setting to share the problem as we were able to discern from the research, and the design path we followed to our proposed solution. We asked our expert reviewers to share their thoughts on the following questions: first, do they feel we understood the problem; second, do they feel the design criteria were adequate for evaluation; and finally, do they think our idea contributes to solving the problem.

Both experts found that we articulated the problem well, and felt that it reflected their experience of systems thinking adoption and diffusion. Our first iteration of the concept focused on the highly sophisticated, feature-rich holos web as the initial manifestation of holos, which would then give rise to the festival. The approach was seen by our expert reviewer as very ambitious, perhaps too big an idea to launch holos with. Any online community, no matter its niche, is forced to compete with the big players in the space. To attempt to draw people to join in sufficient numbers to generate the content needed, ahead of being in a position to show its value, could be near impossible. The herculean effort would detract from holos' primary goal as it would have to tackle the adoption of the social platform first.

With this feedback in mind we developed a second iteration of our concept and made the festival the cornerstone of holos, and only after nine years of successful festivals would holos web be launched as an application of the festival's ethos to the digital realm. This revised approach met with a very positive response. Our solution was deemed highly desirable and doable. It was felt however that the solution needed to articulate more deliberately how it addresses the barrier to adoption that the

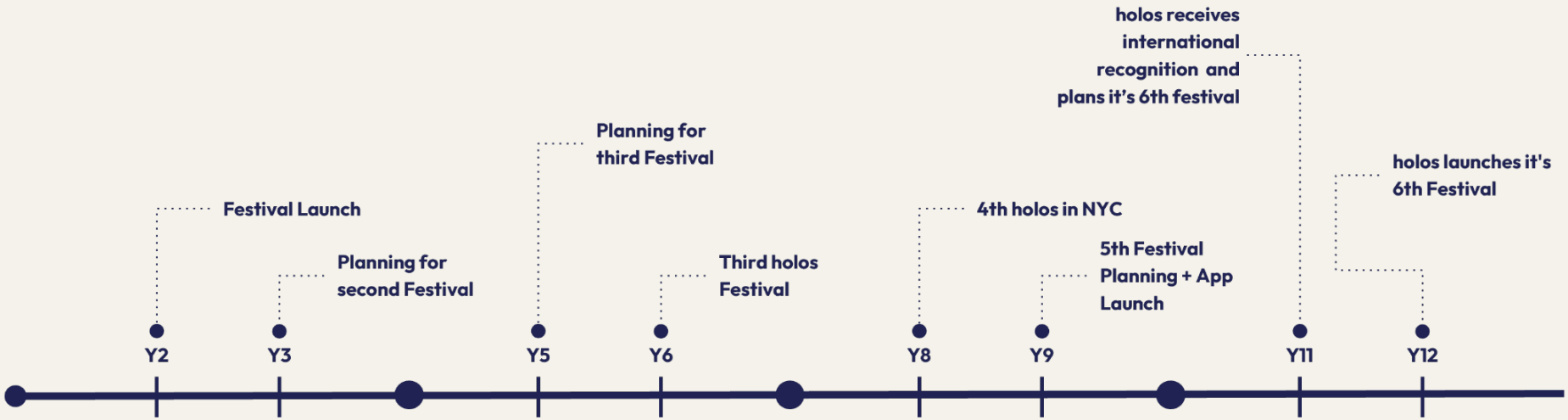
competitiveness of systems thinking communities represents. In our final iteration for this project, we endeavoured to emphasize this element more explicitly.

Finally, both pitch feedback sessions yielded comments regarding staged implementation, more precisely that of starting small and building momentum. This strategy aligns with most adoption theories and we would do well to apply innovation adoption and diffusion best practices to our solution's implementation. Therefore in the iteration presented here, we have added an inaugural phase whereby a smaller scale version of the holos festival, including only three projects, sponsored by UNDC lab or other such organization, and offered as a parallel event to another larger event, is proposed as a feasible starting point, in order to demonstrate the key principles and value-creating potential of holos, as well as to build partnerships, to learn and grow from.

Key Considerations for Future Iterations, Next Steps & Strategic Timeline

Looking beyond the present limited scope of this research project, we sought to identify where the concept could be taken and any considerations that should be noted in future iterations.

We outlined a simple strategic timeline for holos that proposes a twelve year horizon (see figure 17). holos will start small with a limited scope inaugural festival acting as a sort of 'proof of concept'. By year 4, holos will expand tenfold. In year 9, leveraging the growing momentum of the festival, holos will launch holos web, enabling holos to increase its impact and reach more people, thereby further accelerating systems thinking adoption and diffusion.



Year 1

The first year is funding by the UN Development Committee who is seeking to drive development via the lens of Systems Thinking. holos plans it's first Festival with 3 big multidisciplinary projects similar to the previous example hosted in Toronto, Canada.

Year 4

With renewed funding and partnership with the UN, host country, and partner country partners, holos hosts it's second Festival with over 30 projects in Milan Italy, held concurrently with Salone del Mobile.

Year 7

After the 3rd holos Festival in Beijing, holos begins planning it's 4th festival, to be held in New York City. It also starts planning on the launch of it's systems social media and design platform holos.web.

Year 10

After a successful launch of their social media and design platform holos.web, holos holds their 5th Festival and presents their first 4 projects that were created through the app. Each were co-created with over 400 crowdsourced participants from across the globe, and disciplines.

Figure 17. Proposed strategic timeline for holos.

In addition to the 10-year strategic plan outlined above, we also propose the following immediate short-term tactics to ensure we achieve our year 1 goals. The tactics are listed below.

Year 1 (Q1 to Q2) Tactics

a. Conduct an external landscape assessment: As we developed the holos concept, a number of similar initiatives came to light, either as a result of our own scanning and experiences, or stemming from the engagements with experts and our advisor. As a next step, it will be important to conduct a market analysis, i.e. a thorough exploration of what is already happening or emerging in the solution space, possibly with the same objective of increasing engagement with, and adoption / application of, systems thinking. Given what we learned about the threat that competitiveness within the systems thinking community poses to increasing adoption, it will be important to build holos alongside other like-minded initiatives if not to seek to partner with them.

b. Conduct feasibility testing: While we have gone through a couple rounds of iterations and feedback with a small number of systems experts and have received positive feedback on our solution, more work needs to be done to test the feasibility in the public. For example, market research using methods such as focus groups should be conducted for each target customer and stakeholder group. Socialization of holos with existing systems thinking communities such as Metaphorum and the Systemic Design Association would also further assess the feasibility and desirability. Financial feasibility assessment should also be conducted to determine the details of the business and financial model that would sustain the organization.

c. Initiate funding process: As the funding process can take a long time, we will also be starting to secure funding as early as possible by first scanning and evaluating for funding sources that fit our scope of work and our values. This work will continue into Q3 to Q4 until we secure enough funding for year 1.

Year 1 (Q3 to Q4) Tactics

a. Community engagement and partnership building: Any further steps to mature the concept should be mindful of the tendency toward reductionism, certainly when involving new people and partners from outside the known systems thinking community. There will be a need to create space for new partners and collaborators, supporters and funders to learn and be brought into the knowledge and understanding required to enable holos to stay true to its purpose and deliver the desired outcomes.

b. Secure funding for year 1: As a continuation of the efforts to secure funding from the beginning of the year, Q2 to Q3 will be heavily focused on various fundraising activities such as applying for grants, gaining partnership/sponsorship agreements. Our focus will be aimed at applying for grants and sponsorships from large international organizations such as the United Nations Development Programme innovation labs. We will connect and engage with our OCAD University SFI network help build our brand and find connections that will help us secure funding.

Conclusion

This Major Research Project explored the question of how we might accelerate the adoption of systems thinking in organizations and communities today. By taking a human-centered design approach, we started with problem finding to understand the current level of systems thinking awareness, literacy, and adoption via expert interviews and literature research data. Using innovation diffusion and adoption theories to frame the insights, we found that systems thinking is stuck in a chasm in its adoption process. Without enough key adopters, systems thinking cannot increase its diffusion across organizations. Systems thinking needs to move past its current steady state of 'dancing on its own' where it is being used by its own innovators and a few early adopters. The systems thinking communities need to come together and collaborate with much wider groups of audience in order for it to be wholly adopted, or it may not achieve its purpose of helping us to solve the world's biggest problems.

In our solution finding process, we explored existing and potential systems thinking users' needs, pains, and gains, as well as the internal and external winning conditions for adoption, in order to design a solution that has the potential to bring systems thinking across the chasm and reach a tipping point of wide adoption. Through this process, we designed holos, which is an open ecosystem built around the existing systems thinking communities that has more variety, is joyful, inclusive, and accessible—increasing the likelihood of adoption with a much larger group of communities.

In a world of increasing complexity, uncertainty, and with many unsolved wicked problems, we believe that systems thinking is the change in our ways of thinking and problem solving that's required for us to tackle some of the biggest challenges we face. The proper adoption and application of systems thinking hold great value in our collective efforts to make the world a better place. Through this Major Research Project, we hope that both the process we have undertaken to explore this topic and our solution, holos, will shed light on how we might accelerate the adoption of systems thinking to a future state where we are all 'dancing together'.

As far as where we go from here, the team shares enthusiasm for our solution and interest in seeing it evolve. Buoyed by the initial reaction and feedback from the few experts we shared our concept with, we can see ourselves putting some additional effort into it in the coming months. One expert invited us to present our solution at an upcoming systems forum in 2022. Should we accept the invitation, our goal would be to socialize the concept and perhaps from there, to build an exploratory advisory board to study the next steps in terms of

broader engagement (using a framework), partnership and feasibility. Some additional concluding thoughts from each team member are below:

Suesan Danesh: "Our research yielded something very compelling, and I think, very much based in reality. Our research and design process was thorough. We worked through the data, the literature, and certainly the experiences and insights of our experts using systemic design, business design and foresight tools. The supporting theories guided us. I would like to be a part of something that brings systems thinking, and particularly the VSM to more people, specifically my colleagues in the federal public service. I think the concept underlying holos could work for the federal public service as a sort of "un-conference" or "camp". A more accessible and open format is critical because the hierarchical and heavily bureaucratic context means that only a few people are offered opportunities to engage in new thinking for innovation and program/service/policy strategic direction. I look forward to giving holos some more thought, to sharing it with others and perhaps to see a kernel of it appear in the federal public service in the near future. I am proud of this project, and of my talented and passionate team mates. Our collaboration enabled me to put what I learned at SFI into practice as well as bring my 20+ years experience helping organizations change to the table."

Qian Feng: "This research project is the culmination of everything we learned from the SFI program, from systemic design to business strategy and foresight. I personally feel proud to have gone through this rigorous, creative and iterative journey, and have arrived at a solution that's very different from what we envisioned at the beginning. This experience has also proven to me yet again that 'the whole is greater than the sum of its parts'. The alchemy of insights, experience, and creativity from each of our team members were absolutely necessary to make this project a reality. We need more collaboration if we want to get more people excited about systems thinking. I hope that holos and its underlying concepts can provide a small source of inspiration to how we might come together in a more open and accessible way to help increase the adoption of systems thinking. I will continue to share holos with others and advocate for the importance of systems thinking in my professional world of organizational learning."

Jeremy Vandermeij: "It was exciting to bring together tools and theories from throughout the course work and use them to find answers and attempt to solve a problem. I rarely have the opportunity to do this in work, which is rare in a master's degree program. The subject matter, process, and academic support I received was enriching, and like in the course work, the opportunity to work on this MRP in a team brought the type of learning synergies that are only working with one's peers, and equals can do. All the learning was amplified by the presence of my two intelligent and critical co-learners, whose personal wisdom contributed to my learning but also to the project's academic significance."

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Appendix A: Expert Interview Questions

September 20, 2021

Opening Questions

- Please tell us about how you have incorporated and used systems thinking and systemic design in your practice.
- What's your current area of focus and in what field/industry/sector? And how long have you been a consultant/leader in this area?

Part 1: Customer context and needs

1. What skills or practices are you known for (why do people hire/engage you)?
2. What are your clients' biggest challenges right now that call you to the table?

Part 2: Understanding Systems Thinking Awareness, Literacy, and Application

- How would you describe the common level of understanding and usage of systems thinking in organizations right now?
- Where is the value and ultimate benefits (if any) in the adoption of systems thinking in today's decision making?
- Do organizations know how to use this knowledge? Why do they continue to struggle with these practices if they are valuable, in your opinion?
- What are the most significant barriers to adoption?
- What trends are enabling/ systems thinking right now? And where is it going in 5 years? What trends are working against it?
- If you had a magic wand and you could create your ideal conditions/environment in which you practice and apply systems thinking, what would it look like?

Part 3: Systems Theories and Methodologies

- Which systems thinking tools or resources do you find the most effective and/or use the most (when working with your client)?
- Are you familiar with Stafford Beer's Viable Systems Model? If so, what's your experience with it?
    - What are some pain points or barriers to adoption?
    - What have you done in the past that's successful?
- Do you have any stories or examples of a situation when you have introduced systems thinking in an organization successfully?What was the impact and what were the lessons learned?

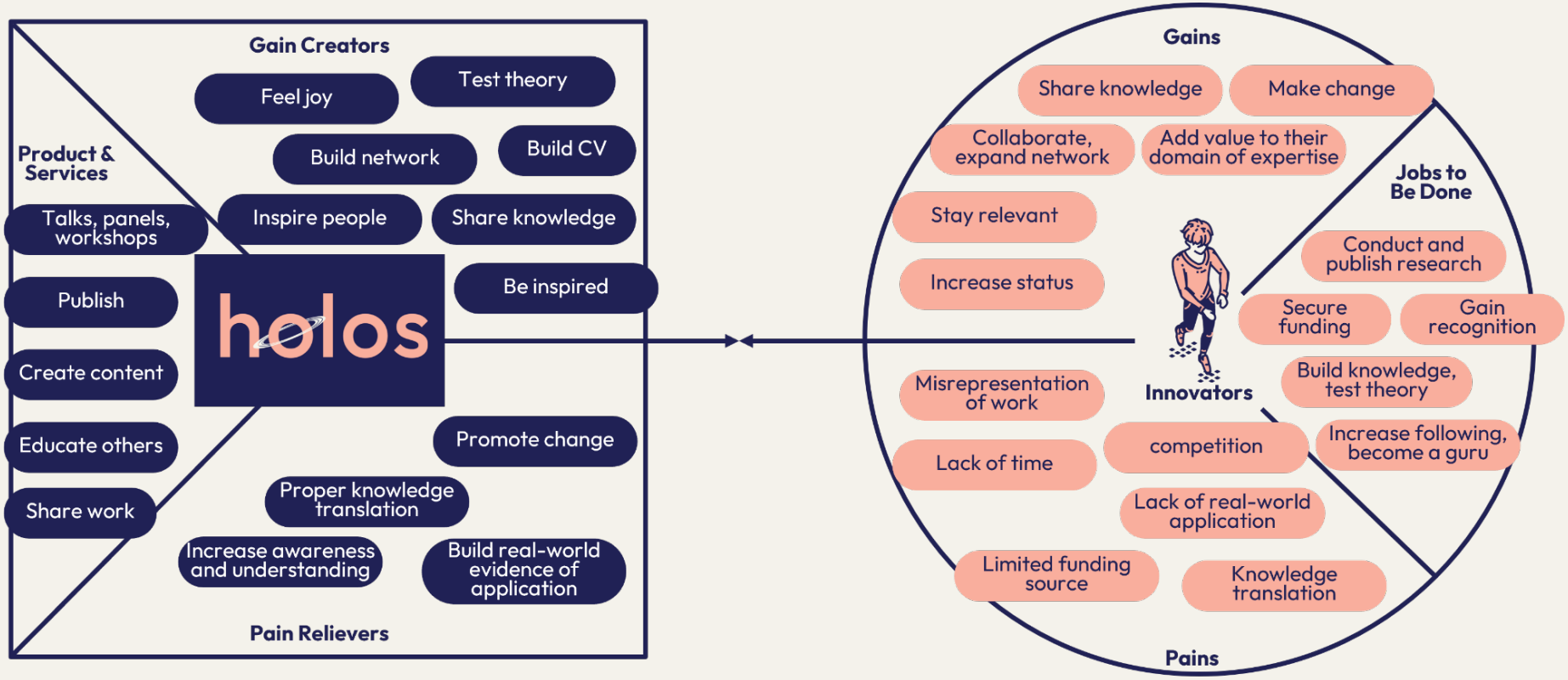
Concluding Questions

- Do you have any questions for us?
- Are you willing to engage with us again as our project evolves, specifically in testing our prototype?

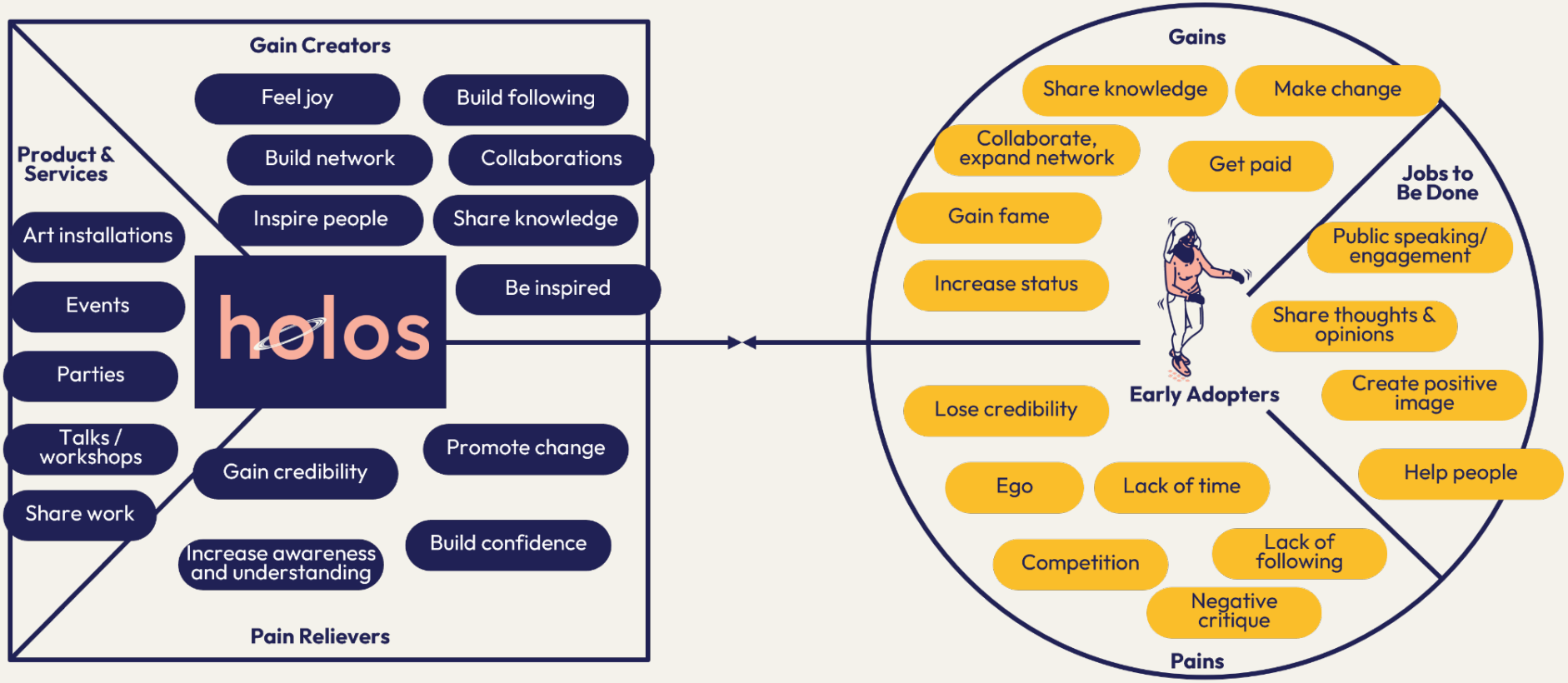
Appendix B: holos Value Proposition Maps

December 20, 2021

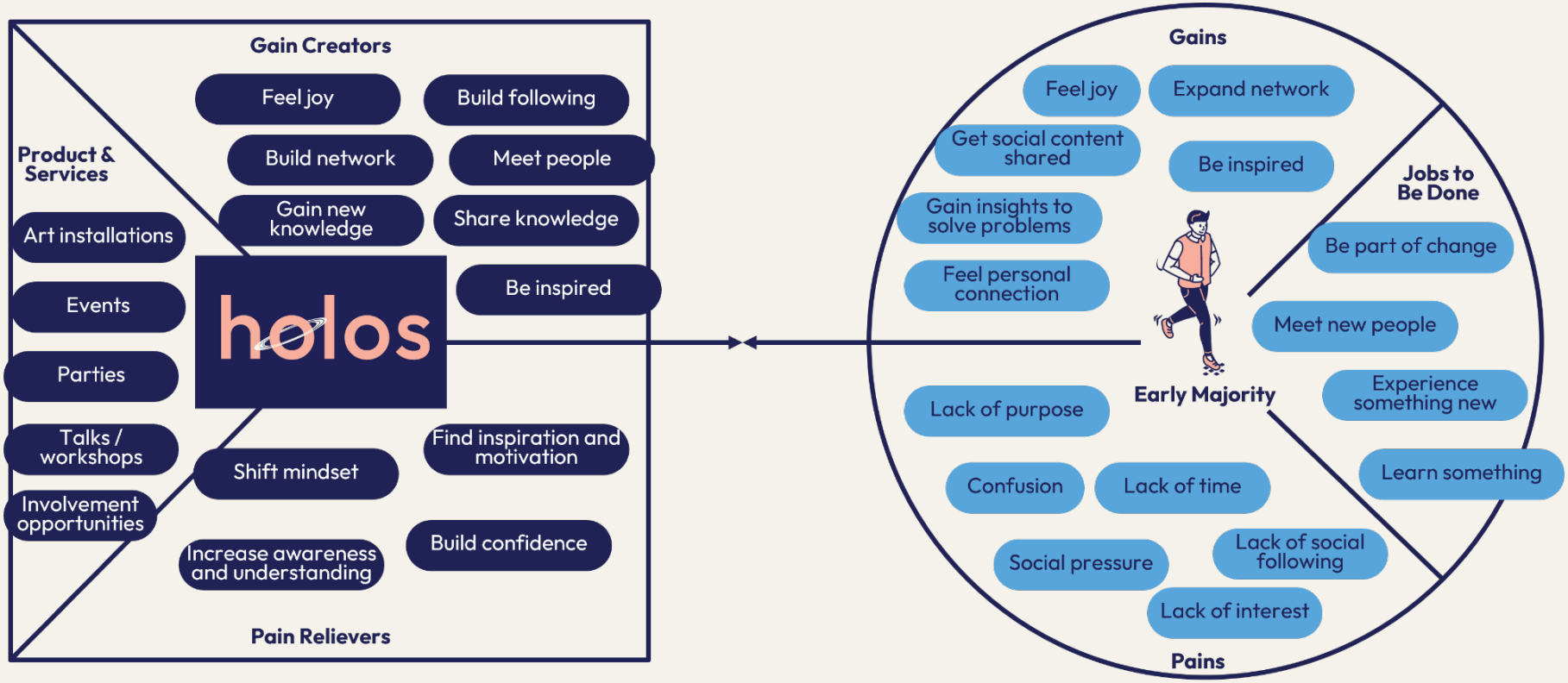
Value Proposition Map for Innovators



Value Proposition Map for Early Adopters



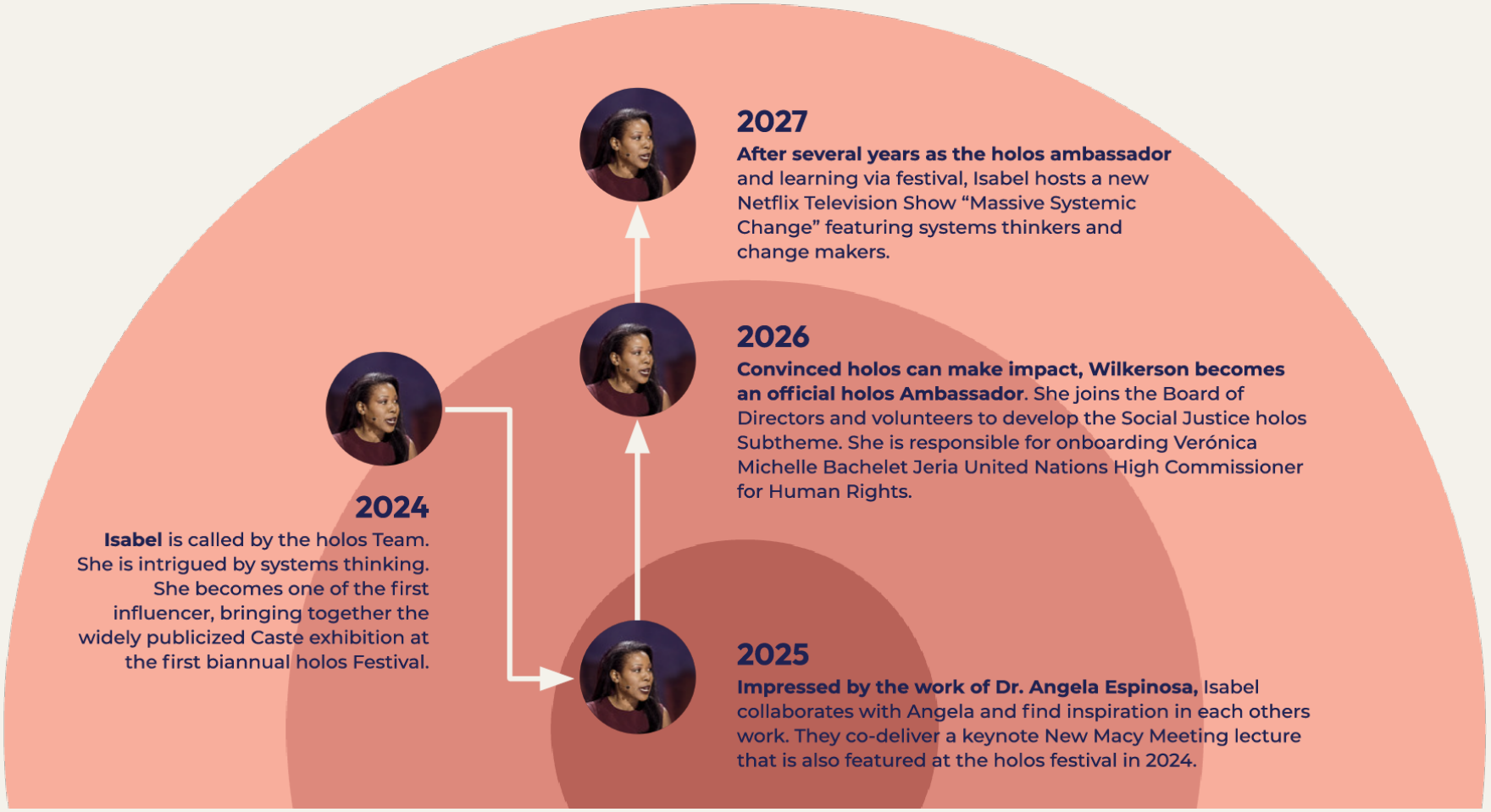
Value Proposition Map for Early Majority



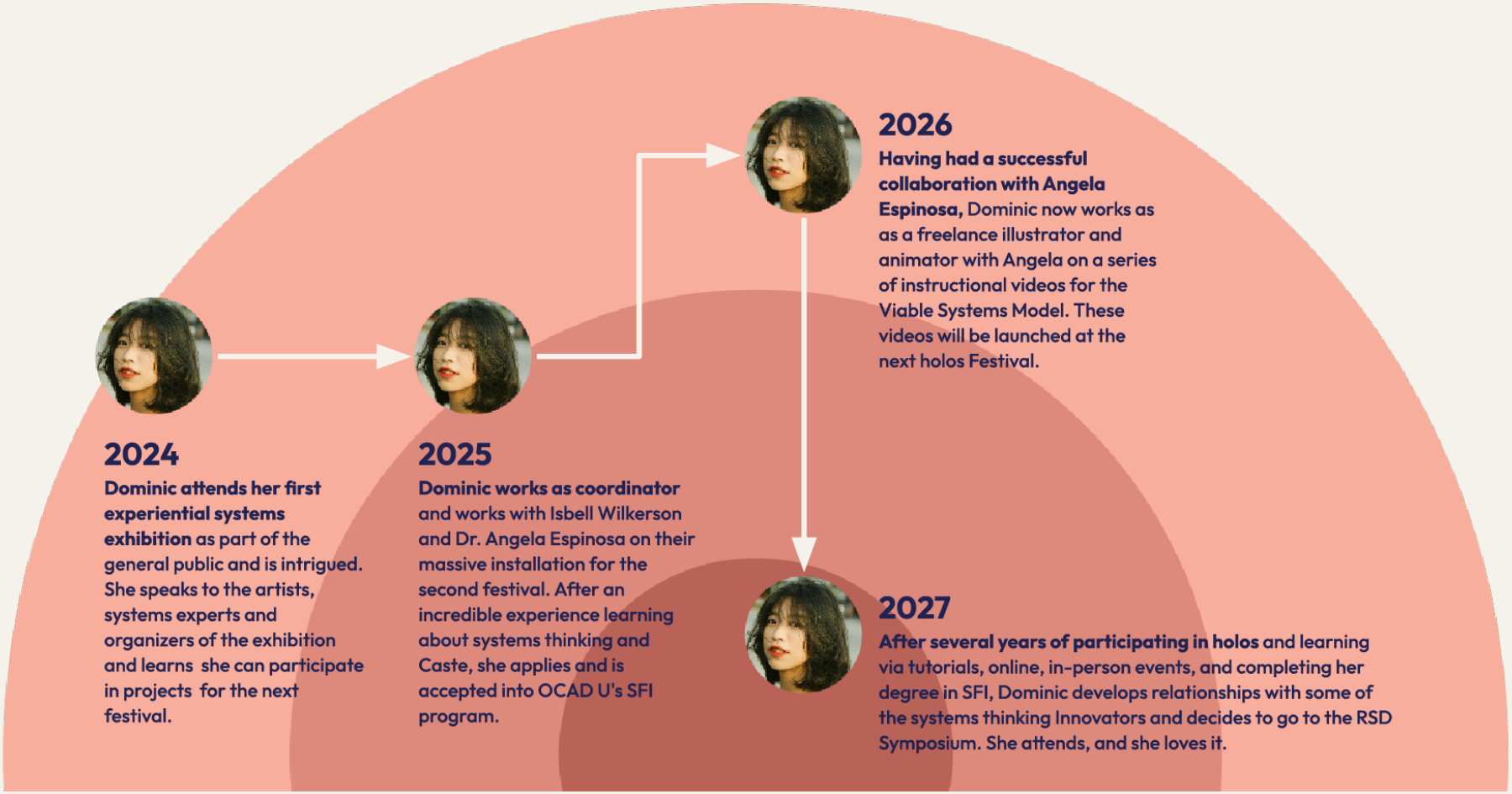
Appendix C: holos Customer Journeys

December 20, 2021

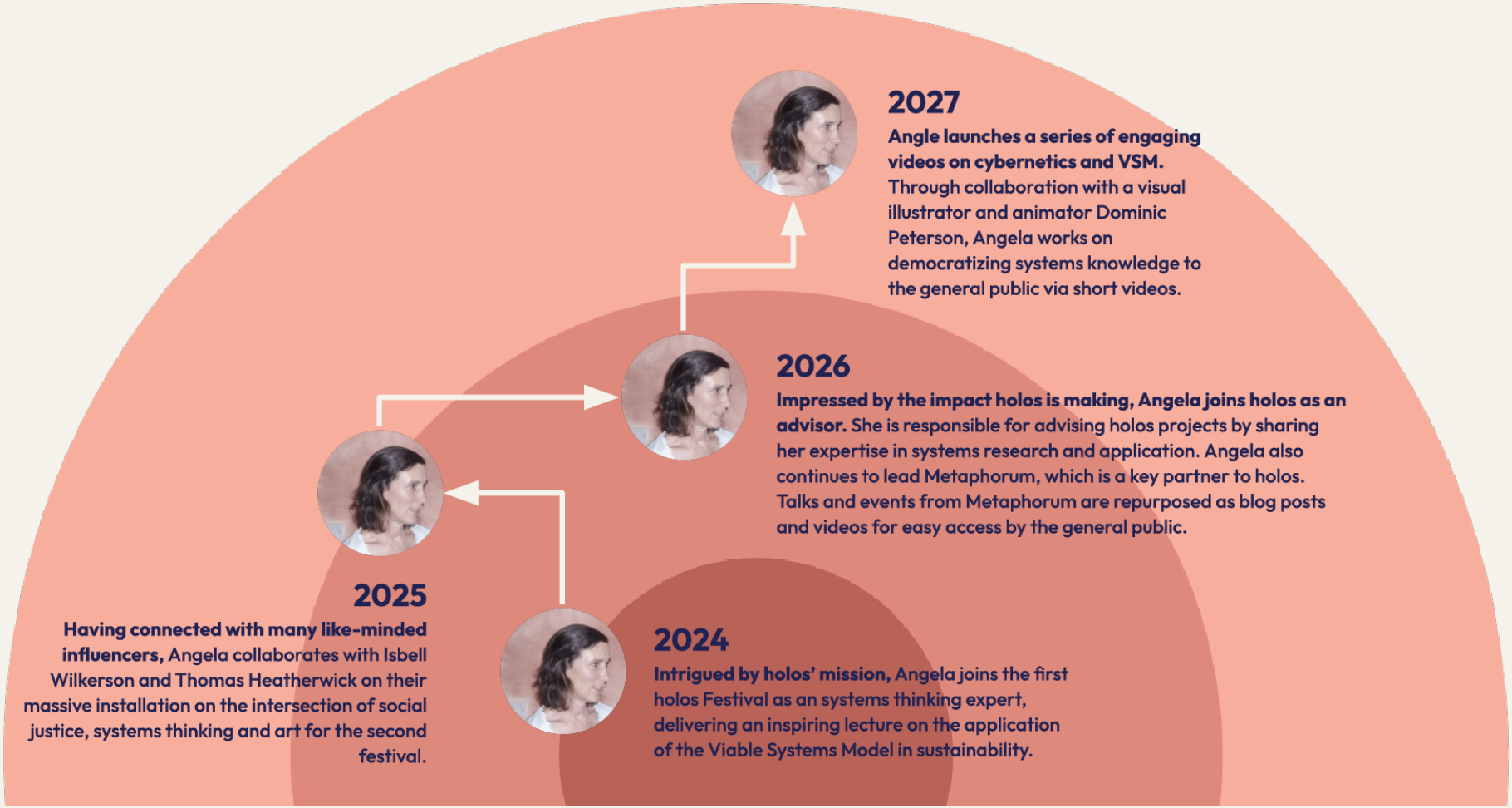
Early Adopter User Journey: Isabel Wilkerson, Influential Author



Early Majority User Journey: Dominic Peterson, Early Career Illustrator



Innovator User Journey: Dr. Angela Espinosa, Cybernetics and VSM Expert



2027

Angle launches a series of engaging videos on cybernetics and VSM. Through collaboration with a visual illustrator and animator Dominic Peterson, Angela works on democratizing systems knowledge to the general public via short videos.

2026

Impressed by the impact holos is making, Angela joins holos as an advisor. She is responsible for advising holos projects by sharing her expertise in systems research and application. Angela also continues to lead Metaphorum, which is a key partner to holos. Talks and events from Metaphorum are repurposed as blog posts and videos for easy access by the general public.

2025

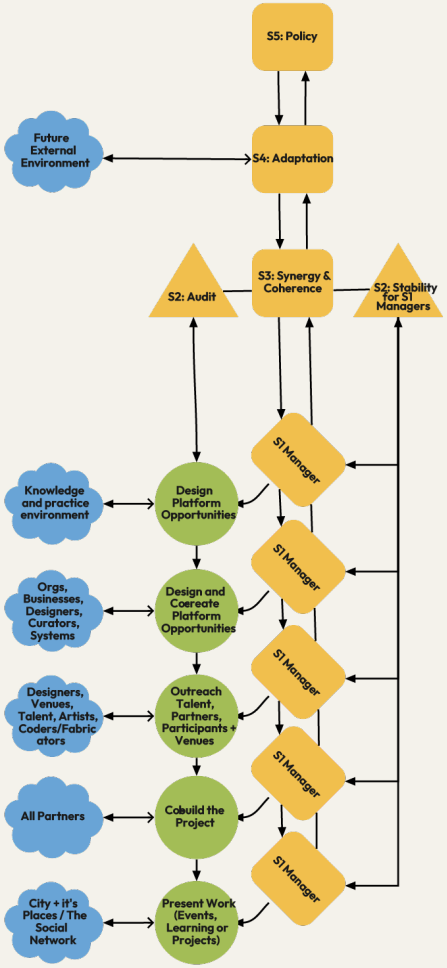
Having connected with many like-minded influencers, Angela collaborates with Isbell Wilkerson and Thomas Heatherwick on their massive installation on the intersection of social justice, systems thinking and art for the second festival.

2024

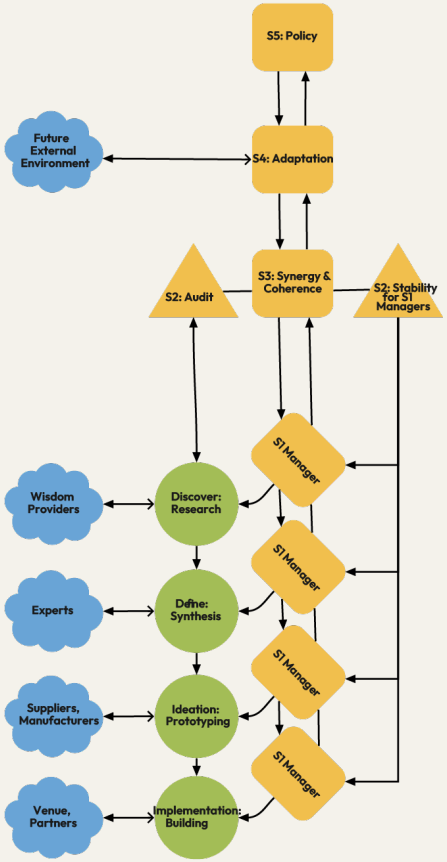
Intrigued by holos' mission, Angela joins the first holos Festival as an systems thinking expert, delivering an inspiring lecture on the application of the Viable Systems Model in sustainability.

Appendix D: VSM

December 20, 2021



holos Organization Viable Systems Model



holos Project Viable Systems Model