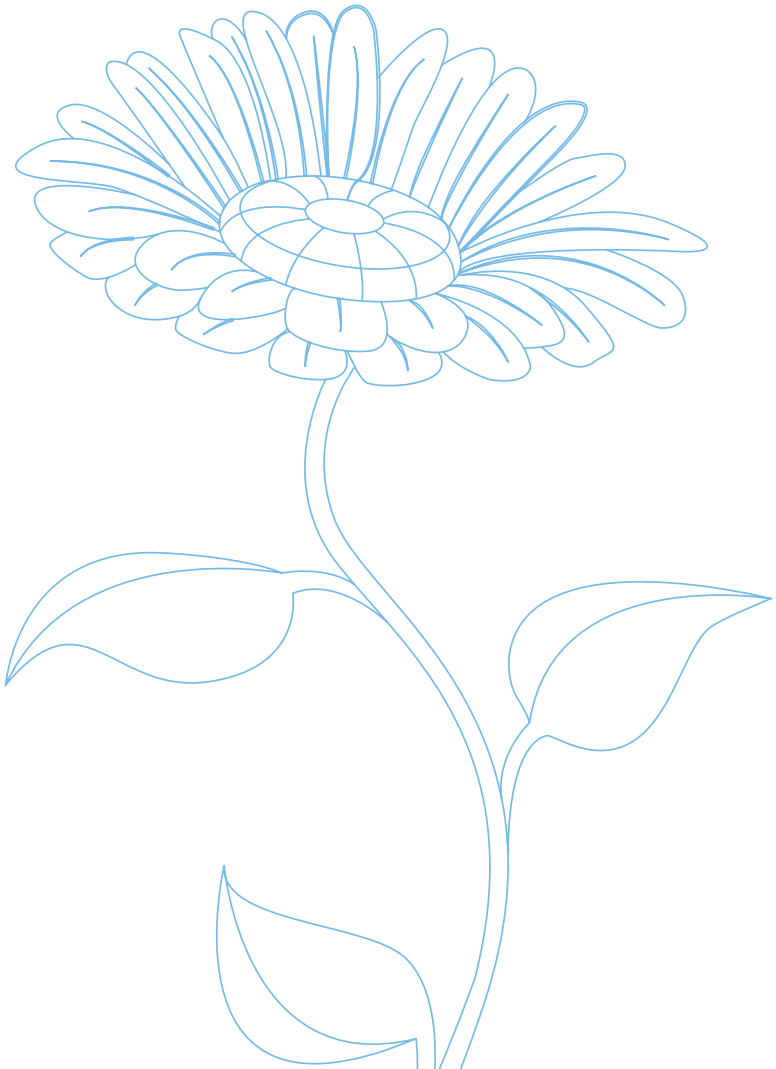
INNOVATION LABS IN HEALTH CARE

A Review of Design Labs as a Model for Healthcare Innovation

Sean J. Molloy



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A Review of Design Labs as a Model for Healthcare Innovation

Sean J. Molloy

Submitted to OCAD University in partial fulfillment of the requirements for the degree of Master of Design in Strategic Foresight and Innovation.

Toronto, Ontario, Canada, April, 2018

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Abstract

Healthcare is facing an uncertain future. People are living longer, costs are rising and patients are demanding a different experience. Over the past 15 years, a growing number of health systems have built in-house innovation labs to survive (and thrive) in this emerging world. Often enabled by design, it was the emergence of these labs that prompted interest in examining them further. Using a qualitative approach including expert interviews, this research explored 17 hospital based design labs around the world. It is hoped that this research may be used by others seeking to advance health design in their own organizations and to provoke discussion and thought on the use of design in the context of healthcare innovation. Outputs of the research include a Synthesis Map of the findings and a Health Design Lab Canvas. The Health Design Lab Canvas is accompanied by design principles for consideration when building a health design lab in a healthcare organization.

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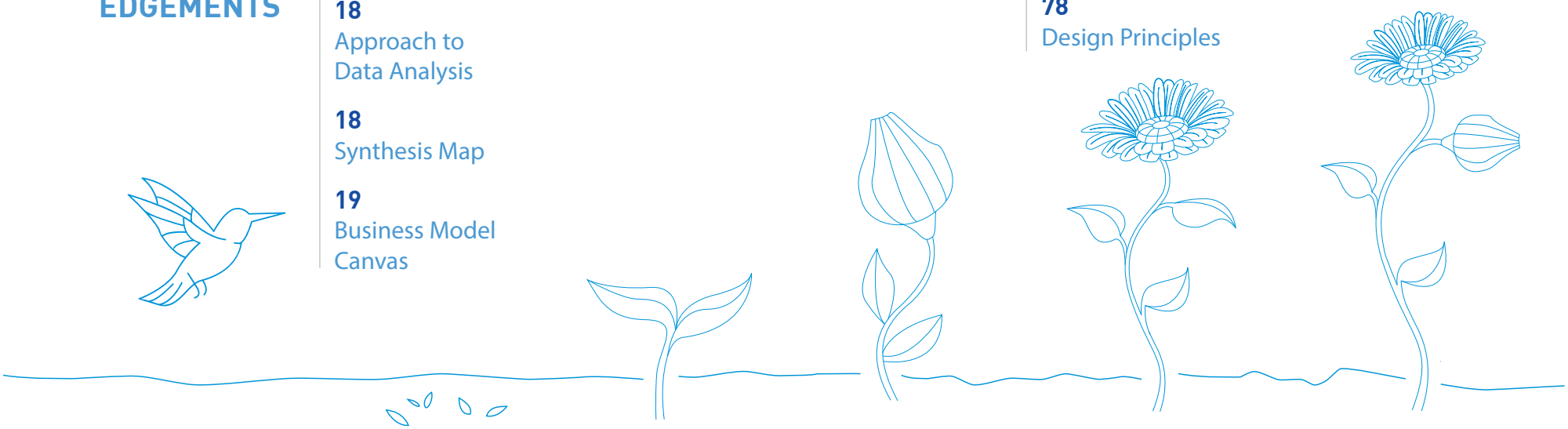

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Dad - And to my late Dad, this one is for you! I think about you every day and wish that you were still here to see this. You were the original designer in the family **THANK YOU!**

"Design allows you to break rules and find solutions that do not currently exist. Nobody ever changed an industry by simply making what exists slightly better."

- **Dennis Boyle**, IDEO

CHAPTER 01

INTRODUCTION AND RESEARCH METHODS

CHAPTER 01

Healthcare systems globally are striving to improve quality and the patient experience while managing population health and lowering costs. (IHI, 2018) Many of these systems have a history of improving services using quality improvement tools from other industries such as Lean or Six Sigma. Today's problems, though, are at a scale that requires new thinking and approaches to transform health care. (Bevan and Fairman, 2011) This transformation will require a focus on new ways of managing change that allows organizations to develop and adopt innovations and the ability to spread and scale them when they are proven successful.

Innovation is now the new buzzword in healthcare as health systems struggle to keep pace with the demands placed upon them. (Naylor, 2015) Definitions of innovation are not universal and many healthcare centres have linked traditional research or quality improvement initiatives to their innovation agenda. (Naylor, 2015) Others, though, are looking at new methods to inspire innovation with design being one that is becoming more accepted across the world. (Xie, 2011 and Kim et al., 2017)

Over the past 15 years, a growing number of healthcare providers have focused upon building capabilities in "design" to survive (and thrive) in this emerging world. Kaiser Permanente has shown early success in leveraging design methods to spur innovation in healthcare. (McCreary, 2010) The Mayo Clinic's Innovation Lab has demonstrated success in leveraging human centered design to improve the patient experience and transform systems of care. (Xie, 2011) Others have opened design labs that advance both the transformation agenda and more traditional improvement activities in the hospital. (Hendriks, 2016) Design-led innovation labs are becoming more prevalent as many leading organizations support their use in advancing innovation and change in their organizations.

This work identified 17 hospitals from around the world that have developed design led innovation practices most commonly referred to as "design labs" as a core vehicle for driving innovation in the organization. These labs exist to develop new, more experimental (hence "lab") ways of thinking, creating and caring, which differs from traditional methods healthcare organizations have used to make change happen. (Davis, 2017) While the use of a design lab has been well established by these early adopters, each lab has a different focus for their work and models of how they will achieve impact.

Project Purpose

The purpose of this project was to study the design labs' purpose, place, impact and future within a hospital to better understand whether "labs" may be an effective model for innovation in healthcare. Insights from this research were distilled into a Synthesis Map that visualizes the findings and frames the lab in the context of a health design ecosystem. The map may be used as an analysis tool for hospitals interested in investing in a lab or as a sense making tool for designers, clinicians and leaders to better understand how the health design lab functions in a hospital.

To support the practical use of this research, a Health Design Lab Canvas was created using Osterwalder's Business Model Canvas. Accompanying the Health Design Lab Canvas are eight design principles to consider in building a new health design lab. It is hoped that the Synthesis Map, Health Design Lab Canvas and the accompanying design principles may allow this research to be used by those seeking to advance health design in their own organizations.

Research Question

This project sought to gain a deeper understanding of design labs. The primary research question of this work was:

Are design labs an effective model for health innovation?

A number of secondary questions were also considered as part of this work:

1. What is the rationale and motivation behind the creation of a design lab?
2. What is the focus of these organizations' design-based innovation agendas? I.e.) Service design, business model innovation, process, product, systems innovation?
3. Are design labs delivering results in line with the expectations in their original business cases?
4. What have been the outcomes associated with the use of design labs?
5. What have been the largest challenges?
6. What barriers to adopting and scaling changes exist for innovations created through the design lab?
7. Have design labs demonstrated results that justify investments in their sustainability?
8. What are the next steps for design in health care? In what other ways may it be used? What other methodologies might it be used with?
9. How do different levels of organizations engage with the design lab? (Front line to Board)
10. How do leaders and users of design labs define the differences between QI and Innovation? Are their views aligned?
11. What are the lessons learned from their experience using design in healthcare?

Definitions

For the purposes of this project, key definitions and their sources are listed as follows:

1) HUMAN CENTERED DESIGN (IDEO)

In order to frame conversations around the use of "design" in healthcare, a working definition was used to level set understanding of what is meant by design. IDEO has used "human centered design" as a formal approach to invention and innovation for many years. Their definition was cited when people asked what was meant by design or how design was framed within the context of this work. It was also the definition used to seek out labs that were using design in healthcare.

"It's a process that starts with the people you're designing for and ends with new solutions that are tailor made to suit their needs. Human-centered design is all about building a deep empathy with the people you're designing for; generating tons of ideas; building a bunch of prototypes; sharing what you've made with the people you're designing for; and eventually putting your innovative new solution out in the world." (IDEO, 2016)

2) DESIGN LAB (JONATHON ROMM, INSTITUTT FOR DESIGN, OSLO NORWAY)

The concept of a "design lab" has been adopted in many settings but it is loosely defined. Jonathon Romm, from the Institutt for Design in Oslo, is completing a PhD in the use of design labs inside and outside of healthcare organizations around the world. His definition was used in this research to frame conversations on how these labs are structured and to analyze their use. The definition he has developed is: *"Embedded design labs are temporal entities, within organisations that utilise design knowledge and capacity to enhance innovation processes." (Romm, 2017)*

3) HEALTH INNOVATION (WORLD HEALTH ORGANIZATION)

Innovation is also often loosely defined in healthcare and sometimes used interchangeably with improvement or the generation of new ideas. Since a large part of the interviews in this research revolved around innovation, it was important to use one definition of healthcare innovation consistently. The World Health Organization provides the following definition:

"Health innovation is to develop and deliver new or improved health policies, systems, products, technologies, services and delivery methods that improve people's health."

(WHO, 2016)

4) QUALITY IMPROVEMENT

Quality improvement has been a core process in most health organizations for over 20 years. Based on principles originally developed in manufacturing, health care organizations have spent large sums teaching teams QI methods to optimize performance and deliver better value. The following definition of QI was used:

"...the combined and unceasing efforts of everyone—healthcare professionals, patients and their families, researchers, payers, planners and educators—to make the changes that will lead to better patient outcomes (health), better system performance (care) and better professional development." (Batalden, 2007)

Research Methodology

To explore design labs in the context of health innovation, this project used a qualitative approach including expert interviews with 32 design labs around the world. (Appendix C) Labs were chosen based on an environmental scan of design practices in health care and with input from the advisory panel for this work. The panel consists of leaders in the health care field including:

- **Kate Sellen**, Director of Design for Health Program at OCAD University
- **Zayna Khayat**, Future Strategist, SE Healthcare, Toronto and Adjunct Faculty, Rotman School of Management Health Sector Strategy Center, University of Toronto
- **Josina Vink**, Researcher and PhD Student, Experio Lab, Sweden
- **Anne Trafford**, CIO, VP, Quality and Performance, Providence Healthcare, St. Joseph's Health Centre and St. Michael's Hospital

The interviews leveraged a semi structured format consisting of a standard set of questions that was shared before the interview with each expert. (Appendix B) Each interview was between 45 – 60 minutes and took place via phone, videoconference or in person. The data from the interviews were coded using NVivo software and thematic analysis was done using a single coder. The study was approved by the OCAD University Research Ethics Board and all participants provided informed consent (Appendix A) prior to completing the interview.

CANADA

Baycrest, Innovation, Technology and Design Lab, Toronto, ON – Bianca Stern, Executive Director

Healthcare Human Factors Lab, UHN, Toronto, On – Joe Cafazzo, Executive Director

UHN Open Lab, Toronto, Ontario – Tai Hyunh, Creative Director

UNITED STATES

Atrium Health Innovation Engine, Charlotte, NC – Ann-Somers Hogg, Director of Innovation

Cedars-Sinai Medical Center, Los Angeles, California – Joseph Castongia, Associate Director, Human Centered Design

Connected Health Innovation – Partners HealthCare, Boston, MA – Jodi Sperber, Senior Scientist, User Centered Design

Health Design Lab @ JeffInnovation, Philadelphia, PA – Robert Pugliese, Associate Director

Kaiser Permanente Design Consultancy, Oakland, California – Estee Neuwirth, **Senior Director**, Innovation and Design

Mayo Clinic Center for Innovation, Rochester, MN – Dr. Douglas Wood, Medical Director

MD Anderson Innovation Centre, Houston, TX – Denise Worrell, Director of Human-Centered Design

Penn Medicine Center for Health Care Innovation, Philadelphia, PA – Matt Van Der Tuyn, Manager of Design and Strategy

Sibley Innovation Hub, Sibley Hospital, Washington, D.C. – Frankie Abralind, Experience Designer

Sutter Health Design and Innovation, Palo Alto, California – Megan Moyer, Director, Design and Innovation

University of Vermont Medical Center Healthcare Innovation Collaboratory – Jeremy Beaudry, Lead Healthcare Experience Designer

EUROPE

Center for Innovation, Karolinska University Hospital, Stockholm, Sweden – Anna Thies, Senior Healthcare Service Designer

HELIX Centre, London, UK – Gianpaolo Fusari, Senior Designer

AUSTRALIA AND NEW ZEALAND

Design for Health and Wellbeing Lab, Auckland, NZ – Steve Reay, Co-Director

A map detailing locations and contact information for all participants in this research is found here - *https://drive.google.com/open?id=1WPLi_j9nJ4WtKdNCjjtLl4bDe-x-ZtDD&usp=sharing*

Approach to Data Analysis

To analyze data collected, a sense-making process was used to understand patterns within the core theme areas of the research questions.

Which questions were, on aggregate, perceived to be critical by individuals?

Which questions were often associated with others?

What relationships exist when demographic filters are applied?

Where are the biggest differences between design labs that have been around for 5 + years and those that have not?

Building on this approach, a variety of analysis techniques were used to understand the quantitative and qualitative data collected. These techniques included:

- Sorting data to understand patterns and trends;
- Visually representing responses to understand the data in new ways;
- Clustering responses to detect similar and dissimilar attributes.

Synthesis Map

Building on insights gathered through the interview process and data analysis, a synthesis map was created. The map is intended to visually explore this research and to support the analysis described above. It is envisioned that the map will provoke discussion and thought on the use of design labs in the context of healthcare innovation.

Synthesis maps evolved from OCAD University's Strategic Foresight and Innovation pedagogy necessary to train students in systems thinking. Synthesis maps are typically designed as communicative artifacts that translate multiple knowledge perspectives about social systems to illustrate the dilemmas and challenges within a complex system scenario. These are "first phase" system maps that synthesize research, perspectives, and design problematics into coherent visual narratives that make sense to stakeholders knowledgeable in these domains.

Health Design Lab Canvas

The Business Model Canvas (Osterwalder, 2010) is a strategic management template for developing new business models or documenting current ones. It is a visual chart with elements that portray a business' value proposition, infrastructure, customers and finances. It was initially proposed by Alexander Osterwalder and has since been used as a tool for developing new businesses or analyzing existing organizations.

The Business Model Canvas was used to inspire the creation of the Health Design Lab Canvas. This is a tool that may be used by anyone looking to create their own health design lab or to critically assess an existing lab. The tool developed in this research is a prototype . If health design leaders find utility in its use, it may be used to share approaches towards using design in hospitals and other healthcare organizations. It is licensed under Creative Commons to share and use. It is intended that this is tested and iterated on as design advances in its maturity and use in healthcare settings around the world.

Study Limitations

The following limitations are acknowledged:

SINGLE CODING

The primary research process could have been amplified by producing a more complex approach to data analysis. Data was coded using a single coder (the author); reliability of results could be enhanced by adding a second coder, however this was not possible with resources available for this research project.

RESEARCH METHODS - INTERVIEWS

Interviews were the primary resource for understanding design labs. Inherent in this process is a bias towards the lived experience of the person being interviewed. Most people interviewed were the directors of the labs themselves and secondary interviews were not conducted. While a bias may exist, the author did feel that all interviewees were transparent with the information shared. To minimize the bias, additional expert interviews could be conducted with other staff in the labs, stakeholders involved in working with the labs, patients and families that have been involved in co-design processes with the labs and other leaders in the organizations.

HOSPITAL BIAS

Interviews in scope for the final analysis consisted solely of labs embedded in hospitals. There is an inherent bias towards a hospital perspective in analysing this data that should be acknowledged.

CHAPTER 02

INTERVIEW RESULTS

CHAPTER 02

Interview data provided insights into organizations, teams, and individuals who are using design labs as a primary methodology to improve or innovate in their organizations. Whether their innovation frame was transformational change or local improvement, the intent was to move to a better future through the use of design. In this section, the results of the research are shared to reveal key insights and patterns in the data. Interviews focused on the following areas:

PURPOSE

- Description of the Lab;
- Rationale for Use;
- Innovation Focus – Process or Outcome;
- Barriers to Innovation and Funding.

PLACE

- Internal and External Relationships;
- QI and Innovation.

IMPACT

- Strategy and Intent; Reporting Structure;
- Metrics of Success;
- Outcomes achieved;
- Ambition and Maturity.

FUTURE

- Values;
- Future of Design;
- The Health Design Lab Canvas;
- Design Principles.

While 32 design labs were interviewed in total, only those that had a design capability housed in a hospital were included in the analysis. (N = 17) The rationale was that these labs are embedded in either public or private hospital systems which allows for a specific and somewhat comparable focus in the analysis. Although this represents a bias towards data generated from hospitals (see prior section on limitations of this research), it was important to first understand this type of lab before moving outside of it in future research.

Purpose

The lab's purpose focuses on how it is structured to achieve its desired outcomes. This includes demographics, the rationale for the lab, innovation focus and barriers to innovation.

DESCRIPTION OF THE LAB

Demographics

Data gathered describing the labs included its name, age, number of staff, skill mix, and how funding is received.

Age

This question sought to gauge the maturity of design labs in health care organizations. Findings indicate that the concept of an embedded design lab in healthcare organizations is relatively new, and although the oldest lab interviewed dates to 2003, more than half of the labs interviewed began after 2012. Many labs spoke to still finding their identity or to viewing the work itself as a prototype evolving over time.

Size

Labs were asked about their size as measured in staff or equivalent full time hours. The distribution varied from very few (1 or 2 people) to three labs that had more than 25 full time staff. The majority of labs (12 of 17) had 14 or less full time members on their team. Labs did point out that they were supported by volunteers and students particularly in labs at hospitals with academic affiliations. Additionally, some labs contracted out services to designers as needed. It was noted that labs with larger staff sizes tended to have broader innovation agendas with staff supporting scaling innovations and commercialization activity.

Skill Mix

In terms of design skills, service designers were mentioned most frequently. This was followed by experience and graphic designers. Complimenting designers, other professionals mentioned included physicians and other clinicians, engineers, strategists, economists, researchers, project managers, IT staff, data specialists, business managers and commercialization experts. Depending on the needs and strategic focus of the lab, a broad range of professions were mentioned. As the scope of the lab's focus expanded, so too did its need for a more diverse skill mix. Interestingly, patients and family members were not mentioned as core members of teams. In follow up questions, it was revealed that patients were engaged on lab projects either directly by the lab or through central patient engagement structures in organizations.

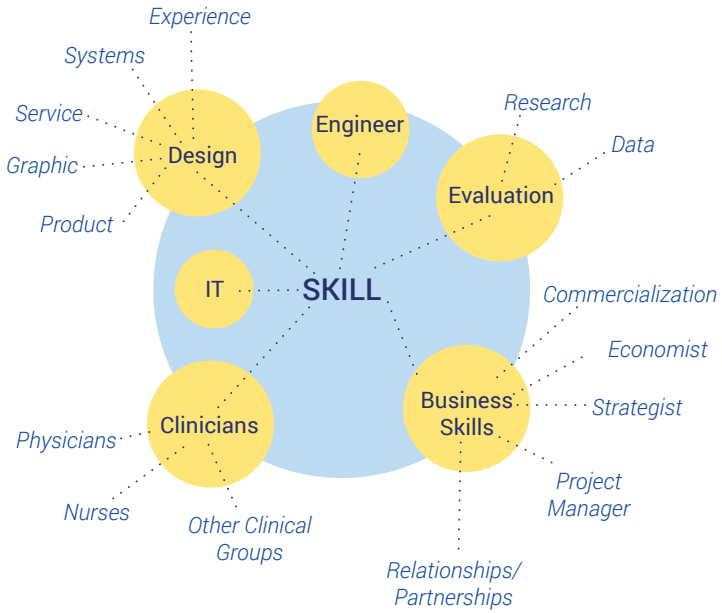


Figure 1: Skill Mix

Funding

Over half of the labs interviewed mentioned that they were wholly or partially funded out of operating dollars of their host organizations. Other sources of revenue to sustain the labs included research grants, philanthropy, government grants and industry dollars, often attached to specific projects. Almost all labs mentioned that they had funding from a variety of these sources but it was noted in interviews that stable operational funding allowed for predictability in sustaining lab operations particularly as it applied to project delivery crossing fiscal years and in attracting and retaining talent.

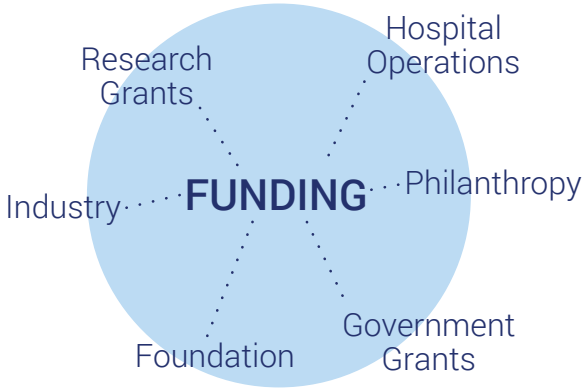


Figure 2: Funding

Space

An interesting finding in this work was that the lab was not always confined to a physical space or location. While most labs indicated that they did have a physical space, a couple of labs indicated that they were virtual and that their lab was intended to go to wherever they needed. Many interviewees also indicated that they were a blend of a physical and a virtual lab with the ability to move around the organization as needed depending on the projects that they were working on.

RATIONALE FOR USE

There was some consistency across labs on the rationale behind their formation. The two main areas of focus when analyzing responses in this category included the lab as an enabler of culture change and the lab as an enabler for innovation. The figure below depicts these two themes which also forms the basis for the strategic intent of these labs.

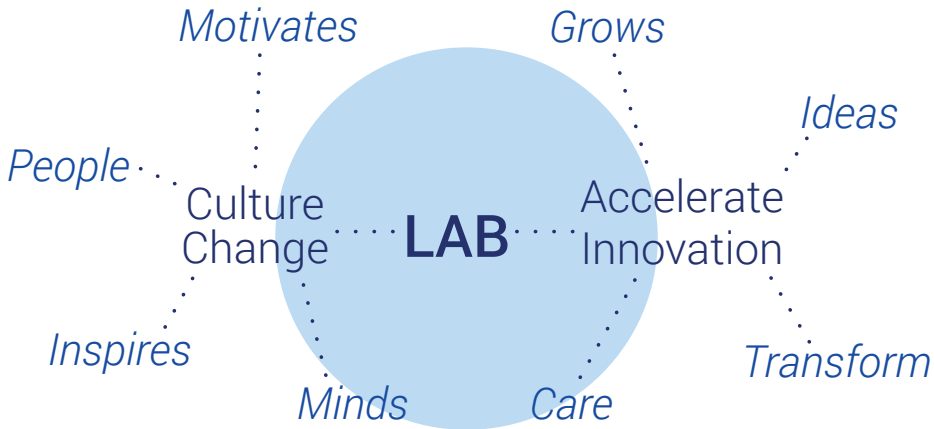


Figure 3: Rationale for Use

STRATEGIC INTENT

Most labs referenced a mission statement or manifesto when describing their rationale or strategic intent.

Examples of Manifestos or Mission Statements include:

"Accelerating ideas to transform healthcare."

"Accelerate the transformation of the system."

"Redesign, rethink, re-imagine, we design better healthcare experiences with patients, their families and staff."

"Harvesting human centered design to improve healthcare outcomes and catalyze change."

"We exist to do nothing less than fully transform healthcare by making it more simple, human, and engaging so we may each live more fully and access life's potential through optimal health."

CULTURAL CHANGE

Interviewees spoke to the lab's importance in changing the mindset of the organization. Words used included "inspire" and "imagine" with a focus on enabling people to believe that they can contribute to positive change. One interviewee spoke about changing the way people think. This process was described as:

"Design brings form to an idea by allowing people to have conversations about what matters to them. This lets people make sense of their thoughts and to have conversations on things like the future of health in ten or fifteen years. Bringing form to an idea helps people think differently about what matters".

ACCELERATE INNOVATION

The second theme was how the lab enables innovation. Examples were words or phrases like "accelerating innovation", "growing" ideas or to act as a "catalyst" for change. Other verbs used included "lead," "transform," and "re-imagine." These were used across interviews reflecting a desire to build a space in which people could create new solutions to problems they faced. Interviewees mentioned that they sought to impact outcomes, cost, experiences, health status and culture in this innovation focus.

Lastly, many also spoke to a better future or a different reality than the one in which they were operating in today. Whether they referenced a product, solution, process, service, experience or system, the consistent response was that movement towards a better future was being enabled through the use of design.

INNOVATION FOCUS

It was important to study the rationale, or strategic intent, of these labs in order to determine the impact they were achieving. Their intent includes how they defined innovation and the types of innovation that they were focused on.

Innovation Definition

This particular question elicited the most interesting reactions from interviewees. A small number mentioned that innovation had become a buzzword or something that they do not really think about. A number of responses had similar key words used in the description. An innovation must be "new" offering greater "value" than what currently exists. It must be "implemented" and "scaled" and does not simply sit as an "idea." It addresses a "problem" that exists and it "improves" pain points that exist. Clusters of text existed around these key words indicating consistency in people's understanding of innovation as a construct. Many also categorized innovation in two parts, process and outcome.

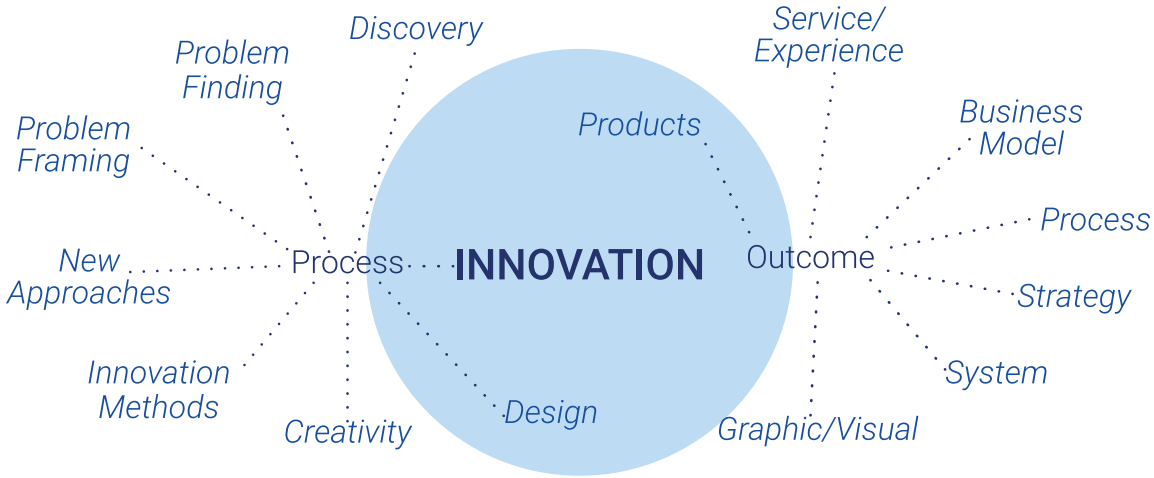


Figure 4: Innovation Focus

1) Innovation as a Process

One theme that emerged from descriptions of innovation was that it was a process and that design was an enabler of the process. Labs sharing this view mentioned that they have been able use this process to identify problems from a human centered perspective and then create solutions/processes/services/experiences to address them. One interviewee commented that *"some people's gut reaction is that innovation is a shiny thing, but the reality is that it is a process."* A few people also pointed out that innovation is really about creativity. It is a creative problem solving process that brings new ideas or approaches to existing problems. This perspective on innovation was shared by one interviewee as:

"Innovation is a process of proactively identifying new opportunities and finding new approaches to existing problems. It is about combining and arranging insights and creating new ideas, methods and ways of doing things."

It was also felt that innovation as a process could be taught. One lab spoke about training clinical learners in design since nowhere in their current curriculum are they taught "how to innovate." Another organization spoke about expanding their focus on design beyond a lab or tactical approach to a capability that is used throughout the organization. There was a feeling that there is space in hospitals and healthcare education to teach people design as a method for innovation.

2) Innovation as an Outcome

A second theme that emerged was that innovation is an outcome. It is a product/service/experience that is new and better than what is currently being offered. One group phrased this as *"something new or radically improved."* The output of the design process is enduring and it is in the implementation of an idea that innovation lies. Another group phrased this as *"Innovation is not ideation. True innovation is at the implementation phase. Scalable and sustainable to fully realize an idea to where it is being used."*

For those that answered that innovation was an outcome, the response was often framed around the impact of the service/experience/product that was created. The output has value in that it has been adopted and scaled. It endures. One group described it as *"Innovation is an outcome that's better than what exists. It has widespread appeal because it makes life easier. It solves a problem, a pressing need."*

Focus of Innovation Agenda

Interviews were designed to better understand the outputs being achieved at each of the hospital design labs. Participants were asked what type of innovation they focused on amongst service innovation, business model innovation, process innovation, product innovation or system innovation.

Responses to this question had a large degree of variability in terms of where their lab focused. Many answers indicated that there was not a specific focus but that it shifted depending on the work they were involved in or problem they were trying to solve. Most labs reported that they had a focus on service/experience innovation and/or either product or process innovation. It was interesting to see the overlap in responses between service and product innovation particularly as it relates to new IT solutions and their role in improving care. Seven labs shared that they either had a focus on systems innovation or that they would like this to be an area of focus in the future. For those that said they were focusing on business model innovation, all were located in the United States.

Answers to how labs self-identified their innovation focus were interesting. One participant said: *"I would consider ourselves to be a service design shop. A lot of the work that we do, especially over the past year, has been focused on the patient experience which is improved in how we add value to the services we provide."* Another said that they *"view our mission as transforming the way that people experience health. Which tells you immediately that we are more of an experience oriented lab."* Another said *"Business model innovation is a huge focus for us, moving past just technology to redefining how we deliver care."* A final lab said that *"They do all of these to some degree with no particular focus but system level change is where we would like to be delivering value and we are slowly trying to get there."*

BARRIERS TO INNOVATION AND DESIGN IN HEALTHCARE

An important element in better understanding the function and impact of design labs, was understanding the barriers that they have encountered. Barriers to innovation should be recognized by leaders and designers working in the healthcare space.

Responses to this question were broad but themes included:

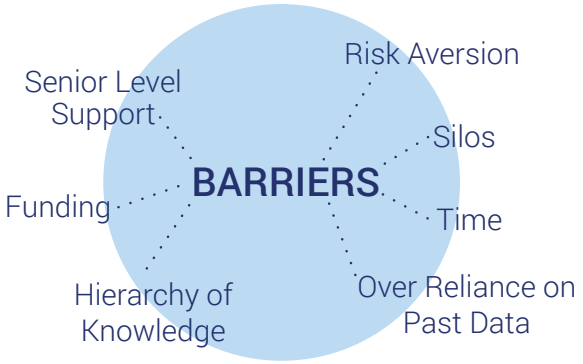


Figure 5: Barriers to Innovation

Time

It was acknowledged that clinicians are busy which may make it difficult to find time to participate in design workshops. Taking clinicians away from care, meant that they had to ask other clinicians to replace them, cancel clinics and/or find an alternative method of paying for their time. Time was also raised as a concern in relation to the length of time it takes to make change happen in healthcare. Healthcare functions at a different pace. Design sprints were often difficult and frustrated some designers involved in this work.

Funding

Some labs found difficulty in getting internal funding from their host institutions. They shared that design was not viewed as mission critical even though they had been able to find local success. In more established labs and in labs where they had secured stable operational funding, this feeling was not shared. Across many interviews, it was felt that healthcare is dominated by cost cutting and finding efficiencies sometimes at the cost of investing in design and innovation. In some cases, a focus on profit or sustainability seemed to be driving the innovation agenda as work focused on how to generate savings or new revenue for the organization.

Hierarchy of Knowledge

Healthcare has a history of using research to develop evidence that informs decisions about practice or policy. This typically involves randomized control trials as the highest standard of evidence. For very good reason, it ensures that treatments have been fully tested for efficacy prior to spreading their use. Some interviewees shared that reliance on this type of evidence hinders the use of design in academic centers, as the level of evidence generated through design research is not held in the same regard. Some labs are therefore engaged to help "implement a solution" versus using design research to unearth problems that need to be solved. It was an underlying tension that multiple labs shared. One described this as:

"We often say that the problem as stated is quite different than the problem understood. After we spend time using observational methods of human centered design we relatively quickly come to a very different problem. This is difficult for many doctors, scientists and researchers to understand."

Risk Aversion and Senior Level Support

Closely linked to the use of randomized control trials as the most acceptable source of evidence is risk aversion. Many interviewees shared that they felt stifled by needing permission to try something new. Interviewees pointed to the permission-based culture that dominates hospitals today. Senior level support at administrative and clinical levels is often needed to provide "permission" to innovate. Healthcare functions in a rules based environment for good reasons but this also impacts the ability to innovate outside of those rules.

Over Reliance on Data

Although it may seem counter intuitive, it was revealed in multiple interviews that healthcare's reliance on data may perpetuate its risk aversion. The rationale for this response was that data is inherently focused on processes that already exist. It involves looking at your current system, setting improvement targets and projecting performance into the future. It is based on a system that is already in place. Design seeks to create something new, where no data may exist; and data is emergent. In an environment where people are rewarded on performance related to existing data, it becomes difficult to create something new without embedding uncertainty into the design process. One participant mentioned that - *"If you have never seen evidence that something worked, you need to suspend your beliefs to believe that something new might actually work."*

Systems Based Innovation and Silos

The people interviewed in this research are all in hospitals that are part of larger health ecosystems. Only seven of the seventeen hospitals interviewed mentioned broader health and social system foci to their work. This may be a function of their place in the system. Multiple interviewees however mentioned that they felt a barrier to change was the siloed nature of healthcare itself. Within hospitals, they encountered departments, programs and clinical groups all working in an independent manner with very little connection. The design lab itself became a connector for these groups but it was felt that this was not enough, at this point, to overcome this fundamental barrier to innovation.

Difficulty Spreading and Scaling Innovation

It was also pointed out that healthcare is famous for an over reliance on pilots with one group describing the phenomenon as "pilotitis." The ability to continuously test ideas without scaling and implementing solutions seemed endemic in their environment.

Overall, this section has described the lab's purpose or how it is structured to achieve its desired outcomes. This included basic demographics, the rationale for the lab's existence, its innovation focus and barriers to innovation that it has had to overcome. Building on this foundation, the following section will discuss insights on how the lab enables change in its organization.

Place

The lab's "sense of place" describes who the lab partners with internally and externally. Additionally, it focuses on how the lab enables the change agenda of the hospital from the perspective of quality improvement and innovation. The concepts of innovation and improvement are also unpacked based on the insights of interviewees. Lastly, this section will detail advice given by those interviewed on how best to approach partnerships and working with innovation and quality improvement teams.

INTERNAL AND EXTERNAL RELATIONSHIPS

The design lab enables connections to form that are not naturally occurring in the hospital. Or if these connections do happen, they are not occurring for the purpose of building something new. The image below visualizes each of these relationships, internal and external.

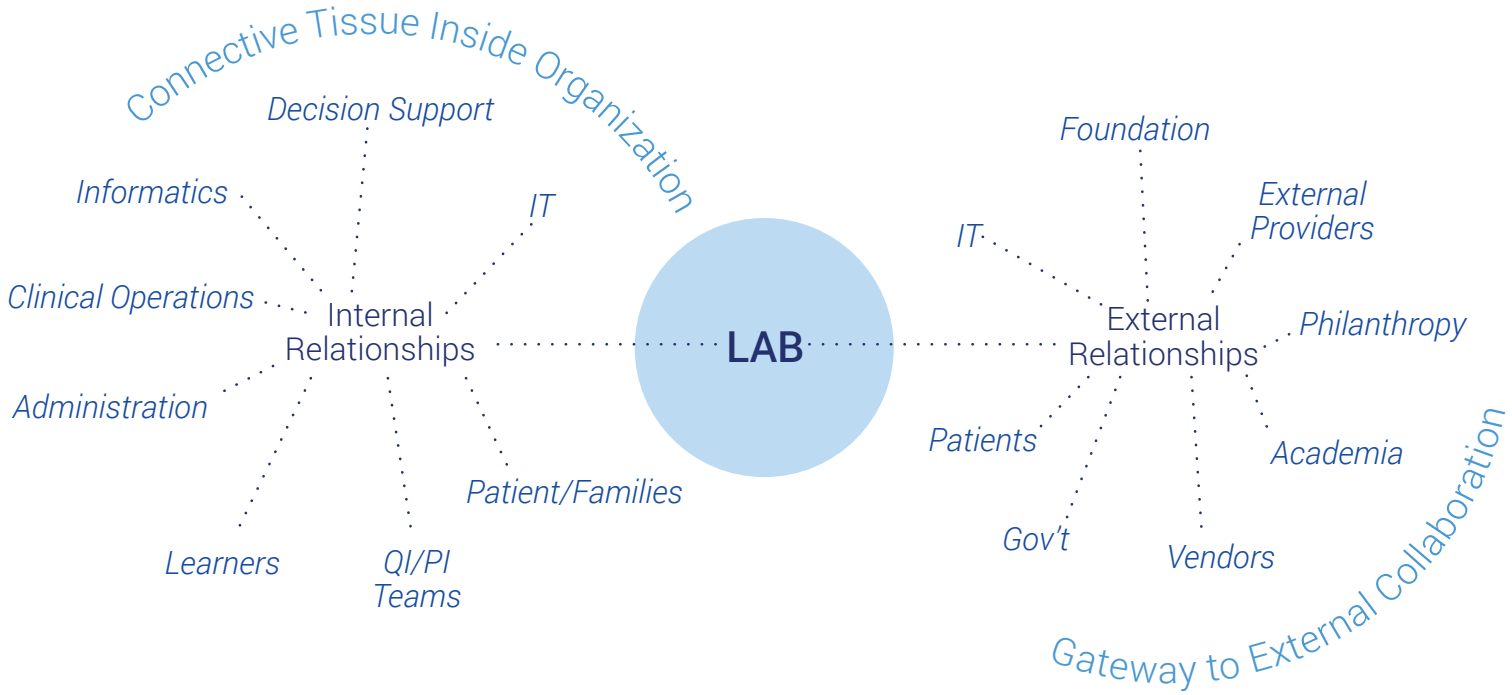


Figure 6: Internal and External Relationships

INTERNAL RELATIONSHIPS

The following groups were mentioned by interviewees as collaborators, partners and participants in the lab's work inside the organization. The lab acts as the connective tissue for many parts of the organization bringing groups together to solve problems.

Information Technology

Many labs cited a close partnership with the IT department in their hospital. This reflected the focus of some labs in supporting digital health and the services and experiences they enabled. While most cited close relationships with IT, many also indicated that IT resources were stretched which sometimes meant projects could be delayed or even put on hold based upon this constraint.

Data

A second internal group that labs worked closely with were the holders of the hospital's data repositories. This included informatics, decision support, analytics and privacy teams especially in labs that were implementing solutions the labs developed. They also partnered with these groups when it came to evaluation of the solutions developed.

Clinical Teams

Although some labs indicated that they were doing external work on a consulting basis, the majority focused on internal activity. This involved working closely with clinical teams in different departments of the hospital. Many mentioned strict criteria for accepting projects including a shared understanding of what the design process is and outcomes that must be achieved.

Clinical Learners

Some labs mentioned partnerships with the education programs of the organization. This was particularly true in relation to teaching design skills to clinical learners or in trying to achieve a critical mass of people in the organization fluent in design.

Process Improvement and Quality Teams

Design labs frequently interact with quality and process improvement teams in most hospitals. As improvement and innovation are both change processes, design labs had to understand the work of the quality team so that they could meaningfully co-exist. More insights related to this interaction is shared below.

Patients and Families

Participants also spoke about their lab's interactions with patients and families. Working in a hospital, many mentioned that they had the ability to work closely with patients in clinical environments. This gave them the opportunity to ask questions or observe patients/families interacting with health services every day. They also mentioned that they had formal processes to engage patients and families in their organizations when needed.

EXTERNAL RELATIONSHIPS

External relationships were shared from two perspectives; project based and/or partnerships. It was shared that the lab serves as a gateway to external collaboration having the ability to bring external groups together with hospital teams to ideate and co-create.

Project Based Relationships

The first perspective was more opportunistic in that labs partnered with external groups on a design initiative, on contracted design projects or on larger initiatives that involved multiple stakeholders. With these engagements, the lab plays a central role in connecting groups of people and curating an environment for people to be creative and solve problems. Partners mentioned in this work include government agencies, other healthcare organizations, research bodies, industry and academic centers. These projects often form a critical stream of revenue with some also involving partnerships that the organization wishes to be involved in.

Formal Partnerships

The second set of external relationships were related to more formal partnerships that have been created with funders, sponsors, industry and other healthcare providers to consistently support the lab's work. External stakeholders included regional or national tech innovation entities, government agencies, academic institutions, industry and tech firms, researchers and other healthcare providers who may be public or private. The lab has the ability to form partnerships that do not currently exist and is able to make this form of external partnership safer for the organization while testing new approaches to change.

Quality Improvement and Innovation Agendas

The previous section sought to understand internal and external relationships when analyzing the labs' sense of place. The following section will analyze how the lab framed its relationship with the overall change agenda in the hospital. This involved better understanding the relationship between quality improvement and innovation and how the design lab relates to both pillars of activity. Understanding the lab's intent and how it enabled either the innovation or improvement agenda was deemed to be a critical area for designers and leaders to understand. Doing so enabled expectations to be created, relationships to form and focus for the teams working in each domain. Prior to asking about how the lab interacted with each process, questions explored how interviewees framed quality improvement and how they framed innovation. The following visual depicts the insights shared related to QI and Innovation.

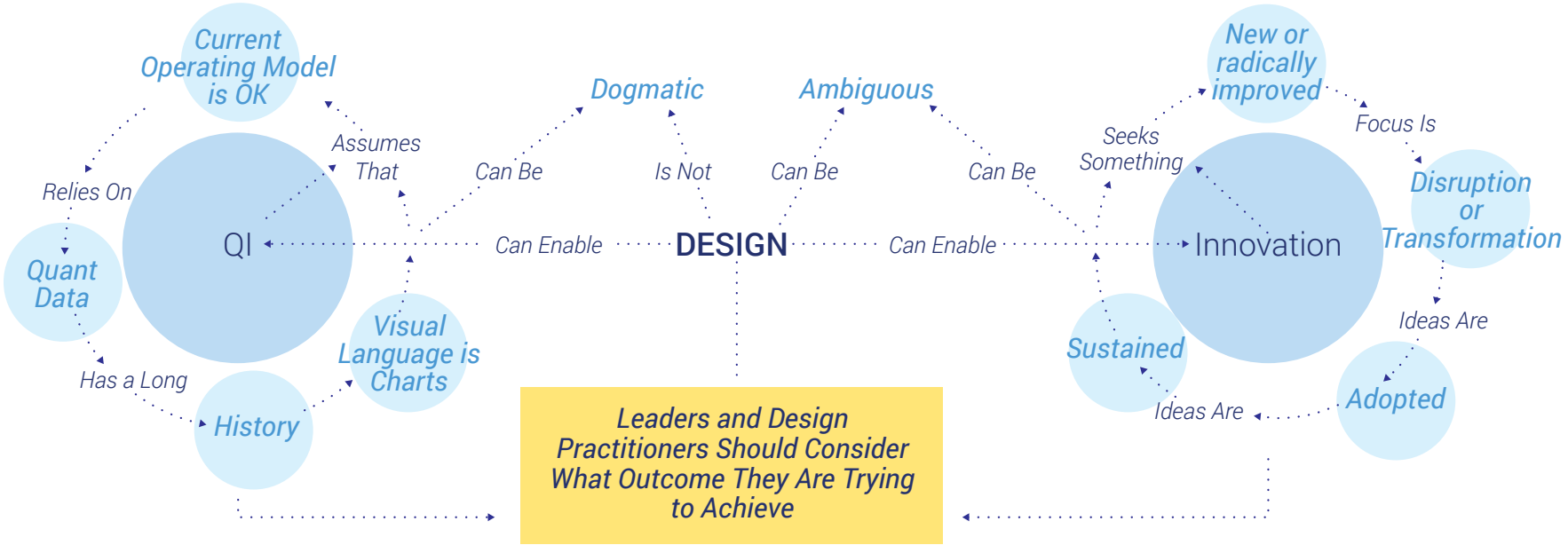


Figure 7: QI and innovation

WHAT IS QUALITY IMPROVEMENT?

Interviewees were asked how they described the differences and similarities between quality improvement and innovation. Design can support both approaches and interviewees repeatedly pointed this out. Dialogue related to a quality improvement definition fell into the following four theme areas:

Focus on Current Operating Model

QI has an inherent focus on the current operating model and processes. Its bias is that things are generally working well and that the system needs to be augmented in order to eliminate waste, reduce inefficiencies or to improve performance from a data perspective. This was described by one interviewee as:

"Quality improvement assumes that the current model is adequate and it can be tweaked to become more efficient. The existing approach is correct and we can reduce waste or improve efficiency or performance in that model. There is a very significant reason that QI should exist because healthcare is in many cases extremely inefficient or very bad at executing within the current model. We know improvement should be pursued and pursued often. So for a very long time quality improvement was the primary mode of change in healthcare. It is appropriate to have QI but it makes a fundamental assumption, that the current operating model is correct."

Reliance on Quantitative Data

Inherent in the QI process is a focus on measuring change based upon historical performance. This approach will naturally lead away from transformational change as you will not be looking to create fundamentally new operating systems where no data currently exists. QI by its nature seeks convergence and stability, reducing variation and attempting to incrementally improve performance in an iterative fashion. It does not seek to disrupt what is functionally assumed to be working well. This was described as:

"Quality improvement is important for systems to help eliminate errors. Its effective in helping reduce costs but it is not as effective in identifying what people really need. The reason is that it focuses on quantitative data. People will tell you what they really need but often it is more qualitative in nature which is more of a design focus than traditional QI. Learning what is meaningful to people allows you to create entirely new services and experiences. If you look at the measurement that goes into six Sigma or what goes into lean tools it is very quantitative not qualitative. This will not allow you to create entirely new experiences or services."

Well Established

Many commented that QI has an established history in healthcare organizations. There have been large investments in teaching QI methods and tools and QI teams have been built to support improvement in many hospitals. It has also become something of an expectation of most clinical teams to improve quality. The board holds senior teams accountable who then hold management and front line teams accountable. Front line clinical teams also have developed an understanding of QI. This understanding has been good for healthcare in that continuous improvement of operations and performance is desired. Where some felt that there was a need for change was in expanding away from QI methods and tools as the sole approach to change. This means embracing design and innovation as another option for organizations

seeking to change the way they operate.

Visual Language is Data

QI has a visual language that does not draw people in at an emotional level. It focuses on qualitative data and its visual language has been run charts, control charts and bar charts. While graphic design has more recently augmented this approach by using infographics and other visual representations of data, the QI approach has traditionally felt mechanical and engineering based. One person commented that:

"I find that QI lacks a visual language which for me is absolutely important in terms of framing a different way of understanding or making sense of the kinds of the problem we are trying to solve."

WHAT IS INNOVATION?

Each interview included a question on how innovation was defined and how it compared to quality improvement. Definitions of innovation fell into the following themes:

New or Radically Improved

The core theme from descriptions of innovation was that it involved the implementation and scaling of new ideas. Innovation is the creation of something different than what exists today. One person described this as:

"If you are using a quality approach, you are leaning on best practices or knowledge that is already there about how best to do something. But when you're looking at areas where there is no pre-existing knowledge of best because we've never done it this way before and we're building the knowledge as we speak, then that's innovation. So it requires design because design allows you to take ambiguity

and create something from nothing."

Transformation

Another theme was that innovation focused on transformation. The outcome in innovation is different than quality improvement in fundamental ways. The outcome demands a different mindset and tools to achieve success which is where many felt design played a role. One response that reflected this was, *"Innovation involves a transformative state that changes the entire frame of your work. The thing that is created is radically different from what's available today and this is often quite difficult to do."*

Adopted and Sustained

It was mentioned multiple times that for an idea to become an innovation it must be "adopted," "scaled" and "sustained." Without adoption, ideas are just that. Interviewees shared that design enables the full innovation process from ideation through to adoption and scaling of an idea. One interviewee described this as: *"Innovation is not ideation. True innovation is determined at the implementation phase. An innovation must have been scalable and sustainable to fully realize an idea to where it is being used widely."*

UNDERSTANDING THE DIFFERENCES BETWEEN QI AND INNOVATION

In describing the differences between QI and Innovation, it must be noted that the dialogue tended to be non-judgemental with most feeling that QI and innovation were complimentary approaches to change. The differences lay in the focus of the change efforts and how design could be used for either approach. The following themes emerged:

Investments Made in Healthcare QI and Innovation

Many pointed out that for a long time QI has been the dominant approach to change in healthcare. Over the years, significant resources have been invested in teaching people how to do QI and what tools they may use. Nearly every hospital now has a VP or Chief of Quality, few have the same dedicated executive lead on innovation. QI is a core capability in organizations whereas design is not. Innovation is also something that although talked about, is rarely defined in a manner that people can grasp, leading to the notion that it is simply a buzzword in healthcare. Further, many staff and leaders in hospitals equate innovation with technology, especially commercialization. This mismatch between QI and Innovation is based upon historical

investments in education, staff and leadership.

The Mindset of the Desired Outcome

The tension between incrementalism (Improvement) and transformational change (Innovation) seemed to be a focus point for people's distinction between the two approaches. Many pointed out that incremental change could be engineered and planned like a project with definable metrics and time lines. The assumption in QI is that the underlying operating model is sufficient to achieve improved outcomes and process improvement is required to achieve results. Innovation, on the other hand, is emergent. It is fraught with failure and constantly iterates in new directions as the design process narrows the gap from identified problems to adopted solutions. One interviewee described this as *"It is the job of QI to stabilize everything, it is the job of innovation to disrupt the status quo."*

Ambiguity

Interviewees shared impressions that QI is dogmatic in its approach whereas innovation has an element of divergence in re-imagining possibilities. It is intentionally messy in trying to push mindsets to fundamentally rethink the system. This puts it at odds with reducing variation through QI. One person framed this as: "Design allows you to create something from nothing. It's allowing you to challenge existing assumptions to break your pattern of thinking and come up with an innovation that is totally different than what you have today. This is a very ambiguous process unlike traditional methods of QI."

Enhancing Relationships Between QI and Innovation Teams

Most labs were clear that the focus of their work was innovation. In sharing the differences between QI and Innovation, many also commented on tensions that have arisen between the two groups in the organization and what they have done to build effective

relationships. The following advice was offered:

Establish Relationships

Many spoke about positive relationships with QI teams in the hospital. Some referenced tension as teams began to know each other's work, approaches and focus. Positive relationships did not happen organically and were curated. Leaders of design labs spoke about strategies they used to intentionally engage QI teams. One referenced that they had their designers take courses in Lean so that they could understand the language of QI. Relationships were not always organic and took time and intentional thought to make them meaningful.

Establish Scope

It was noted that the design team should have a clear mission so that they understand what type of work they will do. While both innovation and improvement are approaches to change, conflict may arise when the organization does not understand the lab's mandate. This was overcome with continued engagement with different groups as people learned the value of design and innovation.

Don't Compete

A few labs mentioned that it is a good idea to form healthy relationships with the QI team as both sides can help each other in their change mandates. While outcomes and scope of work may differ, both exist to make the organization better which is common ground. Additionally, it was mentioned that there are parts of the QI process where design is a good tool to help in ideation, experimentation

and innovation. QI can also be effective in implementation and scaling of new ideas.

Impact

Insights from interviews revealed how labs were seeking ways to make an impact and what was influencing their ability to do so. This section will review Strategy and Intent, Metrics to Measure Success and the lab's Ambition and Maturity. Together, these areas allow for a better understanding of how labs are achieving success.

STRATEGY AND INTENT

The following visual depicts insights on how labs match their intent to the outcomes they are achieving. Most labs also shared a connection with the hospital's strategy and were responsible for helping to advance the organization's innovation agenda. This was not universal. In labs that were more removed from the organization, they shared their own ambition as it relates to the lab's strategy. But this was only found in three of the labs interviewed.

Insights demonstrate that the link between strategy and innovation influences how the design lab is positioned to support the organization's innovation agenda. An organization's innovation agenda is built from the strategy set by the CEO

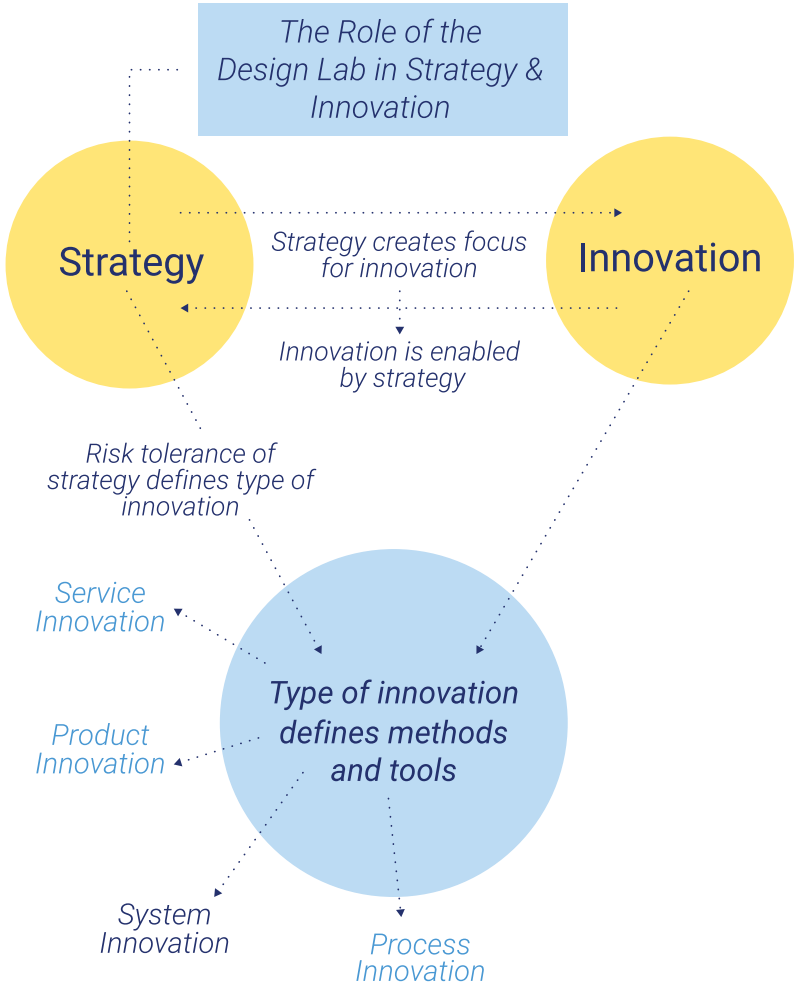


Figure 8: Strategy, Innovation and the Role of Design Lab

and the Board. They set the strategy and innovation ambition of the organization and then mobilize resources to innovate.

In most clinical settings, clinicians already innovate daily. Most do it because they have an amazing ability to improvise on the front lines to take care of the patients they see every day. Others innovate based upon research they are doing or clinical quality improvement.

The CEO and Board though, are seeking to build a longer term strategy that influences change at either the organizational or system level. Their ambition will dictate how innovative this process will be and how the lab may play a role in influencing this work. What became clear in this research is that many of the labs interviewed are doing a lot of work in innovation at the clinical and operational level or in day to day operations in the hospital. Many also shared a desire to move outside of this space into greater influence at the organizational and system level. Labs also shared that they did not have the ability to influence decisions on which levels of the organization they could innovate in. Reporting structures and strategy seemed to have the greatest influence on them.

The lab's strategy was not created in isolation from the hospital in most labs interviewed. The lab had to consider their place within the organization and the direction from leaders responsible for creating the lab. The labs interviewed shared that they reported to different leadership groups in the organization and nuances to their work was apparent depending on who they reported to. Reporting structures and organizational or clinical strategies seemed to be the core

Figure 9: Reporting Structure

influences of a lab's strategic intent. Only a small minority of labs shared a sense of independence from the organization in terms of strategy and structures.

REPORTING STRUCTURES

This visual builds on the insights from the previous section which revealed that reporting structures often influenced the direction and ambition of the work in the design lab. Labs identified that they reported to the following groups:

Quality

Some labs reported into the Quality department accountable to a VP, Quality, Chief Quality Officer or equivalent in the organization. This enabled a holistic view of the two core change processes in the organization, Quality and Innovation. These labs appeared to have a focus on clinical innovation, experience design and some business model innovation. One also had a focus on systems design as part of its work.

Strategy and Innovation

Some labs also reported into the Strategy and/or Innovation function of the organization. These labs seemed to have a closer link to the core direction of the CEO and Board. These labs also had a greater focus on business model innovation and systems change.

Medical Leadership

A third group mentioned was medical leadership. This included the Chief Medical Officer, Chief of a department or other equivalent medical leader. These labs tended to have greater freedom from the organization and some had more of a focus on medical leadership, medical trainees or clinical innovation.

Research

A few labs mentioned that they were created or sustained through research grants These labs either started with a specific focus or evolved based upon the mandate of their grants. These labs did indicate that they may have greater freedom from hospital operations but there also seemed to be some concern regarding stable funding and how they might ensure continuity.

Patient Experience

One lab mentioned that they were created from a partnership with the patient experience team. This lab seemed to be more independent from the organization in its work with more of an academic mandate.

LAB AUTONOMY AND STRATEGY

Design labs shared that their work was influenced by the organization or the person or group that they reported to. True independence from any entity was not found in this work. The closest labs to full independence seemed to be those that existed because of research grants or those that existed through medical leadership. Both of these groups, though, seemed to have concerns around sustainability in that they needed to generate revenue to sustain themselves. The groups that paid for services then had some influence over the lab's direction even if it was latent.

Labs that were funded from operating dollars indicated that they had a responsibility to deliver results on the organization's strategy. This included a focus on experience as a core metric of organizational quality or on a lab's focus in improving hospital operations. Some labs indicated that they were also involved in IT design, user experience design and product design. These labs had a focus on improving current offerings, developing new products to improve current operations or on commercialization. Lastly, some labs indicated that they had a focus on business model innovation and systems transformation. These tended to be associated with strategy or innovation in the organization and were more closely linked to the CEO. These labs were the exception. Regardless of placement within the organization, the ambition of leadership and the strategy of the organization seemed to influence the lab's direction of work. This is discussed below in the "Ambition and Maturity" section.

METRICS OF SUCCESS

One of the goals of this research has been to measure the impact of design labs in the hospital context. Interviewees were able to cite a number of successful projects that

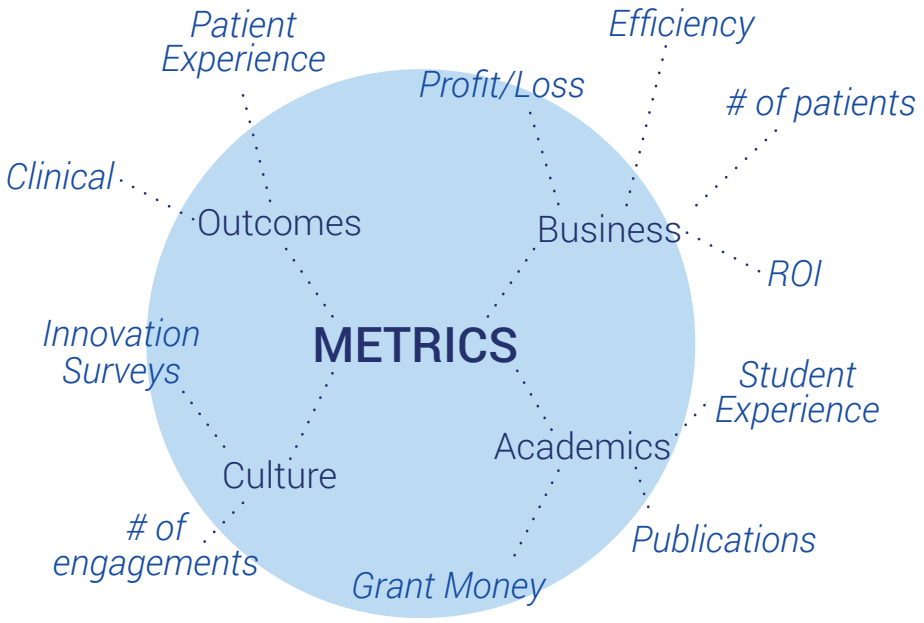


Figure 10: Metrics of Success

they worked on or products that have been developed and scaled. Additionally, longevity and increased funding over time was also cited as proxies for success. From a measurement perspective, four distinct areas were identified to measure success. These are depicted in the figure below through the domains of business, outcomes, culture and research and academia.

Business Outcomes

Business metrics focused on a return on investment for the lab or measurement of innovation activity. Metrics included those based on commercialization of products developed in the lab, the number of patents created, and the number of projects that were in progress or planned in the lab. Additionally, many labs mentioned that their revenue model relied upon external projects which was important to measure and monitor. Efficiency metrics were also mentioned by a couple of labs where process innovation was mentioned as a focus for work.

Clinical and Experience Based Outcomes

Many labs had a focus on improving clinical and experience based outcomes. Measurable improvements were cited in successful clinical interventions designed by labs in this study. Interestingly, there is a paucity of published information as it relates to the impact of design on outcomes. When this was considered as part of a follow up question, it was shared that design research is not fully accepted within mainstream academic research in healthcare.

Labs also shared that they focused on activity related to improving the patient experience as funding models and the industry itself shifts towards acceptance of patient experience as a key quality priority.

Cultural Metrics

Given that many mentioned the rationale for

the lab was associated with shifting culture and mindsets, some labs examined whether or not they could measure its impact in this regard. Outside of surveys that measured engagement or culture, this was said to be more difficult to measure and proxy measures included the number of staff or physicians involved in design initiatives or lab based projects.

Research, Academics and Scholarship

Some labs had affiliations with design programs at universities. This meant that research, academic and scholarship based metrics were critical in these labs. These included the number of papers published or presentations delivered, quantity and quality of learning opportunities for students and the number of grants received for design engagements.

ARE DESIGN LABS AN EFFECTIVE MODEL FOR HEALTHCARE INNOVATION?

Overall, it is difficult to assess whether or not design labs have been an effective model for innovation in hospitals. This may be too specific to measure in a study of this nature. What is measurable, is that organizations shared multiple projects where they have been successful in developing new tools, processes, products, business models and services that had a meaningful impact on experiences and outcomes. Additionally, multiple labs have received more funding to expand operations indicating that the work they do is valued by the organization. As these labs appear to still be relatively new in their evolution, it would be difficult to make a determination of effectiveness but there is self-reported positive impact at many of the labs interviewed.

AMBITION AND MATURITY

An interesting tension emerged between the design ambitions of the lab and the innovation ambition of the organization it was based in. Designers mentioned that they would like to focus on systems-based initiatives like re-framing the concept of health, building healthy communities and ambitious projects like designing hospitals without waiting rooms. The organization, though, often asks designers to help build better visuals or to work on projects like way-finding. These are lower risk initiatives that do make the environment and experience better for patients and staff but often leave designers unsatisfied. This mismatch in ambitions can lead to tension amongst designers and the organization itself. Further, leaders from labs that were more mature (over 3 - 5 years) mentioned periods where they questioned their existence seeking to understand whether the organization could match the lab's ability to think more broadly than just graphic design. One interviewee described the potential for design to help re-imagine futures in saying:

"Design will be more relevant in the future because we can't just look at the work of a hospital and not look at the main goal of the patient or citizen which is to not come to the hospital at all. We need to think about healthy and happy people rather than just curing unhealthy and unhappy people."

To visualize this tension, a maturity model was created named the Ambition and Complexity Model. It is based upon elements of the Design Domains work of Van Patter and Jones (Jones, 2013) and on Richard Buchanan's Four Orders of Design. (1992) An arrow was placed on the left side of the model to indicate that complexity and risk increase as your work moves into the areas of social and systemic transformation. The right side of the model also has an arrow moving upwards which depicts the ambition of the design

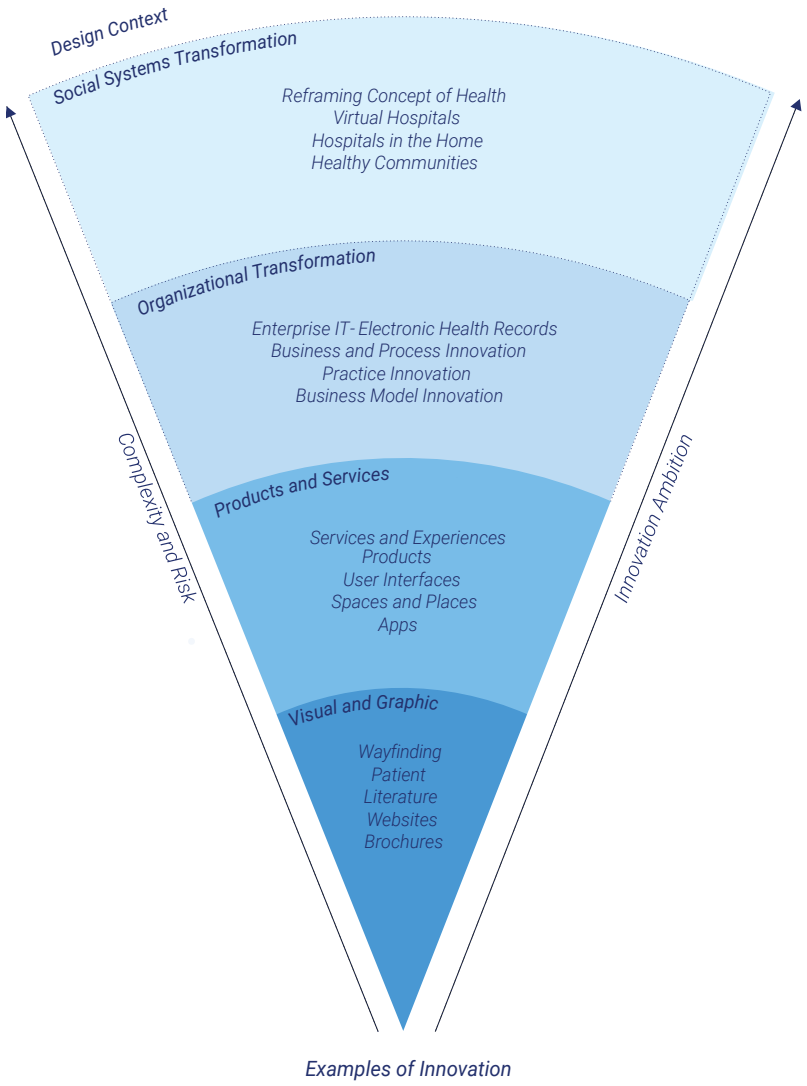


Figure 11: Ambition and Complexity Model

lab and organization's innovation strategy which increases as the lab focuses on higher orders of design. Designers are capable of working in each level but their ambition will naturally move them higher on the model towards systemic design and transformation. Using this framework, if one placed a dot where their current work fits into the layers of the model and then placed another dot on where they wanted to be, there might be a difference between the two places. The mismatch between the lab's ambition and the actual work being done is what is termed the ambition/complexity dilemma and provides an area for dialogue amongst designers, lab leaders and the organization.

THE AMBITION/COMPLEXITY DILEMMA

In the context of this research, participants indicated that hospitals value design in the spaces of graphic design, product design and service design. Systems design has been harder to do. But for patients and families, systems design is actually the area of innovation where there is potentially the greatest impact. It is also the area of highest complexity making it much harder to do, much harder to achieve success in and it presents the greatest risk to the organization. The only way that you can move into systems design is if the ambition of the organization and lab will allow designers to work with stakeholders in this space.

This tension is depicted in the model by the arrow along the left side that refers to complexity and risk. It is inherently more difficult to move towards organizational transformation and social/systemic transformation due to the added complexity

of the work. While a designer can enable activity across all four layers of this model, the complexity of design engagements will make this work more difficult. That is, the domains the designer will be working in are increasingly complex even though the designer would like to work there. One lab shared this tension by saying:

"I'm not sure that the organization understands what design is. What we are asked to do is very much about fixing hospital problems. We're interested in re-framing and designing health and wellbeing broadly. Why can't we do more community work outside the hospital? And I don't know how much of that is what we do or lack of clarity from the organization."

The impression that the design lab could do more was shared by many research participants. Interestingly, this insight was more apparent in labs that had been around longer than 3-5 years and seemed to be indicative of a plateau in ambition as the organization limits the scope of the lab's work. Some shared that when they were new, they took on more graphic design and visual design work in an effort to demonstrate their value. As they matured it appeared as though a plateau was reached unless the lab was enabled by systemic and organizational design. The mismatch between the ambition of the lab and the ambition of the work they are being asked to do is the zone of discontent. It is the delta between these two places that seems to have been the most frustrating for those working in the labs interviewed. The ambition/complexity dilemma is an insight worthy of further exploration by design and innovation leaders in relation to their own

practices and how their labs are structured.

HOW MIGHT WE USE THIS MODEL?

This model is intended to provoke dialogue on the intent behind a hospital's innovation agenda. It depicts a gradual expansion of focus from graphic design to systems design with each domain introducing added complexity and risk. The model may act as a tool for enhancing dialogue on the use of design while measuring the maturity and ambition of the organization's innovation efforts. It may also challenge existing orthodoxies around the limits to design in the organization.

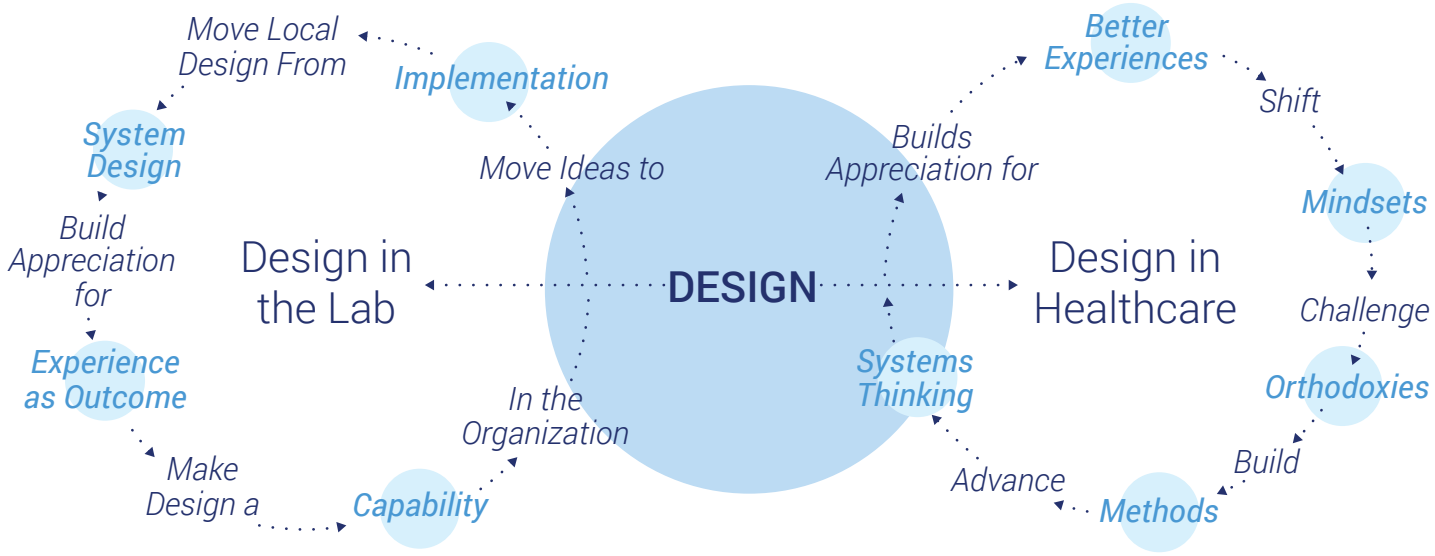


Figure 12: The Future of Design

The last part of the interview focused on questions about the overall future of design in healthcare and the future of their labs focus. Additionally, advice was sought for other designers working in the healthcare space. Responses were as follows:

FUTURE OF DESIGN IN HEALTHCARE

Interviewees shared their perspectives on future uses of design in healthcare and their labs. Responses focused on valuing the experience, shifting mindsets, rigour in design methods and integrating systems thinking and foresight methods into design. The following areas were covered in the responses.

Valuing the Experience

As health care systems embrace the value of the experience (patients, families, staff) as a key component of healthcare quality, they will be looking for new ways improve. Interviewees pointed out that they saw a niche for design as a tool for enabling better experiences. Design can enable healthcare organizations to co-design systems, processes, and products with patients since improving user experience is at the core of its methods. Design may allow organizations to become truly patient centered giving users an opportunity to co-design the services they receive. One person shared this perspective saying, *"We have a lot of resources dedicated to the advancement of medical science, but maybe the art of caring is thinking about the human experience of care and that's where we truly can make an impact using design."*

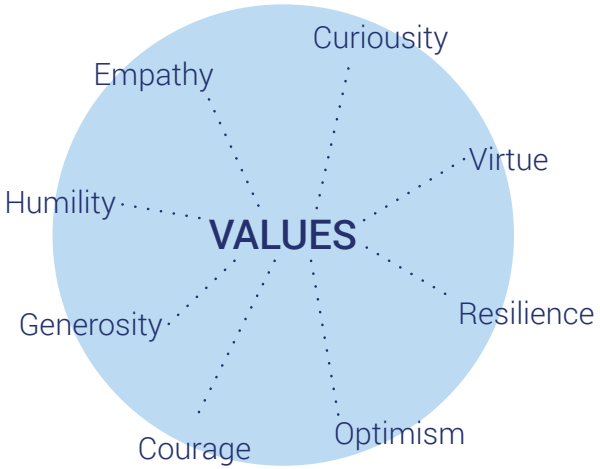


Figure 13: Values

Shifting Mindsets and Challenging Orthodoxies

Design may also be able to help shift the culture of organizations. Design brings form

to an idea provoking conversations that would not naturally occur. These conversations can challenge existing orthodoxies and beliefs allowing the organization to imagine new possibilities in creating services, products and processes. Additionally, it can challenge the philosophy of the healthcare model itself - that is the sick care model. Design may enable us to shift our beliefs from a system predicated on the concept of sickness and chronic disease to one that is framed around health. One lab described this as: *"we have to come to the understanding that we need to stop thinking about health care and start thinking about health. We have to stop thinking about chronic disease and start thinking about chronic health."*

Rigour in Methods

One of the challenges previously mentioned in this work was that design is not accepted as a scientific discipline in most academic and hospital environments. A few mentioned that in order to overcome this it's incumbent upon designers in healthcare to be rigorous in applying design methods and tools. They should focus on design's methods as valid, academically defensible forms of research that are underpinned by structured methodologies. There was a feeling shared by some that design was sometimes being used as "innovation theatre" rather than as a tool for better experiences and outcomes, although this was not universal.

Systems and Foresight Focus

While labs have developed new products, processes or tools, many shared the feeling that they were only in the infancy of using design to guide the future of healthcare. Some labs indicated that they were interested in exploring the integration of foresight methods and systems thinking into the design process to enable dialogue and ideation at the strategic and systemic level. The ability to elevate design to the levels of organizational or systemic innovation was shared by numerous people. Design may have the ability to nudge human systems forward, changing cultures along the way. A lab described this process as:

"For us, we are looking at how you can integrate systems thinking and foresight into the design process. To achieve culture change, how do you engage people in a more complex dialogue about the future? This is the next generation beyond design thinking. We recently did a futures workshop imagining possible future scenarios ten years out This allows stakeholders to go beyond incremental thinking, to be more expansive in their thinking and to incorporate trends and influences outside of health care into the design process."

FUTURE OF THE DESIGN LAB IN THE HOSPITAL

Following questions on the future of healthcare design, each interviewee was asked to reflect on their lab and what they see as possible future directions. It was interesting to note that a number of labs felt they were at an existential moment in their existence as they matured in their design practices while the organization shifted towards acceptance of their design practice. Some felt that they wanted to do more and to play a role in reshaping the health system, others felt they needed to pivot so that they could re-frame their value in the organization. Some of the key themes that they reflected on included the following:

Shift from Ideas to Implementation

Labs shared that although some have had success in developing and scaling innovations, there was still more to be done in moving ideas to implementation. One lab referenced how a design approach can support teams with implementing ideas that have been successfully tested but never scaled. Using design can help move ideas along a continuum from ideation to a focus on implementation, scaling and sustaining innovations. This was not shared universally as a strategic objective but it was acknowledged that without implementation, ideas may be left untested and their potential not realized.

Local Design to Systems Design

Responses related to the future of design also indicated a desire to position the lab as an enabler of system change. Whether it was to re-imagine the future of healthcare or to enable a co-design process at the systems level, labs were keen to advance the impact of their work and to use design as a strategic capability in the organization. Examples of this were how a hospital may re-imagine its business without the need for physical space (virtual hospitals) or how it might design a hospital without waiting rooms. Some also framed this dialogue as moving from tactical engagements to systems based ones or from working on smaller scale projects to larger ones. Many sought the ability to move towards a transformational level of change.

Further Entrench Experience as a Valued Outcome

Some labs were focusing on advancing the patient experience as a core innovation space of the lab and organization. There was a feeling that healthcare still had a lot of progress to make before they reached the level of other industries when it came to creating exceptional experiences. Labs saw

their own value in this space and some saw advancing this as core to their future efforts.

Design as a Core Capability

An interesting insight from a few labs was that they wanted to move design towards a core capability in the organization. One interviewee spoke about moving design practices situated in a lab to a capability that is ubiquitous. Interestingly, this was only shared by labs that were more mature in their evolution possibly indicating a refinement in approaches as one gains experience using design in a hospital and in the organization's acceptance of its value.

ADVICE TO OTHER HOSPITAL DESIGN LABS

The final question in the interview sought advice on the future of design in healthcare. Their advice clustered into the following themes:

Be Rigorous

It has been difficult to establish design as an accepted method given the evidence-based paradigm of medicine and healthcare. Some spoke to the need to match the logic of medicine with that of design. Designers need to be true to their methods and ensure that their work is rigorous and valid. Demonstrating the rigorous logic of design will help people understand its place in the medical environment as it competes with more scientific approaches to change. This does not mean that design becomes a rigid endeavour, rather designers should pay attention to explaining their research methods and how insights were gathered. This will help legitimize design methods in scientific settings. One interviewee described this as:

"I see Human Centered Design becoming more legitimate within the scientific community. I think there's room to expand and educate our clinical partners and our academic partners on the rigour of Human Centered Design. I don't want to turn it

into a science but we have a defined methodology and we have a defined process. I'd like to see an even match between human centered design as a research methodology and that of more traditional scientific approaches in healthcare."

Hold on to Core Ideals of Design

Design is needed in healthcare today. Healthcare is sometimes difficult as hospitals face increasing demand, higher expenses and pressure from funders to lower costs of care. It sometimes is not an industry filled with joy despite the miracles it performs every day. Design is about being generous, optimistic, creative and seeking new ideas. All of these are needed in healthcare and should be embraced by the designer working in the healthcare space. Bringing these attributes into healthcare institutions can sometimes be met with scepticism; but it can be overcome by being true to design's principles.

Understand Complexity of Healthcare

The number of people interviewed in this work that did not come from a traditional healthcare background was notable. It was also interesting to hear them talk about their experiences in healthcare compared to other industries. It was shared multiple times that designers in healthcare need to take the time to understand the complexity of the environment and understand the motivations of stakeholders working within it. Two designers who had worked in other industries mentioned that it was the most complex environment that they had ever worked in but they also mentioned that it felt like the most rewarding. Others mentioned that designers in their lab had left healthcare as they grew tired of the slow pace of change. One designer's advice for others designing in the healthcare space was:

"You need to have an understanding of the complexity of the healthcare system to be able to use design in it. Don't just come into healthcare with your post it notes and think you will solve the world's problems because you will get kicked out really fast."

CHAPTER 03

SENSE MAKING: THE SYNTHESIS MAP

CHAPTER 03

This section is intended to support a review of the Synthesis Map that accompanies this report. It describes the elements of the map and expands on the visuals in the map. The Map is intended as a tool for dialogue amongst a group of people discussing a lab or how design may be used in healthcare. If this section is read without the Map, it will feel as though it repeats the previous Chapter. If you do not intend to review the Map, feel free to move forward to Chapter 4.

People interviewed in this research generously shared their experience in leading design based initiatives in healthcare. The synthesis map visualizes responses from participants and frames the lab in the context of a health innovation ecosystem. The intent behind the creation of the map was to represent the findings in a manner that would make insights available for future use. The map may be used as an analysis tool for hospitals interested in investing in a lab or as a thinking tool for the design practitioner to better understand strategic decisions made in the construction of a lab. It may also be used by stakeholders as an opportunity to view the lab within the context of the hospital and to visualize its sense of place.

The synthesis map includes principles for consideration in building a design lab or practice in a hospital. These are framed within the context of a Business Model Canvas that has been termed the Health Design Lab Canvas. The Canvas, supported

by the Synthesis Map, may enable strategic conversations about design in hospitals.

The metaphor of a flower was used to draw focus back to the intent of the lab; to nurture and grow ideas that meet human needs. The map is divided into four sections which include the lab's purpose, its place, impact and the future. The preceding section, (Chapter 2) contains the detailed insights used in each section of the map. The following sections break down each of these key elements:

Purpose

WHAT DOES A DESIGN LAB LOOK LIKE?

This section of the map highlights elements of the lab's rationale and structure. It also considers the labs "point of view" or what it is trying to achieve. Linking rationale, focus and metrics allows the user to see the importance of setting direction. This also allows the user to consider the resources and skills that it may need to achieve results related to the lab's direction. Matching resources to purpose was mentioned by multiple labs as a key ingredient to achieve success. The following areas are outlined in this section of the map:

A) Skill Mix

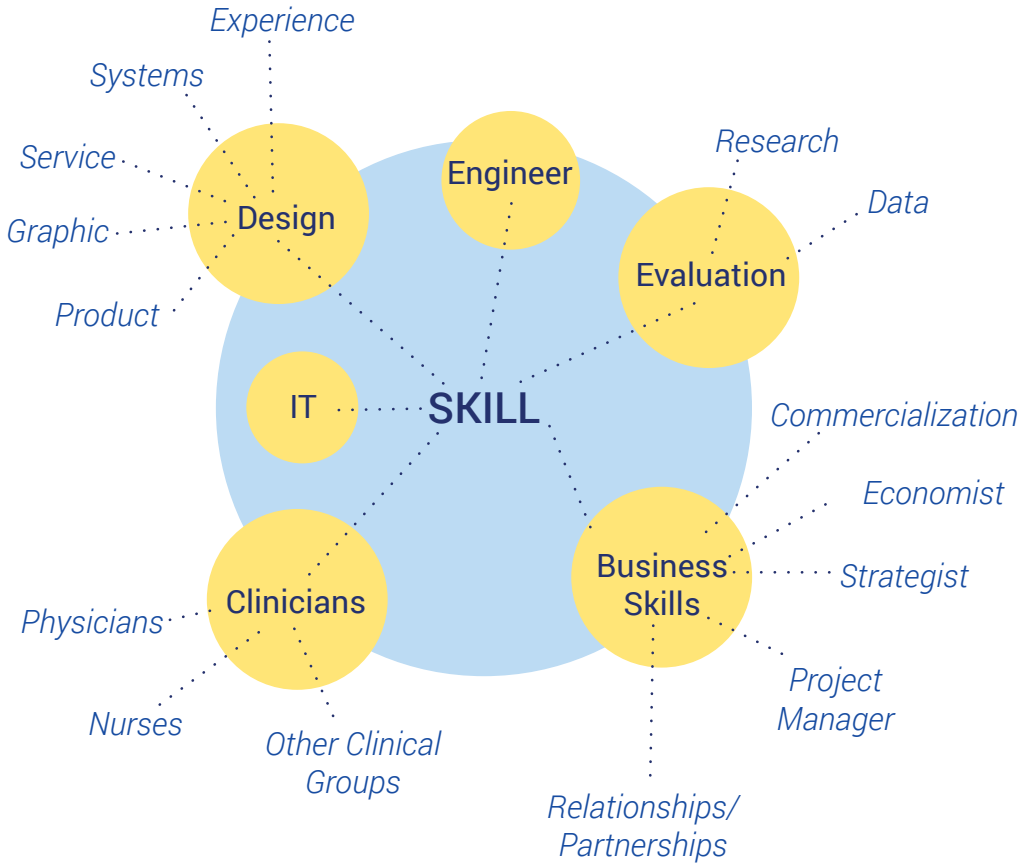


Figure 1: Skill Mix

Labs identified a range of design skills including graphic, service, experience and product designers. Physicians or other clinicians, engineers, strategists, economists, researchers, project managers, IT staff, data specialists, business managers and commercialization experts were also listed. The key distinction in why certain mixes were chosen was the intent of the lab, or the scope of what it was trying to achieve.

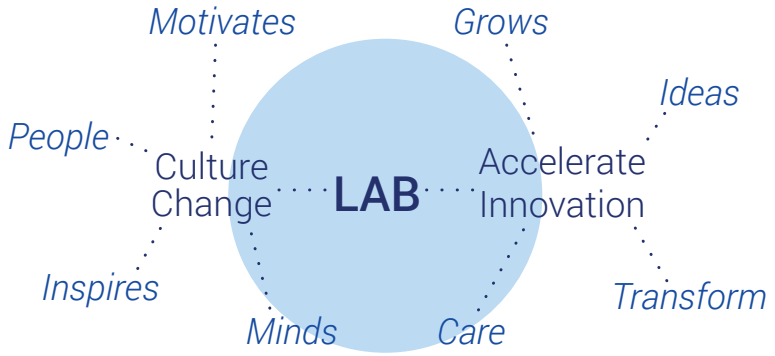


Figure 3: Rationale for Use

B) Rationale for Use

The lab is an enabler of culture change and/or an enabler for innovation. Both were mentioned in interviews. It's a space to inspire, motivate, grow ideas, lead, transform, re-imagine and catalyse. It can also be a space to imagine and build a better future. The

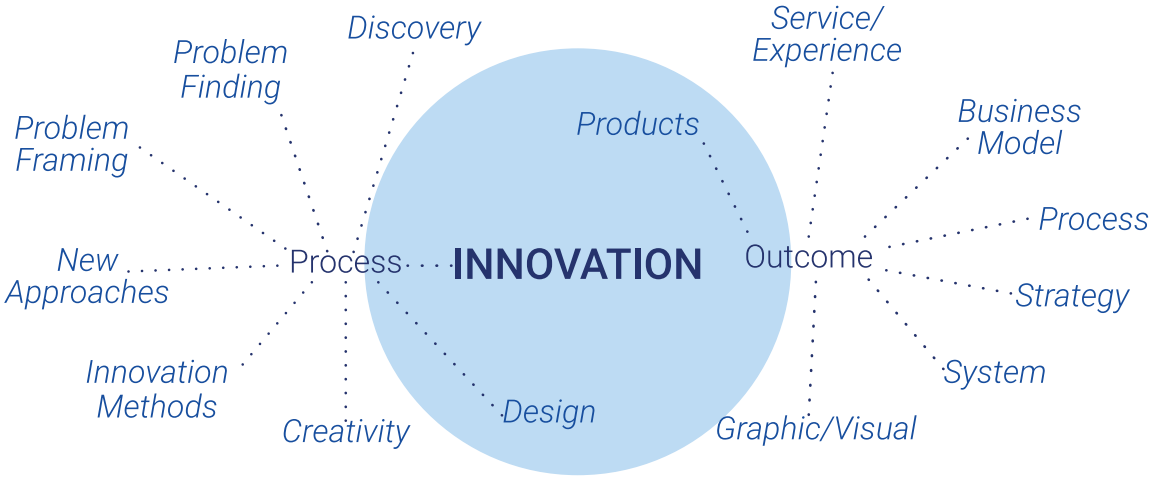


Figure 4: Innovation Focus

lab's rationale is grounded in its manifesto or mission which is built from its strategy.

C) Innovation Focus

Building on the lab's rationale is the focus of its work and the types of innovations that the lab intends to create. The range of innovation can be from products to systems innovation but understanding the intent is important. The lab may also focus on improvement activity if that is the choice of the lab and the organization.

D) Barriers to Innovation

Anticipating barriers to innovation will allow the lab to anticipate what it may need to overcome. These include time constraints, funding, hierarchies, risk aversion, over reliance on data and silos.

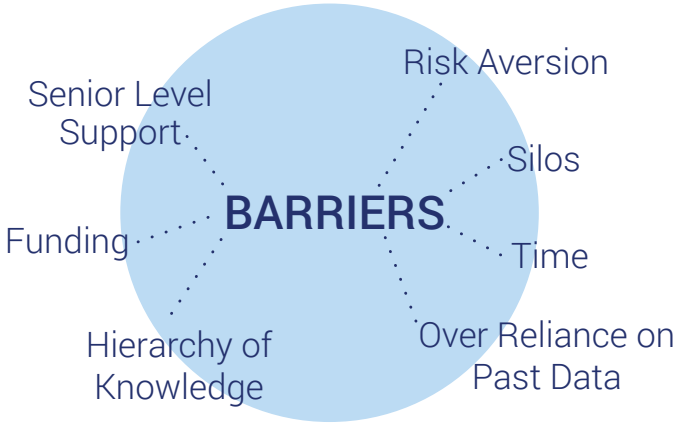


Figure 5: Barriers for Innovation

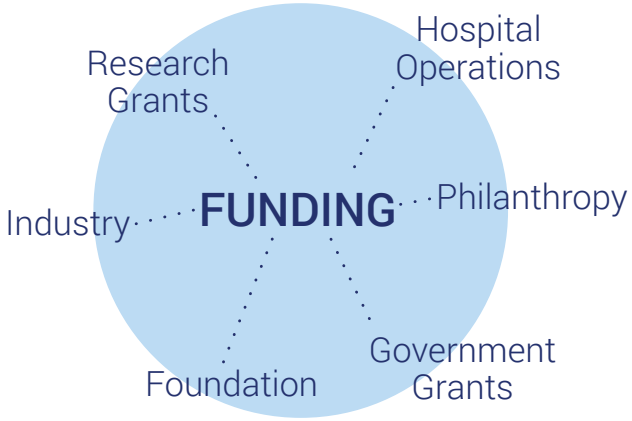


Figure 2: Funding

E) Funding

Labs should consider a balance of funding sources in creating their lab. Sources may include stable base funding from the organization, research dollars, foundation grants, philanthropy, industry contracts and government grants. Most labs shared that they did look at a variety of sources for sustainability.

Place

WHAT IS THE DESIGN LAB'S SENSE OF PLACE?

This section of the map depicts the relationships the lab has with internal and external stakeholders and the direction of its work whether it is improvement, innovation or a combination of both. Understanding the lab's "place" in the organization is critical to understanding how it is going to meet its objectives.

A) Internal Relationships

The lab has relationships with a number of internal stakeholders including IT, decision support, clinical teams, learners, process improvement/QI teams and patients and families. Interviewees shared that the lab must be thoughtful about who they engage with and seek out ways to nurture these relationships. Their credibility and success lies in the ability to help and support internal stakeholders through change initiatives. They will also

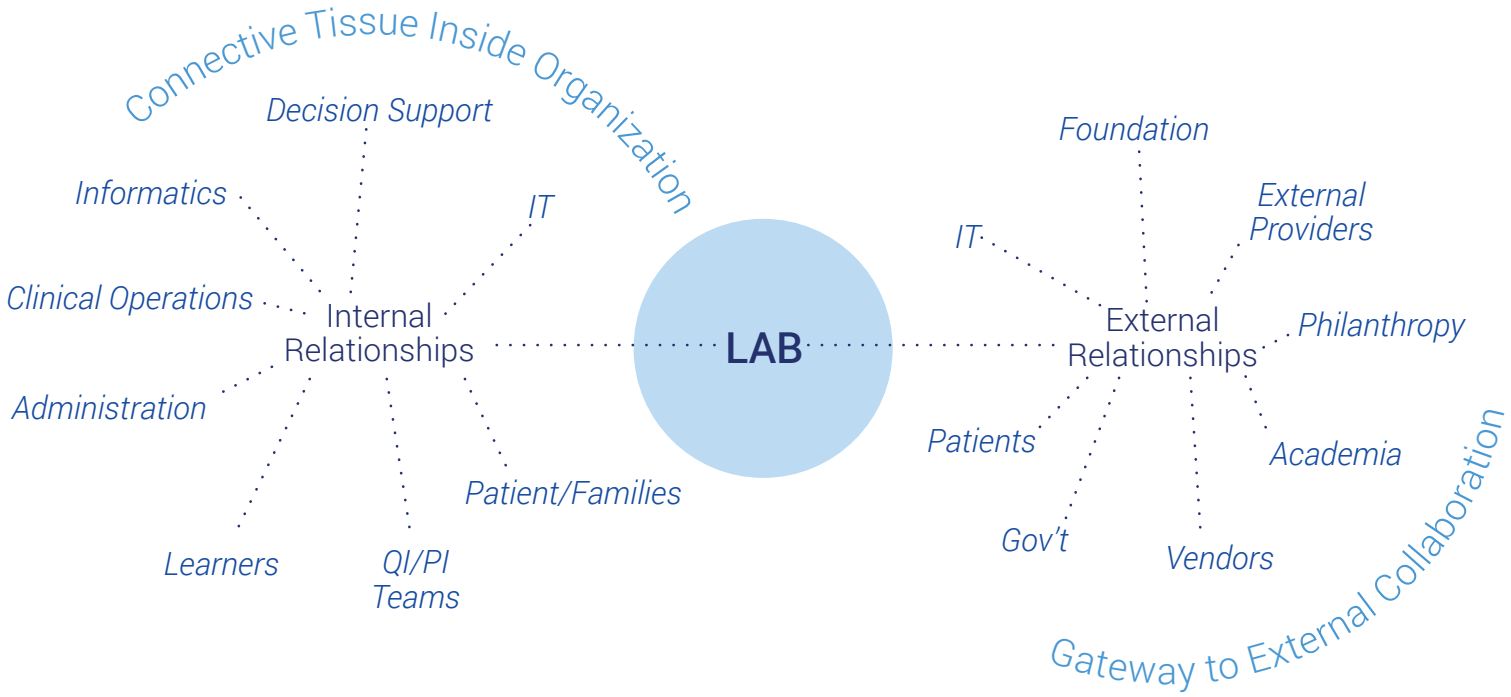


Figure 6: Internal and external relationships

rely on support services to scale and sustain innovations so internal partnerships are important to nurture.

B) External Relationships

The lab has a number of external relationships that are either partnership based or transactional in nature. These may include funders, innovation partners, government, academia, vendors, IT firms and other healthcare providers. The partnerships that the lab establishes will be a key ingredient in the outcomes that it will achieve. Care must be given in building strategic partnerships, alliances and relationships in order to help the lab and organization achieve success.

C) QI and Innovation

This figure depicts how innovation and improvement were described and the differences and similarities between each. Understanding that innovation and improvement are two different dimensions of change is critical. Then framing design efforts within the realm of improvement (process innovation) and/or transformational innovation is important to set expectations and define the scope of initiatives. This section of the map depicts the relationships between the two and how they link to intent.

Impact

HOW ARE DESIGN LABS MAKING AN IMPACT?

A consistent insight across interviewees in this research has been to align the direction of the lab's design initiatives with a stated intent. Doing so enables designers to focus their creative efforts around strategically important innovation spaces and it provides clarity for stakeholders so that they are able to interact with the lab in a transparent manner. Political realities

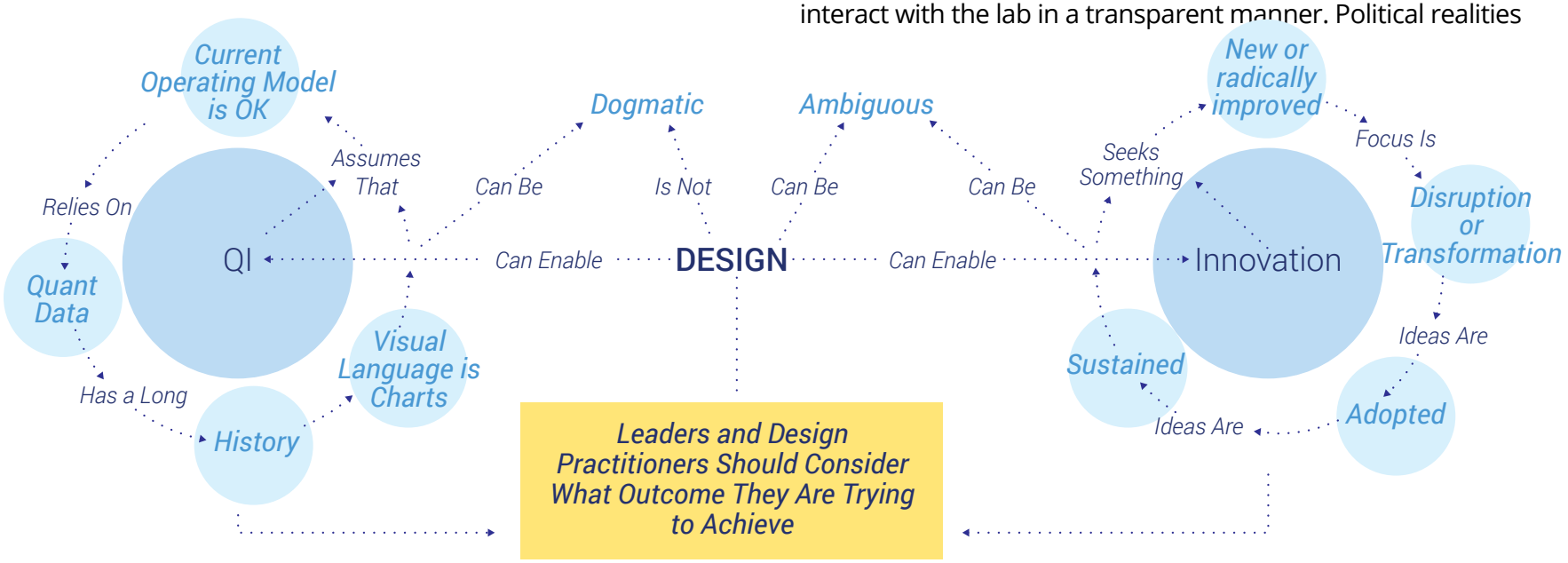


Figure 7: QI and innovation

of each organization will determine the independence or dependence the lab has with the organization but aligning the direction of the lab with the organization seems to offer the ability to move ideas towards implementation. Mention should be made that design can enable the development of the organization's strategy itself forcing the organization to move its thinking past current state into plausible futures that are important to patients, families and communities.

A) Strategy and Intent

Design is effective in enabling and supporting different types of change initiatives in an organization. Understanding the link between strategy and innovation will create clarity in setting the ambition of the organization and the lab. Most labs had defined a manifesto or mission to reflect their design point of view or intent along with their ambition. This process sets expectations for those in the lab and those working with it around the scope and spaces for innovation and the focus of design activity.

B) Reporting Structure

Reporting structures influenced the nature and ambition of the work

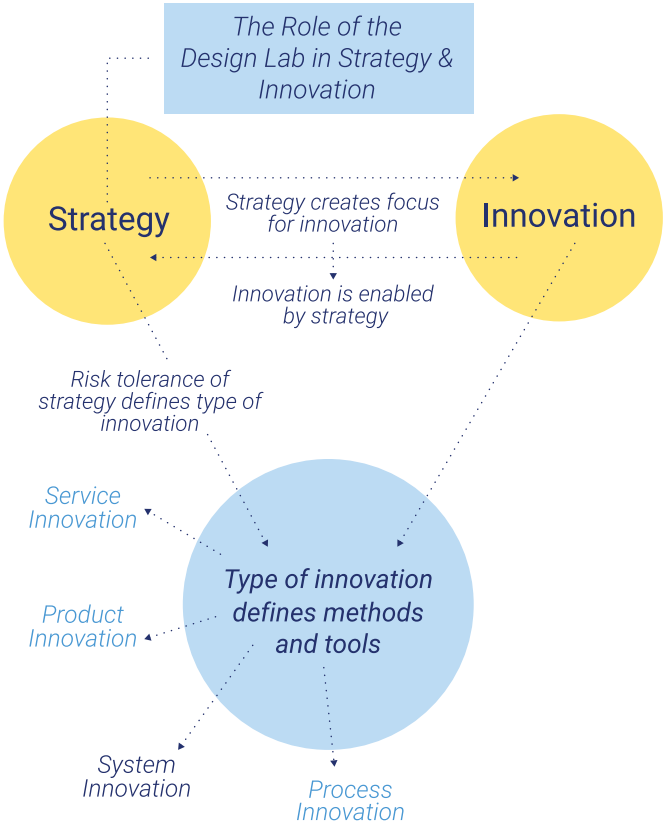


Figure 8: Strategy, innovation and the role of design lab

Figure 9: Reporting Structure

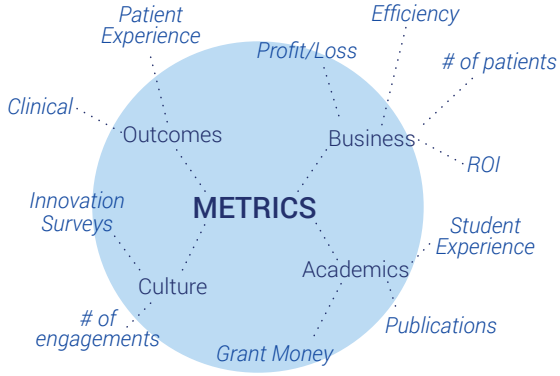


Figure 10: Metrics of Success

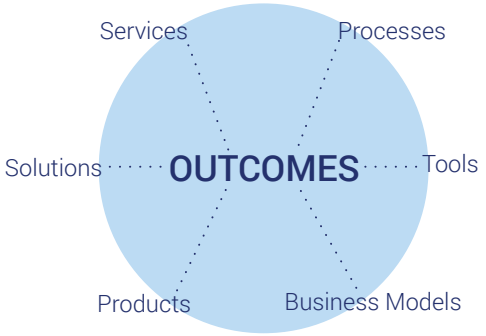


Figure 14: Outcomes

of the lab. Labs indicated that they reported to Quality, Strategy, Innovation, Medical Leadership, Research and/or Patient Experience. Each had separate considerations as it relates to strategy and intent but none seemed to have complete independence in what they did.

C) Metrics of Success

To determine the impact that the lab is having on the organization it is important to attempt to quantify the difference it is making. This may include a range of metrics including business outcomes, clinical and experience outcomes, culture and impact associated with research and academia.

D) Outcomes

Labs shared examples of successful projects using design in healthcare. These include examples of new tools, processes, solutions and services that have had an impact on patient experiences and outcomes. Labs also shared that longevity, organizational reinvestment and contracts with external organizations were proxy measures for the success of their work.

E) Ambition and Complexity Model

Interviewees clearly established the link between strategic intent and desired outcomes. They also shared that design could enable transformation and better health for patients, families, staff, physicians

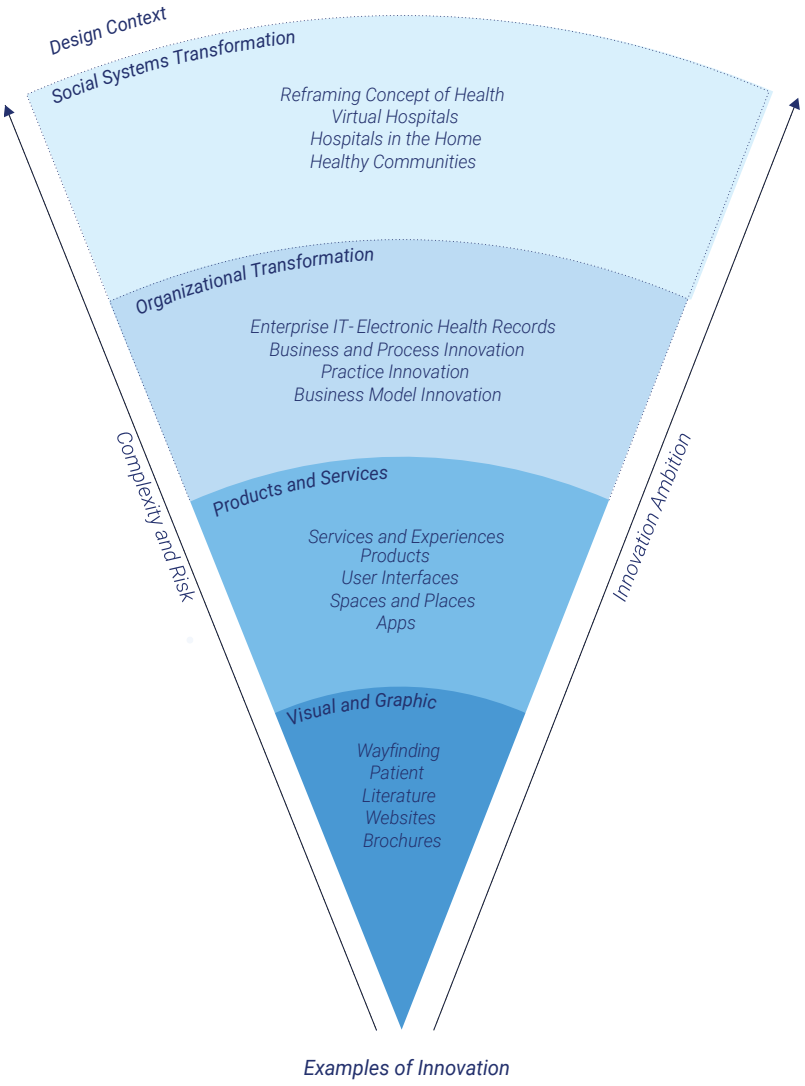


Figure 11: Ambition and Complexity Model

and the community. Using the Jones/Van Patten Design Domains model as its inspiration, the Ambition and Complexity Model was created to better understand a lab's ambition and maturity while provoking dialogue on what a lab may achieve. The model depicts the domains of design within the context of complexity and risk along with the innovation ambition of the organization and lab. The alignment between an organization's ambition and the lab's ambition is important to consider. For those labs where the gap is large between these two points, it seemed there may be a larger zone of discontent and space to discuss how the lab will continue to serve the organization.

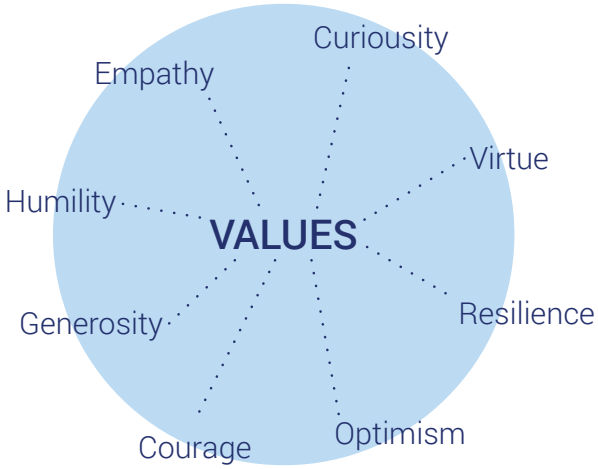


Figure 13: Values

Future

HOW MIGHT WE BUILD OR CRITICALLY ASSESS A DESIGN LAB?

Participants in this research were from some of the most established hospital based design practices in the world. Their insights informed the development of the following section of the map which articulates how a design lab might be formed or areas to consider when assessing the function of a current lab.

A) Values

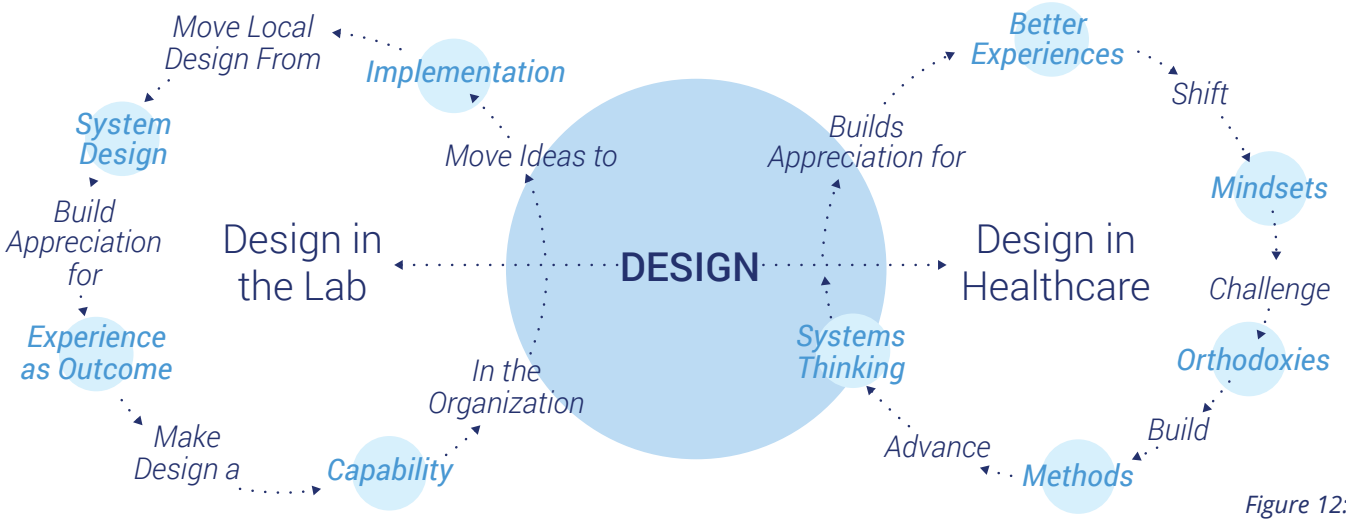


Figure 12: The Future of Design

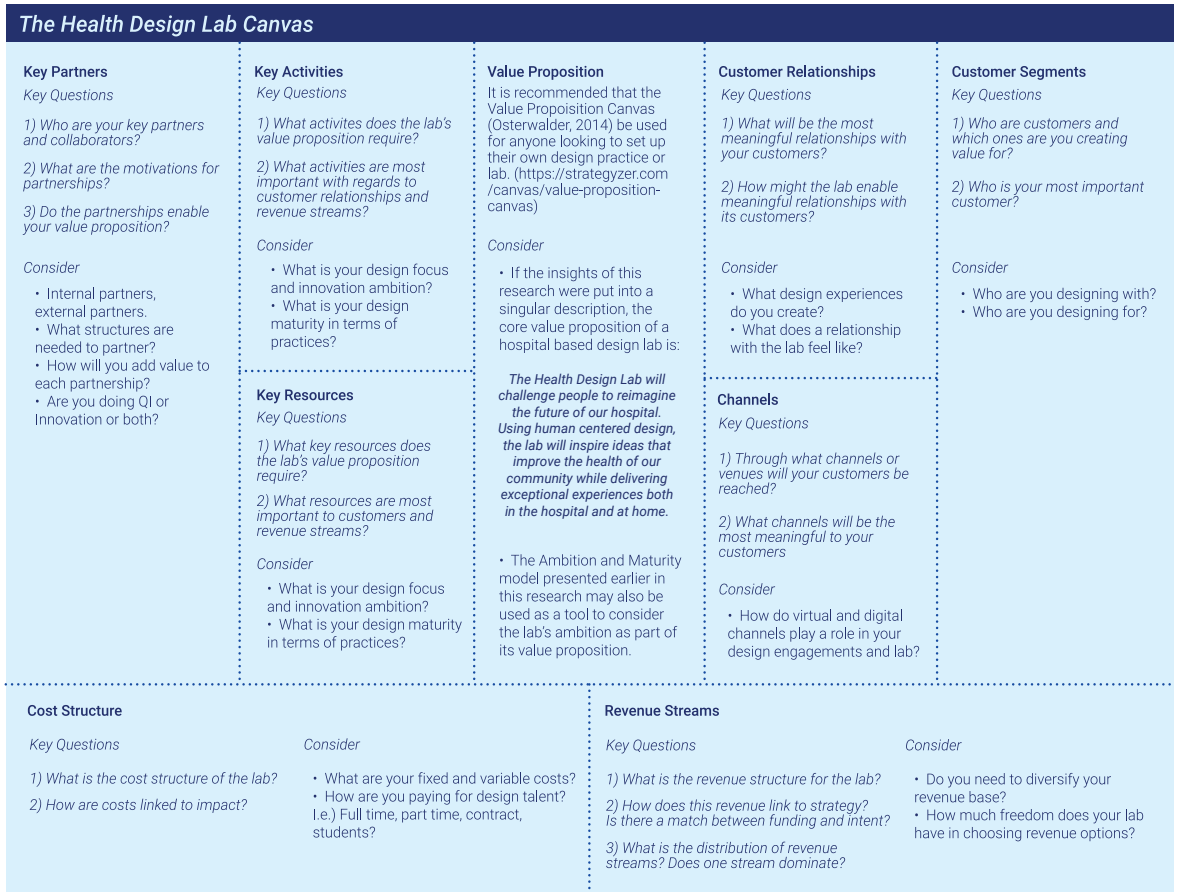
Interviewees shared advice for those seeking to use design in healthcare. Taking from this wisdom, values were embedded into the process map to consider when building your design practice.

B) Future of Design

Design has a number of possible future uses in healthcare including improving patient experiences, shifting mindsets and challenging orthodoxies. Design can enable strategy and it was felt that it could influence transformational changes in healthcare if it was further leveraged.

C) The Health Design Lab Canvas

Chapter four will examine the creation and use of the Health Design Lab Canvas and its accompanying design principles. The canvas can be used to create a new lab or to review the work of a current design lab using the perspectives and insights revealed in this research.



CHAPTER 04

HEALTH DESIGN LAB CANVAS AND DESIGN PRINCIPLES

CHAPTER 04

Infrastructure

One of the goals of this work is to advance the understanding of how a design lab functions and the impact that it may achieve, but what should an organization consider when building its own lab or seeking to pivot an existing lab's focus? The Synthesis Map allows for dialogue on insights generated through this research. The next step is to consider how a lab may be built.

The Business Model Canvas (Osterwalder, 2010) is a strategic management template for developing new business models or documenting current ones. In this work, the Business Model Canvas has been used to create a Health Design Lab Canvas as a model for designers or healthcare leaders to consider. To support the use of the canvas, eight design principles are offered which articulate the most relevant insights from this research. It is hoped that together the Health Design Lab Canvas and the design principles may allow this research to be used by others seeking to advance health design in their own organizations.

KEY PARTNERS

Key questions to consider in this section are:

1) Who are your key partners and collaborators?

2) What are the motivations for partnerships?

3) Do the partnerships enable your value proposition?

Labs described a broad array of internal and external partners that an organization needs to engage for the lab's success. The lab acts as the connective tissue inside the organization and it is the gateway to collaboration externally. Internally, administration, clinicians, staff, IT, informatics, QI teams, patients and families were all mentioned as critical enablers of the lab's activity.

Externally, a broader array of stakeholders was mentioned including foundations, external funders, government, private firms, not for profits, social organizations, patients and families. Partnerships, whether internal or external, should be guided by the strategy or intent of the lab and the projects it has taken on. Choosing partners wisely is critical for the success of the lab.

MOTIVATIONS FOR PARTNERSHIPS

An interesting insight from some interviews was that the lab may act as a body that can "de-risk" the innovation process. This means that while it would be difficult in the course of normal operations to propose wild ideas like virtual hospitals, the lab can. It can reduce the risk of innovation by creating a safe space for organizations to talk about and ideate around potentially controversial ideas. Additionally, most hospitals are bound by complex arrangements related to procurement, finance and risk that sometimes make it difficult to work with private organizations. The lab can invite partners in to imagine new solutions or processes and it allows for a safe space for this type of collaboration to happen. Labs that were moving in this direction talked about arrangements with their finance, risk/legal and privacy teams to satisfy the organization's obligations while working with external partners.

Inside the organization, partnerships were also created as a way to connect everyday operations with innovation. That is to create time and space to innovate and think outside of the norms of everyday clinical activity. Some spoke to this aspect of the lab's work being the most rewarding where they could take front line clinicians and staff away from their work to create better experiences. Creativity in building appropriate internal relationships was advised along with selecting the right projects to engage in so that there is a strategic fit, heightening the likelihood of success in their work.

KEY ACTIVITIES

Key questions for consideration in this section are:

1) **What key activities does the lab's value proposition require?**
2) **What activities are most important with regards to customer relationships and revenue streams?**

The design lab can be the nexus of inspiration, ideation, creation and implementation in the hospital. Depending on the strategy and focus, the lab brings people together to understand needs, frame problems, develop prototypes and test changes. The creative process is a core activity of the lab leveraging the tools, methods, skills and mindset of the designer to achieve results. The lab offers clinicians and patients a safe space to co-create and build a better future. Some labs cited examples of moving past prototypes towards implementation and commercialization. For those labs moving into this phase of the innovation process, it requires different skills, processes and competencies in order to be successful.

The activities most important with regards to customer relationships are the creative process; curating the design process from ideation to implementation and bringing together diverse groups of people in co-creation. It is often the ability of the lab to bring together diverse groups to innovate where the lab will find value in the organization. At its foundation, the lab needs to be able to curate amazing design experiences that will keep customers engaged and requesting increasingly sophisticated work.

KEY RESOURCES

Key questions for consideration in this section are:

1) **What key resources does the lab's value proposition require?**

2) **What resources are most important to customers and revenue streams?**

The lab will require a number of physical and non-physical resources to be able deliver on its value proposition. The following areas should be considered:

Physical

Although not all labs interviewed cited dedicated physical space for their work, those that did indicated that it provides space for people to get excited, feel inspired and to get away from their everyday environment. As the intent of most work in the lab is to inspire creativity, creating a physical space where compelling design engagements may happen is important to consider. Physical space also tends to become a drawing point where external funders, donors and partners can come to be inspired or work with partners inside the organization. Depending on the ambition of the organization and lab, physical assets ranged from white boards, post-its and markers to maker labs with 3D printers, industrial presses and wood working shops.

Intellectual

The design lab needs to consider a variety of skills depending on ambition and focus. Some labs mentioned that design skills are at a premium in their markets and that it was difficult to source talent. Others mentioned that designers were coming from other industries because they were attracted to the mission of healthcare, which is to make things better for people. These designers sometimes became frustrated at their experience in health care feeling stifled by the pace of change, hierarchy or a lack of ambition by the organization they worked in. Matching design talent with the focus of the work is important.

Local market forces should also be considered related to the availability of design talent in different parts of the world. People that are enthusiastic, humble, generous and optimistic were said to be able to learn design on the job and support a team of designers on their mandate. One lab spoke to hiring a team of formal designers with apprentices who may not have formal design training. With constraints on budgets and the availability of talent in some areas, this approach is an interesting one to consider.

Outside of designers, a variety of other skill sets were cited. Business skills, evaluation, research, IT, project coordination and communications should be considered. These people can enable the work of designers and they can enable the spread of ideas into implementation and commercialization if it is the mandate of the work.

Financial

Sustainability is a consideration for most hospitals and healthcare organizations. A critical enabler of many hospital labs has been their funding model. Many labs shared that they were funded predominantly from operating funds. They had steady annual funding available linked to a senior leader's portfolio in the organization. This allowed for better financial planning and the ability to link the lab's work to strategic priorities. Consideration should be given to setting up a multi-year funding arrangement in the organization as some labs indicated that their innovation processes often crossed years and stable funding enabled their ability to succeed. Where this is not possible research grants, donors, external contracts and fee for service models were all mentioned for revenue generation.

Offering

VALUE PROPOSITION

It is recommended that the Value Proposition Canvas (Osterwalder, 2014) be used to create a value proposition for a lab. (https://strategyzer.com/canvas/value-proposition-canvas) This tool will compliment the Health Design Lab Canvas and allow the user to create a value proposition designed for their local environment and needs. When developing the value proposition, the intent of design efforts and ambition of the strategy should be considered. The Ambition and Complexity Model previously shared in this report may provide a tool that is relevant to guide discussions on what the lab is seeking to achieve, the ambition of the outcomes that the lab wants to generate and the tools and skills needed to enable it.

If the insights of this work were put into a singular value proposition of a hospital based design lab it would look like the following:

The Health Design Lab will challenge people to re-imagine the future of our hospital. Using human centered design, the lab will inspire ideas that improve the health of our community while delivering exceptional experiences both in the hospital and at home.

This value proposition describes what was heard across interviews and gives an insight into the rationale behind the development of design labs in this project.

Labs shared a variety of approaches to driving value in the organization. Some spoke of impacting culture, others spoke of creating compelling experiences, some spoke of new business models and others spoke about products that were created. Regardless of the nature of the innovation, labs spoke about creating something new and different than what was offered today. They spoke about transforming the experience for healthcare providers and patients and families. Many responses on value were framed in words like imagine, catalyse, improve, transform and create. The lab was a space where all of this could happen. Interestingly, some organizations that have been using design for a longer period of time (5 years plus) have started to augment the lab's offerings by making design a core competency or capability. The intent or value of design remains the same but they have shifted their ambition moving design past

a physical lab and temporal entity into an organizational mindset that is enduring.

Customers

CUSTOMER SEGMENTS

Key questions for consideration in this section are:

1) **Who are your customers and which ones are you creating value for?**

2) **Who is your most important customer?**

Labs identified customers in two ways. The first customer segment was those they were designing for, or the people who would yield the value of the innovations that were created in the lab. Depending on the focus of the lab, this could be an individual patient, a cohort of patients like those in a department, unit or clinic, or a particular disease group like cancer patients, or entire communities. Setting the focus of the design lab determines which of these customer groups becomes important.

The second way in which customers were identified are those that are seeking to innovate or to "do design." These are clinical operations, physicians and other clinical provider groups, funders, external bodies wishing to engage with the lab or researchers. These groups often purchased services or time with the lab and became customers. Mention should be made that sometimes these customers could drive the mandate of the lab if it became too dependent on their funds as the sole source of revenue.

Lastly, for many labs, the primary customer of the lab is the organization itself. Consideration should be given to the relationship with the organization, the link between the lab's strategy and the organization's strategy and how the lab will inspire and create beyond the ambition of the organization's strategy. Determining how the inevitable tension will be managed when the lab is pushing beyond he organization's mandate should also be considered. Often the lab is seeking to move outside the boundaries of the hospital itself whereas the hospital is asking the lab to optimize current operations. This is a key insight and something that needs to be managed when considering customers in a hospital-based design lab.

Labs should also consider what is the role of the patient, citizen or community? Are they a customer? A supplier? A partner? They may be all of these but this should be

acknowledged as part of discussions regarding the lab's structure, mandate and focus.

CHANNELS

Key questions for consideration in this section are:

1) Through what channels or venues will your customers be reached?

2) What channels will be most meaningful to your customers?

Human centered design involves observing humans interacting with their environment, interviewing them, understanding them and creating with them. This builds the need for physical space to engage with customers and/or the ability to be versatile in bringing a design lab to whatever setting you are designing in. The vast majority of labs interviewed indicated that they did have their own physical space to co-create with and engage their customers.

An interesting insight also indicated that more labs were adopting virtual solutions to engage with customers. Using social media, online forms and smart phones for quick touch points with customers were cited as ways in which labs were trying to be creative in reaching customers. Particularly with clinical partners whose time was often constrained, designers were using virtual media to engage people in the design process. Additionally, going to clinical spaces and engaging them while they have downtime in their clinics was another method that designers were using to engage. Hospital environments seemed to be less than ideal environments and indeed not very "lab" like so designers find themselves using creative methods to reach users and gather insights.

CUSTOMER RELATIONSHIPS

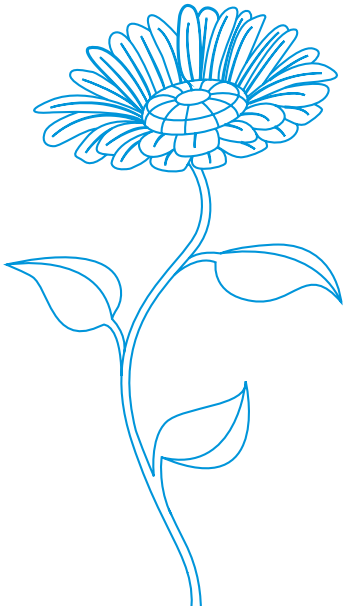
Key questions for consideration in this section are:

1) What will be the most meaningful

relationships with your customers?

2) How might the lab enable meaningful relationships with its customers?

Customer relationships within the lab are usually framed around co-creation. Those engaging with the lab will often not know what they are seeking or come with predetermined solutions that they wish to implement. Labs mentioned that they screened engagements and often turned down work where people came with solutions they sought to implement. Often these were better served by approaches like project management or QI. When customers were willing to spend time finding out what problems they were trying to solve, then the lab was able to engage with customers in a meaningful way. Additionally, some labs mentioned that they have been able to build communities of change makers in the hospital that engage with the lab on a variety of initiatives. Once design and the innovation process is better understood, people learn how to better interact with the lab and customer relationships are strengthened. This is often a result of "doing" design work so unless its experienced as a customer, sometimes design can be misunderstood by stakeholders.



Another enabler as it relates to customer relationships is that labs may look to their own design methods and tools to create meaningful relationships with customers. What are your customers' needs? How does the lab enable connections and relationships with each customer segment and do customers value their experience in working with the lab? Designers and the lab should be well placed to enable outstanding customer experiences through the design process itself. Many entities, both inside and outside of the hospital, will be looking to

have a tangible outcome of their partnership with the lab and this should be considered while building meaningful relationships.

Finances

COST STRUCTURES

Key questions for consideration in this section are:

1) What is the cost structure of the lab?

2) How are costs linked to impact?

Most labs function on a blend of fixed and variable costs depending on the engagements and partnerships the lab has at any moment in time. The labs have a core group of design talent working in house but many mentioned the ability to contract out services to other designers or engage student designers as projects grow. A blend of in house staff, contracted designers and/or students seemed to be the optimal model that most labs adopted allowing for the ability to execute on a core set of design projects while scaling up as needed. Variable costs seem to be project dependent and focused on design talent. Fixed costs include overhead related to lab infrastructure and other staff.

REVENUE STREAMS

Key questions for consideration in this section are:

1) What is the revenue structure for the lab?

2) How does this revenue link to strategy? Is there a match between funding and intent?

3) What is the distribution of revenue streams? Does one stream dominate?

Design labs cited a number of different revenue streams for operations. When considering revenue streams, it's important to consider multi-year funding and stability as labs articulated that annual funding cycles were a disadvantage related to scaling innovation and in attracting and retaining talent. Streams include operational dollars from the hospital, foundation or donor dollars, internal or external project based revenue, government grants and research dollars. Each stream has advantages and disadvantages but dependence on any one stream creates a tension in terms of the labs independence and ability to set its own design objectives. Labs that seemed to be making the largest impact in terms of the ability to

implement and scale ideas did share that they had stable operating fund and a strong link to senior levels of the organization.

Design Principles

This work synthesizes insights from global leaders in healthcare design to allow leaders or design practitioners the ability to create their own lab or critically assess their current lab. To allow for this possibility, the Health Design Lab Canvas was developed for strategic planning related to a new or existing lab.

In developing a new lab or when critically appraising an existing one, eight design principles should be considered. They are:

1. ALIGN AMBITION WITH DESIGN

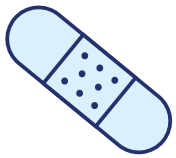
Leaders of hospital based design labs have spent a great deal of time focusing on what they want to achieve. Most labs articulated a manifesto or mission statement and were able to define the intent behind their work while sharing a desire to do more. Their ambition did not seem to be matched by the projects they were doing which is a tension that must be considered. The misalignment of expectations between stakeholders and designers working in the lab often led to dissatisfaction.

The Innovation and Complexity Model developed in this research is a tool that can be used to analyze the ambition of the lab and the outcomes that have been achieved. Users can place their ambition on the model and also identify where they are currently being effective in achieving outcomes. The match or mismatch between these two areas is often the zone of discontent unless there is a clear plan on how to close the gap. It is important to consider ambition as it will drive the strategy of the lab and how it should be built to achieve success. In establishing

ambition, it's also critical to consider the strategic ambition of the organization in which the lab is based. The mismatch in these two ambitions frequently leads to dissatisfaction or animosity between the lab and the organization itself.

2. MATCH AMBITION WITH SKILLS

Closely linked to setting focus and ambition is building your team to achieve success. While designers are at a premium in most markets, organizations should attempt to match their ambition with needed design skills. Labs mentioned graphic, service, experience and product designers as people with unique skill sets working in healthcare design labs today. Many labs mentioned a more generalist approach as they started to build their lab but as the lab matures, the complexity of the projects it is involved in often requires specific skills to achieve success. For those labs moving into commercialization and scaling products that it develops, a broad array of skills outside of design are also needed to achieve success. All of this starts with setting your ambition but those labs that seemed to achieve success also articulated a link to thoughtful consideration of new skills needed to achieve success.



3. DE-RISK INNOVATION

An interesting insight from this work was the ability of the lab to both re-imagine what is possible and to de-risk the ability to do so. In most parts of a hospital, the focus is on

providing direct patient care every single day. There is very little time to step back and re-imagine possibilities in how the organization may build exceptional experiences or re-frame the concept of health. The lab becomes that place in many organizations. In some ways, it specializes in the art of possible but this focus also comes with obligations in terms of building relationships both inside and outside the organization.

Hospitals are traditionally quite risk averse. Dreaming up new concepts on how to deliver better services is part of its mandate but the ability to invest time in this process is limited. The lab builds relationships with partners inside the organization to allow them this time and space. Thoughtfully engaging stakeholders requires creativity but the lab brings together people that do not normally connect in the organization. Bringing together these disparate groups is a critical function of labs and in some ways enables them to become the connective tissue of the organization in terms of creativity. Nurturing these relationships including those with other internal change leaders like the quality improvement team is an important consideration.

Establishing relationships outside of the organization is again linked to the ambition of the lab. The lab may become an entry point to organizations and people who wish to innovate with the hospital. This does not normally happen in everyday business and the lab opens the door to collaboration. Careful consideration of partners and a transparent process to engage can be the starting point to creating new products, processes or services that may help transform an organization or system. Labs should consider these partnerships as assets that need to be leveraged to maximize their innovation capacity and ambition.

4. PUT PATIENTS ON THE TEAM

Another design principle is engaging patients as part of the core team. Many labs spoke to their interactions with patients both within the organization and externally. This often involved specific engagements with patients on an episodic or opportunistic basis depending on the project. Patient involvement in design was often referenced within the context of how design engagements were done. Patient advisors, ethnography, interviews and involvement on design teams were all mentioned. Patients as members of the lab team itself was not mentioned which was an interesting insight. Consideration

should be given to how a lab may lead within the hospital by having patients as members of the team. Positioned as the front face of the lab, radical engagement with patients can be something that the design lab champions. User centered design in a hospital cannot be enabled without patient involvement and the lab is well positioned to promote radical engagement as part of its existence.

5. FOCUS ON THE RELATIONSHIP BETWEEN LAB AND THE ORGANIZATION

Understanding how a lab relates to the hospital is critical to its success. Not understanding the role of the lab in the organization's innovation agenda can be a source of tension. Some labs exist outside of the operating system of the hospital they are located in. This allows them the freedom to choose areas in which they will innovate but this structure was not common in this research. Usually the arrangement was the opposite. Labs were built inside the hospital with the intent that they advance innovation within or for the organization. When the lab seeks to operate outside of the strategic parameters of the organization, while the organization is interested in the lab advancing its mandate, there is tension. Consideration should be given as to the lab's place in the organization, its independence and its link to organization's innovation agenda.

6. CHOOSE QI AND/ OR INNOVATION

Many labs spoke about an inherent tension between the Quality Improvement or Process Improvement teams and the Innovation or Design Team. Tension often arose from an unclear understanding of each other's role and the value they bring to the organization. This may be overcome by clearly defining the role of the lab in the context of the change agenda of the organization. Most labs spoke to quality improvement being a form of innovation often framed around process innovation. Design can play a critical role in advancing the improvement and innovation agendas in an organization but the lab must seek ways to define how it will participate in the change agenda. QI has a head start on

design in almost all hospitals. Millions, have been invested in teaching QI and design is in some ways a new player in this market. The lab should seek ways to help people make sense of design's role in this agenda and offer explanations as to how it can complement or advance QI and how it can support innovation in a hospital. Importance must be given to considering how design and the lab might lead or support either agenda and what resources are required to achieve success.

7. ASSESS YOUR DESIGN MATURITY

While the lab and organization will set its innovation ambition, it is important to also consider the maturity of design practices in the lab and organization. As organizations mature in their use of design they sometimes will expand from tactical approaches to the use of design towards enabling design as core competency or capability in the organization. The lab itself will play a role in advancing the maturity and sophistication of its own practices and with time can enable design across the organization. The Ambition and Complexity model may also be used to assess organizational maturity in the use of design and to frame a dialogue on the ambition of the design agenda.

8. STRATEGY MAY EQUAL IMPACT

When designing a new lab or reflecting on a current one, the importance of strategy or a defined intent should be considered. The organization will have varying degrees of influence over the lab from total control to a loose affiliation, but the lab itself must completely understand the intent, ambition and desired outcomes for its work. Doing so enables expectations to be built, teams to form, appropriate skills to be hired and people engaged in achieving results. Without this level of focus, there is a danger that design becomes something that is resented in the organization or that the lab grows stale under the weight of unrealistic expectations or unfulfilled promise. A clear intent towards the work of the lab builds confidence in the team and the ability for stakeholders to understand the type of work being done. It also allows the lab to set the parameters around how it will engage with the external environment.

CHAPTER 05

NEXT STEPS

CHAPTER 05

This research represented an opportunity to learn from early adopters in the use of design at hospitals around the world. What was found was that design is playing an integral role in helping many organizations re-imagine the services and experiences they offer to their patients and communities. Local examples of meaningful innovations were mentioned by many labs and some organizations were moving beyond tactical uses of design to design as a core organizational capability. Others have referenced successful use of design to effect change at a systems level.

This research reflects the environment in early 2018. Using insights from this research, a synthesis map was built. This map may be used by any organization seeking to develop its own design capability or for those that find themselves at a moment where they are reflecting on their current design practice or lab in their organization. Regardless of where the organization is in their design journey, the map has value as a reflective tool.

A final output of this research is the Health Design Lab Canvas and its accompanying eight design principles. It is built on the wisdom of those labs interviewed in this work with the shared intent of improving design practices in healthcare around the world. It is intended that this be a prototype of a health design lab that we can continue to iterate on and that it may be used by anyone interested in creating their own health design lab or focus in a hospital.

Possible Areas of Future Research

This research represents a starting point into exploring the health design lab and how it may be leveraged in the context of health systems innovation. Further research will bring a better understanding of possible future uses of design in health care. Areas of future exploration include the following:

1) CRITICAL ANALYSIS OF DESIGN LABS

This research supported a descriptive analysis of health design labs. It could be further enhanced by a critical analysis of design labs as a method for health innovation. While this research found that there were local examples of success, deeper analysis may uncover further evidence of impact.

2) DESIGN LABS IN UNIVERSITIES, PRIVATE HEALTH ORGANIZATIONS AND IN SOCIAL SYSTEMS

This research project included several interviews that were in settings outside of hospitals also focusing on health. These interviews were removed from the analysis and report but a similar approach to this work could be used to better understand these labs. An analysis of connections between hospitals and these labs could help in developing better collaborative opportunities and future strategies for labs in all health settings. It may be possible to advance health systems innovation by examining these connections with the intent of strengthening opportunities for innovation across sectors.

3) DESIGN LAB ARCHETYPES

There is a great deal of variability in how these labs have been designed and implemented. Building archetypes of different types of health design labs could further support efforts on examining successful models of innovation and how they are best supported.

4) QI AND INNOVATION IN HEALTHCARE

This research has established that the links between innovation and improvement are sometimes misunderstood by those working in hospitals and other healthcare organizations. When both terms are sometimes used interchangeably, it may impact upon the ability of the change leader to succeed. More study should be done on the relationships between these two domains, their methodologies and how they might be best supported in healthcare organizations.

5) EVIDENCE ON IMPACT OF DESIGN IN HEALTHCARE

It has been noted numerous times in this work that design is enabling successful outcomes locally but it is not being published. Healthcare exists in an academic environment and more publications would enable the sharing of knowledge related to design methods in healthcare and the impact that it is achieving. It is hoped that his work may be taken as a starting point towards more research on design in healthcare or that it can be used by others already exploring academic projects in this space.

6) STRATEGIC DESIGN

Further exploration into the use of design at the systemic and strategic level would enable its use. Studying where design has enabled strategy and systems thinking in healthcare would be a meaningful contribution to the literature on design. Many people spoke to the possibilities for design in this area but there is very little literature in this domain, particularly in hospitals.

7) HEALTH DESIGN LAB CANVAS

This tool is a prototype as it currently exists. If health design leaders find utility in its use, the tool may be a way to share approaches towards using design in hospitals and other healthcare organizations. It is licensed under Creative Commons to share and use. Its hoped that this may become a prototype that is tested and iterated on as design advances in its maturity and use in healthcare settings around the world.

References

A look at where Ontario healthcare dollars are going - Toronto | Globalnews.ca. (January 12, 2016). Retrieved April 17, 2018, from https://globalnews.ca/news/2449651/a-look-at-where-ontario-healthcare-dollars-are-going/

Apple Heart Study launches to identify irregular heart rhythms - Apple. (November, 2017). Retrieved April 15, 2018, from https://www.apple.com/newsroom/2017/11/apple-heart-study-launches-to-identify-irregular-heart-rhythms/

Abrams, Melinda, et al. "The Affordable Care Act's payment and delivery system reforms: a progress report at five years." Issue brief (Commonwealth Fund) 12 (2015): 1-16.

Accreditation Canada. (2013). Accreditation Canada - Client- and family-centered care standards. Retrieved August 10, 2016, from Accreditation Canada, https://accreditation.ca/client-and-family-centred-care https://accreditation.ca/client-and-family-centred-care

Annual Report 2017 of the Office of the Auditor General of Ontario. (n.d.). Retrieved from http://www.auditor.on.ca/en/content/annualreports/arreports/en17/2017AR_v1_en_web.pdf

Athenahealth. "5 Elements of a Successful Patient Engagement Strategies – Whitepaper, Athenahealth." Website accessed on 5 August, 2016.

Baker, G. Ross, and Jean-Louis Denis. A comparative study of three transformative healthcare systems: lessons for Canada. Canadian Health Services Research Foundation, 2011.

Baker, G. Ross, Renata Axler. Creating A High Performing Healthcare System for Ontario: Evidence Supporting Strategic Changes in Ontario, University of Toronto: Institute of Health Policy, Management and Evaluation, October 2015.

Batalden, P. B., & Davidoff, F. (2007, February). What is "quality improvement" and how can it transform healthcare? Quality and Safety in Health Care, 16(1), 2–3. http://doi.org/10.1136/qshc.2006.022046

BDC. (2017). Five Game-Changing Consumer Trends index. Retrieved February 18, 2018, from https://www.bdc.ca/EN/Documents/analysis_research/Consumer_Trends_Report_EN.pdf

Berwick DM. Disseminating Innovations in Health Care. JAMA. 2003;289(15):1969-1975. doi:10.1001/jama.289.15.1969.

Bevan, H., & Fairman, S. (2014). White Paper: The new era of thinking and practice in change and transformation. A call to action for leaders of health and care, 1–48. Retrieved from http://theedge.nhsiq

Bhattacharyya, Onil, David Blumenthal and Eric C. Schneider. (January 10, 2018) Introducing Innovation Capacity into Your Org for Small and Large Change. Retrieved February 23, 2018, from https://catalyst.nejm.org/juggle-care-redesign-innovation-capacity/?utm_content=buffer95caf&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

Bon, Abdul Talib, and Esam MA Mustafa. "Impact of Total Quality Management on innovation in service organizations: literature review and new conceptual framework." Procedia Engineering 53 (2013): 516-529.

Brookfield Institute. A Compass to Canada's Innovation and Entrepreneurship Ecosystem. Retrieved July 17, 2016, from Brookfield Institute, http://brookfieldinstitute.ca/wp-content/uploads/2016/07/InnovEntreCompass2016_07.pdf

Buchanan, R. (2001). Design Research and the New Learning. Design Issues, 17(4), 3–23.

Buchanan, R. (1992). Wicked Problems Thinking in Design. Design Issues, 8(2), 5–21.

Buchanan, R. (2015). Worlds in the Making: Design, Management, and the Reform of Organizational Culture. She Ji: The Journal of Design, Economics, and Innovation, 1(1), 5–21. http://doi.org/10.1016/j.sheji.2015.09.003

CreateIT Now at Southlake Opens its Doors to Innovation - ventureLAB. (n.d.). Retrieved February 18, 2018, from https://venturelab.ca/createit-now/

CityBlock - Your personalized health system. (n.d.). Retrieved April 15, 2018, from https://www.cityblock.com/

Currie, D. (2012). US uninsurance rate falls, but 48.6 million still lack coverage: Affordable care act contributes to gains. The Nation's Health, 42(9), 1–14. Retrieved from http://thenationshealth.aphapublications.org/content/42/9/1.3.full

Curry, A., & Hodgson, A. (2008). Seeing in multiple horizons: Connecting futures to strategy. Journal of Futures Studies, 13(1), 1–20.

Dafny, L. S., & Lee, T. H. M. (2016). How to Bring Real Competition to the Health Care Industry. Harvard Business Review. Retrieved from https://hbr.org/2016/12/health-care-needs-real-competition

Daglio, M. . G. D. . K. H. (2014). Innovating the Public Sector: from Ideas to Impact. Building Organisational Capacity for Public Sector Innovation Background Paper, (November), 1–40. Retrieved from https://www.oecd.org/innovating-the-public-sector/Background-report.pdf

Darzi, L. A. (2013, June). From innovation to transformation A framework for diffusion of healthcare innovation. Retrieved August 17, 2016, from Institute of Global Health Innovation Imperial College London, https://workspace.imperial.ac.uk/global-health-innovation/Public/From_Innovation_to_Transformation.pdf

Davis, Russell and Pesesky, M. (2017). Innovation labs' growing place in health care: What you need to know | Advisory Board. Retrieved April 6, 2018, from https://www.advisory.com/research/health-care-industry-committee/the-bridge/2017/03/innovation-labs

Dickson, F., Friedman, E., & Ross, L. (2011). Innovating in Health Care – an Environment Adverse to Change. Touchpoint: The Journal of Service Design, 3(2), 48–53.

Genome | What Is Personalized Medicine? (August, 2014). Retrieved April 15, 2018, from http://genomemag.com/what-is-personalized-medicine/

Government of Canada. (n.d.). Innovation Superclusters Initiative - Canada.ca. Retrieved February 18, 2018, from https://www.canada.ca/en/innovation-science-economic-development/programs/small-business-financing-growth/innovation-superclusters.html

Hendriks, S. (2016). Innovation Spotlight: Johns Hopkins Medicine's Sibley Innovation Hub. Retrieved from https://www.medelita.com/community/johns-hopkins-sibley-innovation-hub/

Herzlinger, Regina E. "Why innovation in health care is so hard." Harvard business review 84.5 (2006): 58.

Hernandez, Susan E., et al. "Patient-centered innovation in health care organizations: A conceptual framework and case study application." Health care management review 38.2 (2013): 166-175.

Herzlinger, R. E. (2011). Why Innovation in Health Care is so Hard. Harvard Business Review.

Herzlinger, Regin, Kumar, Vasant Ramaswamy, and Kevin A. Schulman "Bridging Health Care's Innovation-Education Gap." Harvard Business Review. Harvard University, 11 Nov. 2014. Web. 16 Aug. 2016.

Hoskins, E. (2015). Patients First: Action Plan for Health Care. Ontario Ministry of Health and Long-Term Care, (February), 1–16. Retrieved from http://www.health.gov.on.ca/en/ms/ecfa/healthy_change/

How retail is changing consumer expectations of the health care patient-provider relationship. Deloitte. (n.d.). Retrieved February 18, 2018, from https://www2.deloitte.com/tr/en/pages/life-sciences-and-healthcare/articles/how-retail-is-changing-consumer-expectations-of-the-health-care-patient-provider-relationship.html#

Hwang, J., & Christensen, C. M. (2008). Disruptive innovation in health care delivery: A framework for business-model innovation. Health Affairs, 27(5), 1329–1335. http://doi.org/10.1377/hlthaff.27.5.1329

IDEO. (2016). IDEO - Design thinking workshop 2016. Retrieved March 4, 2018, from http://www.designkit.org/human-centered-design

Innovation Partnership: Procurement by Co-Design - MaRS. (n.d.). Retrieved February 18, 2018, from https://www.marsdd.com/systems-change/procurement-co-design/procurement-co-design-overview/

Institute for Healthcare Improvement. (n.d.). Institute for Healthcare Improvement: The IHI Triple Aim. Retrieved May 10, 2018, from http://www.ihi.org/Engage/Initiatives/TripleAim/Pages/default.aspx

Institute for Healthcare Improvement: History. (n.d.). Retrieved February 2, 2018, from http://www.ihi.org/about/pages/history.aspx

Institute for Healthcare Improvement: How Do Innovation and Improvement Differ? (n.d.). Retrieved March 10, 2018, from http://www.ihi.org/education/IHIOpenSchool/resources/Pages/Activities/Mate-InnovationVsImprovement.aspx

Johnson, Bev, et al. "Partnering with patients and families to design a patient-and family-centered health care system." Bethesda MD: Institute for Family-Centered Care (2008).

Jonash, Benjamin. In Pursuit of Innovation - A CEO checklist. Deloitte Center for Health Solutions. 2015. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/life-sciences-health-care/us-chs-ceochecklist-012815.pdf

Jones, Peter. (2013). Design for Care: Innovating Healthcare Experience. Brooklyn, NY: Rosenfeld Media.

Kaiser Permanente chief says members are flocking to virtual visits - Modern Healthcare. (April, 2017). Retrieved April 15, 2018, from http://www.modernhealthcare.com/article/20170421/NEWS/170429950

Keeley, L. (2006) The Power of Innovation, Irving, TX: VHA Health Foundation.

Keeley, L. (2007) The Ten Types of Innovation, Doblin Inc, Chicago.

Kim, Sharon, Myers, C. and L. Allen. (2017). Health Care Providers Can Use Design Thinking to Improve Patient Experiences. Retrieved March 6, 2018, from https://hbr.org/2017/08/health-care-providers-can-use-design-thinking-to-improve-patient-experiences

Kimble, L., & Rashad Massoud, M. (2017). What do we mean by innovation in healthcare? EMJ Innov, 1(1), 89–91. http://doi.org/10.1002/14651858.CD001939.8.

Kiran, T. (n.d.). Doctors Need to Stop Communicating with Patients Like It's 1980. Retrieved February 18, 2018, from http://www.huffingtonpost.ca/evidencenetwork-ca/doctors-need-to-stop-communicating-with-patients-like-it-s-1980_a_23357737/

Kirsner, S. (2015). What Big Companies Get Wrong About Innovation Metrics. Harvard Business Review Digital Articles, 5(6), 2–5. Retrieved from https://hbr.org/2015/05/what-big-companies-get-wrong-about-innovation-metrics

Länsisalmi, Hannakaisa, et al. "Innovation in healthcare: a systematic review of recent research." Nursing Science Quarterly 19.1 (2006): 66-72.

Lazar, H., J. Lavis, P.-G. Forest and J. Church (2013). Paradigm freeze: Why it is so hard to reform health-care policy in Canada.

Leadership and innovation | McKinsey & Company. (n.d.). Retrieved March 3, 2018, from https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/leadership-and-innovation

Lewis, S., Donaldson, C., Mitton, C., & Currie, G. (2001). The future of health care in Canada. BMJ (Clinical Research Ed.), 323(7318), 926–9. http://doi.org/10.3325/cmj.2011.52.433

Loblaw Enters into Agreement to Purchase Canadian Healthcare Technology Company, QHR. (n.d.). Retrieved April 15, 2018, from https://www.qhrtechnologies.com/press-release/loblaw-enters-into-agreement-to-purchase-canadian-healthcare-technology-company-qhr/

Malterud, Kirsti. "Qualitative research: standards, challenges, and guidelines." The lancet 358.9280 (2001): 483-488.

Marchildon, GP (2013). Health Systems in Transition, Canada. 2nd Edition. Toronto, ON:

World Health Organization. Available online: http://www.euro.who.int/__data/assets/pdf_file/0011/181955/e96759.pdf

McCarthy, C., Carleton, P. F., Krumpholz, E., & Chow, M. P. (2018). Accelerating Innovation Through Coopetition: The Innovation Learning Network Experience. Nursing Administration Quarterly, 42(1), 26–34. http://doi.org/10.1097/NAQ.0000000000000268

McCreary, L. (2010). Kaiser Permanente' s Innovation on the Front Lines. Harvard Business Review, (September), 1–7

Mills, A. (2014). Health Care Systems in Low-and Middle- Income Countries. N Engl J Med The New England Journal of Medicine Downloaded from Nejm. org on, 370, 552–7. http://www.nejm.org/doi/full/10.1056/NEJMra1110897

Ministry of Health and Long Term Care. Patients First: Action Plan for Health Care Message from the Minister of Health and Long-Term Care. Retrieved August 2, 2016, from http://www.health.gov.on.ca/en/ms/ecfa/healthy_change/docs/rep_patientsfirst.pdf

Moullin, Joanna C., et al. "A systematic review of implementation frameworks of innovations in healthcare and resulting generic implementation framework." Health Research Policy and Systems 13.1 (2015): 1.

Naylor, David, et al. “Unleashing Innovation: Excellent Healthcare for Canada.” Report of the Advisory Panel on Healthcare Innovation (2015).

Nintendo’s New Business? Your Health. (Feb, 2015) Retrieved April 15, 2018, from https://kotaku.com/nintendos-new-business-your-health-1684166147

OECD (2015), Fiscal Sustainability of Health Systems: Bridging Health and Finance Perspectives, OECD Publishing, Paris.

OECD. (2016, January). OECD Health Policy Overview - Health Policies in Canada. Retrieved August 2, 2016, from http://www.oecd.org/canada/Health-Policy-in-Canada-January-2016.pdf

Osterwalder, Alexander, Pigneur, Yves Pigneur, Bernarda, Gregory and Smith, A. (2014). Value Proposition Design: How to Create Products and Services Customers Want. John Wiley & Sons.

Osterwalder, A., Pigneur, Y., In Clark, T., & Smith, A. (2010). Business model generation: A handbook for visionaries, game changers, and challengers.

Omachonu, Vincent K., and Norman G. Einspruch. Innovation in healthcare delivery systems: a conceptual framework. The Innovation Journal: The Public Sector Innovation Journal 15.1 (2010): 1-20.

Pathways to Innovation and Change. A Report on the 2016 National Health Leadership Conference. (2016) Retrieved April 2, 2018 from http://www.healthcarecan.ca/wp-content/themes/camyno/assets/document/Reports/2016/HCC/EN/PathwaysInnovationChange_EN.pdf

Paulus, Ronald A., Karen Davis, and Glenn D. Steele. “Continuous innovation in health care: implications of the Geisinger experience.” Health Affairs 27.5 (2008):

Picard, A. (2018). How does Canada’s health spending hold up to international scrutiny? Retrieved March 25, 2018, from https://www.theglobeandmail.com/opinion/article-how-does-canadas-health-spending-hold-up-to-international-scrutiny/?utm_medium=Referrer:+Social+Network+/+Media&utm_campaign=Shared+Web+Article+Links

PwC Global Health’s New Entrants. (March, 2015). New Health Entrants, Price Waterhouse Coopers. Retrieved from https://www.pwcaccelerator.com/pwcsaccelerator/docs/pwc-global-new-entrants-healthcare.pdf

Reay, S., Collier, G., Kennedy-Good, J., Old, A., Douglas, R., & Bill, A. (2017). Designing the future of healthcare together: prototyping a hospital co-design space. CoDesign, 13(4), 227–244. http://doi.org/10.1080/15710882.2016.1160127

Report of the Advisory Panel on Healthcare Innovation (2015). Unleashing Innovation: Excellent Healthcare for Canada. Ottawa, ON.

http://www.healthycanadians.gc.ca/publications/health-system-systeme-sante/reporthealthcare-innovation-rapport-soins/alt/report-healthcare-innovation-rapport-soins-eng.pdf

Roberts, Jess P., et al. “A design thinking framework for healthcare management and innovation.” Healthcare. Vol. 4. No. 1. Elsevier, 2016.

Romm, Jonathan. Spaces for Co-Designing Health and Care: Embedded Innovation Labs for Patient-Centric Healthcare Service Design. PhD Project Proposal. Institutt for Design, Oslo, Norway. April, 2017.

Quality Improvement Primers - Health Quality Ontario. Retrieved August 2, 2016, from Quality Improvement Science, http://www.hqontario.ca/portals/0/documents/qi/qi-science-primer-en.pdf

Scrutton, J., Holley-Moore, G., & Bamford, S.-M. (2015). Creating a Sustainable 21st Century Healthcare System. The International Longevity Centre. Retrieved from http://www.ilcuk.org.uk/images/uploads/publication-pdfs/Creating_a_Sustainable_21st_Century_Healthcare_System.pdf

Siguaw, Judy A., Penny M. Simpson, and Cathy A. Enz. “Conceptualizing innovation orientation: A framework for study and integration of innovation research.” Journal of product innovation management 23.6 (2006): 556-574.

Thakur, Ramendra, Sonya HY Hsu, and Gwen Fontenot. “Innovation in healthcare: Issues and future trends.” Journal of Business Research 65.4 (2012): 562-569.

The Future of Autonomous Emergency Response | design mind. (n.d.). Retrieved April 15, 2018, from https://designmind.frogdesign.com/2015/11/the-future-of-autonomous-emergency-response/

The Financial Crisis and Global Health Report of a High-Level Consultation World Health Organization, Geneva. World Health Organization (2009): Accessed on 2 Aug. 2016.

Verma, A., and S. Bhatia. “A Policy Framework for Health Systems to Promote Triple Aim Innovation.” HealthcarePapers 15.3 (2015): 9-23.

Virgin Care | Virgin. (n.d.). Retrieved April 15, 2018, from https://www.virgin.com/company/virgin-care

VHA. (2006). The Power of Innovation. Retrieved August 17, 2016, from 2006 VHA

Research Series, http://static1.squarespace.com/static/53dbed74e4b038a3eba30e8c/t/540fa2b8e4b0c1ca62eaea22/1410310840277/The_Power_of_Innovation.pdf

Watkiss, S. (2014). Expanding orders of design – Austin Center for Design. Retrieved April 6, 2018, from http://www.ac4d.com/2014/11/expanding-orders-of-design/

Wenzl, E. M. and M. (n.d.). 2015 International Profiles of Health Care Systems. The Commonwealth Fund. http://www.commonwealthfund.org/~/media/files/publications/fund-report/2016/jan/1857_mossialos_intl_profiles_2015_v7.pdf

World Health Organization (WHO) - Health Innovation Group. (2016). WHO. Retrieved from http://www.who.int/life-course/about/who-health-innovation-group/en/

Why Consider an Innovation Center? - Center for Care Innovations. (n.d.). Retrieved February 23, 2018, from https://www.careinnovations.org/resources/why-consider-an-innovation-center/

Why we need a health accord with patients at the centre. Retrieved August 5, 2016, from Patients Canada - Press Release, January 17, 2016. http://www.patientscanada.ca/index.cfm?id=51428&modeX=BlogID&modeXval=22782&BlogID=22782&title=Why-we-need-a-Health-Accord-with-patients-at-the-centre&action=showcomments

Wykes, S. (2016, June 8). Stanford Health Blog. Retrieved August 17, 2016, from Learning how to use design thinking to improve the patient experience, http://scopeblog.stanford.edu/2016/06/08/learning-how-to-use-design-thinking-to-improve-the-patient-experience/

Xie, D. (2011). Lessons from the Mayo Clinic: Can design thinking help global health delivery? — global health at MIT. Retrieved May 10, 2018, from http://globalhealth.mit.edu/mayo-clinic-lesson/

APPENDIX A

INTERVIEW CONSENT

Expert Interview Participant Consent Form

Thank you for your interest in participating in an interview as part of this major research project (MRP). Please review this consent form and discuss any questions you may have with Sean Molloy, the Principal Investigator.

Format

The semi-structured interview will take place via telephone and will last roughly 45 - 60 minutes. You will be provided with the interview questions and topics as part of the consent process and in advance of the interview.

Identification

You have the choice of whether you would like your participation to be anonymous or revealed as part of this research. The final report may include direct quotes from participants and compare approaches to innovation used at different design labs around the world.

Should you not wish to be identified, please include this information below.

Withdrawing from the Project

Your participation in this interview is entirely voluntary. You may refuse to participate or may withdraw from the interview at any time. You may refuse to answer any question that you do not wish to answer. You may withdraw your data by contacting Sean Molloy via email (xyz@student.ocadu.ca) by December 31, 2017.

Risks

While risks are limited, some participants may experience discomfort answering questions about their industry in an interview setting.

Benefits

When the research is completed, participants will be notified and will have access to all final reports and documents. For those interested, your name and/or organization's will be highlighted for the work you are doing in design and innovation.

Confidentiality and Anonymity

Information gathered in this interview will be published in the final MRP report. This research may also be published separately via conference proceedings or academic papers. Only the Principal Investigator will have access to the data. Upon completion of the research project, all data will be destroyed.

Any identifiers of you or your organization (names, titles, contact information) will be anonymized in the final report, unless allowed below in accordance with usage outlined in this consent form. Specific quotes and identifying information related to your organization will not be used unless permission is granted to the researchers via email.

I, the undersigned, have read the consent form and have had the opportunity to discuss the research project with the Principal Investigator.

In terms of using data collected in this interview, I consent to the following process for sharing of my data.

I wish to have identifiable information anonymized. The researcher may use information from the interview in a non-identifiable manner.

I consent to the use of my data for the purposes of this research and consent to my name and organization being identified in the final report and linked to the information shared. The researcher also may use direct quotes from my interview in the final report.

In terms of sharing your participation in this research, I consent to the following release of information regarding my participation:

I do not want my participation shared. I want to remain anonymous.

I am comfortable with my participation being shared. I allow the following identifiers to be published in the final report:

First name

Last name

Title at organization or company

Organization or company name

Should the researcher develop case studies for the final report or in future research, I would be interested in participating.

Participant's Signature: _____

Date: _____

Full Name: _____

Telephone Number: _____

APPENDIX B

INTERVIEW GUIDE

Introductions

Hello, my name is Sean Molloy. I am a Master of Design student at OCAD University in Toronto. Thank you for agreeing to participate in this interview. Our conversation should last no longer than 45-60 minutes.

During this interview, we will discuss the evolution of your design and innovation practice at X. We will also talk about your impressions of where you see your work evolving and its place in the context of the innovation ecosystem in healthcare.

Interviewer to revisit contents of the Interview Participant Consent Form.

Do you have any questions before we begin?
(Allow interviewee to ask questions)

Semi-Structured Interview

The interviewer will go through the following questions with the interviewee:

1. DEMOGRAPHICS

a. Please confirm that your title is XYZ.

b. Please provide a brief description of what your organization does?

c. How large is your organization? (I.e.) # of beds, # of staff/ physicians, operating budget, catchment area. etc.

d. Can you please explain briefly what your role entails and how long you were in this role? How long you have been with this organization more broadly?

2. DESIGN LAB CHARACTERISTICS

a. What is the name of your design/innovation lab?

b. When was it started, where is it located in the organogram and where is it physically located within the organization?

c. How big is your team and what is the skill mix of individuals on the team?

d. Does your lab have a mission statement or manifesto?

e. What is the rationale and motivation behind the creation of your design lab?

f. What is the focus of your design-based innovation agenda? I.e.) Service design, business model innovation, process innovation, product innovation, systems innovation? IE, do you focus on a specific patient population or issue (such as aging, mental health, cancer)?

g. How internal vs externally-oriented are you?

h. How are you funded?

i. Where do you source your talent?

j. How do you define innovation?

3. OUTCOMES

a. Is the design lab delivering results in line with expectations in its original business cases?

b. What have been the outcomes associated with its use?

c. What have been the largest challenges?

d. What barriers to adopting and scaling changes have you experienced for innovations created at your lab or in partnership with your lab?

e. Has the design lab demonstrated results that justify investments in its sustainability?

f. What methods or measures do you use to evaluate success?

4. DESIGN LAB IN THE CONTEXT OF THE ORGANIZATION YOU WORK IN

a. How do different levels of organizations engage with the design lab? (Front line to Board, different staff members or clinicians)

b. How do leaders and users of design labs define the differences between QI and Innovation? Are their views aligned?

c. How are patients involved in your work / processes? Clinical staff? Other departments – IT, finance, HR, communications, research, etc.

5. DESIGN LAB IN THE CONTEXT OF THE BROADER HEALTH SYSTEM YOU WORK IN

a. How does your lab interact with the external health system?

b. How does your lab partners with external companies/ organizations? i.e.) Tech, vendor, art, design etc.

c. Does your lab scale innovations outside of your health center?

6. NEXT STEPS/FUTURE THINKING

a. What social, economic, political, technological, environmental, and/or values based trends in your industry and elsewhere are shaping the future of the work that you do?

b. What do you see as the next steps in the use of human centered design in health care more broadly? In what other ways may it be used? What other methodologies might it be used with?

c. Where/ how do you see the mandate or work of your design lab evolving in the next 1-3 years?

d. What is your advice to others or major lessons learned from your experience using design in healthcare?

Follow Ups - Would it be possible for you to share documents/articles/ websites/reports or other things that came up in the discussion?

CLARIFYING QUESTIONS

• Can you expand on that?

• Can you provide any additional details or examples?

CONCLUDING STATEMENTS

Thank you for participating in this interview. I will remind you that you can contact me at any point between now and December 31, 2017 to retract anything that you shared in this interview or to withdraw entirely.

I will share the transcribed notes of this interview for your reference. I will also share back anonymized data from other interviews once all are complete.

APPENDIX C

DRIVERS OF CHANGE

Canada

Baycrest Innovation, Technology and Design Lab, Toronto, ON
Bianca Stern, Executive Director

Emily Carr Health Design Lab
Caylee Raber, Director, Health Design Lab

Healthcare Human Factors Lab, UHN, Toronto, ON
Joe Cafazzo, Executive Director

OCAD University Design for Health Lab
Kate Sellen, Director, Design for Health Program

Saint Elizabeth, Toronto, ON
Erik Landriault, Director, Innovation

UHN Open Lab, Toronto, Ontario
Tai Hyunh, Creative Director

United States

Atrium Health Innovation Engine, Charlotte, NC
Ann-Somers Hogg, Director of Innovation

Cedars-Sinai Medical Center, Los Angeles, California
Joseph Castongia, Associate Director, Human Centered Design

Centre for Care Innovations, Oakland, California
Laura Blumenthal, Program Manager, Innovation

Connected Health Innovation – Partners HealthCare, Boston, MA
Jodi Sperber, Senior Scientist, User Centered Design

Design Institute for Health, Dell Medical School, University of Texas, Austin
Stacey Chang, Executive Director

Health Design Lab @ JeffInnovation, Philadelphia, PA
Robert Pugliese, Associate Director

IDEO, Palo Alto, CA
Dennis Boyle, Partner

Independence Blue Cross Center for Innovation, Philadelphia, PA
Michele Histand, Director of Innovation

Innovation and Design Lab, University of California, Santa Cruz
David Yager, Founder and Director

Kaiser Permanente Design Consultancy, Oakland, California
Estee Neuwirth, Senior Director, Innovation and Design

Mayo Clinic Center for Innovation, Rochester, MN
Dr. Douglas Wood, Medical Director

MD Anderson Innovation Centre, Houston, TX
Denise Worrell, Director of Human-Centered Design

Penn Medicine Center for Health Care Innovation, Philadelphia, PA
Matt Van Der Tuyn, Manager, Design and Strategy

Sibley Innovation Hub, Sibley Hospital, Washington, D.C.
Frankie Abralind, Experience Designer

SPARK Health Innovation Lab, University of Utah
Jim Agutter, Director and Founder

Sutter Health Design and Innovation, Palo Alto, California
Megan Moyer, Director, Design and Innovation

University of Vermont Medical Centre Healthcare Innovation Collaboratory
Jeremy Beaudry, Lead Healthcare Experience Designer

VA Center for Innovation, Washington, DC
Andrea Ippolito, VA Innovators Network Director

Europe

Center for Innovation, Karolinska University Hospital, Stockholm, Sweden
Anna Thies, Senior Healthcare Service Designer

Centre for Connected Health, Oslo, Norway
Jonathan Romm, Designer

Experio Lab, Karlstad, Sweden
Tomas Edman, Head of Operations

Helen Hamlyn Center for Design at the Royal College of Art, London, UK
Jonathan West, Research Fellow

HELIX Centre, London, UK
Gianpaolo Fusari, Senior Designer

Lab4Living, Sheffield Hallam University, Sheffield, UK
Paul Chamberlain, Design Director

Australia and New Zealand

Design for Health and Wellbeing Lab, Auckland, NZ
Steve Reay, Co-Director

Health Collab, Monash University, Melbourne, Australia
Daphne Flynne, Director

** Interviews in scope for this analysis are in **bold**.*

APPENDIX

D

THE HEALTH DESIGN LAB CANVAS

The Health Design Lab Canvas

Key Partners

Key Questions

1) Who are your key partners and collaborators?

2) What are the motivations for partnerships?

3) Do the partnerships enable your value proposition?

Consider

- Internal partners, external partners.
- What structures are needed to partner?
- How will you add value to each partnership?
- Are you doing QI or Innovation or both?

Key Activities

Key Questions

1) What activites does the lab's value proposition require?

2) What activities are most important with regards to customer relationships and revenue streams?

Consider

- What is your design focus and innovation ambition?
- What is your design maturity in terms of practices?

Key Resources

Key Questions

1) What key resources does the lab's value proposition require?

2) What resources are most important to customers and revenue streams?

Consider

- What is your design focus and innovation ambition?
- What is your design maturity in terms of practices?

Value Proposition

It is recommended that the Value Propoisition Canvas (Osterwalder, 2014) be used for anyone looking to set up their own design practice or lab. (https://strategyzer.com/canvas/value-proposition-canvas)

Consider

- If the insights of this research were put into a singular description, the core value proposition of a hospital based design lab is:

The Health Design Lab will challenge people to reimagine the future of our hospital. Using human centered design, the lab will inspire ideas that improve the health of our community while delivering exceptional experiences both in the hospital and at home.

- The Ambition and Maturity model presented earlier in this research may also be used as a tool to consider the lab's ambition as part of its value proposition.

Customer Relationships

Key Questions

1) What will be the most meaningful relationships with your customers?

2) How might the lab enable meaningful relationships with its customers?

Consider

- What design experiences do you create?
- What does a relationship with the lab feel like?

Channels

Key Questions

1) Through what channels or venues will your customers be reached?

2) What channels will be the most meaningful to your customers

Consider

- How do virtual and digital channels play a role in your design engagements and lab?

Customer Segments

Key Questions

1) Who are customers and which ones are you creating value for?

2) Who is your most important customer?

Consider

- Who are you designing with?
- Who are you designing for?

Cost Structure

Key Questions

1) What is the cost structure of the lab?

2) How are costs linked to impact?

Consider

- What are your fixed and variable costs?
- How are you paying for design talent? I.e.) Full time, part time, contract, students?

Revenue Streams

Key Questions

1) What is the revenue structure for the lab?

2) How does this revenue link to strategy? Is there a match between funding and intent?

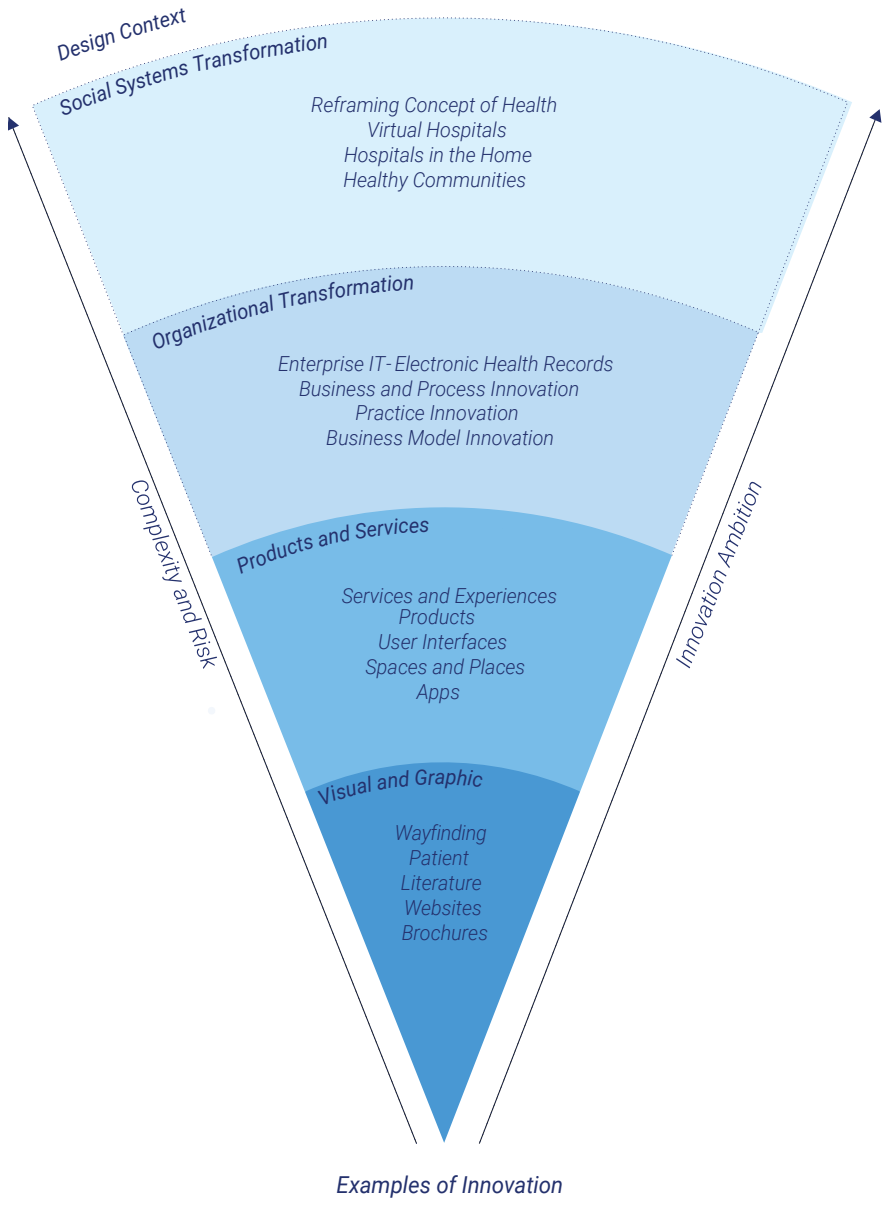
3) What is the distribution of revenue streams? Does one stream dominate?

Consider

- Do you need to diversify your revenue base?
- How much freedom does your lab have in choosing revenue options?

APPENDIX E

THE AMBITION AND COMPLEXITY MODEL



INNOVATION LABS IN HEALTH CARE

A Review of Design Labs as a Model for Healthcare Innovation

Sean J. Molloy

2018