Leveraging User-Centred Design Methods in Canadian Public Service Innovation Labs

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Abstract

Innovation labs have emerged as a promising means to improve the capacity of public sector organisations to address complex challenges through creativity, experimentation, and multi-disciplinary collaboration. Yet, many Canadian public service innovation labs struggle to sustain momentum, generate measurable outcomes, or scale successful innovations. This thesis investigates the role of User-Centred Design (UCD) methodologies in enhancing the effectiveness of public sector innovation labs. Drawing on design science research methodology and case studies including federal, provincial, and international examples, this research proposes a framework to support innovation lab practice.

The framework includes three interrelated artefacts: a typology to classify innovation labs based on their funding, focus, approach to collaboration, and governance mandate; a structured process model for lab setup, system definition, co-design and scaling of innovations; and a playbook to guide individual innovation projects to ensure consistent results, capacity building, and knowledge transfer. These artefacts were iteratively developed and refined through five design iterations and validated through stakeholder engagement and an expert panel review.

Findings indicate that a systematic approach to incorporating UCD methods such as co-design, rapid prototyping, and iterative evaluation improve problem definition, team cohesion, and the likelihood of generating scalable public sector innovations. However, the research also reveals that organisational maturity, leadership support, and cross-sector collaboration are critical

enablers of success. By aligning innovation lab practices with the principles of UCD and adapting them to the operational realities of the public sector, this thesis offers a blueprint for transforming public service innovation.

Acknowledgements

I would first like to acknowledge my supervisor Dr. Liam Peyton; without whose unwavering support and encouragement I would have abandoned this pursuit long ago. I would also like to acknowledge the generous support of the Indigenous and Black Engineering & Technology (IBET) PhD project.

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I owe a deep debt of gratitude to Anne White, Leon Voon, Nicholas Scott and Milena Tasic, who generously provided feedback and insight that contributed greatly to this thesis. I also take this opportunity to acknowledge the many public sector innovators, both formal and informal who have inspired this work.

This thesis is dedicated to the memories of the Rev. William Oscar Agard and Enid Agard my grandparents who were my first superheroes, and believed I could achieve anything.

"My mouth shall be the mouth of those
calamities that have no mouth… and I shall
speak for you all."

Aimé Césaire — From *Notebook of a Return to the Native Land*

"Bringing the gifts that my ancestors gave,
I am the dream and the hope of the slave."

Maya Angelou – Still I Rise

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List of Acronyms

Acronym	Definition
ADM	Assistant Deputy Minister
CRA	Canada Revenue Agency
DG	Director General
DSR	Design Science Research
DSRM	Design Science Research Methodology
GoC	Government of Canada
HCI	Human-Computer Interaction
HXLab	Human Experience Lab
IBET	Indigenous and Black Engineering Technology
ISO	International Organization for Standardization
KPI	Key Performance Indicator
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
OPSI	Observatory of Public Sector Innovation
PEI	Prince Edward Island
PPP	Public-Private Partnership
PSD	Public Sector Division
PSIL	Public Sector Innovation Lab
RCT	Randomised Controlled Trial
REB	Research Ethics Board
ROI	Return on Investment
RQ	Research Question
SLR	Systematic Literature Review
SWOT	Strengths, Weaknesses, Opportunities, Threats
UCD	User-Centred Design
UDI	User-Driven Innovation
UX	User Experience

Chapter 1. Introduction

1.1 Motivation

As the discipline of user centred design (UCD) has matured over the past 25 years, the strategic value of leveraging empirical research and UCD has become more apparent and is now entrenched in many organisations. Concurrently, the quest for innovation has also taken root in many public and private sector organisations. Arguably, the private sector has been much better at innovating than the public sector. In this work, I have witnessed and participated in some of the innovation labs being initiated within the Canadian federal government. Consistently they struggle to produce results. Often, they do not last very long beyond their inception.

Many of the accepted definitions of innovation, one sees in practice, centre on commercialization and market success to differentiate innovation from invention. While these definitions are in line with private sector organisational goals of maximizing profit and market share, these are often not the goals of public sector organisations. As observed in "The Innovator's Dilemma" (Christensen, 1997), organisations face the challenge of balancing the exploitation of existing competencies with the exploration of new opportunities to innovate. This dilemma is particularly pronounced in the distinction between private and public sector capacities for innovation.

While the private sector has been adept at leveraging UCD for competitive advantage, the public sector's attempts to foster innovation, notably through the establishment of innovation labs, have

encountered challenges. These initiatives, though well intentioned, often struggle to produce tangible outcomes or sustain momentum. The reasons for this disparity can be multifaceted, including organisational inertia, risk aversion, and the complexities of public sector accountability and governance structures (Bharosa et al., 2020; Lindquist & Buttazzoni, 2021; McGann et al., 2021; OECD, 2020).

Supporting this argument, literature such as "Lean Startup" (Ries, 2011) and "Design Thinking" (Brown, 2008), emphasizes the value of iterative development and cross-disciplinary collaboration in fostering innovation. The lean startup method is an evidence-based approach to creating and managing new products or services under conditions of uncertainty. It emphasizes rapid experimentation, validated learning, and iterative product releases to efficiently discover what customers value and to minimize wasted effort. Design thinking is a human-centred approach to innovation that integrates the needs of people, the possibilities of technology, and the requirements for business success. It relies on iterative cycles of empathy, ideation, and experimentation to generate creative solutions that are both desirable and feasible. These principles, while embraced by the private sector, encounter unique barriers within public institutions (OECD, 2020). Consequently, the challenge for public sector innovation lies not only in adopting user-centric and agile methodologies but also in navigating the inherent constraints and cultures of public organisations.

This thesis proposes a framework aimed at addressing the systemic barriers to innovation in the public sector. It examines case studies within the Canadian federal government innovation labs to identify strategies that can bridge the gap between the potential for innovation and its realization. In addition to Canadian Federal Public Service innovation labs, I have engaged with

a provincial government innovation lab, as well an innovation lab from the Singapore federal government. By integrating insights from seminal texts, lived experience and primary research, I seek to contribute to a deeper understanding of how public sector organisations can more effectively harness the principles of UCD and in the context of innovation labs to better serve public interests.

As a long-time practitioner and consultant with over twenty-five years of experience working in UCD and with federal innovation labs, I bring a particular bias to this research. My bias is rooted in direct observation of how many public sector innovation labs in Canada have struggled to sustain themselves or produce tangible, operational outcomes. Over the past decade, I have witnessed labs emerge with enthusiasm and high-level mandates only to dissolve when political priorities shifted or when outputs failed to translate into concrete changes within their parent organizations. This recurring pattern shaped the motivation for this thesis and led me to frame my three research questions around how UCD methods might strengthen the operationalization of innovation, bridging the gap between theory and implementation. My bias, therefore, is toward practicality: I view successful innovation not as a theoretical exercise, but as one that produces usable, replicable results. Rather than compromising the objectivity of this research, this practitioner bias enhances it. It provides a grounded lens through which to evaluate the data, and it underscores the value of engaging experienced practitioners and experts who, like myself, operate at the intersection of design theory and organizational reality.

The establishment of user-centred innovation labs in the Canadian federal public service holds significant promise for enhancing public sector innovation, yet many of these labs struggle to sustain momentum, produce tangible outcomes, or scale successful innovations. This thesis

proposes three critical artefacts: a typology, a process model, and a playbook, to provide structure, guidance, and repeatability in leveraging UCD methods within public sector innovation labs. A typology is essential for defining and categorizing labs based on their funding models, focus areas, collaboration openness, and governance mandate, ensuring that they operate with realistic expectations, well-defined objectives, and the necessary resources to sustain meaningful innovation. In parallel, a structured process model serves as a roadmap, offering a step-by-step approach for lab setup, problem identification, ideation, co-design, and prototyping while integrating iterative evaluation to refine approaches based on real-world feedback. This structured method aligns lab activities with government priorities, ensuring innovation is both practical and accountable. However, even when labs are successfully established, they often struggle with knowledge retention, sustainability, and consistency of results across different innovation projects within a lab. A playbook for guiding individual projects is a crucial component for documenting best practices, standardizing approaches, and facilitating capacity building. By ensuring that insights from innovation labs are retained and can be used to scale successful experiments across departments, the playbook prevents valuable lessons from being lost.

Public sector innovation labs have the potential to transform government services through UCD methodologies, but without a clear typology, structured processes, and an actionable playbook, many risk becoming short-lived experiments rather than sustainable engines of innovation. By providing a framework for categorization, a structured innovation process, and a repository of best practices, this thesis seeks to bridge the gap between innovation potential and tangible impact in the Canadian federal public service.

It is at this point that I should also clarify the use of terminology in this thesis. The term user-centred design (UCD) is used as a general term that is meant to include concepts such as user-experience (UX) and human-centred design (HCD). While UX and UCD are often used interchangeably, they are not synonymous. UX refers to the overall experience a person has when interacting with a system, service, or product including emotional, cognitive, and physical responses. In contrast, UCD is a methodological approach to design that emphasizes the active involvement of users throughout the design and development process to ensure outcomes meet their needs.

This thesis adopts the 1999 ISO 13407 definition of UCD as "the active involvement of users and a clear understanding of user and task requirements; an appropriate allocation of function between users and technology; the iteration of design solutions; and multidisciplinary design" because it formalizes key principles that remain foundational even as the field has evolved. Even with advances in UX research and the emergence of new design paradigms, these UCD principles continue to underpin best practices in public sector innovation settings.

This distinction is important in the context of my research. The central motivation of this thesis is to examine whether public sector innovation labs that explicitly apply UCD methods are better able to achieve meaningful outcomes, an inquiry rooted in two decades of consulting practice where labs often failed to connect outputs to user or citizen value (see Section 1.1 Motivation). Moreover, Research Questions 2 and 3 explicitly ask how UCD methods can be leveraged for innovation and what guidance can be offered to public service labs employing such approaches. The focus, therefore, is not just on whether user experience is considered, but whether systematic, repeatable UCD practices are embedded in the lab's operations. This distinction becomes

especially relevant when I analyse how UCD is (or is not) integrated into public sector innovation labs in Section 3.2 and further contextualized in our analysis of lab process models in Section 4.2.

1.2 Thesis Contributions

The main contribution of this research is a framework that practitioners can use to understand how to organise and guide their innovation efforts. It consists of three components:

- A typology that identifies specific attributes along four dimensions that impact the nature and functioning of an innovation lab,
- a process model which outlines the steps and stages necessary to manage innovation in a user-centred innovation lab, and
- a playbook containing techniques and metrics to help them reproduce the process, as well as define and measure success.

While we believe our framework to be generally applicable, our thesis research has focused on public sector innovation. Our framework was validated and refined as we participated in or consulted with 4 different government innovation labs in four separate case studies. These are presented in chapter 4.

We have published and presented our work in the following venues:

- Saul, D., Scott, N., Tasic, M., Voon, L. (2025) A Process Model for Human-Centred Innovation Labs in the Public Service. *Journal of Innovation Management* (in progress)

- Saul, D (2024), *Leveraging Human-Centred Design Methods in Public Sector Innovation Labs*, Responsible AI 2024, Guelph, Ontario, May 28 (poster)
- Saul, D (2024)., Climate Action Now! Persona Workshop, University of Ottawa, March 27 and 28
- Saul, D. (2023) *Leveraging Human-Centred Design Methodology in Public Sector Innovation Labs*, Indigenous Black Engineering Technology PhD Project Conference, Edmonton, Alberta, November 9 (Presentation)
- Saul, D. (2022) *Leveraging Human-Centred Design Methods in an Innovation Lifecycle*. Indigenous Black Engineering Technology PhD Project Conference, Waterloo, Ontario, October 24 (poster)

1.3 Thesis Organisation

In Chapter 2 we present our research methodology outlining the foundations, design science research approach, and specific qualitative methods used to collect and analyse data across the case studies, as well as the iterative processes that linked typology development, process model refinement, and playbook creation.

In Chapter 3, we provide an overview of main background concepts that provide the context for this thesis. We provide a functional definition of innovation labs in section 3.1. We report on two systematic literature reviews in 3.2 and 3.3, and in section 3.4, we identify the key related works that we will use for comparison when evaluating the results of our research.

In Chapter 4, we provide a detailed description of our framework for leveraging User-Centred Design methods in public sector innovation labs.

In Chapter 5, we evaluate and trace the development of our thesis framework through four case studies as it was evaluated and used in four different innovation labs.

In Chapter 6 we evaluate our proposed framework against the existing literature and convene a review panel of expert collaborators to evaluate the framework and discuss how it might be improved.

Finally, in Chapter 7, we summarize the results and potential of the thesis in conclusions and potential future work.

We also include the documents associated with the REB approval of our research in Appendix B.

Please note: The use of "I" in Chapter 1 refers to my personal motivation as a practitioner. The "we" is used throughout the rest of the thesis when referring to the research (e.g., "we propose").

Chapter 2 Research Methodology

This chapter is structured into four key sections. First, we present our research questions. Next, we discuss the philosophical foundation of our research approach. Following that, we detail the design of our research. Finally, we provide an account of how data was collected and analysed.

2.1 Research Questions

As innovation has become a priority for public service organisations, the adoption of user-centred design (UCD) methodologies offers significant potential to drive transformative solutions. However, despite the establishment of innovation labs in Canada's public sector, these efforts often face systemic barriers, such as organisational inertia, limited scalability, and challenges in sustaining meaningful outcomes (Bharosa et al., 2020; Lindquist & Buttazzoni, 2021; McGann et al., 2021; OECD, 2020).

These research questions seek to understand how public sector innovation labs can be characterized to inform better practices, how UCD methods can be effectively leveraged to enhance innovation processes, and what specific guidance can be given to public service innovation projects to address their unique operational contexts.

The research questions are as follows:

RQ1: What are the characteristics of public service innovation labs that determine their effectiveness at managing and supporting innovation projects?

RQ2: How can User-Centred Design methods be leveraged for innovation in the context of public service innovation labs?

RQ3: What guidance can leaders of a public service innovation lab give to innovation projects that employ a User-Centred Design approach?

Our approach to addressing these questions is described in detail in section 2.3 Research Design.

2.2 Research Philosophy

The aim of this research is not only to understand, but to contribute to improved practice in the design and operation of public sector innovation labs. Our research philosophy reflects this dual concern of understanding and utility. The approach is informed by our professional experience in UCD and public sector innovation. It is shaped by a belief that meaningful insights emerge through a repeating interplay between theory and practice. In keeping with the methodological commitments of UCD (Chammas et al., 2015), our approach is inherently participatory and recognizes the value of practitioner insight as a form of expertise and focuses on the iterative production of useful artefacts.

These methodological commitments, which are foundational to this thesis, are threefold. First, UCD places a primary and explicit focus on understanding the end-users, their goals, and their context of use, treating this as the central driver for all design decisions (ISO 9241-210, 2019).

Second, this understanding is not based on assumption but is gathered through empirical data, direct observation, and active engagement with users. Third, UCD is inherently iterative; it involves a continuous cycle of designing, prototyping, and testing with actual users to progressively refine the solution and validate its usefulness (Gould & Lewis, 1985). Therefore, when this thesis describes its approach as "inherently participatory," it refers to this active, collaborative engagement with practitioners as co-designers, treating their insights as a critical form of user data essential to the iterative design cycle.

The reader may also note the general avoidance of the term UX in favour of UCD as explained in Section 1.1. UCD as a term is used in the first relevant ISO standard 13407:1999, which has since been replaced with ISO 9241-210:2019 that continues the use of the term UCD.

This research is grounded in the Design Science Research (DSR) paradigm. DSR is fundamentally concerned with the creation and evaluation of innovative artifacts—in this case, a framework, process model, and playbook—that are designed to solve practical, real-world problems (Hevner et al., 2004). The DSR paradigm provides the overarching structure for this thesis, guiding the iterative cycles of problem diagnosis, artifact design, and empirical evaluation. Within this overarching DSR framework, this research employs a multi-method approach. Case study methodology is adopted as the primary strategy for empirical inquiry, enabling an in-depth, "how" and "why" investigation of the complex, real-world phenomena of public service innovation labs (Yin, 2014). These case studies are not separate from the DSR process; rather, they serve as the primary vehicle for both the *problem formulation* and the *artifact evaluation* stages of DSR.

Furthermore, an Action Research (AR) *stance* is adopted within the case study method. This AR stance is distinguished from AR as a full-fledged methodology (Susman & Evered, 1978); here, it represents the researcher's participatory and reflective engagement with the practitioners inside the case study organizations. This "involved" stance aligns with DSR's goal of ensuring practical relevance (Cole et al., 2005) and allows the researcher to collaboratively refine and validate the designed artifacts in situ. Therefore, DSR serves as the guiding paradigm, case study as the formal research method, and action research as the participatory stance for data generation and co-design within the cases.

Even before enrolling in the PhD program, my intention was to develop more cohesive and generalizable artefacts to support innovation work in my consultancy. Over the years, we had accumulated tools and techniques in a somewhat ad hoc way. What was lacking was a unified guide that could be disseminated across public sector contexts. Peffers et al., (2007) provide a nominal, six-step process for conducting DSR that illustrates the process quite effectively. This will be described in detail in section 2.3 Research Design.

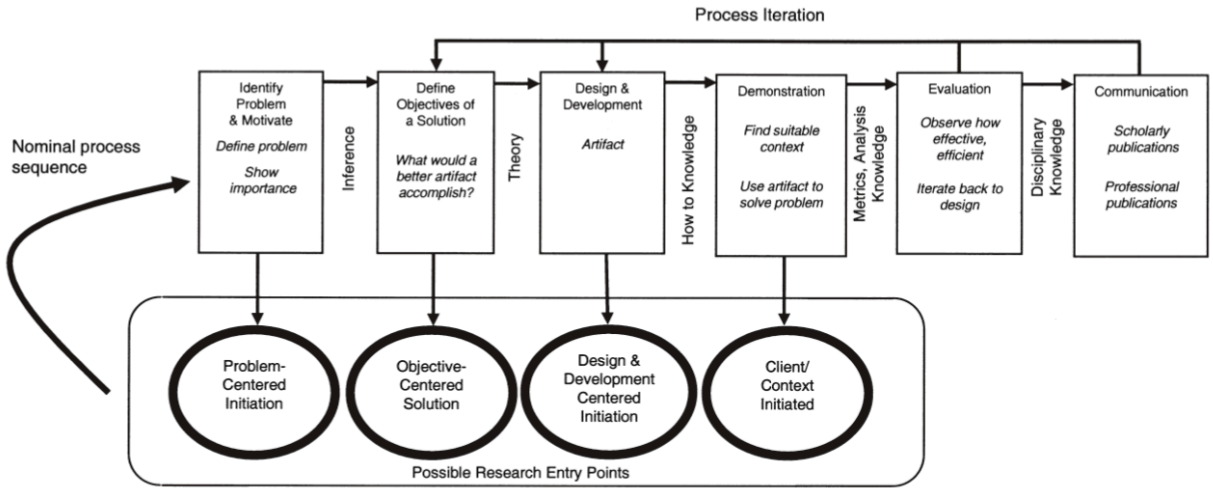

Figure 1: Peffers et al. DSRM Process Model (2007)

Finally, all data collection and analysis was qualitative (Hancock & Algozzine, 2017; Walliman, 2011) in nature and sample sizes were intentionally small. The aim was not to generate statistically generalizable conclusions, but to develop context-sensitive insights and actionable tools. A qualitative approach is the most appropriate methodology for this research because the phenomena under investigation are complex, contextual, and deeply embedded in organizational culture. Quantitative measures cannot capture the nuances of how practitioners interpret "innovation," negotiate constraints, or translate design theory into practice.

This study seeks to uncover *how* and *why* questions, and such "how" and "why" questions are best addressed through qualitative inquiry. The interpretive depth afforded by qualitative methods enables the identification of patterns of meaning and practitioner reasoning that are invisible to numerical analysis. Moreover, qualitative research aligns with the design-science underpinnings of this thesis, which views knowledge as being co-created through interaction between researcher and participant. Given that this research involves reflective engagement with experienced practitioners, a qualitative methodology is not only justified but essential for producing insights that are grounded, actionable, and faithful to the lived realities of public sector innovation. This approach also reflects a broader epistemological commitment to pragmatism, where the test of a theory or artefact lies in its usefulness and applicability.

2.3 Research Design

This thesis's main motivation was to build an Innovation Lab Process Model artefact to address the gaps we saw in the literature and our professional experience. We followed the DSR process

model depicted in Figure 1 in section 2.2, and conducted a total of five iterations as shown in the figure below in which artefact(s) were developed and evaluated in each iteration.

- The diamonds represent the evaluation of artefacts using a case study at each iteration, followed by circle for an expert panel review at the end of our thesis work.
- The light blue regions indicate phases where we were directly embedded in the work of a lab conducting interviews, guiding design activities, or supporting the development of innovation lab practices. This includes the expert panel review which included the key stakeholder from each case study and from which a joint publication is planned (in progress).
- The rectangles represent our research in which we sought to create or find artefacts to address the gaps in leveraging UCD methods in public service innovation labs.

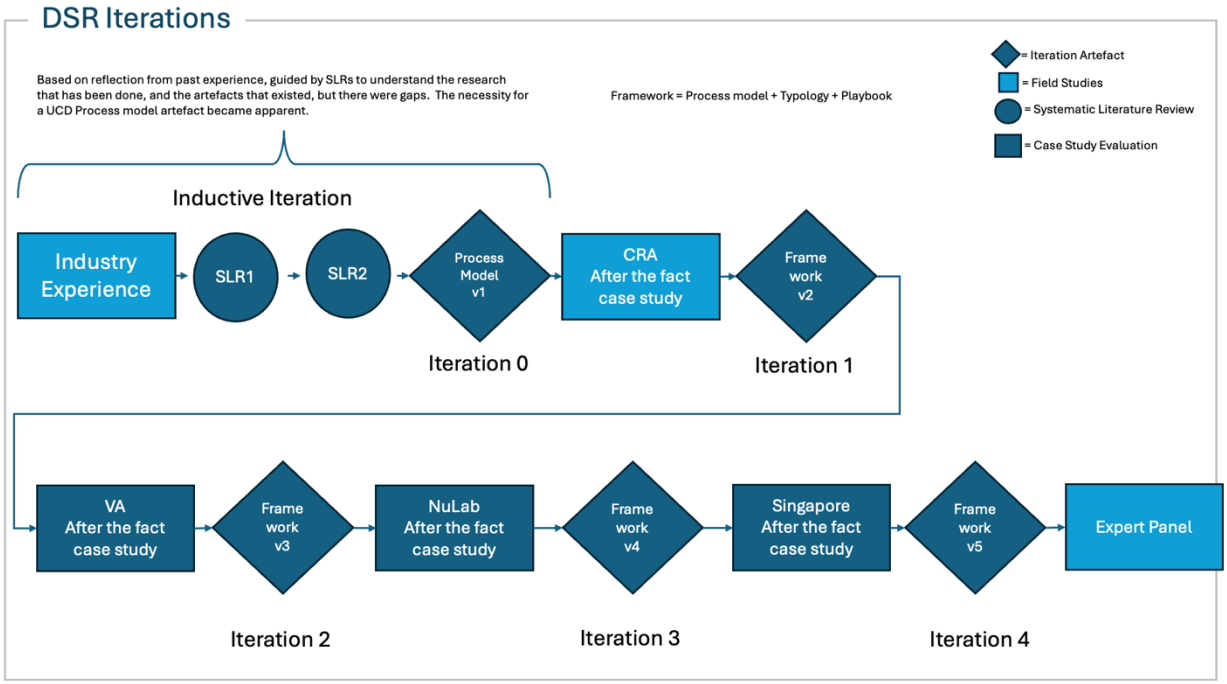

Figure 2: Overview of Research Design for Thesis

Iteration 0 was objective centred (see Peffers diagram in section 2.2) and leveraged our industry experience and two SLRs to see what artefacts existed in the literature to guide public sector innovation labs, which ultimately resulted in a gap analysis of the ISO process model for innovation (*ISO 56002:2019, Innovation Management - Innovation Management System - Guidance*, 2019) and our initial proposed Innovation Lab Process Model. Iterations 1-4 were design and development centred (see Peffers diagram in section 2.2) and focused on refining our artefact(s) based on a series of case studies. We started with a case study of a Canadian Federal Government innovation lab that we had participated in as an active researcher. Subsequent case studies were used to validate the relevance of our artefacts to other Canadian Federal Government innovation labs (iteration 2), a Canadian Provincial innovation lab (iteration 3), and an International City-State innovation lab (Singapore) that were well known in the literature.

Below is a table summarizing the research design for this thesis.

DSR Iteration	Research Questions	Research Methods	Artefacts	Evaluation	Communication
Iteration 0	RQ1, RQ2	Two SLRs, DSR (induction from industry experience)	Initial process model	Gap Analysis	Indigenous and Black Engineering Technology (IBET) Fellowship Conference poster 2021
Iteration 1	RQ2	Case study (CRA), DSR	Complete process model	Stakeholder interview, gap analysis.	
Iteration 2	RQ1, RQ2, RQ3	Case study (Second federal government department), DSR	Initial typology and playbook. Updated process model.	Stakeholder interview, gap analysis.	IBET Fellowship Conference presentation 2023
Iteration 3	RQ1, RQ2, RQ3	Case study (NouLAB - Provincial government), DSR	Updated typology, playbook and process model.	Stakeholder interview, gap analysis.	IBET Fellowship Conference poster & presentation 2024
Iteration 4	RQ1, RQ2, RQ3	Case study (HXLab - Singapore),	Updated typology, playbook and process model	Stakeholder interview, gap analysis.	PhD Thesis, Expert Panel paper (in progress).

		DSR (expert panel review).		Expert Panel Review. Related works gap analysis.	

Table 1: Overall Research Design

The following are additional details related to the rows in the preceding table, each of which corresponds to a DSR iteration.

Iteration 0

The initial iteration of the research focused on identifying the gaps in both scholarly literature and practitioner practice regarding innovation labs in the public sector. This phase began with two systematic literature reviews aimed at understanding how innovation labs are currently characterized and to what extent user-centred design (UCD) methods are integrated into their practices. Drawing also on the researcher's prior consulting experience, this stage generated an early version of the process model artefact by synthesizing theoretical frameworks and practical observations. This work was shared publicly as a poster presentation at the Indigenous and Black Engineering and Technology (IBET) Fellowship Conference in 2021, serving as a foundation for subsequent empirical investigation and refinement.

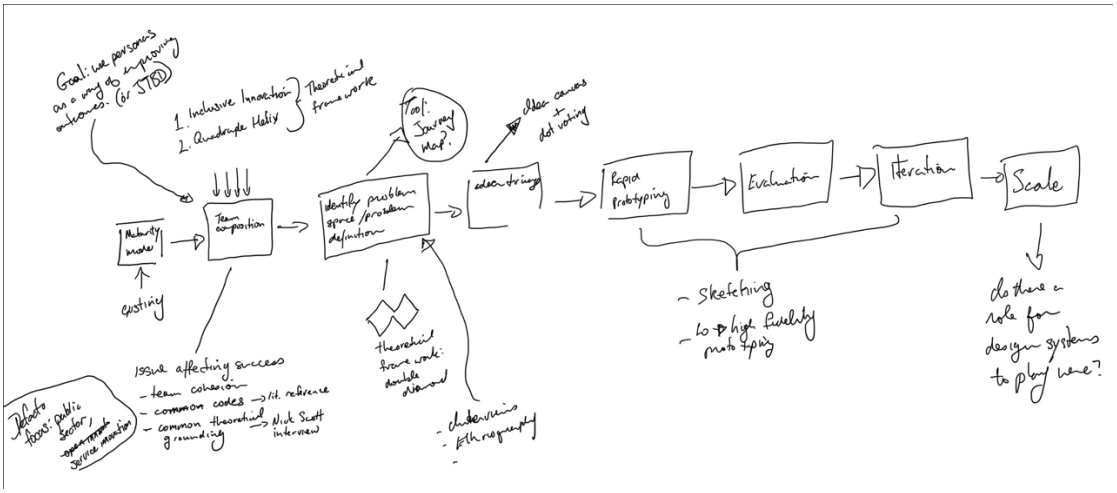

Figure 3: Early sketch of process model

Iteration 1

In the first design iteration, the proposed process model was formalized based on my past experience as an industry UX designer within the Canada Revenue Agency (CRA) Innovation Lab. We then evaluated the process model as a case study, using focused interviews to review it with the head of the CRA innovation lab. This allowed for a critical comparison between theoretical constructs and operational realities. Data collected through observation and reflective practice informed a significant refinement of the model. This iteration marked a shift from conceptual development to empirical validation, highlighting areas where design activities, facilitation practices, and lab governance required greater clarity or adaptation. The outcome was a need for refinement of the process model as well as the recognition of a need for a detailed typology and playbook. These additions were motivated by the lack of a shared vocabulary to distinguish lab types which was critical to guide and motivate decisions in the setup of the lab and the setup of individual projects, as well as the need to establish templates

and guidelines that individual projects could follow that reflected the values and typology of the innovation lab.

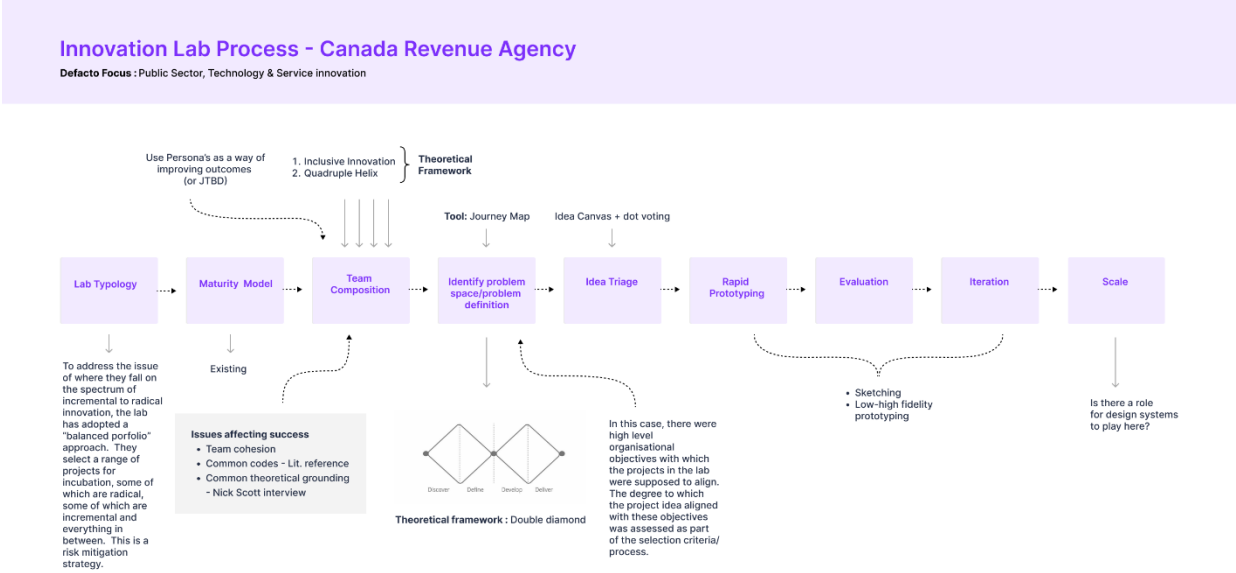

Figure 4: CRA Iteration of the process model

Iteration 2

The second iteration we refined the process model based on the feedback from the iteration 1 case study and developed artefacts for a typology and playbook. This was evaluated through a case study with a second public sector innovation lab within the Canadian Federal Government. The feedback from this case study validated the relevance of our three artefacts. Stakeholder interviews and comparative analysis with the CRA case allowed for triangulation of findings. This work was presented at the 2023 IBET Fellowship Conference, expanding visibility and gathering early feedback.

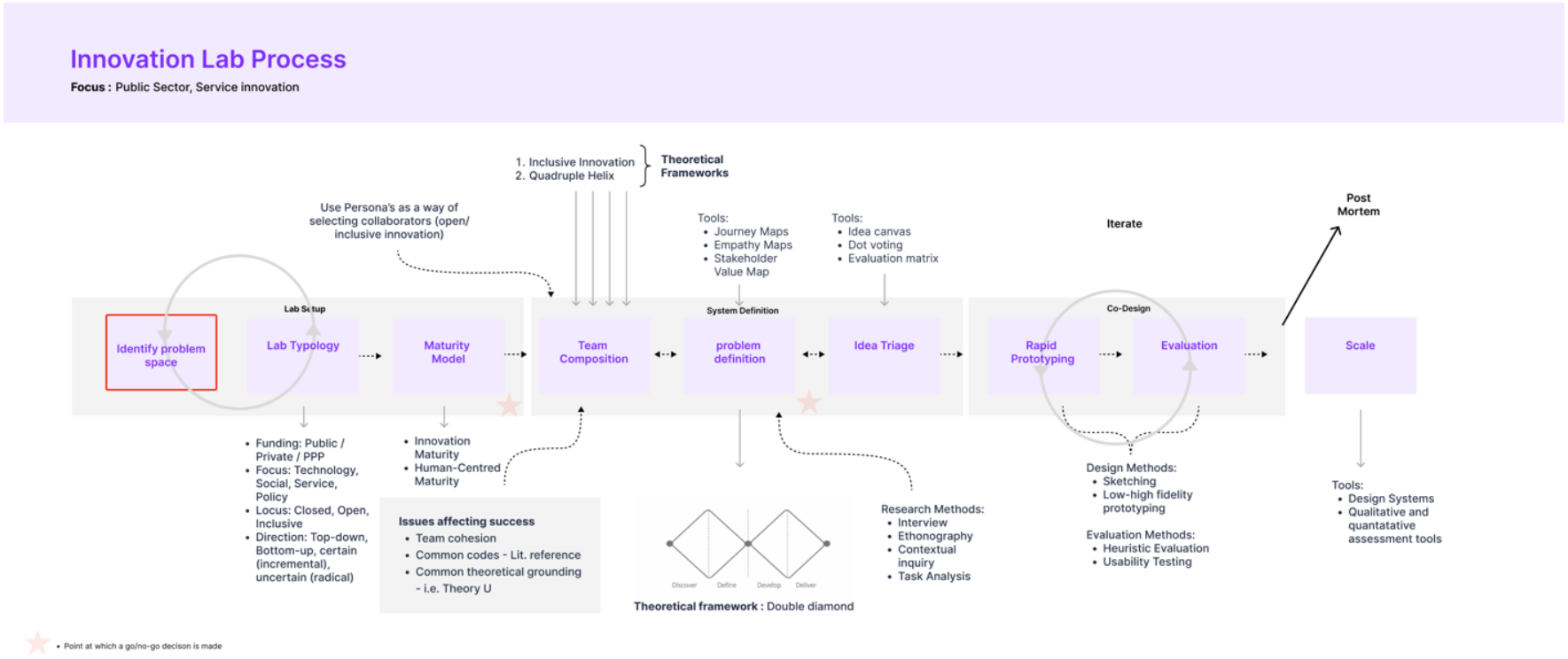

Figure 5: Iteration 2 Process Model

Iteration 3

The third iteration involved minor refinements of the three artefacts based on the case study from iteration 2. We then evaluated the three artefacts with a case study based on a provincial innovation lab, NouLAB. Retrospective analysis and structured interviews enabled deeper contextualization of the artefacts in a non-federal setting. Data from this iteration emphasized the importance of tailoring UCD practices to organisational readiness and resourcing. Additionally, this stage contributed to broader conceptual clarity by challenging assumptions made in earlier versions of the artefacts. Insights from this case were shared at the 2024 IBET Conference through both a poster and oral presentation.

Iteration 4

The typology, playbook, and process model were further refined to better account for differences in mandate, funding, and maturity across levels of government, that was learned in iteration 3. The fourth iteration was evaluated using a case study of an international innovation lab, HXLab, where retrospective analysis and structured interviews enabled deeper contextualization of the artefacts in a federal public sector setting outside of Canada. The typology, playbook, and process model were further refined to better account for differences in mandate, funding, and maturity of a different federal government. Data from this iteration emphasized the importance of tailoring UCD practices to organisational culture. Additionally, this stage contributed to broader conceptual clarity by challenging assumptions made in earlier versions of the artefacts.

Expert Panel Review

At the end of the thesis, we conducted an expert panel review and a comparison of related works to evaluate the final version of our artefacts across all case studies. The expert panel consisted of myself, and the four leaders of the innovation labs in each of our case studies. It consisted of a guided discussion, real-time feedback throughout, and a structured questionnaire provided at the end. The feedback obtained during this stage informed the final refinements to the typology, process model, and playbook. These validated artefacts form the core contribution of the thesis and are positioned for further dissemination through an expert panel paper currently in preparation.

All qualitative data gathered from the case studies (including interview transcripts, observational notes, and document analysis) and the expert panel review was analysed using thematic analysis, following the reflexive approach outlined by Braun and Clarke (2012). A hybrid deductive and inductive process was employed to systematically identify and interpret patterns of meaning within the data.

In the first phase, a *deductive*, "top-down" approach was used to code the data against a framework of pre-defined themes. This initial deductive framework was based directly on the primary constructs of the research artifacts, namely the stages and sub-sections of the proposed innovation process model (detailed in Chapter 5). This allowed for a systematic validation of the model's components against the empirical data from the case studies.

In the second phase, an *inductive*, "bottom-up" approach was applied. This involved re-reading the data to identify new, emergent themes that were not captured by the initial deductive framework. This inductive coding was essential for discovering unanticipated insights and

patterns, particularly during the analysis of the expert review panel feedback, where experts provided nuanced perspectives that extended beyond the initial process model. This hybrid approach ensured that the analysis was both grounded in the research's theoretical foundations and open to new, data-driven discoveries.

2.4 Research Data

The nature of the research and the corresponding data that was collected was qualitative. The data collected included: literature review papers and analysis, notes and transcripts from interviews and the expert panel review, and some feedback sent by email communications, screen-share sessions, and transcripts. There was some quantification in a 5-point Likert scale questionnaire used in the final expert panel evaluation of the thesis. This thesis used DSR as the overarching methodology. The methodology consists of structured iterations that refine artefacts based on empirical validation data.

2.4.1 Literature Review (Iteration 0)

Motivated by two decades of industry experience, we gathered primary data through a systematic search of the following academic databases Scopus, Web of Science and Springer related to research questions 1 and 2. These literature reviews are explained in detail in section 3.2 and 3.3. Additional secondary data was gathered through industry websites, and sources of grey data based on our industry experience as well as references found in the primary data.

2.4.2 Case Studies (Iterations 1-4)

The type of data and manner of data collection was similar for all of our case studies. For each case study we had a series of communications and ad hoc discussions with the head of each innovation lab. We made detailed notes of these communications and discussions and organised them around our artefacts, in particular the process model to create a systematic understanding of how UCD-supported innovation was taking place in those labs. In case study 1 and case study 4 we were also given access to internal documents that documented how the lab was run and how some of their innovation projects were managed.

In case study 1, we had been an active participant in the initial setup of the lab and the first projects. Therefore, we also had observational data gathered from our previous direct involvement. The data included auto ethnographic, practitioner-based insights and was analysed using thematic analysis to extract patterns regarding the structure and effectiveness of innovation labs, mapping findings against industry best practices to identify gaps while looking for potential refinements.

Based on the notes collected, for each case study, we captured how they functioned based on the process model. We classified the lab according to the typology and considered what they had or would have benefited from having in terms of a playbook. For each case study, interviews and stakeholder feedback served as the primary source of data for evaluating and refining the proposed artefacts. These interviews with lab managers explored topics such as the perceived utility of the process model, barriers to implementing UCD practices, and reflections on organisational readiness for innovation. In addition to scheduled interview discussions, informal feedback was gathered through email correspondence.

Thematic analysis was used to identify recurring patterns across these interactions, while outlier insights were flagged for deeper reflection. This body of qualitative data played a critical role in grounding the design science research process in lived practitioner experience. It also provided contextualized perspectives that helped refine not only the structure and language of the process model but also the usability of the playbook and the dimensions of the emerging typology. Stakeholder voices were essential in surfacing friction points, validating assumptions, and identifying gaps in the artefacts that may not have been evident through literature alone.

2.4.3 Expert Panel Review

At the end of our thesis research, we focused on expert validation through a structured panel composed of senior practitioners and thought leaders in public sector innovation. The expert panel review provided feedback through a focused discussion and a follow-up questionnaire. The expert panel evaluation is described in detail in section 6.2. The expert panel evaluated the coherence, relevance, and applicability of the process model, typology, and playbook. Real-time feedback was collected when participants engaged directly with the typology and process model. Rating data was captured using Likert-scale responses, while qualitative insights were clustered thematically to identify opportunities for refinement. The expert panel review provided critical external validation, surfacing both points of convergence and constructive disagreement that informed final updates to language, structure, and strategic positioning of the framework. The expert panel is now collaborating on a publication (in progress) to report on its results.

Chapter 3 Background and Related Works

This chapter lays the foundation for this thesis. It provides an introduction to the concept of an innovation lab, detailing their evolution and various models. It then provides a systematic literature review on the use of UCD as an approach to innovation. This is followed by a systematic literature review on public sector innovation labs within the broader discourse of public sector innovation, highlighting key theoretical frameworks and previous studies that shape current practices and thinking in the field. Finally, we identify related works that capture the current state of the art to give context and comparison with the artefacts (typology, process model, and playbook) of our proposed framework (which is presented in Chapter 4). This background lays the foundation for this thesis by establishing the challenges faced by public sector innovation labs and the potential advantages gained by adopting UCD methods.

3.1 Innovation Labs

An innovation lab is a dedicated space or initiative within an organisation that focuses on fostering creativity and developing new ideas, products, or solutions.(*ISO 56002:2019*, 2019) (Russo-Spena & Mele, 2012) The main goal of an innovation lab is to encourage creative thinking, experimentation, and collaboration, often to drive transformation and progress within the organisation or in the market.(McGann et al., 2021)

Innovation labs can be found in a variety of sectors, from tech companies to financial institutions, educational organisations, and government agencies. Each lab will have its unique approach, but the common thread is that they are all designed to break away from traditional ways of working

to find novel solutions to challenges. (Bharosa et al., 2020)(Tõnurist et al., 2017)(Carstensen & Bason, 2012)(Roux-Marchand et al., 2020)

The study of innovation in the scientific literature has evolved significantly over time, marked by several key phases and influential works. The term "innovation" began to gain attention early in the twentieth century with economists like Joseph Schumpeter, who in his work *The Theory of Economic Development* (Schumpeter, 1934), emphasized the role of the entrepreneur and innovation in economic growth. After the Second World War, the study of innovation expanded beyond economics into fields like sociology and management. Robert K. Merton, in his sociological studies, examined the social structure of science and its impact on the development of new knowledge and innovations (Calhoun, 2010). *Diffusion of Innovations* (Rogers, 1983) became a seminal work, proposing a theory on how, why, and at what rate new ideas and technology spread. In the nineteen sixties and seventies, studies began focusing more on technological innovation and its management within organisations. Books like *Managing the Flow of Technology* (Allen, 1984) highlighted the importance of networks and communication in the innovation process.

Later in the twentieth century, the concept of "innovation systems" emerged, emphasizing the interaction between various actors (firms, universities, government) in the innovation process. *National Systems of Innovation* (Lundvall, 2010) and *National Innovation Systems: A Comparative Analysis* (Nelson, 1993) were influential in shaping this perspective. Henry Chesbrough introduced the concept of "open innovation" in his book *Open Innovation: The New Imperative for Creating and Profiting from Technology* (Chesbrough, 2003), which argued for the use of external as well as internal ideas and paths to market.

More recent research focuses on the role of digital technologies, sustainability, and social innovation. Scholars like Eric von Hippel have explored user-driven innovation, particularly in the context of digital and open-source models (von Hippel, 2005). This overview shows the evolution of innovation study from a focus on individual entrepreneurs and economic growth to a broader examination of complex systems, policy, and the role of technology and society in shaping innovation processes.

This gradual paradigm shift from Schumpeter (1934) to von Hippel (2005) and Chesbrough's (2003) work emphasizes the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation, respectively. These concepts underscore the importance of "permeable organizational boundaries" to enhance an organisation's technology and innovation base, marking a departure from the traditional, closed models of research and development. This is important because older closed and economy-driven models of innovation had little to offer the public sector. The recent drive in the public sector to adopt technology, to be digital first and citizen engaged, requires innovation, and therefore innovation has become a central focus of the public sector. (Office of the Auditor General of Canada, 1998)

When transitioning the discourse to public sector innovation, it becomes crucial to acknowledge that innovation within this context transcends mere commercialization and profit margins. The Organisation for Economic Co-operation and Development (OECD, 2020) emphasized that public sector innovation encompasses a broader spectrum, including policy, service, system, and governance innovations, which aim not only for economic gain but also for social good and

improved governance. Public sector innovation is, therefore, a multifaceted phenomenon that must be understood in terms of value creation across various dimensions social, economic, and political rather than being narrowly defined by commercial success alone (OECD, 2020). This expanded view recognizes that public sector innovation has the potential to drive significant improvements in society, such as enhancing the quality of life, increasing accessibility to services, and fostering a more engaged and informed citizenry.

3.2 Public Sector Innovation Labs

This section presents the findings of a systematic literature review (SLR) that was conducted during Iteration 0 of the research process (see Chapter 2). The purpose of this review was to explore how public sector innovation labs are described and classified in the existing literature, and to assess whether any frameworks or artefacts already exist that address RQ1 and RQ2, namely, how public service innovation labs can be characterized, and how UCD methods are being leveraged within them. As described in the Research Design (Section 2.3), this literature review formed a critical component of the initial gap analysis that informed the creation of the process model, typology, and playbook that underpin the thesis. We outline and categorize the diverse types and functions of innovation labs in the public sector, providing a structured framework to better understand their operational dynamics and strategic orientations. The main questions are as follows:

Q1 - What are the different types of public sector innovation labs?

Q2 - How are Public Sector innovation Labs Classified?

Q3 - What separates private sector innovation labs from public sector innovation labs?

Q4 - Do these labs have similar definitions of innovation?

3.2.1 Development of a Review Protocol

In conjunction with a research librarian from the University of Ottawa, we developed a search query that focused on the term innovation labs, (the term innovation laboratories did not appear as a way of defining the concept) and different terminology for "public sector". My initial search query included the term "typology" and did not yield many results. Removing the word "typology" and, relying on the help of the research librarian, who was able to point me to some specific databases and journals produced more results. An initial scan of the returned results indicated that the formulation of the query was effective, and no more keywords needed to be added. The keywords were run in the following databases and search engines:

Google Scholar

Scopus

PAIS

OECD iLibrary

Web of Science

Pro-Quest Politics

Pro-Quest

Google

After receiving the initial set of results, the titles of the articles were scanned manually to establish a preliminary relevance. That initial scan allowed for the number of relevant articles to be greatly

reduced. Following an initial scan of the titles, a scan of the abstracts of the reduced list of articles was carried out. No articles were excluded based on the review of the abstracts. While some were not centrally relevant, for this literature review, there were at least adjacent themes that were of interest for background or contextual purposes.

Finally, we reviewed a list of active innovation hubs and labs on the GCCollab Wiki (a publicly accessible wiki run by the Canadian federal government to foster collaboration), and we were able to glean some documentation from some of the GC (Government of Canada) innovation labs that had publicly accessible web sites and information. In addition to peer reviewed journals, various sources of grey literature were consulted by using the aforementioned search terms in broader databases like Google and Pro-Quest

The criteria by which we judged articles to be relevant were as follows:

Cr1: Where the articles reporting on observed experience in innovation labs?
Cr2: Did the methodology used in obtaining the findings seem logical?
Cr3: Were the conclusions drawn reasonable based on the methodology?
Cr4: Did the findings or methodology have answer at least one of the research questions?

3.2.2 Conducting the Review

The keywords used in my initial search were innovation labs, public sector, and typology. The query was formulated as follows:

Table 2: Database Queries – SLR1

Query	Database	Results
TITLE-ABS- KEY (innovation AND lab AND typology)	SCOPUS	20
(TITLE-ABS- KEY (journal AND of AND experimental AN D innovation)) AND (labs)	SCOPUS	79
Innovation AND labs	ScienceDirect	8
("innovation") AND ("labs" OR "hubs" OR "spaces")	ScienceDirect	54
from (All Fields contains '"innovation lab" OR "innovation labs"') **AND** from (All Fields contains '"public sector" OR government* OR "public service"')	OECD iLibrary	278
from (All Fields contains '"innovation lab" OR "innovation labs"') **AND** from (All Fields contains '"public sector" OR government* OR "public service"') **AND** from (IGO collection contains 'OECD') **AND** from (Country contains 'Canada')	OECD iLibrary	6
innovation lab typology) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years	Web of Science	22

(“Innovation lab” OR”Innovation labs”) AND (“public sector” or government* or “public service”). - No wire feeds	Pro-Quest	5,856
(“Innovation lab” OR”Innovation labs”) AND (“public sector” or government* or “public service”) AND “typology”	Pro-Quest	262
(“Innovation lab” OR”Innovation labs”) AND (“public sector” or government* or “public service”)	Pro-Quest - Politics	384

Articles that were selected as primary sources needed to have some description, classification or definition of an innovation lab. This included, but was not limited to the physical space, the projected outcomes, the mandate or purpose, the funding or revenue model, the methodology or philosophy employed, the reporting structure or level of autonomy, skillset or disciplines of staff or clients, organisational culture.

3.2.3 Reporting the Review

Research shows that there are many ways in which public sector innovation labs can be classified. One way is by the area of the public sector in which they operate. These can include:

- Federal, Regional (including province, territory or state), Municipal government
- Public Universities

Public sector innovation labs can be categorized by their focus, such as:

- Technology
- Civic Engagement
- Systemic Design
- User-Centred Design
- Research
- Big Data & Data Analysis
- Prototyping, Testing & Experimentation
- Collaboration
- Experiential Learning
- Gender Based Analysis
- Public Engagement
- Strategic Foresight
- Behavioural Design
- Design Thinking
- Evaluation
- Lived Experience

Apart from jurisdiction and focus, there was a variety of approaches to innovation that were described in the literature. McGann et al. (2018) describes four distinct approaches used in public sector innovation labs. There are, design-led labs, which tend to use design thinking when seeking to innovate in the policy space and generally leverage a 'user-centred' approach by employing such methods as ethnography, to clarify problem definitions and use a collaborative, co-creation approach when it comes to designing a solution.

The labs that employ an open government or open data approach to focus on data analytics and applying digital tools to analyse and synthesize large quantities of public data. However, "while they may share an emphasis with design-led labs on participatory methods, 'open government' labs can be distinguished by their focus on increasing the accessibility of government data." (McGann et al., 2018).

There are also labs that employ an evidence-based approach. These labs focus on applying rigorous evaluation techniques, such as randomised controlled trials (RCTs). They tend to exhibit an adherence to the idea of evidence-based policy. (McGann et al., 2018)

There are also labs that are defined as mixed methods. These did not show any distinct preference for one approach over another and often used different approaches as the need arose.

In addition to these, the literature has shown that public sector innovation labs have:
Different funding models – Some are funded by their departments, some by interdepartmental initiatives, some by partnerships between government or academia and industry. Many tend to be structurally separated from the rest of the public sector and are expected to be able to attract external funding as well as "sell" their ideas and solutions to the public sector. (Schuurman & Tõnurist, 2017)

Different resourcing and skill makeup – Carstensen & Bason (2012) noted of Danish government's MindLab: "The people hired had the formal training of political science, interaction design and anthropology. Only two had longer practical experience as civil servants." In their

case, this created friction, but there are many examples of the benefits of a multidisciplinary approach to staffing a public sector innovation lab.

Finally, the labs featured across these articles present different definitions and interpretations of innovation, particularly in the context of Living Labs vs. Innovation Labs. These labs do not define innovation in a single unified way, but instead offer multiple conceptualizations of innovation depending on the lab's purpose, discipline, and theoretical underpinning. Living labs tend to focus on the co-creation of value through real-life experimentation, user involvement, integrating feedback iteratively (Bergvall-Kåreborn & Ståhlbröst, 2009; Pełka, 2013), and alignment with user needs, discovered through embedded, real-world interaction (Leminen & Westerlund, 2017).There are additional, context-specific definitions of innovation within the context of Living Labs: As social and systemic transformation, (Schaffers & Turkama, 2012), or even as a quantum-inspired emergence of novel realities. (Leminen et al., 2023)

True innovation labs, also have a variety of ways in which they define innovation. Unlike living labs, innovation labs tend to be more practice-driven and context-specific, with many also lacking a consistent definition of innovation. These labs focus more on internal experimentation, design methods, and systemic problem-solving. (Schuurman & Tõnurist, 2017)**.** This diversity reflects their multidisciplinary and applied nature of both.

There are commonalities however in the definitions of innovation amongst different labs, and across the living lab, innovation lab spectrum. They all see innovation as:

- A collaborative and multi-stakeholder process
- User or human centred

- Iterative and experimental

So while these labs do not have similar definitions of innovation, there are commonalities among them that can lead us to say that innovation is a human-centred, collaborative, and experimental process driven by diverse actors working together in real or simulated environments to co-create solutions that address complex challenges.

3.3 User-Centred Design as an Approach to Innovation

Before examining UCD's specific application in public sector innovation, it is essential to establish its core principles as a design philosophy. UCD is an approach to design and development that prioritizes the needs, wants, and limitations of the end-user at all stages of the design process (Lowdermilk, 2013). While specific methods may vary, the UCD philosophy is guided by several key principles.

Foremost among these is an *empirical focus on users and context*. This principle mandates that designers must gain a deep and empathetic understanding of the people who will use the artefact, the tasks they aim to accomplish, and the real-world environment in which they will perform them (Kirakowski & Bevan, 1997). This understanding is not based on designer assumptions but on data gathered through observation, interviews, and other field methods. A second core principle is *iterative design*. UCD rejects a linear, single-pass development process; instead, it is built on a continuous cycle of prototyping, testing, and refinement, where direct user feedback informs and validates each subsequent version of the design (Gould & Lewis, 1985).

A third core principle is the *active involvement of users*. As Lowdermilk (2013) emphasizes, users are not merely subjects to be studied but are ideally active participants and co-designers in the process. This participatory stance ensures that the final solution is not just technically sound but also practically relevant and usable. Finally, UCD requires a *holistic approach*, considering the entire user experience (UX) from the first point of contact to the completion of the user's goals. This includes usability, accessibility, and the user's affective response to the product or service (ISO 9241-210, 2019). It is this set of principles that informs the "methodological commitments" (Chammas et al., 2015) referenced in Chapter 2 and which provides the lens for evaluating the innovation lab practices investigated in this thesis.

A systematic literature review was conducted to investigate the application and effectiveness of UCD techniques within innovation labs. This review critically examines the extent to which these methodologies are integrated into the functioning of innovation labs, exploring both their deployment and impact across various settings. UCD embeds empathy, iteration, and co-creation throughout the innovation process. Codified in international standards such as ISO 9241-210, UCD formalizes principles like early user involvement, iterative design, and a focus on the entire user experience. In the context of public service innovation labs, UCD is not merely a toolkit but a philosophical orientation that redefines how challenges are framed, how interventions are developed, and how outcomes are assessed. In order to address RQ2, this section examines the principles of UCD and its applicability as a strategic innovation method within government contexts.

For clarity, the following terms will be use in this review with the following functional definitions:

Innovation:

- Innovation is the multi-stage process whereby organisations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace. (Baregheh et al., 2009)

User-Centred Design:

- ISO 13407 describes the UCD process as: ‘‘the active involvement of users and a clear understanding of user and task requirements; an appropriate allocation of function between users and technology; the iteration of design solutions; multidisciplinary design.’’ International Organization for Standardization. (1999).

Innovation Lab:

- For the purpose of this review, we will employ the functional definition of an innovation lab as “a semi-autonomous organisation that engages diverse participants on a long-term basis in open collaboration for the purpose of creating, elaborating, and prototyping radical solutions to pre-identified systemic challenges.” (Gryszkiewicz et al., 2016)

For the purposes of this thesis, User-Centred Design (UCD) is preferred over the broader term Human-Centred Design (HCD) because it more precisely captures the focus on involving specific user groups such as citizens, clients, or public servants throughout the design and innovation process. While HCD encompasses a wide range of human factors, including social systems and emotional experiences, UCD emphasizes concrete methods for understanding user needs, testing

solutions iteratively, and aligning outputs with user tasks and goals. Given that this research investigates how public sector innovation labs can improve outcomes by systematically involving end users, the term UCD provides a clearer, more actionable lens that aligns with the structure and evaluation of lab practices.

3.3.1 The Need for the Systematic Review

User-centred design and innovation practices share similar goals and often methods such as design thinking are employed to drive innovation. For example, MindLab's process model aimed at strengthening citizen engagement is described as "firmly anchored in design thinking, qualitative research and policy development, with the aim of capturing the subjective reality experienced by both citizens and businesses in the development of new solutions." (Carstensen & Bason, 2012). Innovation and UCD are, however, two distinct disciplines, and while there seems to be an awareness of UCD practices among proponents of innovation labs, the literature seems to reflect two distinct disciplines. This raises the question of whether the distinctions are substantial or simply semantic. In order to answer this, a systematic literature review has been undertaken to assess the extent UCD methods are being used in shared innovation spaces, and the effect of these methods on their outputs.

3.3.2 Specification of the Review Questions

The two review questions are aimed at establishing the rate or prevalence of the use of user-centred design methods in innovation labs and assessing if there are any major differences in the outcomes or outputs of labs that use UCD methodologies and those that do not. The questions are as follows:

Q1: To what extent is User-Centred Design being used within innovation labs?

Q2: Are there substantial differences in the characteristics of innovation labs that use a user-centred design approach compared to labs that do not?

3.3.3 Development of a Review Protocol

In conjunction with a research librarian from the University of Ottawa, we developed a search query that focused on the term innovation labs, and different terminological expressions for "user-centred design" or related terms that were knows to be used synonymously or interchangeably. Wildcards were used to account for whether the full or abbreviated, or plural word for laboratory was used as well as to account for possible regional differences in the spelling of the word centred. The keywords were run in the following databases and search engines: ScienceDirect, Scopus, Web of Science, EBSCO, ProQuest. OECD iLibrary and Google Scholar were also used as sources of grey literature.

3.3.4 Conducting the Review

The keywords used in my initial search were innovation labs, public sector, and typology. The queries were formulated as follows:

Table 3: Database Queries – SLR2

Query	Database	Results

TITLE-ABS-KEY ((("innovation lab*" OR "collaboration space" OR "living lab") AND ("User-Cen*" OR “ucd” OR “ux” OR “design AND thinking” OR “human-computer AND interaction” OR hci)))	Scopus	60
("innovation lab" OR "collaboration space" OR "living lab") AND ("User-Centred" OR “ucd” OR “ux” OR “design thinking” OR “human-computer interaction” OR hci)	ScienceDirect	14
((“innovation lab*") OR "collaboration space" OR "living lab") AND ("User-Cen* Design" OR UCD OR UX OR “design thinking” or “human-computer interaction” or HCI)	Business Source Complete	20
[STRICT](("innovation lab" OR "innovation labs")) OR "collaboration space" OR "living lab") AND ("User-Cen* Design" OR UCD OR UX OR “design thinking” or “human-computer interaction” or HCI)	ProQuest	373
TOPIC (((“innovation lab*") OR "collaboration space" OR "living lab") AND ("User-Cen* Design" OR UCD OR UX OR “design thinking” or “human-computer interaction” or HCI))	Web Of Science - Core Collection	103
(All Fields contains ‘(("innovation lab*" OR "collaboration space*" OR "living lab*") AND ("User-Cent*" OR “UCD” OR “UX” OR “Design Thinking” OR “Human-Computer Interaction” OR HCI))’) from (Language contains	OECD iLibrary	262

'en OR fr') AND from (IGO collection contains 'OECD') with type(s) subtype/chapter OR subtype/table OR subtype/graph OR subtype/journal OR subtype/article OR subtype/working paper		

After receiving the initial set of 832 results, Covidence was used to identify duplicates. Fifteen duplicates were found automatically using Covidence. Once duplicates were removed, a manual scan of titles and abstracts removed articles with slight differences that were essentially duplicates, and irrelevant articles, leaving 32 candidate articles for full text review. An initial screening of the articles' full text allowed for the removal of 3 more articles. Upon detailed review of the articles' full text one more article was removed. This resulted in a total of 28 articles reviewed for this SLR.

3.3.4.1 Inclusion Criteria

Articles that reference living labs or innovation labs and reference the approach or methodology employed.

3.3.4.2 Exclusion Criteria

Articles that were not published in English or French.

Articles that were not related to the review questions because it was not possible to determine what approach was being used or characteristics of the labs were not described in sufficient detail to make proper comparison with other labs.

Articles that referenced living labs, innovation labs, innovation or user-centred design, but define them in a manner that is substantially different from the functional definitions used in this SLR.

Articles that would cost the researcher money to obtain.

3.3.5 Quality Assessment Criteria

In order to be able to do a comparison, there is a need to find articles that clearly reference the methodology or approach used by the innovation lab, and there must be a subset that specifically reference user-centred design or some variation thereof. The following questions will be used to assess quality.

The criteria by which we judged articles to be relevant were as follows:

QAC 1: Do articles provide detailed descriptions of activities from which specific UCD characteristics can be observed?

QAC 2: Do the articles that reference a UCD approach present elements of that approach that would allow the lab's activities to be classified as user centred in keeping with accepted?

QAC 3: Do articles provide overviews or typologies of innovation of living labs?

QAC 4: Do articles present a credible and sufficiently detailed description of the lab's approach to innovation?

QAC 5: Do articles present a credible and sufficiently detailed description of the lab's output or outcomes?

The review found very few articles that were considered of high quality based on the assessment criteria. This did not mean the articles themselves were of low quality or badly written. All of the articles satisfied at least one of the quality assessment criteria, but few satisfied all of them.

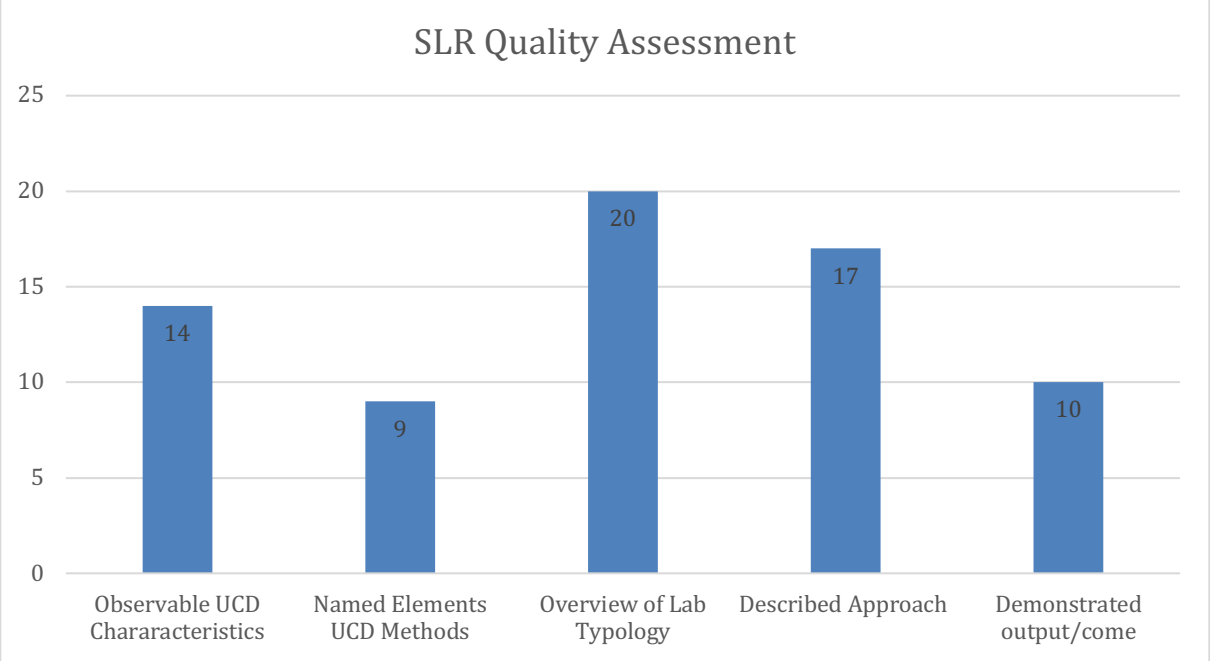

Figure 6: Number of Articles that Satisfied Quality Criteria

3.3.5.1 Selection of Primary Studies

After the removal of duplicates and the initial scan of the titles and abstracts, the preceding quality criteria were applied during the initial full text screening. Articles that were irrelevant, or did not have sufficient details to help in the answering of the review questions were discarded. Not

all of the articles turned out to be high quality based on the defined criteria however as these were not exclusion criteria articles that didn't meet all of the quality criteria still proved to be of some value in literature review.

3.3.6 Reporting the Review

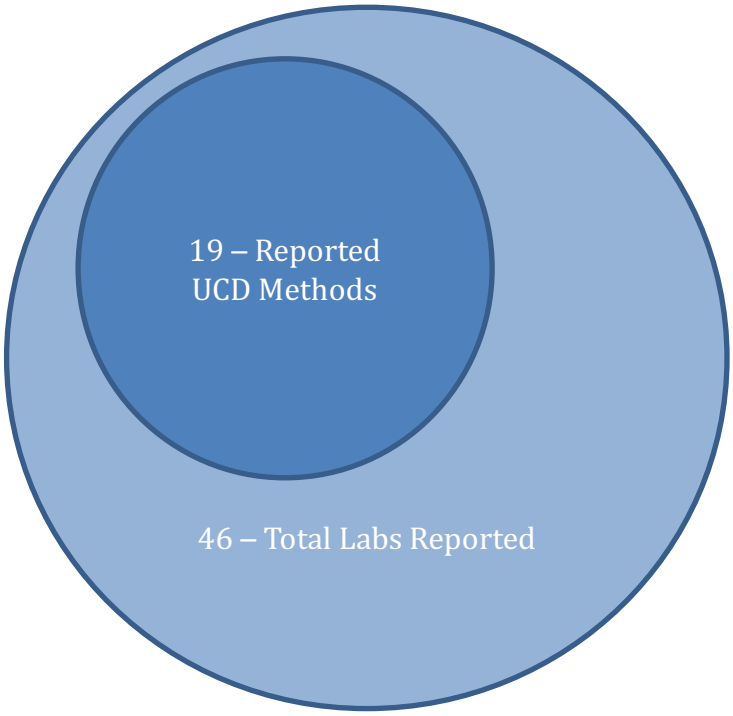

Figure 7: Prevalence of UCD Methods in Innovation Labs

This literature review uncovered descriptions of 46 identifiable collaborative innovation spaces. Of the 46 labs that were examined, 19 descriptions referenced identifiable user-centred design methods in their practice. As will be discussed in the limitations, this does not mean that more labs were not using UCD methods, but they may not have had the vocabulary to describe them as such, or the focus of the research didn't require the methods of the lab to be described in sufficient detail to be able to definitively assess their practices as UCD or not.

For example, one paper (Baedeker et al., 2020) described the process, project and outputs without identifying the lab or the organisation with which the lab was affiliated. That paper was one of

the few that had extensive reporting on the outcomes of the projects undertaken. In addition, Baedeker et al. (2020) demonstrate a clear iterative approach to design, and usability of the design was testing with target users. While the project (named 'Piaf') is not included in the list of labs in the data extraction table, it is considered one of the 19 examples of UCD methods illustrated in *Figure 7*.

Seven of the labs were clearly identifiable as physical spaces. These ranged from labs such as the US Office of Personnel Management innovation lab, which were dedicated lab spaces in buildings, to broader areas like the San Francisco Fix-it Team, which was deployed in several neighbourhoods throughout San Francisco, California. In keeping with the concept of Living Labs, most of the labs that were described as such did not specify a physical space. Depending on the focus of the research, the literature described innovation labs in various ways, and focused on various aspects of innovation, innovation labs, UCD, and user involvement. The majority of studies focused on methods or approaches to innovation and some studies like (Alavi et al., 2020; Mérindol & Versailles, 2017) and (McGann et al., 2018) examined multiple labs in order to assess aspects such as the co-creation process, creativity and public sector innovation respectively.

There was no identifiable pattern of characteristics inherent to labs that used UCD methods. Of the labs that were described in the reviewed articles, in addition to the Piaf prototypes, only 4 others had outputs that were documented.

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3.3.7 Synthesis

There are many ways in which those that study and practice innovation can benefit from a deeper understanding and a more conscious embracing of UCD methods in their innovation practice. The limited evidence in the literature does suggest that the study of UCD methods in the practice of innovation can result in improved outcomes. An example of such is illustrated by Habibipour et al. (2018), who found in their study of factors that contributed to dropout behaviour of participants in Living Lab field tests, that elements such as poor user selection, and ignoring user feedback were factors in participants dropping out. As living labs do rely on end user participation to achieve their outcomes, employing established UCD methods that have traditionally been used for persona development, participant recruiting, co-creation and feedback capture can potentially have a significant and positive effect of innovation lab outcomes.

Insight was also gained from research that referenced innovation projects but did not specifically reference labs. For example, the review included three case studies of innovation spaces do not technically qualify as labs, they demonstrate different approaches to user involvement in the innovation process. As such the one described at the "Customized Space" which has the highest level of user involvement is classified as having the "Users' needs and preferences at the centre of the development of the project and everything that is developed in the project revolves around what the users want." At one end of the spectrum that they describe, is the user as a subject to be observed, and at the other end of the spectrum is the user as nexus of all innovation and design activity, whose wants drive the whole process. While the former description is more in keeping with traditional UCD, even in the latter description it is acknowledged that the professional stakeholders face a choice about which methods they need to employ in order to gain insight about the users. (Storvang et al., 2020)

The first proposition that Leminen & Westerlund (2017) make in their paper studying the use of tools in Living Labs is that "Standardized tools decrease the complexity of innovation activities, and decreasing complexity leads to predefined incremental innovation outcomes in living labs." User-centre design practice has long made use of standardized tools in exactly the way that Leminen & Westerlund (2017) describe. It was also noted in the article that are a class of innovation labs that consistently invent new tools and techniques. This is sometimes necessary, but more often than not a waste of effort as sufficient and validated tools exist. They do not explore why these labs invent their own tools.

(Dopp et al., 2019)noted that the use of "shared language around UCD can maximize the usefulness of interdisciplinary efforts to promote the implementation of evidence-based practices through improved design". Their research produced a glossary of UCD strategies that span many aspects of the design and innovation lifecycle. Such as conducting heuristic evaluation, usability testing, live prototyping, conducting co-creation sessions and defining target users and their needs.

This glossary and the descriptions proved very useful in assessing some of the labs that did not use conventional UCD terminology to describe their practice.

3.3.8 Discussion

This review was able to answer the first review question. Of the labs that were examined in this literature review (47 labs), almost half (19 labs) employed some sort of user-centred design methods or techniques. These ranged from leveraging personas (Dopp et al. 2019) to low-fidelity

prototyping and iteration (Baedeker et al. 2020), (McGann et al. 2018) and (Leminen and Westerlund, 2017) and validation methods such as usability testing (Almirall et al. 2012)

However, based on the literature that was reviewed, the author was unable to answer the second review question. While there are many documented cases of outputs and outcomes, it was found that outcomes are seldom the focus of research that examines methods therefore it was difficult to assess the link between methods and outcomes. For example, the description of US Office of Personnel Management in the literature goes into great detail about the lab's physical space, staff and methods, but does not mention specific outputs.

Research tends to focus on output, or methods. Some research is focused on the setting up, management or governance of shared innovation spaces or networks of spaces. A great deal of literature has been published for example on the European Network of Living Labs (ENoLL). This review question might in fact be ill suited to be answered by a literature review, and better suited to be answered by an experiment, or action research.

Despite failing to answer the second review question, the literature did illustrate some enlightening conceptual differences between the goals of UCD as a practice and the goals of innovation labs

It is the author's opinion that the concept of the lead user, as described by Ivy Eisenberg (2011) for example, is at odds with tradition of UCD which according to the ISO definition as the focus of UCD is usability, as represented by a broad spectrum of users often embodied in a set of primary personas that are representative of the segments of the broader user population. It would appear that when the goal is usability, representative or user-led methods are best, but when the goal is innovation, lead-user methods are the best.

Many studies of innovation spaces and living labs focus on the methodology and how the concepts of innovation spaces can be improved. Most of the studies in this review looked at aspects of methodology and the structure of the lab design. Some studies specifically mention outcomes or whether they were achieved. (Fecher et al., 2020; Georges et al., 2015; Habibipour et al., 2018; Russo-Spena & Mele, 2012; Schuurman et al., 2016)

The few studies that did describe the methods in enough detail to assess whether or not they were user centred were enlightening. (Fecher et al., 2020; Georges et al., 2015; Habibipour et al., 2018; Russo-Spena & Mele, 2012; Schuurman et al., 2016)

There seems to be many aspects of user centred design methodology that have already been incorporated into innovation practices. There does, however, seems to be a fundamental difference in terminology that sometimes makes it appear that user centred design practices are not being used or are not well understood within the discipline of innovation. A limitation of this SLR is that will be discussed is that there were not a large number of papers that dealt specifically with the topic of user centred design in the context of innovation labs living labs or shared collaboration spaces. The author had to surmise based on descriptions of methodologies whether or not the strategies in fact were user centred or not. To aid in that assessment a list of user centred strategies was used from a published glossary of user centred strategies from the medical field. These strategies were common UCD methods that were employed throughout the design lifecycle. The most relevant or impactful finding of this SLR was the role of the user in innovation.

As well, the concept of the lead user versus the concept of user lead innovation is very important to highlight. Within the context of traditional user centred design, usability as a concept is

achieved when representative users are able to complete representative tasks with effectiveness efficiency and satisfaction (Mirnig et al., 2015). As such, a typical user or a group of users that represent the primary user groups in a user population are essential for achieving representativeness. In the context of innovation, the lead user as described by Eisenberg (2011) is more adept at driving innovation because of their mastery of everyday tasks or typical tasks they are able to then push the tools or practices of the domain to their limits and therefore spark radical innovation. Whereas more representative users tend to drive incremental small-scale improvements and not necessarily innovations.

The lack of detailed descriptions of outcomes in the literature can be explained by the fact that innovation spaces, and living labs in particular do not always have defined objectives, and when they do, those objectives are likely to change as the needs of the users are better understood (Leminen, 2015).

3.3.9 Limitations of this Study

There are several limitations of this study that should be pointed out. Firstly, due to time constraints it is likely that only a small portion of the available literature was reviewed. While peer review was an integral part of the process, there is only one author of this review and that may also introduce bias. A further limitation is that many research studies focus on the theoretical frameworks, typologies and overall landscape. Few go into sufficient detail to fully assess details of the methodologies.

Furthermore, there is a lack of consistent language across disciplines that require careful assessment to determine whether methods that are described truly conform to the functional definition of user-centred design used in this study. For example, Tacer & Ruzzier (2015), describe what they call User-Driven Innovation (UDI) in part, as the exploration of user needs not being limited to "the examination of requirements and desires directly connected with the product or service. Rather, it includes a user's broader life, identity, value system and desired holistic experience with the product or service " (Tacer & Ruzzier, 2015). While no specific methodologies are mentioned that would commonly be identified as UCD, the approach of seeking an holistic understanding of different facets of the users' experience with a product or service is central to the practice of UCD, and thus for the purposes of the review would be considered as using UCD methods in the context of an innovation lab.

While a standardized vocabulary and nomenclature across the two disciplines is unlikely it is the author's hope that this work can expose both innovation and UCD practitioners to additional tools, which in the spirit of multidisciplinarity, will further enrich both practices.

3.4 Related Works

This section reviews selected related works that represent the current state of practice in Public Sector Innovation Labs (PSIL). These works have been chosen because they each attempt to address aspects of our research questions that are comparable to the three artefacts of our proposed framework (see Chapter 1.2). The related works discussed here serve as a baseline for evaluating whether the proposed artefacts represent an improvement. They will be used in

Chapter 6 as part of the evaluation strategy, alongside expert panel review and case study validation, to assess whether the artefacts meaningfully address the shortcomings observed in current literature and practice, and thus advance the field's ability to apply UCD systematically for PSIL.

3.4.1 Typology

This section addresses RQ1 to understand how PSIL are characterized and categorized. Although various works attempt to classify innovation labs, most do so at a high level and lack a structured framework that links typological characteristics to the operational needs and constraints of public sector environments. The typology proposed by Stoll (Stoll & Andermatt, 2025), for example, provides a useful starting point for distinguishing labs based on value creation and partnership orientation. However, it is not grounded in empirical design or participatory research and lacks sufficient detail around critical dimensions like funding structures, governance direction, and team composition, factors that emerged as highly consequential in the case studies conducted for this thesis. As such, while this and similar works point toward answers to RQ1, they fall short of offering an actionable typology that can guide real-world lab setup or predict innovation outcomes.

In recent years, there has been an upswing in the study of innovation generally. A search for peer reviewed articles about innovation that were published in 2013 yielded 28,800 results. A search for the same topic in articles published in 2023 yielded over 75,000 results. Public sector innovation as a subject of study has undergone a similar increase in scholarship; however, the study of innovation labs in the public sector remains a relatively small percentage of that research.

In our research, we have only found one previous example of a typology of public sector innovation labs. General typologies of public service innovation exist in the literature, such as (Chen et al., 2020) provide broad categorization of innovation, in this cased targeting the focus (strategy, capacity or operations) and the locus (internal or external). This typology seems to present an adequate way of describing public sector innovation in general terms. It does not address the specific exigencies of a particular entity such as a lab. Instead, it addresses institutional innovation at the broadest scale (Klarin, 2019; Kotsemir & Abroskin, 2013).

Research identifying a typology specific to public sector innovation labs is sparser. Aline Stoll, has created a typology of public sector innovation labs that seeks to "help distinguish various lab types in practical contexts"(Stoll & Andermatt, 2025) Stoll's typology is based mainly on existing scientific literature. While the strength of this approach is that it does not focus on any single case study, it does not take an experimental approach. Instead, the author seeks to create an empirically grounded typology through secondary research.

While we agree with Stoll that it is difficult to create a definitive typology due to the heterogeneity of entities that identify as innovation labs, we believe that an experimental approach rooted in design science research will yield a more accurate typology due to Design Science Research Methodology (DSRM) being inherently problem solving and innovation focused. It aims at creating and evaluating artefacts (like models, frameworks, or systems) designed to solve specific problems. This approach is particularly useful in fields where new solutions or models are required. In the case of a typology for public sector innovation labs, there are few other examples and Stoll's typology is gathered from a variety of sources with varying degrees of specificity in

their focus on a. innovation labs, b. public sector innovation c. classifying said innovation focus or entities.

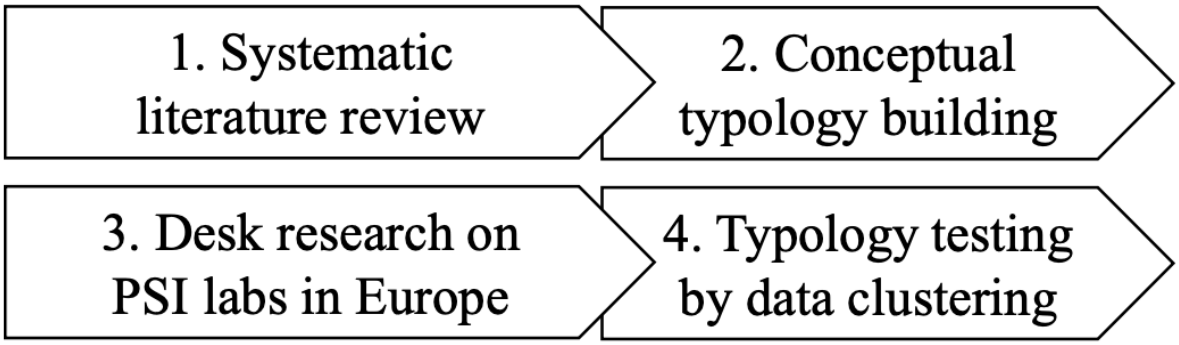

Figure 8. Four-step Process for Producing Stoll's Typology

The resulting typology is limited in its scope with respect to governance because it seems to only address the issue of partnership, and too broad in its scope with respect to the value dimension only differentiating between broad and narrow scope.

Lindsay Cole (Cole, 2022) produced a framework for conceptualizing the purpose of a public sector innovation lab. This framework is detailed and specific. It is created using a combination of action research and grounded theory and addresses many facets of innovation within the context of a public sector innovation lab. However, Cole's framework presupposes the existence of the lab and focuses on their approach to change. Cole's framework is intended to influence how labs conceptualize innovation, which is a very important element of a successful PSIL. However, it stops short of being a prescriptive blueprint of the creation and operationalization of an innovation lab, instead presenting a series of options that a PSIL might consider when transitioning from one generation of the lab to the next.

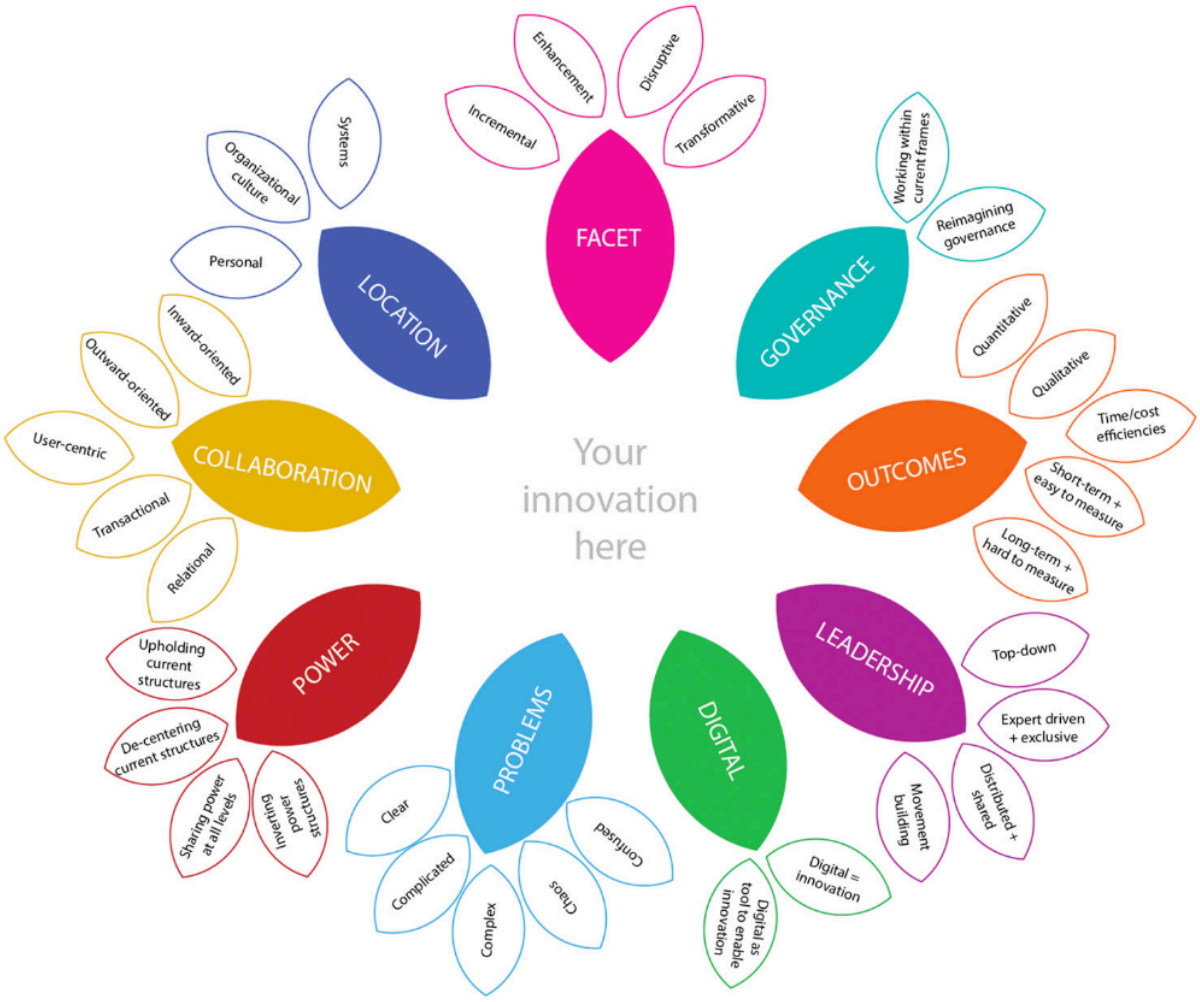

Figure 9. The Theorizing Innovation Flower Framework proposed by Lindsay Cole (2022)

3.4.2 Process Model (OECD)

This section addresses the lack of structured, actionable guidance for managing innovation projects in the public sector, a gap that links directly to RQ2. The OECD Innovation Lifecycle (2020) and ISO Process Model (ISO 56002:2019) provide high-level process models that acknowledge the importance of systematic innovation, but they stop short of operationalizing these stages for the specific realities of innovation labs. These models tend to offer conceptual guidance suitable for organisations with mature innovation systems but are too abstract to support

practitioners in designing and delivering innovation projects in a lab setting, especially in contexts with lower innovation maturity. While these frameworks begin to address the strategic need for structure, they do not specify how UCD methods can be integrated at each stage of innovation. The iterations of the process model based on the case studies specifically seeks to provide the structure and steps to enable effective management of innovation labs.

There is no widely accepted best practice for the process that innovation labs should follow. The OECD states, with regards to innovation in the Canadian Public Sector "Innovation is inherently complex, varied and cannot be understood or supported through any one single approach." (OECD, 2018). Furthermore, the OECD also contends that "The challenge of supporting public sector innovation at a system level is further exacerbated by the lack of existing relevant guidance in a public sector context" (OECD, 2018). The OECD themselves propose a model for public sector innovation that addresses the problem of lacking guidance on a systemic approach to innovation.

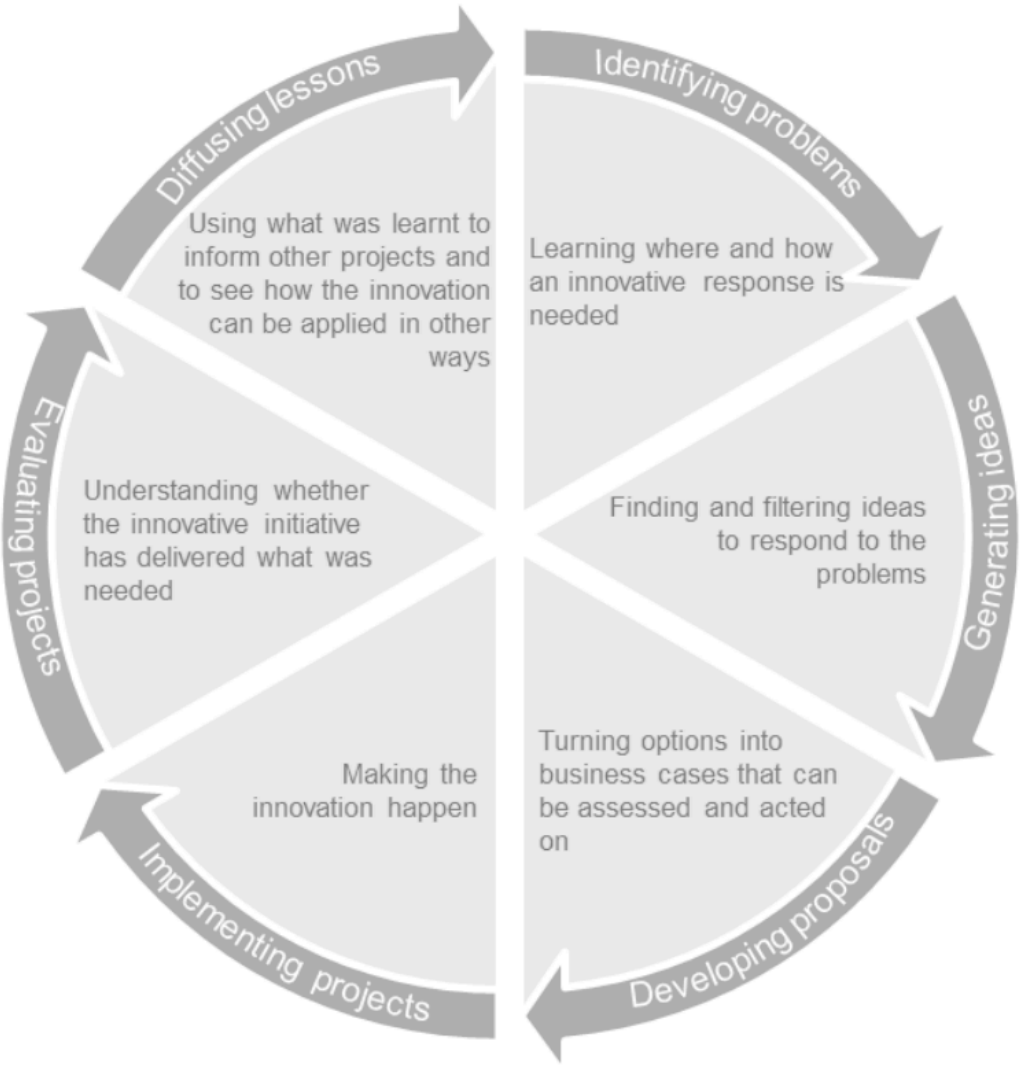

Figure 10: The OECD Innovation Lifecycle

The OECD Innovation Lifecycle presented in their 2020 report (OECD, 2020) addresses the issues of process and systemization by providing a framework for public sector teams and organisations to guide their innovation process. It addresses each stage of the innovation process. It prompts also prompts users of the lifecycle to examine their strengths and weaknesses at each stage of the innovation process. It does not however provide specific guidance on how to follow the process. It falls short of being actionable. There is good reason for this, as it is intended to guide a wide variety of innovation activities not just innovation labs. While several innovation

labs such as the Asker Welfare Labs, LabX and Pulse Lab are presented as case studies in the report, and innovation labs are mentioned specifically as a way to facilitate the lifecycle process, their advice is structured to also be applicable to innovation at network and ecosystem level and this lacks the specificity required for the lab context (OECD, 2020).

The process model that we propose is specific to the context of innovation labs. It maps to the stages of the OECD lifecycle but goes further by presenting more detailed actions to follow at each stage and takes into account the implications of variables in lab typology, team composition, and design and testing methods among other things. By documenting the process model to a level of specificity where lab typology is specified, it is our contention that teams managing innovation labs in the public sector will find it relevant, actionable useful.

In addition to the OECD, the International Organisation for Standardisation details a framework for innovation management in ISO 56002:2019 (*ISO 56002:2019, Innovation Management - Innovation Management System - Guidance*, 2019). This standard is a high-level process model for provides guidance for the establishment, implementation, maintenance and continual improvement of an innovation management system for use in all established organisations. This process model is not specific to public sector innovation and addresses processes at the highest level due to its focus on management. Our process model seeks to address some of the unique

challenges of public sector innovation while also providing detailed enough guidance to be actionable.

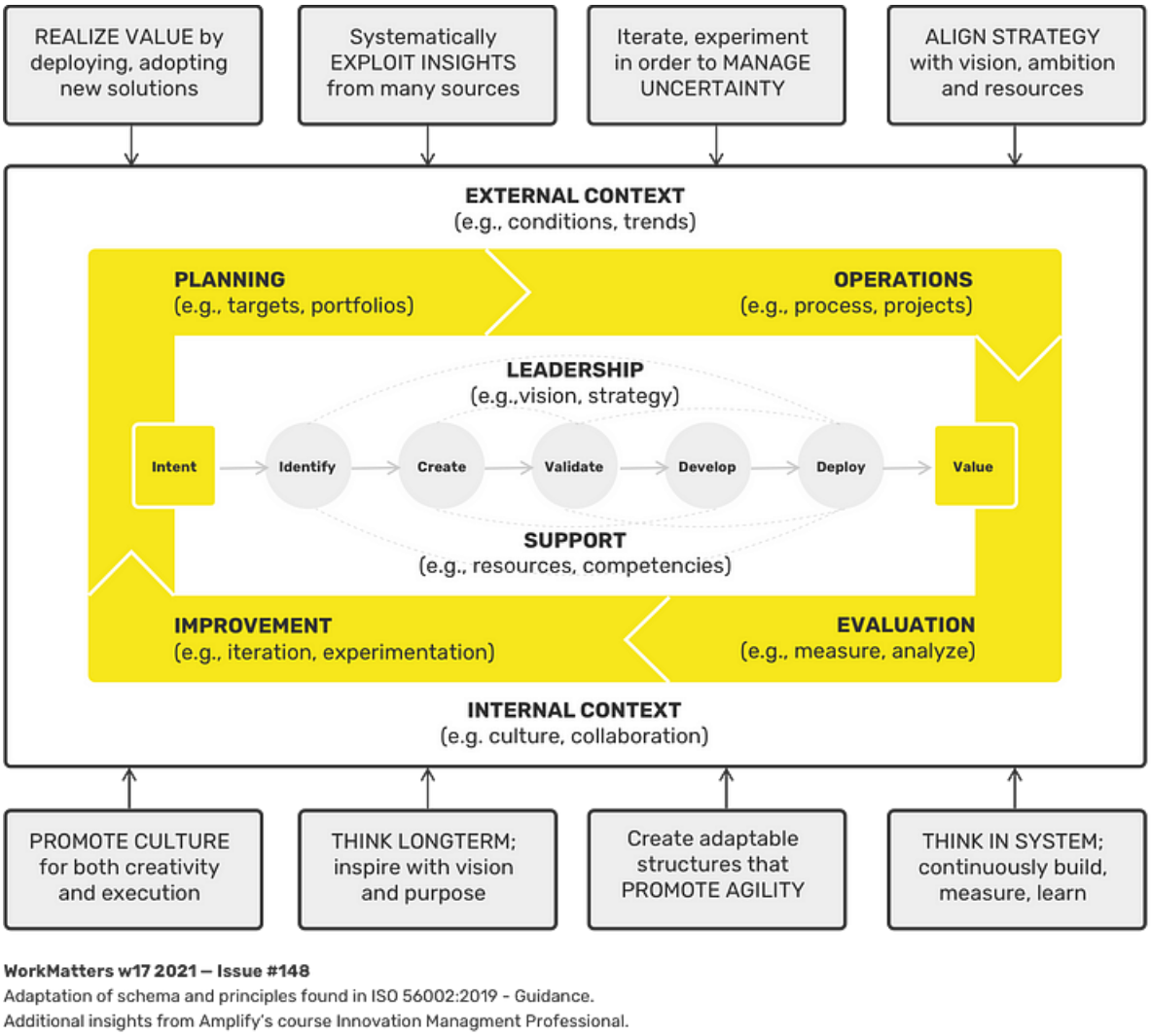

Figure 11: Visual interpretation of ISO56002-2019

3.4.3 Government Playbook

This section addresses the absence of reusable, context-sensitive tools and techniques for innovation project delivery within public sector labs, which is a gap that addresses RQ3. The OECD OPSI Innovation Playbook (2022) is a notable attempt to operationalize innovation principles through toolkits and case studies. However, while it offers breadth and adaptability, it

lacks the coherence and specificity required for end-to-end lab project delivery. The playbook functions more as a repository of resources than a structured guide that reflects the dynamics of lab typology, UCD maturity, and iterative development. This thesis proposes a more focused, modular playbook specifically designed to support innovation lab teams in applying UCD methods from project initiation through prototyping and evaluation. The playbook artefact thus builds on the intention of works like the OPSI Playbook but addresses its fragmentation and lack of embedded process logic.

The OECD Observatory of Public Sector Innovation (OPSI) published an innovation playbook in 2022. The OPSI Innovation Playbook (OECD, 2022) serves as a comprehensive guide for public sector organisations seeking to embed innovation into their operations by translating the Declaration on Public Sector Innovation into practical guidance on how to apply the principles. It provides a structured approach to fostering and implementing innovative practices, drawing upon numerous case studies while linking to various toolkits, which are relevant to each concept that it presents. The Playbook itself espouses five core principles of innovation which are to be applied in a three-step process. It is meant to be accessible, actionable and user-centred (OECD, 2022). The playbook offers toolkits, methods, and strategies tailored to the public sector's unique challenges and opportunities, recognizing the different contexts and objectives compared to the private sector. It is designed to facilitate public servants and policymakers in navigating the complex landscape of innovation, from ideation to implementation.

One of the core strengths of the OPSI Innovation Playbook is its adaptability to various government structures and scales. It encourages a culture of experimentation, iterative learning, and user-centric design, crucial elements for addressing the ever-evolving needs of the public.

Moreover, it promotes collaborative approaches, leveraging partnerships across departments and with external stakeholders to create more impactful and sustainable solutions.

The OPSI playbook falls short of its objective in one crucial manner. It is not usable. For each case study, there is a link to a separate toolkit, with over 31 in all. While it is intended that innovators use the playbook to address specific problems in public sector innovation, it works more like a compendium of external resources than it does a comprehensive playbook. While it may be useful in helping innovators overcome specific challenges its 3-step process and 5 principles of innovation are rather simplistic and high level. Again, as with the OECD innovation lifecycle, the intent is likely to be general enough to address a myriad of innovation contexts within the public sector.

Our playbook will be uniquely focused on the process of innovating within the context of innovation labs, leveraging actionable insights based on the typology and team structure of a specific lab. As the name suggest, the playbook will be filled with "plays" that can be followed in specific situations. Ultimately, the OECD produces the OPSI playbook, which does not follow the six stages of the OECD innovation lifecycle (with the exception of the final stage. Both models have diffusion as the final stage).

Chapter 4 Framework for User-Centred Innovation Labs

Both the literature and our first-hand experience as industry practitioners of User-Centred Design (UCD) and innovation indicate that many PSIL fail to live up to the promise of their mandates. McGann et al. (McGann et al., 2021) when writing about the role of public sector labs in policy innovation note that they observe a lack of follow-through with many labs where the ideas that are generated never get adopted as functional policy. Furthermore, they note that the impact of these labs can vary depending on the structure of the labs' relationships with government partners and the nature of their activities in promoting citizen participation. McGann et al. note that most of the effort goes into problem definition and blames this front loading of effort on "design thinking" and its emphasis on precise problem definition.

We contend that McGann et al. (2021) have an incomplete understanding of design thinking, and perhaps the participants in their research did as well. As a theoretical framework that underpins our process model, there is nothing in the description or definition of design thinking that would lead one to believe that the early stages of the method are any more important or carry more weight than the latter stages. On the contrary, design thinking is often visualized as a "double diamond" that is perfectly symmetrical in its stages indicating that the later stages of the process are as important as the early stages (Brown, 2008).

Rather than a flaw in design thinking or other UCD frameworks, it is likely that while the problems are well defined up front, other crucial aspects of understanding the structure and intent

of the innovation lab are missing. The purpose of a precise definition of a problem statement is to make the design and evaluation stages of the process as straightforward and efficient as possible. However, in order to get to the design and evaluation stages in an innovation lab process, teams must assemble, create and triage possible solutions, while validating and refining them.

For this reason, we propose a process model that focuses on these steps. In the first phase of our process model, it is important to leverage a multi-dimensional typology in order to fully understand the nature of the innovation lab. This understanding will allow for a team composition that is most fit for purpose, as well as inform the choice of methods for co-design and evaluation that are best suited to the needs of the specific public sector innovation lab. In order for practitioners to be effective in their individual innovation projects, it is also essential to provide accessible, repeatable guidance that reflects the lab's specific context and values. For this reason, the process model is supported by a practical playbook which is an applied toolkit of methods, templates, and decision points that helps ensure consistency, build capacity, and enable project teams to navigate the complexities of public sector innovation with confidence.

4.1 Multi-dimensional Typology

There are many ways to categorize innovation labs. The literature identifies labs based on the tools they use and whether their process is linear or non-linear (Leminen & Westerlund, 2017); their "openness, or closedness" (Gryszkiewicz et al., 2016); or the type of innovation that is practiced i.e. radical, incremental, imitative, disruptive, sustaining, frugal and so on (Klarin,

2019). We propose that the essential dimensions along which innovation labs should be characterized are funding, focus, collaboration and mandate.

We have found in our case studies in Chapter 5 that characterising a lab along these dimensions is a crucial step in our process model. It is the first step in our proposed process model (section 4.2), and perhaps the most important step as it is meant to inform subsequent stages in the process model. Asking typological questions allows concrete distinctions to be made about how a lab will function, who will participate in the process what methods will be used and what types of outcomes can be expected. Each element of the typology serves a pragmatic purpose in the context of a public sector innovation lab.

4.1.1 Funding

The funding dimension that we propose here is based on categorizations of funding sources (Leminen & Westerlund, 2017), which denote differences between fully publicly funded, privately funded and funding provided through a public private partnership (PPP). The source of funding of the lab has direct implications on the way the lab can operate, with publicly or PPP funded labs more often being required to adhere to broader organisational mandates such as sustainable development goals, diversity equity and inclusion policies or other requirements. Conversely, private funding, while wholly private or PPP can lead to the inclusion of organisational goals that are at odds with a public sector mandate.

A public sector innovation lab is distinct subset within our proposed multi-dimensional typology. The funding structure is the first and most distinct element of the typology that identifies a public sector innovation lab. While it is obvious that a public sector innovation lab is taxpayer funded,

there are more granular elements of funding structure that may have a great impact on the lab's success and should be considered in the typology. For example, in the CRA case study described in chapter 4.1, the government not only allocated budget for the staff of the innovation accelerator, but they also created an internal cost centre. This meant that participants were able to bill their time against the innovation accelerator budget and the time they spent engaging in innovation activities was not billed out of their own operational budgets.

This may be a seemingly nuanced distinction considering all the funding is essentially out of the taxpayer "pot", but it removed a potential barrier for participation in that managers didn't feel that their staff was being paid while doing activities other than their prescribed jobs. More broadly, the fact that the funding is coming from a public source as opposed to private or venture capital implies that achieving a return on investment is not a primary success metric for these types of labs.

While this point of view may technically be correct, the reality of a public funding structure is more nuanced. The OECD report on the public sector innovation lifecycle states that "innovation is political" (OECD, 2020) meaning that within the public sector, organisational priorities can change drastically based on such factors as elections, what news story is getting prominent attention, or myriad social and geo-political factors.

In most public sector contexts, there is no option to have an innovation "skunkworks". Public access to information laws, audits and media reporting, present the constant possibility of innovation (and its associated successes or failures) being publicly scrutinized. In addition, whereas in the private sector, the pressure to innovate can often be linked to market share,

profitability or a number of other existential metrics, most public sector entities (perhaps with the exception of universities) will not cease to exist if they do not innovate. These factors, the fear of public scrutiny and the fact that innovation is not tied to survival combine to present a picture of public funding creating a nuance that is generally not present in the private sector where the impetus to innovate may be much more closely linked to survival and profits.

In addition, there are other distinctions that appear most often in the public sector. In understanding the funding model of a lab, we are able to extrapolate some of the pressures that a lab will have to navigate, and strategies for mitigating those pressures can be built into the management processes of the lab. For example, a lab could be pre-emptive in engaging the media in order to frame and give context to potential experimental failures by issuing press releases on a regular basis.

4.1.2 Focus

Another dimension for a public service innovation lab is its focus or approach. Innovation labs can be focused on technology, social, service or policy innovation among others (Almirall et al., 2012). The focus of the lab will also determine the skillset of the members of the team. For example, a lab focused on technology innovation cannot be run by a team that completely lacks technology expertise, a policy innovation lab will require team members that are well versed in public policy etc. It should be noted however, that based on our experience, all public sector labs eventually intersect with government or departmental policy at some level, and a lack of understanding of policy issues has proved detrimental to the successful rollout of some innovations.

To what end are the innovation activities directed? Traditional definitions of innovation often focus on commercialization (Godin, 2008). This definition is inadequate to describe public sector innovation. Beyond commercialisable technology or services, public sector innovation also focuses on social and policy innovation. Understanding and defining this focus serves two purposes. It allows for efficiency in terms of team selection, innovation activities. It also allows for effectiveness as the core mandate of innovation lab is focused on one type of opportunity space, and one way to solve that problem. A problem may have multiple viable methods by which it can be solved; focusing on one type of solution allows the lab to focus expertise and activity. (Kotsemir & Abroskin, 2013)

.

Private sector innovation labs tend to measure success in terms of commercialization of products, or in innovating processes, which leads to better commercialization (i.e. operational efficiencies, production or service innovations that lead to more profits or market share). Within the last 15 years, industry has been forced to include diversity and inclusion, as well as environmental sustainability in their innovation objectives due to societal pressure. It can be argued however that these are not social or policy foci, but in effect, a way to safeguard market share and ensure continued profitability.

Within the public sector however, it is not unusual to encounter policy innovation labs, service innovation labs or social innovation labs. These labs may seek technological innovation, but they are generally doing so to further their goals of achieving social, policy or service innovation. In short, the technology is an enabler, not an end goal.

To be clear, we are not suggesting that private sector innovation does not occur in the areas of policy, service or social aspects, but we do suggest these foci for innovation in the private sector are not ends in and of themselves. Conversely, public sector innovation success and failure is not measured in dollars and cents. Therefore, understanding the focus of the lab can allow for a wider variety of success metrics that more accurately reflect the mandate and intention behind the innovation lab.

4.1.3 Collaboration

While definitions of an innovation lab might be varied. A common aspect of most definitions is the fact that they are collaborative (Russo-Spena & Mele, 2012). How that collaboration is managed however is a very important distinction. Our process is based on principles of User-Centred design, which require close collaboration with end users and other stakeholders. Participants may be specifically recruited due to some characteristic, or an open call for participation made, or they are restricted to participants from within a certain group or organisation. Understanding this detail will influence recruitment and engagement methods, whether specific compensation is required or whether accommodations need to be made.

Labs can also be categorized by means of collaboration, which can be open, closed or inclusive. Open innovation refers to an innovation process that is open for anyone to participate, whether they have specialized skills or not and is based on the philosophy that any and everyone is capable of contributing meaningfully to an innovation process. Closed innovation occurs most often in the private sector and refers to when the innovation activities are not visible to the public and are conducted entirely within the organisation. Often this is done to protect intellectual property and maintain a competitive edge. Inclusive innovation refers to an innovation process, which

specifically seeks to include marginalized groups. The inclusion of marginalized groups provides different voices and perspectives, which enrich the innovation process.

Much has been researched and written about open vs. closed innovation and inclusive innovation within the triple, quadruple and even quintuple helix of innovation. (Gryszkiewicz et al., 2016)(Schillo & Robinson, 2017)(Leydesdorff, 2012)(Galvao et al., 2019) all refer to who is invited to the party. This is a very important aspect to consider for two main reasons. Firstly, private sector innovation has sometimes struggled with being User-Centred because of the fact that it is often closed innovation. As such there is no impetus to involve society, the general public or end users.

There have been some notable innovation misfires in recent years arguably due to the fact that the innovation teams comprised of engineers focused on technology went far down the road of product development without checking whether the product, was useful, usable, or desirable. The Blackberry Storm, opioid painkillers, Zeo's Sleep Coach and most recently Humane's AI Pin, are all real-world examples of what can happen when time and money is spent to develop innovation in a closed system where end users are not involved until late in the product development lifecycle.

The other more pragmatic reason why understanding the type of collaboration that is required is important to the success of an innovation lab, is that those people will need to be found, engaged and potentially recruited to participate in the innovation lab. In the case of a private sector technology product, engaging average users is a different endeavour than engaging people with disabilities, indigenous communities, and representatives from various geographies, language

groups, marginalized groups etc. In the latter cases, there may be policies and protocols that govern these interactions, or at very least issues of trust, equity and power dynamics that should be taken into account and navigated.

4.1.4 Mandate

Mandate refers to the source of the labs' authority. We identify the mandate as being either top-down, mandated by organisational leadership or bottom-up provided or crowdsourced from non-leadership sources. Top-down mandates tend to seek to align with broader strategic objectives of the organisation, while bottom-up mandates tend to seek to address actual lived or observed problem spaces.

Sometimes innovation is driven by a clearly observable need. Sometime innovation is mandated by an organisation's leadership. Both occur in public sector innovation. The element of direction in the typology is simply a reference to where the mandate to innovate is coming from. Both top-down, and bottom-up direction have their advantages and disadvantages, but they are not the only way to drive innovation. We do not seek to prescribe the best type of direction, but in understanding it, we can better position an innovation lab for success.

Public sector innovation labs (PSILs) are generally, but not always, top-down directionally. Due to the bureaucratic and hierarchical nature of government agencies, it is often difficult to innovate from the bottom up. In PSILs that we have observed even the innovation processes that sought to illicit ideas from all employees in the agency were mandated by leadership. Influencing the direction from which innovation mandates flow is often an issue of organisational cultures.

In many private sector innovation cultures, innovating is encouraged from any and all parts of the organisation. This is seen as having many benefits, not the least of which is having a broader base from which potential innovations can flow and providing employees with a sense of impact and influence on the organisation. The OECD in its report on public sector innovation notes the degree to which the public sector is stratified and reliant on hierarchy. In the end, this is often detrimental to innovation, as those who are perceived as being from a lower level are perhaps afraid or dissuaded from disrupting the status quo, lest it be seen as jumping the established chain of command.

Finally, a balanced portfolio approach to the type of projects considered by the PSIL can be adopted to mitigate risk as part of the mandate of the PSIL. In order to ensure a better chance of at least some minimal successes, some project ideas that represent incremental innovation can be accepted. At the same time, in order to be bold and innovative, some ideas that represented radical innovation with a greater chance of complete failure, can also be accepted. Potential projects that represented a mix of focus on policy, service or technology solutions can also be accepted as part of a balanced portfolio approach. This deliberate effort to build a balanced portfolio of innovations is intended to mitigate risk of failure, which as mentioned before is a real concern for public sector departments and agencies.

4.2 A Process Model for User-Centred Innovation Labs

This section presents the final version of our process model for User Centred Innovation Labs that draws upon elements of key theories that were summarized in section 2.2. This version was developed over several iterations.

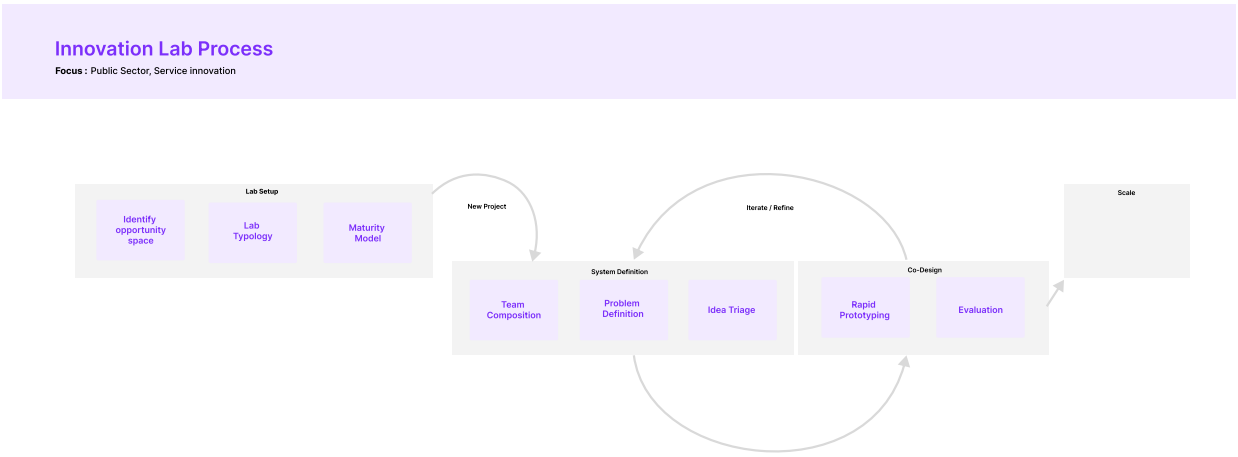

Figure 12: Innovation Lab Process Model

We propose a process model for public sector innovation labs that is rooted in Design Thinking (Brown, 2009) and User-Centred Design (International Organization for Standardization, 1999), the ISO56002 standard (*ISO 56002:2019*, 2019) and the OECD public sector innovation lifecycle (OECD, 2020). This model defines the type and function of the lab as early on in the process of forming the lab as possible. While other innovation process models such as the OECD's start at the problem definition phase, our research and experience have led us to believe that usually, by that point, the innovation team is already formed, and an organisational mandate has already been given. This severely limits the ability of the lab to effectively address the defined problem as the dynamics and culture of the lab may already be established and some necessary skillset may be absent.

The latter half of the proposed model emphasizes an iterative approach to evaluating and improving on the output of the co-design stage. By starting out with a low fidelity prototype, the lab can gather feedback quickly and cheaply and iterate on that feedback with successively more

complex and functional prototypes as they build towards high fidelity and eventual scale out. While the concept of prototyping is common in cases of technological innovation, it is less commonly applied in cases of social, service or policy innovation. We believe the concept of quick low-fidelity prototyping would be equally as effective in these types of innovation activities.

4.2.1 Lab Setup

The word lab or laboratory is often erroneously conflated with a physical space. While physical space is important for innovation work that is not what defines a lab. A lab or laboratory is simply a controlled environment, where extraneous variables can be controlled. The process associated with the public sector innovation lab model seeks to control the social and organisational environment rather than uniquely the physical space. An innovation lab as an entity can address multiple problems, and in the case of the PSIL, process will assemble various teams, with various compositions in order to address those problems. It is necessary to take the time to point this out so that it is clear that the lab is not the people or the place, but the "lab" is the assembly of people to address a specific problem at a specific point in time. The Lab Setup phase has three elements: The identification of the opportunity space, the defining of the type of lab and the assessing of the organisation's human centred and innovation maturity.

4.2.1.1 Identifying the Opportunity Space

The first step in assembling an innovation lab is identifying where there is the opportunity to solve a problem that requires innovation. This initial step does not require a great deal of specificity. Ideally, when an organisation makes the decision to create an innovation lab, there should be some tangible reason why. An innovation lab being a specific type of innovation

activity with its own strengths and weaknesses, it should be clear why it is the preferred method of attempting to innovate, and what general problem space it is intended to address.

4.2.1.2 Lab Typology

Determining the typology of the innovation lab will greatly influence to structure and operation of the lab. This is done by carefully considering each of the dimensions defined in section 4.1 to understand what type of innovation lab this will be. After defining the problem, establishing the nature of the innovation lab is the next crucial step. The type of lab will influence the methods that are used; the team that is assembled; as well as the types of prototyping and testing methods that are viable. In short understanding and being able to describe the lab based along some key dimensions will contribute to all the other subsequent aspects of the lab's functioning. The typology is arguably the most important step in our defined process as it influences each subsequent stage.

Each identified element of the typology has direct implications for the stages that follow in the process model. Funding structures influence both the composition of the team and the scope of what is feasible; for example, a lab with dedicated, multi-year funding may invest in long-term co-design cycles and recruit specialized talent, while a cost-recovery model may require leaner teams and shorter project timelines. The focus of the lab, whether policy, service, technology, or social innovation shapes the selection of design methods, the framing of problem statements, and the kinds of outputs expected at each stage. The nature of collaboration determines who is invited into the innovation process and how: a closed lab working internally will rely on existing institutional knowledge, whereas an open or inclusive lab will need to incorporate strategies for citizen engagement, facilitation, and participatory research. Finally, the mandate, whether top-down, bottom-up, or hybrid influences how

problem spaces are defined, how project priorities are selected, and how evaluation is conducted. A top-down lab may emphasize alignment with executive priorities and KPI-driven metrics, while a bottom-up lab may prioritize discovery, experimentation, and responsiveness to emergent user needs. In this way, the typology not only informs how a lab is set up but actively shapes every decision point in the innovation process.

4.2.1.3 Maturity Levels

We propose assessing organisational maturity using maturity models for both innovation and UCD for several reasons. It is important to understand the current state of the organisation UCD and innovation maturity to plan for improvement. Maturity models provide a framework to benchmark the current state of innovation and UCD practices within the organisation. They help in identifying the strengths and weaknesses prior to moving into the team building stage, allowing to bolster strengths and compensate for weakness. Understanding where the organisation stands in terms of maturity allows for more effective allocation of resources. Labs can focus their efforts and investments on areas that require development, avoiding wastage of resources on already mature aspects. Maturity assessments highlight capability gaps in both innovation and UCD. Labs can then decide whether to address these gaps through targeted training, hiring or a combination of the two.

Organisations with higher maturity levels in innovation and UCD are better equipped to adapt to changes and scale their solutions effectively. This adaptability is crucial in the public sector, where policies and public needs can evolve rapidly.

Using accepted models to assess innovation and UCD maturity in a public sector innovation lab is not just about understanding the current state of capacity and capability, but is a strategic

tool for continuous improvement, helping to ensure that innovation efforts are effective, efficient, and aligned with organisational objectives and human needs.

It is helpful to consider the two aspects of maturity as a matrix where both UCD and Innovation maturity can be measured independently.

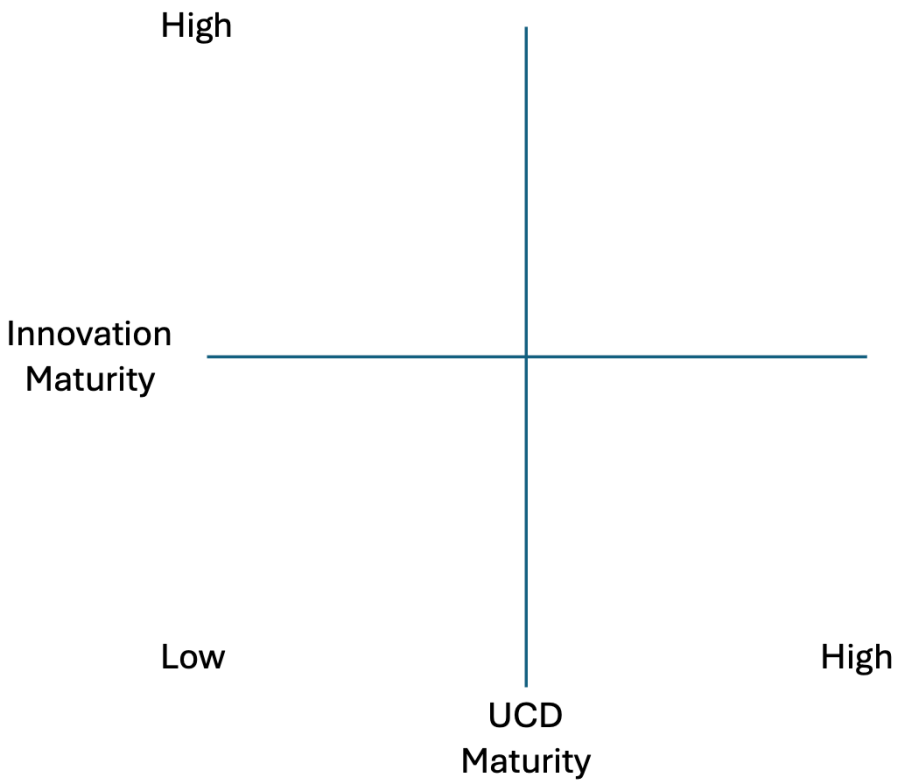

Figure 13: UCD/Innovation Maturity Matrix

The matrix is solely for classification, along these two-dimensional spectra, each quadrant having specific implications:

High Innovation Maturity & High UCD Maturity: This is the ideal environment for an innovation lab. This quadrant implies that the organisation has experience in both UCD and

innovation. It implies that there are processes and governance structures that are in place, and while they may not have pursued innovation in a lab context before it is not new as a concept. In this quadrant, it is easier to position the lab as a strategic partner within the organisation. The lab should focus on scaling, building sustainable innovation practices and codifying their knowledge and methods. There is more appetite for radical innovation.

Low Innovation Maturity & Low UCD Maturity: These organisations are neither equipped to experiment nor oriented towards users' needs. The implications of landing in this quadrant are that both innovation and UCD are new pursuits for the organisation. There may be limited leadership support or understanding for innovation processes. There may not be subject matter experts on staff, so roles might have to be supported by external consultants. There may not be a governance structure in place, so responsibility for day-to-day operations and strategic alignment will have to be clearly defined. Success metrics will likely not exist, so care has to be taken to ensure success is defined and the innovation lab's mandate aligns with the organisation's overall strategic vision. This lab should focus on capability and capacity building. It may be safer to focus on incremental, low-risk initiatives that can quickly demonstrate success and show value in order to prove the usefulness of an innovation lab. A playbook in this scenario would be a very useful tool to develop maturity and build a culture of experimentation and innovation.

High Innovation Maturity & Low UCD Maturity: It is common for technology firms to fall into this quadrant. In that scenario, they have a well-funded research and development program that runs quite well, but the focus is on technology and engineering instead of on the humans that use the technology. This quadrant is less common in the public sector as these are organisations that are open to and experienced in experimentation and disruption. The risk here is that

innovation is driven by assumptions about users and technological curiosity. While a technology focus isn't necessarily bad, it should always be grounded in real user needs. This type of lab should focus on understanding UCD methods and building them into their workflow.

Low Innovation Maturity & High UCD Maturity: These organisations are typically attuned to user needs and experiences, often excelling at collecting feedback and refining service delivery. However, they tend to lack a strategic commitment to experimentation and may be risk-averse when it comes to developing and adopting new approaches. While they are likely comfortable running small tests and iterating on service improvements, they may not frame these activities as "experimentation" or link them to innovation outcomes. UCD in these contexts tends to be tactical focused on optimizing discrete service touchpoints, rather than a pathway to systemic or radical change. As a result, the mechanics of innovation management such as idea triage, portfolio balancing, governance, and scaling are often underdeveloped or absent altogether. Innovation labs in this environment should focus on building awareness of these strategic dimensions, helping the organization recognize that its user-centred practices already contain the seeds of innovation. A key role of the lab would be to elevate UCD from a service design toolset to a strategic capability by demonstrating the value of managing a balanced portfolio of incremental and transformative initiatives. This means gradually introducing frameworks for evaluating risk and return, identifying high-leverage opportunities, and linking lab efforts to broader organisational goals.

4.2.1.4 Project Playbook

Once the lab is characterized in terms of typology, problem space, maturity levels, it is important to provide a guide that can be followed by the individual projects hosted by the lab to ensure consistency and quality in how the projects are run and the results that are produced. It helps

guide the individual projects through system-definition and co-design. This was understood as a key to success in our first Case Study in chapter 5. A full exposition of what goes into a Playbook is provided in section 4.3.

4.2.2 System Definition

At this point, the problem space has been identified and the major typological components have been established. It is now time to determine how the innovation lab will function. This section is identified as system definition because it is at this point that the functioning of the lab will be defined.

4.2.2.1 Team Composition

In our experience one of the main issues affecting successful innovation in any context has been team composition. This is not simply a matter of choosing the right skills for the right job. It is also a matter of team cohesion.

Managing innovation can be hectic at best, and extremely stressful at its worst. Good team cohesion helps to mitigate these stresses. This is not a matter of personalities that mesh (although that helps too) but rather a sense that the team has a clear mandate, whether top-down or bottom-up, and is unified in their approach to the management of the innovation labs, and the execution of the various tasks that said management entails.

Interviewing one of the founders of a provincial government social innovation lab, having a common theoretical grounding was identified as the single greatest factor in their success. The

entire team ascribed to the Theory U model and practiced it. Conversely, in our experience with a federal government agency's innovation accelerator, there was a lack of a common approach which resulted in wasted time and unfruitful debates about the way to move forward. The team oscillated between Theory of Change and a logic model, in the end it became confusing and distracting for the innovators, who were looking for guidance in developing their ideas.

Finally, intentionally addressing team composition allows for the establishment of common codes. One of the premises of innovation labs is that they are multidisciplinary. A drawback of multidisciplinarity is that participants will often have different "codes". Leydesdorff in writing about the concept of the Triple Helix and the evolution of that theoretical framework (Leydesdorff, 2012) describe how tacit knowledge depends on shared conventions and norms that are formed by a common institutional environments. These shared experiences give rise to common codes of communication. The issue arises when we assemble teams of people with different codes of communication, different norms. To be productive, it is likely necessary to quickly form new common codes of communication in order to be effective (Capdevila, 2014a).

4.2.2.2 Problem Definition

Defining a specific problem statement is a fundamental step in the innovation process. It sets the stage for targeted research and idea generation, guiding the direction of creative efforts towards solving specific, challenges. The literature underscores the critical role of accurately defining problem statements in fostering innovation.

A well-defined problem statement is instrumental in guiding the methodology and objectives of a study towards innovation and improved outcome be keeping the innovation team focused on a clear and unambiguous objective (Nasution et al., 2019). Additionally, (Buheji, 2017) contends that "the capacity of problem solving is not only related to the mindset, but in fact to the problem statement."

Delineating clear, specific problem statements so not only clarifies the scope of the challenge but also enhances the potential for generating impactful, innovative solutions.

4.2.2.3 Idea Triage

Because innovation labs are often tasked with addressing "wicked problems", Design Thinking has become a common framework to layer on top of innovation activities (Buchanan, 1992). The iterative nature of Design Thinking lends itself to addressing the multifactorial systemic problems that are typically called wicked problems" Design Thinking is commonly visualized using a double diamond diagram first introduced by the British Design Council (Design Council, 2003). What appears to be a double diamond is meant to represent convergent and divergent activities. The Idea Triage stage is a series of divergent then convergent activities similar to those represented in the Double Diamond. Once the problem is defined, structured brainstorming takes place in order to generate ideas. The main goal of the brainstorming is to produce a large quantity of novel ideas regardless of quality. There are a number of established brainstorming techniques that can be leveraged for this activity. The triage refers to a process, once the brainstorming is done, by which ideas as rejected or accepted. This is done based on a scoring system such as dot voting, combined with an assessment rubric designed to ensure feasibility, viability and

desirability while aligning with organisational goals. Once the ideas that best support organisational goals while being the most viable, desirable and feasible are selected. Those ideas are then leveraged in the co-design phase.

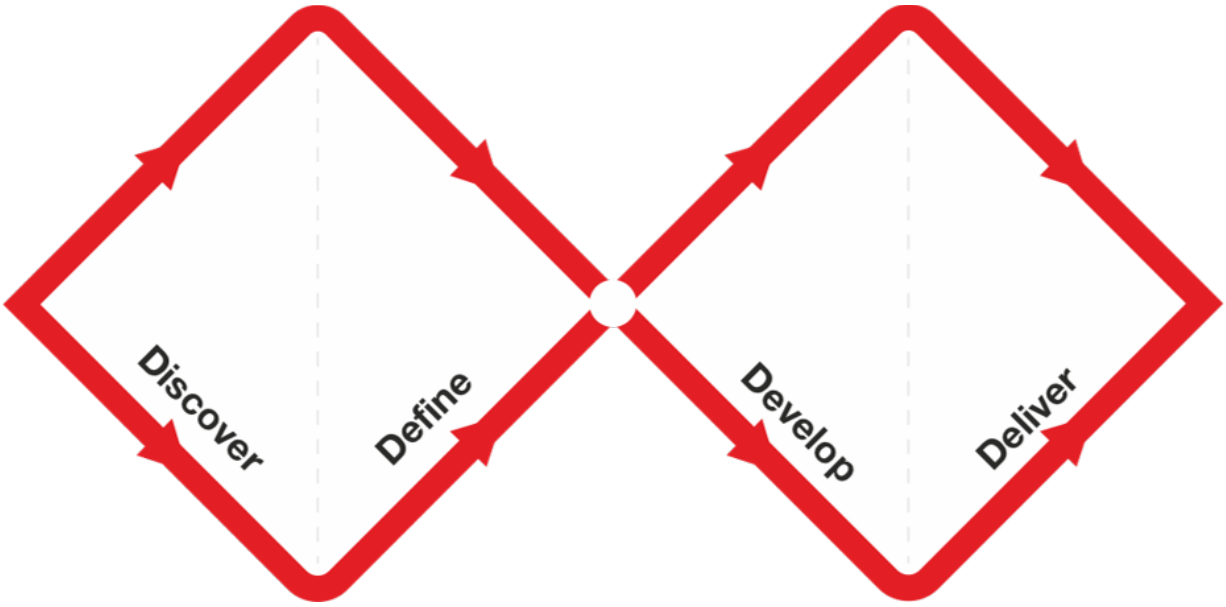

Figure 14: The Design Council Double Diamond (CC BY 4.0 license)

4.2.3 Co-Design

Co-design is a crucial phase in the innovation process, it fosters collaborative creativity and problem-solving. Through co-design, stakeholders can actively participate in the innovation process, ensuring that the final product, policy or service closely aligns with user needs and expectations, thus enhancing its value and relevance in the market. (Russo-Spena & Mele, 2012). The Co-Design phase represents the point in the innovation lab process model where creation occurs. While collaboration is present throughout all the stages, co-design is unique due to the intensity, frequency, and structure of that collaboration. It is in this phase that multidisciplinary participants work together to generate, refine, and converge on possible solutions. These solutions emerge through the active intersection of diverse forms of

knowledge, including lived experience, technical expertise, policy insight, and organizational context.

Unlike lab setup and system definition, which are typically structured as preparatory and stabilizing activities, co-design is the core of the innovation process and inherently iterative. It is not a singular workshop or decision point but a structured series of engagements and refinements, each building on insights and feedback from previous sessions. These iterations help navigate the ambiguity that often characterizes public sector innovation and allow teams to evolve both their understanding of the problem and their conception of viable interventions. Each cycle of co-design results in new or refined artefacts such as personas, journey maps, low-fidelity prototypes, or service blueprints that serve both as design tools and as communicative instruments to align stakeholders.

Co-design is particularly critical in the public sector context due to the need (sometimes the legal requirement) for synchronization across multiple domains. Public sector innovation often requires the parallel development of service delivery mechanisms, policy frameworks, supporting technologies, communications strategies, and governance models. These elements must be concurrently designed in a coherent manner. Therefore, co-design requires deliberate sequencing and facilitation, so that solutions can be developed holistically rather than in silos.
Furthermore, co-design is a key pursuit where UCD methods are most intensively applied. Methods such as ideation workshops, participatory sketching, concept testing, and feedback synthesis are used to ensure that user needs remain central to solution development. However, it is important to underscore that co-design is not merely about generating ideas, it is about generating ideas that can be prototyped and evaluated iteratively in the subsequent phase. The

boundary between co-design and prototyping is intentionally fuzzy, as early design artefacts often double as low-fidelity prototypes to test core assumptions before more formal evaluation methods are applied.

It is worth noting that co-design rarely proceeds in a linear fashion. The process model presented in this thesis (see Figure 13) acknowledges this by feedback loops that allow learnings from prototyping and evaluation to inform further cycles of design.

In short, co-design is the phase where the groundwork laid in lab setup and system definition is activated through structured, user-informed collaboration. It is where public sector innovation labs do the work of translating insight into implementable ideas. When done well, it lays the foundation for scalable interventions by ensuring that solutions are not only imaginative, but also feasible, desirable, and grounded in the lived realities of the communities they aim to serve.

4.2.3.1 Rapid Prototyping

Rapid prototyping in innovation labs, using low fidelity prototypes offers significant benefits for the innovation process. It allows for quick and cost-effective exploration of ideas, enabling teams to iterate designs based on user feedback without investing heavily in high-fidelity models. This approach fosters a fail-fast, learn-quick environment where creativity and experimentation are encouraged. By focusing on the core functionality and user experience rather than detailed aesthetics, teams can identify and resolve potential issues early, speeding up the development cycle and increasing the chances of creating innovative, user-centred solutions.

4.2.3.2 Evaluation

In the innovation lab, evaluating prototypes is a critical phase where UCD methods like cognitive walkthroughs play a pivotal role. These techniques are designed to elicit insightful feedback from users and stakeholders by simulating the user's interaction with the prototype to uncover potential issues and areas for improvement. This feedback is invaluable for refining the concept, as it guides the iterative design process. Each cycle of design, evaluation, and iteration can produce prototypes with higher and higher fidelity but also ensures that the evolving product, service or policy aligns more closely with organisational goals, user needs and expectations. This iterative process is fundamental to transforming initial ideas into viable, user-centric innovations.

4.2.4 Scale

Scaling the outputs of public sector innovation labs involves strategic partnerships, integrating innovations into broader governmental and organisational frameworks, while ensuring that solutions are adaptable to different contexts. That being said, the role of the innovation lab is not to scale innovation, but to prepare innovations for scale. The act of scaling is typically outside of the lab's mandate and capacity to control. Scaling is included as a stage in the process model only so far is it is part of the accepted definition of innovation and according to much of the literature is one of the key factors that separate an invention from an innovation.

Furthermore, building capacity within public institutions to adopt and adapt innovations is crucial, as is the development of robust evaluation mechanisms to measure impact and effectiveness. This ensures that the innovations not only address immediate needs but also are also sustainable and scalable across different regions and communities, ultimately leading to systemic change within the public sector. Where handoff to scaling partners fails, a structured

postmortem can offer important insights to improve future innovation efforts. This learning process, while technically outside the lab's operational scope, is vital to the broader innovation system.

A detailed analysis and understanding of Scale is outside the scope of this thesis. Arguably, it requires its own process model and a completely separate PhD thesis to start to address. The Scale step in our process is a handoff to an as yet undefined process for scaling that is not part of this thesis.

4.3 Public Sector Innovation Lab Playbook

While the process model presented in the previous section provides structured guidance for managers establishing and operating a user-centred public sector innovation lab, a complementary artefact is needed to support the teams conducting individual innovation projects. The playbook presented here addresses this gap. Its purpose is to ensure that teams consistently apply proven UCD techniques and preserves the lab's institutional memory.

As discussed in the CRA Innovation Accelerator case study (section 5.1), even when the broader process is understood at a managerial level, there is often no shared standard for how individual projects are scoped, designed, and evaluated. This results in inconsistencies across projects and lost learnings. A playbook, by contrast, codifies successful techniques and approaches thereby enabling more consistent outcomes, better knowledge translation, and broader organisational learning.

This need is amplified by the limited expertise in applying UCD techniques within the public sector. As the systematic literature review revealed, while innovation labs often aspire to be human-centred, few provide specific guidance on what that entails in practice. The playbook therefore acts as a bridge between high-level intent and day-to-day implementation. It provides not just "what" to do, but also "how" to do it, covering specific methods for discovery, ideation, prototyping, and evaluation. It is especially useful for lab participants who may not have formal training in design but are asked to contribute meaningfully to the innovation process. Whereas the process model is intended for lab managers to structure and govern innovation activities, the playbook is designed for the project teams who must execute those activities. Together, they ensure that both the strategic and operational dimensions of innovation are grounded in human-centred design principles.

Usually, the first version of a lab's playbook is created during the first project that the innovation lab hosts, and then refined from time to time as the lab learns what works from subsequent projects. Every innovation lab is unique; therefore, each lab needs a unique and evolving playbook that takes into account the factors of the lab typology, the maturity level of the lab, the composition of the lab team and the context in which the lab operates. It provides a reference for all innovation projects in the lab to understand lab setup (section 3.2.1) and provide a guide through System Definition (section 3.2.2) and Co-Design (section 3.2.3) that helps them understand the process model they are to follow and highlight the opportunities for using User-Centred Design Methods and tools. The playbook presented in this chapter was created as an output of the CRA Innovation Accelerator case study described in section 5.1.

The playbook has two components. The first is an Evaluation Metrics Framework that establishes a coherent and consistent set of criteria for evaluating the progress for an innovation project. The second is

a set of documents describing or defining the UCD techniques and methods to be used. In the case of the CRA Innovation Accelerator, this consists of a structure of concept introduction, a continuing example of the concept, then exercises to allow participants to put the concepts into practice to see if they fully understood them.

The concept of a playbook is designed as a practical guide tailored specifically for public service innovation labs. It acts as a collection of strategies, techniques, and metrics that assist these labs in understanding, organising, and executing their innovation projects effectively. The playbook is built upon the foundational elements of our research namely the Typology and the Process Model which help characterize and analyse the operational dynamics of innovation labs.

The playbook's primary utility is in providing actionable insights and structured methodologies that labs can directly apply to enhance their operational effectiveness, outputs and outcomes. It includes detailed plays or actions that labs can follow in specific scenarios, facilitating smoother and more effective innovation processes. Moreover, the playbook is crucial for transferring knowledge and best practices across different labs, fostering a more coherent and unified approach to innovation in the public sector. It serves not just as a guide but as a tool for continuous improvement and adaptation within public sector innovation environments, enabling labs to measure their success and iterate on their processes based on real-world outcomes and feedback.

4.3.1 Evaluation Metrics Framework

Evaluation metrics are essential for any innovation lab because they provide a structured way to determine whether a project is making progress, achieving its intended outcomes, and creating

value. Without metrics, labs risk relying on assumptions, anecdotal evidence, or superficial outputs (e.g., number of workshops held, or ideas generated), which can obscure whether real change is occurring. Metrics help teams understand what's working, what needs to be improved, and when to pivot or stop. They also make learning visible and actionable especially during the iterative cycles of co-design by helping teams track how each round of feedback or prototyping impacts user experience or service performance.

For public sector labs, metrics serve an additional purpose: accountability. Because these labs are often funded by taxpayer dollars, it's important to demonstrate not only activity but effectiveness. Metrics help justify continued investment by showing how a solution improves outcomes for citizens, supports policy objectives, or builds internal capacity. They also provide a common language for communicating impact to decision-makers, collaborators, and the public. In short, evaluation metrics ensure that innovation efforts are not just creative, but purposeful, evidence-based, and oriented toward real-world outcomes.

For Public Sector Innovation Labs, the metrics that define success often differ significantly from those in the private sector, primarily because public sector initiatives typically prioritize public value and service enhancement over profit. A structured evaluation framework is however still essential to the functioning and credibility of a public sector innovation lab. Within the Co-Design stage of the process model, iterative evaluation plays a critical role in shaping and refining prototypes based on evidence and user feedback. Without clear evaluation metrics, teams risk relying on intuition or anecdotal data, which undermines both learning and accountability. Evaluation metrics enable teams to assess whether their design hypotheses are valid, whether user

needs are being met, and whether a solution is desirable, feasible, and viable before moving into more resource-intensive stages of development.

In addition to supporting prototyping activities, evaluation metrics are also crucial to the Scale phase. Innovation in the public sector is only meaningful if it leads to sustainable improvements in outcomes for users, citizens, or internal stakeholders. As such, the playbook includes two broad categories of evaluation metrics: (1) prototype-level metrics that assess usability, desirability, effectiveness, and learning during the development and testing of a solution; and (2) rollout-level metrics that assess longer-term impacts, such as service performance, adoption rates, policy alignment, and user satisfaction over time. These two levels are interdependent: rigorous prototype evaluation increases the likelihood of successful scale, while rollout metrics ensure that value is realized and sustained post-implementation.

By aligning all projects to a shared set of core indicators, the lab builds an evidence base that supports cross-project learning, internal legitimacy, and the broader goal of embedding UCD-informed innovation within the public sector.

Below is a checklist of potential metrics and characteristics which can help define the right metrics for a PSIL. The checklist items are drawn from a combination of sources and practices, rather than a single standardized framework. They represent evaluation techniques commonly used in co-design and prototyping phases, such as usability, desirability, and feasibility assessments; as well as insights from public sector practice gleaned from interaction with public sector lab managers; and developmental evaluation research such as that done by Michael Quinn Patton and Jamie Gamble (Gamble, 2008; Patton, 2010):

4.3.1.1 Checklist of Metrics for Public Sector Innovation Labs

- ☐ User Satisfaction: Measures the level of satisfaction among citizens who interact with services or products developed by the lab. High user satisfaction indicates that the lab is effectively meeting public needs and infers a User-Centred approach.
- ☐ Service Accessibility: Assesses improvements in the accessibility of public services as a result of innovations developed in the lab, particularly for disadvantaged or underserved populations.
- ☐ Efficiency Gains: Monitors any increase in operational efficiency within the public sector services, such as reduced processing times, cost savings, or enhanced resource allocation.
- ☐ Policy Impact: Evaluates how innovations have influenced policy-making, including the creation of new policies or the amendment of existing ones.
- ☐ Stakeholder Engagement: Tracks the level of engagement from various stakeholders involved or affected by the lab's projects, including public feedback loops and collaborative initiatives.
- ☐ Adoption and Scalability: Measures the rate at which other agencies or departments adopt the lab's innovations and the scalability of these solutions across different contexts.
- ☐ Innovation Lifespan: Looks at the sustainability and longevity of implemented innovations, assessing their relevance and adaptability over time.
- ☐ Employee Empowerment: Gauges improvements in employee morale and capabilities due to engagement in innovative practices and trainings.
- ☐ Community Impact: Assesses the broader societal impact of the lab's innovations, such as enhancements in quality of life, environmental sustainability, or economic development.

- ☐ Transparency and Accountability: Evaluates the improvements in governance through increased transparency and accountability in public services.
- ☐ Cultural Shift: Measures changes in organisational culture towards more innovation-friendly practices.

4.3.1.2 Metrics Public Sector Innovation Labs Should Avoid

As PSILs are not focused on traditional "business" metrics, there are some common measures of success that are common in private sector innovation labs which would not serve as any type of indicator of success or failure in a public sector innovation lab. While some labs might be operated on a cost recovery basis, measures such as profitability or market share usually will not be standard measures of success in a public sector innovation lab.

- ☐ Revenue Generation: This is typically not relevant in the public sector context, where the focus is on service delivery and public welfare rather than financial return.

- ☐ Commercial Market Share: Unlike private companies, public sector labs are typically not competing in commercial markets, so market share is not a common success metric. In some rare instances where there is discretion of use, it is not a critical metric as it is in the private sector where more market share generally means more revenue.

- ☐ Short-term ROI: Public sector projects often have longer timelines and benefits that accrue over extended periods, making ROI a less relevant metric over the short term. In the context of public sector innovation labs, return on investment (ROI) must be understood more broadly than in traditional private sector settings. While private sector

> ROI is typically calculated in financial terms such as profit margins, cost savings, or shareholder value the public sector operates with a fundamentally different value proposition. Government innovation often aims to improve service quality, increase accessibility, enhance citizen experience, or strengthen policy outcomes. As such, ROI in public innovation should also consider non-financial indicators, including improved equity, time saved for citizens or staff, increased uptake of services, and the extent to which initiatives align with broader policy goals. This expanded definition of value is especially important for labs employing UCD methods, as the ultimate "return" may be measured in social benefit, systemic resilience, or institutional learning rather than immediate monetary gain.

Even if a public sector innovation lab operates on a cost recovery or "pay to play" model, focusing solely on revenue, or profitability as success metrics can be misleading due to several reasons. Public sector organisations primarily aim to provide value to the public and improve service delivery rather than generating profit. Metrics like profitability do not capture the broader societal benefits such as enhanced public welfare, improved health outcomes, or increased educational opportunities that these labs are designed to produce.

Public sector initiatives often involve long-term investments in infrastructure, education, health, and social services, where the benefits accrue over a long period and are diffused across a broad segment of society. ROI and profitability are typically short-term financial metrics that may not reflect the long-term value and impact of these investments. Emphasizing financial return can deter innovation labs from taking necessary risks or pursuing innovative projects that may have high potential for public benefit but uncertain financial returns.

Innovation in the public sector often requires experimentation and learning from failures, which may not immediately translate into profit. Public sector innovation labs often aim to enhance accessibility and equity in service delivery, focusing on underserved and vulnerable populations. Profitability metrics may discourage initiatives aimed at these groups if they are not the most financially lucrative but are crucial for social equity. It is more effective to use a range of qualitative and quantitative metrics that reflect the multi-dimensional objectives of public sector labs. These might include user satisfaction, service improvement, policy influence, and societal impact, which provide a more holistic view of success. By prioritizing metrics that align more closely with their missions, public sector innovation labs can ensure they fulfil their primary role of enhancing public good, rather than merely focusing on financial outcomes.

In determining the most important metrics for evaluating a Public Sector Innovation Lab, the focus typically revolves around impact measurement and stakeholder engagement. The main characteristics guiding the selection of metrics include measuring how innovations contribute to the public good, improve service delivery, and solve societal challenges. These are qualitative metrics that are best measured through firsthand exposure to users and stakeholders in the problem space. Another important metric to consider relates to evaluating the extent of collaboration with stakeholders, including citizens, businesses, and other government entities, to foster inclusive and sustainable solutions. The successful involvement and inclusion of diverse and multidisciplinary voices in the innovation process is an important measure of the effectiveness of the process. Ultimately, the choice of metrics should align with the lab's strategic goals, ensuring that they reflect improvements in efficiency, effectiveness, and the overall public value generated by the innovation efforts.

Traditionally private sector innovation labs often measure time, number of outputs and commercialization metrics such as adoption or market share. None of these would be relevant in a public sector context. Even the time it takes to complete the innovation process has significantly different implications in the public sector than it does in the private sector (OECD, 2020). Again, this is both a challenge and an opportunity. The opportunity lies in the possibility to have a purer innovation process not driven by market forces, and to create a set of metrics that really measure innovation.

4.3.1.3 The Role of Metrics in Innovation

Ultimately, the most important things to measure are the number of cycles (or cohorts) that the innovation lab is able to produce as well as the number and quality of the innovations that are the outputs of these labs. Labs that are using the User-Centred process model, should be more successful, and focused and therefore should survive longer than labs that do not. Being human centred and multidisciplinary should allow for more ideas to complete the innovation lifecycle, be scaled up and produce noticeable change in the problem spaces they aim to address.

Looking in detail however at KPIs, which can be used to measure success or failure of innovation labs in the public sector, needs to be more nuanced for two main reasons. Firstly, as just discussed output in terms of the numbers of cycles and innovations may not be as important in the public sector context and employee engagement, citizen engagement, or meeting political or organisational goals.

Secondly, the research questions we are seeking to answer with this study are fundamental questions of guidance and of transforming the manner in which public sector innovation labs operate. Traditional output metrics are lagging indicators, meaning that by the time the metrics are gathered the lab has already succeeded or failed. Because of this, more leading indicators of lab success are necessary to assess whether the process model is in fact of any benefit. Metrics like retention rate of participants throughout the process, number of participants who are engaged at intake, cultural awareness of innovation and its practices are all potential leading indicators that can allow lab managers to assess before and during innovation activities whether or not they are being successful.

4.3.2 UCD Techniques & Methods

A recurring challenge observed across the case studies and in practice is the lack of expertise among public sector teams regarding which UCD techniques to employ at different stages of the innovation process. While many labs are enthusiastic about co-design or "being innovative," they often lack the methodological fluency needed to select appropriate techniques for discovery, ideation, prototyping, or evaluation. This gap can result in missed insights, poorly scoped problems, or solutions that fail to satisfy user needs. To address this, the playbook provides specific guidance on which techniques, approaches and methods are best suited to each stage of the process model, thereby ensuring that participants apply the right tool at the right time. The goal of the playbook is not to be an exhaustive compendium of methods and processes, but to provide practical, context-appropriate options that support high-quality, user-informed innovation.

The most relevant User-Centred Design (UCD) methods for a Public Sector Innovation Lab to understand and master include:

Example Guidance for Techniques by Stage:

System Definition

- **Problem Definition**
    - Techniques: “How Might We” framing, insight synthesis, persona development, stakeholder mapping, journey mapping, service blueprints, ethnography, interviews.
    - Purpose: To understand user needs, system touchpoints, and root causes of pain points. To frame a UCD challenge that is clear, actionable, and grounded in evidence.
- **Ideation**
    - Techniques: Brainwriting, sketching, Crazy 8s, concept posters, co-creation workshops.
    - Purpose: To generate a wide range of creative solutions with input from users and stakeholders.

Co-Design

- **Prototyping**
    - Techniques: Low-fidelity wireframes, paper prototypes, service enactments, role play.
    - Purpose: To test and refine core elements of the solution early and often with minimal cost.
- **Evaluation**

- Techniques: Usability testing, card sorting, desirability testing (e.g. preference ranking), A/B testing (where possible), structured feedback sessions.
- Purpose: To validate assumptions, gather evidence of user satisfaction and fit, and guide iterative improvement.

These methods ensure that the solutions developed are truly centred on the needs and experiences of the citizens they aim to serve, leading to more effective and sustainable public services.

The leaders of the lab will determine which particular set of UCD techniques and methods they want to commit to and standardise on. If the lab is at a low UCD maturity level because knowledge of UCD is not common within the lab, then they may need to plan for training courses for team members or they may choose to hire outside consultants to bolster the team's competency during the Team Composition stage of Systems Definition.

Chapter 5 Case Studies

In this chapter, we delve into the heart of applied research through a series of detailed case studies at different public sector innovation labs. Throughout the sections that follow, we offer a narrative of integration and discovery, where the framework of Typology, Process Model, and Playbook becomes the lens through which we interpret and engage with each lab's unique challenges.

We contacted four leaders of four separate labs that we were familiar with, including one in which we had been an active participant. With each leader, we discussed and reviewed how their lab operated in order to evaluate how relevant and useful our framework was for understanding and guiding the way the labs and their innovation projects were conducted. The four leaders were also brought together to perform an expert panel review (Chapter 6.2) after all the case studies were completed to formally review our thesis artefacts. A short bio of the four leaders is provided in chapter 6.2.2 Experts.

5.1 Case Study 1 – Canada Revenue Agency Innovation Accelerator

5.1.1 Overview

This case study unfolds with the innovation journey of the Canada Revenue Agency (CRA), an expansive organisation seeking to cultivate the creative potential of over 40,000 employees located all across Canada, through an innovation incubation program. This initiative, characterized by a call for ideas across all departments, from IT to customer service, represents a

ground-breaking effort to foster an environment where employee-generated ideas can evolve from mere concepts to actionable prototypes.

The innovation lab at CRA was run as an innovation incubator. Cohorts of innovators from across the agency were shepherded through the innovation process, with training and guidance from the incubator team. We joined the incubator team as a UCD consulting expert helping the team learn how to leverage UCD techniques and methods in their innovation projects. The general subject area was presented to the employees as a challenge and ideas were simultaneously developed as higher levels of fidelity and triaged as innovation teams moved through each step of the process.

5.1.2 Typology

Table 4: Typology Implications for CRA Incubator

	Dimension	Classification	Implications (Why it matters)
CRA Innovation Incubator	Funding	Publicly funded, the lab operated on a fully funded model meaning that it had dedicated staff and that participants were able to charge their time to a dedicated cost centre	The implications were that cost, or budget did not become a detriment to managers by being a strain on their existing budgets. This allowed for broad engagement throughout the agency
	Focus	Mixed (Technology, service, policy)	The lab did not restrict the type of innovation that could be proposed or worked on. This resulted in a variety of foci, there were technological, process, policy and service innovations that were proposed. The implication once again that broad engagement was possible. Participants that were not technically

			minded did not feel left out of the innovation process.
	Collaboration	Closed	The innovation incubator was only open to CRA employees. Engaging the general public may have resulted in substantially different innovations, however the focus of this iteration of the innovation incubator was "improving the employee experience" therefore it made sense to restrict involvement to employees.
	Mandate	Top-down	CRA executives decided on the theme of the innovation incubator (improving the employee experience). A team was formed, and management structure was imposed, including requirements for reporting. The implication of this was that outputs ended up being the measurement that upper management was most concerned with. The incubator adopted a balanced portfolio approach balancing incremental and radical innovation ideas in an attempt to mitigate risk.
	Mandate	Balanced Portfolio	There were two main reasons to seek to balance the portfolio of innovation ideas that were selected to move through the incubation process. Both radical and incremental innovations were selected in order to balance risk. Both the risk of failure, as smaller more incremental ideas were seen as having a higher chance of being successfully prototyped and ultimately scaled, whereas larger, more audacious and radical ideas often held the promise of creating a great impact. In adopting the balanced portfolio approach, the incubator sought to ensure both success and impact.

5.1.3 Process model

The lab was in its second innovation cycle, (meaning the second annual set of approved projects) when we started working with them. The first innovation cycle was small in scale and was not deemed successful, so they sought outside help to formalize a process and upskill the innovation team.

With the exception of the then director, none of the CRA innovation incubator team members had any experience in innovation. However, as is often the case in the Canadian public sector, that director left the project for another job before the complete innovation accelerator program was complete for that cohort. They were then replaced with a bureaucrat that placed more importance on outputs than outcomes.

Outputs are defined as the artefacts: the pitch decks, the annual reports, the prototypes. Outcomes however are the results the innovators hope to achieve with their innovations, such as employee engagement, faster processing times etc.

In the second iteration of the innovation incubator, through an intensive boot camp, we introduced UCD as the underlying approach to innovation. We did this by hosting training sessions that introduced participants and lab staff to the basic tenets of UCD. We explored design thinking, jobs-to-be-done, systems thinking and other human centred models as ways of illustrating the similarities that exist among these UCD approaches.

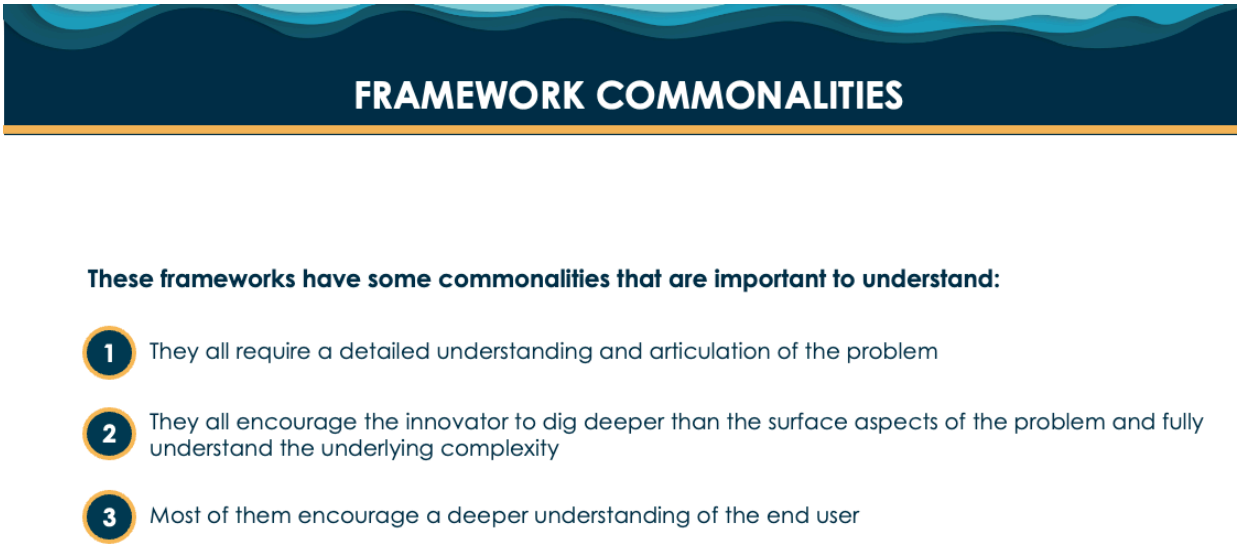

Figure 15: Review of Common Factors of UCD Frameworks

5.1.3.1 Lab Setup

Our experience with this innovation lab allowed us to assess how to refine key aspects of the process model. In the Lab Setup phase, the case study allowed us to understand the importance of the typology and a clear approach. A CRA employee who had previous innovation experience had worked with Nesta and was a proponent of Theory for/of Change popularized by Mars Solutions Labs. We were seeking to have participants describe their problem spaces with simple User-Centred problem statements such as "how-might-we" statements, while others were introducing more complex concepts such as "challenge hypotheses". These differing approaches proved to be highly confusing to lab participants.

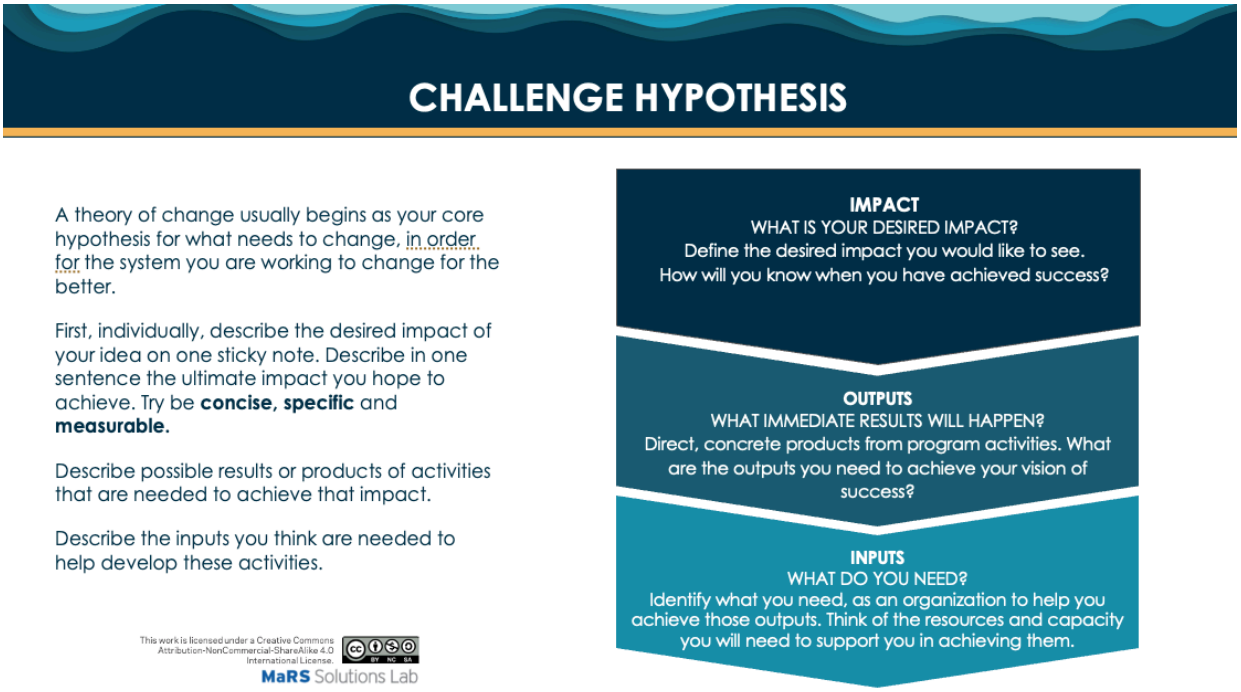

Figure 16: Bootcamp Slide Explaining Theory of Change Challenge Hypothesis

The lack of experience within the innovation team, both in terms of how to manage an innovation practice, and in terms of UCD caused the addition of the Maturity Model Step to the Lab Setup phase. Our assumption that these concepts would be quickly and easily taught and adopted proved to be false. The high level of confusion at the outset was made worse by the fact that we started off by discussing multiple theoretical frameworks and approaches both of UCD and innovation.

The addition of the maturity model step is intended to assess the maturity of the organisation both in terms of UCD and innovation with so that the approach can be further tailored to increase the chances of success. There are several existing models and ongoing research into maturity models that can be leveraged to assess organisational maturity (Essmann & Du Preez, 2009), (Salah et al., 2015). There are several potential implications for an organisation such as the CRA depending on where they fall within an innovation UCD maturity matrix.

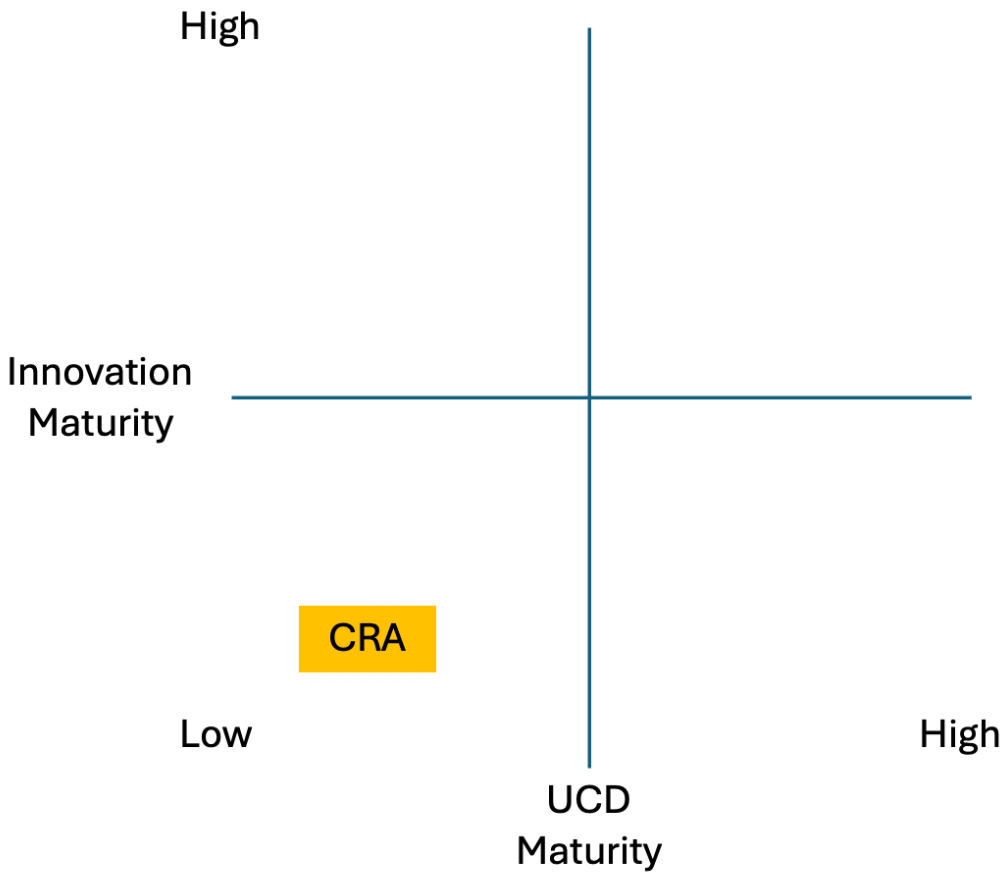

Figure 17: Innovation / UCD Maturity Matrix

If the CRA lab was both High Innovation and High UCD Maturity, the CRA would be well-equipped to develop and implement efficient, user-friendly services that meet the needs of Canadian taxpayers. This could lead to increased taxpayer satisfaction, improved compliance rates, and more effective tax collection processes. It would also foster a culture of continuous improvement and adaptability to changes in the tax landscape or technology. The implication for the process model would be that such an organisation would likely already have some form of process for innovation, and that process would be User-Centred. They most that would need to

be done would be to assess the alignment to the User-Centred Innovation process model and fill in gaps if there were any.

On the other hand, if the CRA Innovation lab was a combination of High Innovation and Low UCD Maturity, the CRA might be good at generating new ideas or adopting new technologies but may not effectively incorporate user feedback or needs into their service designs. This could result in innovative services that are not user-friendly or do not fully meet the needs of taxpayers, potentially leading to frustration and decreased compliance. The focus of the process model in this case would be on the later co-design stages and in identifying and categorizing users in the system definition phase.

Or, if the CRA Innovation lab was a combination of Low Innovation and High UCD Maturity, the agency might provide services that are user-friendly and meet current needs but may struggle to adapt to new challenges or changes in the tax environment. This could limit the CRA's ability to respond to emerging trends, such as the increasing use of digital services or changing taxpayer demographics. In this case the focus would be on the problem definition and idea triage steps, with less of a focus on the defining personas or on the co-design stage.

In this case, however, the assessment was that the CRA Innovation lab was both Low Innovation and Low UCD Maturity. As a result, the CRA faced difficulties in both developing new, effective solutions and in meeting the current needs of taxpayers efficiently. This could lead to outdated, cumbersome processes that frustrate taxpayers and staff, potentially resulting in lower compliance rates and operational inefficiencies.

Understanding the low maturity state in both aspects allowed us to understand that we had to start by teaching basic concepts of both innovation and UCD to the accelerator team, and the participants. We created a program where we would walk participants through each stage in a series of workshops as well as provide direct mentoring support to at each stage of the process model to the innovator teams. In addition, knowledge transfer was initiated in a "train the trainer" program to ensure the innovation accelerator staff were fully conversant with the process, the methods and the underlying approaches.

5.1.3.2 System Definition

In the system definition phase, the Team Composition step did not align to our process model simply because the team was largely defined before we engaged with the innovation accelerator. We were also not given the latitude to suggest additions or subtractions from the team. In some ways this way a moot point because of the low maturity. We were able to train the team that we got in various aspects of innovation and UCD. While we did have some differences in frameworks and approaches at the beginning, the team was eventually able to coalesce around a Design Thinking approach. Having a unified understanding of the approach greatly facilitated communication among team members and lab participants.

One phenomenon of note was the evolution of common codes. This was not something that we were aware of at the outset; however, we observed it and were later able to situate it in the literature. Capdevila, (2014b) and Leydesdorff, (2012) write about individuals needing to share the same institutional context in order to have similar communication codes, and differences in communication codes making knowledge transfer, particularly in the context of multidisciplinary innovation, difficult. We observed participants from IT, having different communication codes from policy or service delivery colleagues. Both Capdevila and Leydesdorff speak of

communication codes within networks and between helixes respectively. We observed the phenomenon within the same organisation, between different departments. At this stage, we do not yet know if it is necessary to go as far as seeking to create a common lexicon as part of the process, however it is unknown how long it takes common communication codes to emerge organically

The problem definition step had two aspects. First, the innovation teams were required to create a very specific problem statement using a template. For this activity we used user-centred or "how might we" outcome-based problem statements. The structure of these statements lend themselves to being User-Centred as they require the participants to identify a specific user who is experiencing and problem and identify how the solution of the problem would benefit the user.

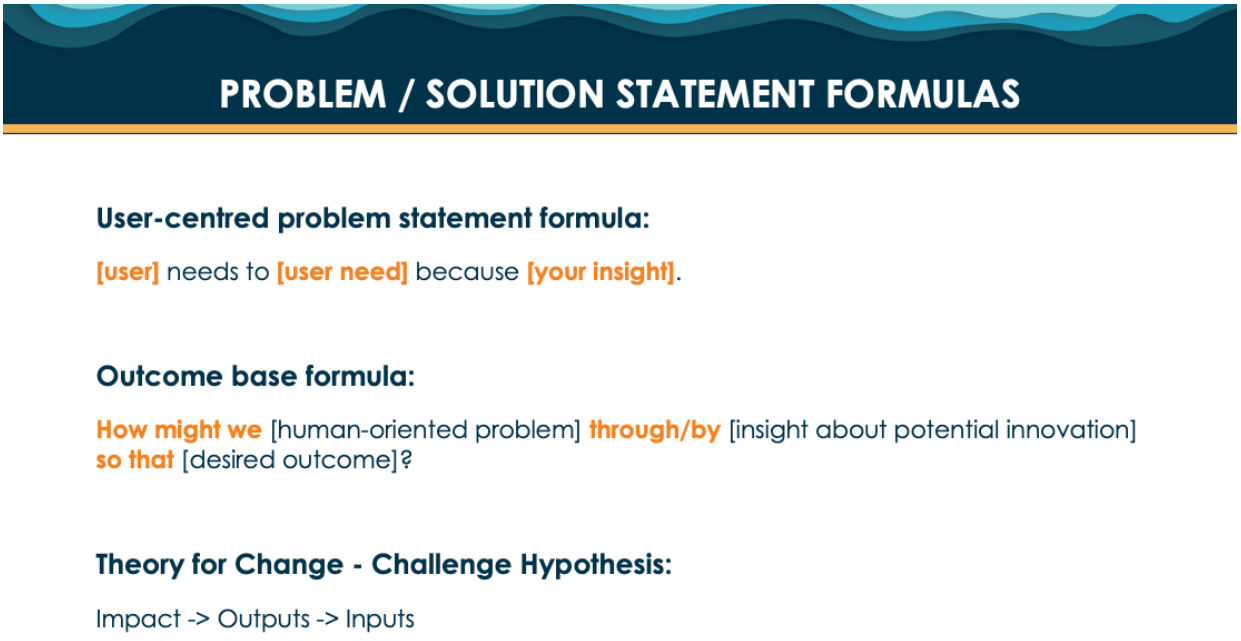

Figure 18: Problem Definition Templates.

The second part of the problem definition step was to have participants validate that their identified problem was in fact a real problem and not just an artefact of their own bias. So, they were required to identify actual employees that were experiencing the problem as they described it in their problem statement and create a validated stakeholder map.

Idea triage is the next step in the system definition phase. It is the stage at which some ideas are eliminated. It was not feasible to prototype all of the ideas from the innovators because of the number, but also due to the fact that this innovation lab had top-down direction we also needed to ensure that ideas aligned with organisational innovation objectives. We introduced an evaluation framework based on IDEO's assessment criteria of desirability, feasibility and viability.

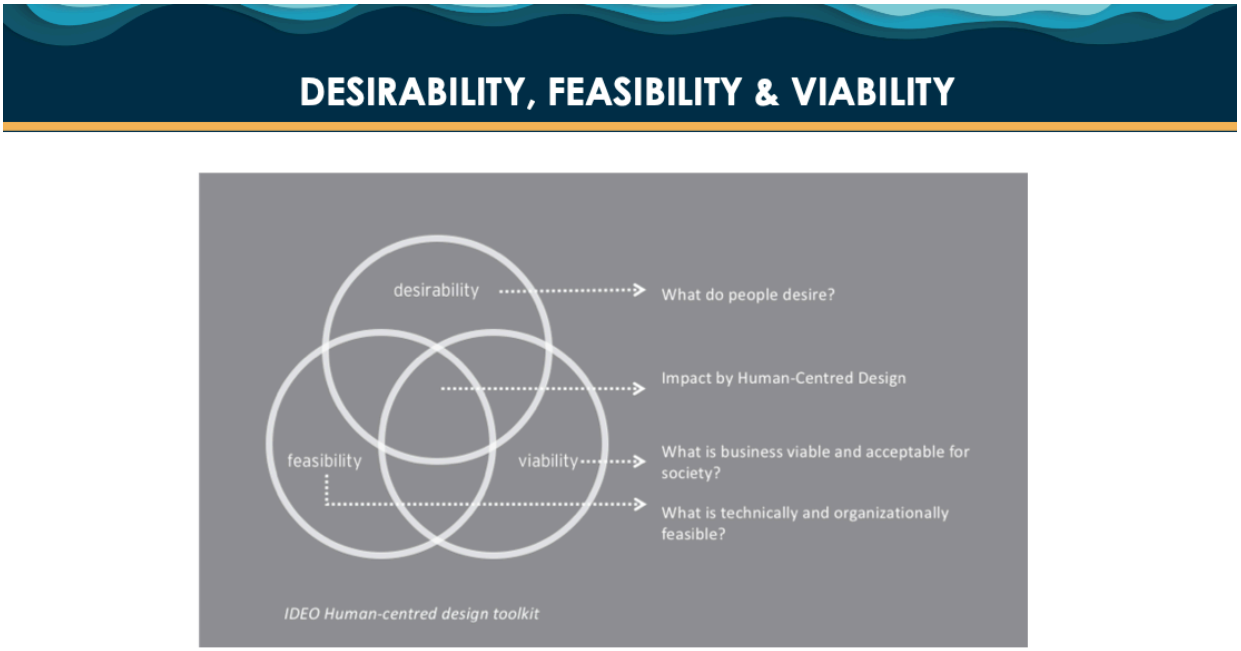

Figure 19: Desirability, Feasibility & Viability Diagram

In addition to the IDEO model, we also challenged participants to prove value. They were asked to define metrics by which the value to the organisation and to employees could be proved. Ideas that could not provide a way to measure value, or could not demonstrate desirability, feasibility and viability were not permitted to advance to the Co-Design phase.

5.1.3.3 Co-Design

The co-design phase was enlightening and is a prime example of the necessity of t understanding the nature of the lab and the organisation. Based on the type of organisation that CRA is, we did not expect to find a high level of proficiency when it came to prototyping. As the OECD notes with respect to the public sector innovation lifecycle, experimentation and failure is not regarded well in the public service (OECD, 2020). There are many reasons for this, not the least of which is the fact that most government work is done in full view of the tax-paying public, and that creativity is not a trait that is encouraged in the public service.

These observations by the OECD held true, and the low fidelity prototyping stage yielded mixed results from group to group. This step is loosely defined in terms of method, and teams were able to write their prototype out as prose use cases, storyboards or wireframes. In addition to those suggested methods, teams also submitted systems diagrams as low fidelity prototypes. Where the process model broke down was that these prototypes are intended for testing and iteration, ideally with each iteration yielding a higher level of fidelity in the prototype. Some of the prototypes were difficult to test and failed to increase in fidelity despite feedback being gathered.

It is difficult to say at this point, but this seems to be a function of culture as opposed to a limitation of the method.

Evaluation was informal in most cases with innovators gathering qualitative feedback. No formal usability testing, or cognitive walkthroughs were conducted at this point. There were two main reasons; firstly, access to subject matter experts was restricted. Again, this seemed to be more a function of culture than anything else. Because some of the innovation ideas were quite radical, there seemed to be a growing amount of reticence to have others interact with them.

The second reason was more pragmatic and more endemic of the public sector. Time. The early stages of process took longer than expected and the managers of the innovation accelerator program were under increasing pressure to show some kind of result. For all of the rhetoric about outcomes over outputs, in the end outputs were the focus.

5.1.4 Playbook

Because the CRA innovation accelerator was at a low UCD maturity, we were brought in as an external consultant to conduct the second cohort of projects. In particular, we set up training documentation and established evaluation metrics that eventually were packaged into a playbook. The figures throughout section 5.1, including the one below, are excerpts from that playbook.

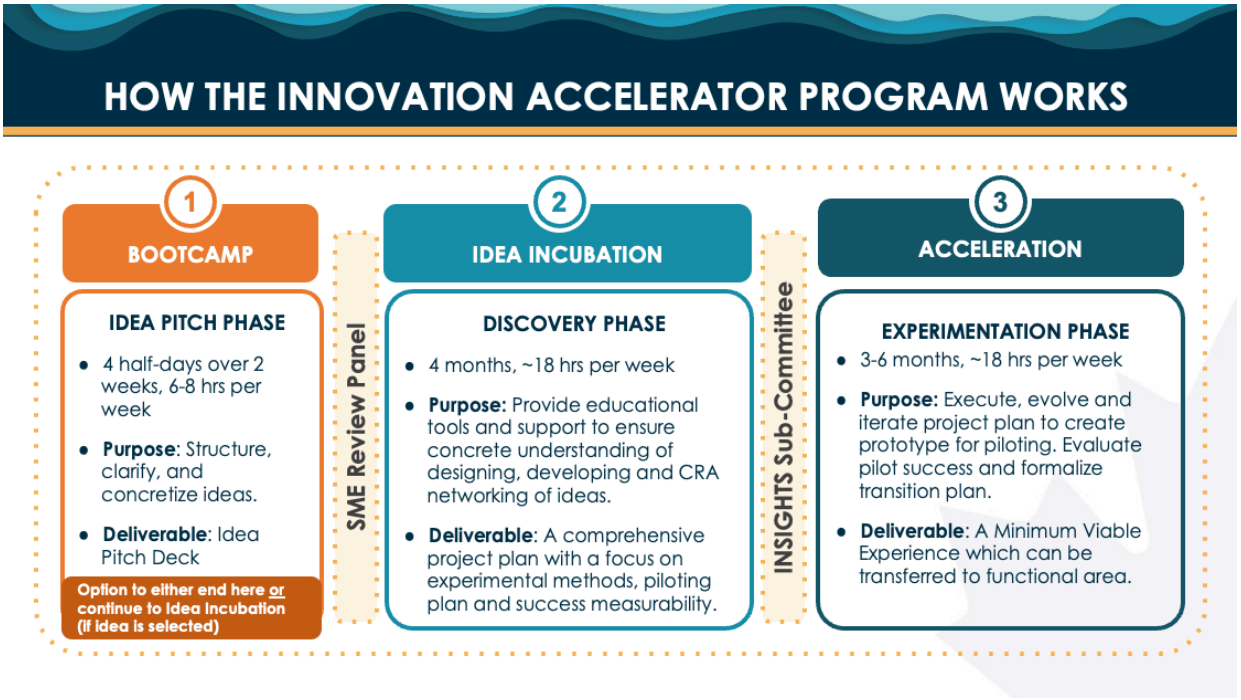

Figure 20: Bootcamp Structure

The playbook for CRA helped guide individual projects through the choices they faced in System Definition and Co-Design when working on a specific project, and incorporated the polices already established by the leaders of the lab during Lab Setup. For team composition, the playbook recommended a mix of skillsets. Designers who have skills in low fidelity prototyping and visual design, project managers, user researchers who are well versed in the design of qualitative research studies, workshop facilitators, will all be required team members along with various support staff. As described in the previous section, research and design methods that were most useful included sketching, storytelling, persona research and development, stakeholder mapping, interviews, surveys and ethnographic research.

The basics of many of these methods needed to be taught to participants. Participants employed interviews, personas, usage scenarios, low fidelity prototyping and other such UCD methods.

They validated their prototypes with cognitive walkthroughs and other forms of user feedback and evaluated those prototypes then iterated on them. Revaluation framework ended up being a measure of how many ideas emerge at the end of the process versus how many ideas there were at the beginning of the process. That ratio ended up being the primary measurement or evaluation of this lab.

Specific plays leveraged frameworks for problem statement definition. In this case we crafted "how might we" statements. These allowed participants to focus on the human element by directing them to consider who they were solving the problem for, and how it would improve that persona's situation. Other plays included brainstorming or idea generation frameworks, as well as self-assessment tools by which they were challenged to validate the feasibility, viability and desirability of their ideas. Participants were also encouraged to use ecosystem thinking and develop a detailed stakeholder map when considering how their ideas could be implemented.

5.1.5 Results

At the end of this interaction with the CRA, we learned that the process model could benefit from some modifications: We added a step at the beginning of the model to account for the problem space. This is the broad direction or issue that the innovation lab will be pointed at. This was separated out from problem definition because it was decided upon before the formation of the lab and was integrated in the lab's mandate. Typically, labs are assembled to solve a specific problem or address an identified issue. Not documenting this as part of the process model is unlikely to change the practice, and documenting it is an acknowledgement of the way innovation

labs work in practice. Targeting a problem space can also affect the initial team selection if the presence of subject matter experts is required.

This experience confirmed the importance of the team selection and the importance of the team having a common approach or philosophy when it comes to innovation. As previously noted, the loss of team members notably the director (and some other team members) did impact the effectiveness and the efficiency of the innovation lab. One aspect that has yet to be addressed in our process model is the idea of culture and the impact that our innovation process model has on the overall culture, as well as the impact that organisational culture has on the process model.

For example, the agency within which this innovation lab operated was very hierarchical, very structured and was placed a high importance on rules and regulations. Getting participants to sketch, to ideate with a blue-sky frame of mind, to interview potential users and managers, all presented challenges due to the highly structured and hierarchical nature of the agency. This agency may, due to their function, be more attuned to regulation and rule following than a typical public sector organisation. These findings did not impact the structure of the process model, however they underscored the importance of understanding the context (i.e. the level of innovation and UCD maturity) and, in this case, highlighted the need for extra attention to be paid in the Co-Design stage as many of those activities were antithetical to their existing corporate culture.

Interacting with this agency resulted in an iteration of the process model. We added the problem space aspect as the first step because we observed that innovation is not often open to the point that it is directionless, and organisations, particularly in the public sector will have systemic issues

they wish to address using innovation labs. It also resulted in the extension of the framework to include both a Playbook and a Typology. The interaction with the agency allowed us to understand how crucial the typology is to the process model and understand why it needed to be more detailed. The motivation for thinking about the typology in this level of detail came from the observation that there was not really a shared vocabulary to describe the nature and type of innovation lab that it was beyond saying it was an innovation accelerator. This label wasn't defined and didn't really give much insight into the way that the lab should function.

5.2 Case Study 2 – Federal Government Department Innovation Hub

5.2.1 Overview

The Innovation Hub is a dedicated team within a department of the Government of Canada that does research, consults with users and tests process changes and digital solutions. The Hub allows for collaboration with service users and their families, and among employees. Into 2024, the Hub was focused on reducing incomplete applications and exploring ways to more quickly receive medical documents from health care providers.

In that context, the innovation hub was approached by the policy innovation arm of the federal department, to address a healthcare related challenge that is complex and intertwined with provincial and federal politics. This challenge involves the federal and provincial government service providers that are required to interact with each other when a member of the armed forces

leaves active duty and becomes a veteran.

Currently, there are inconsistencies across the country in how this transition is made because the department is a federal system interacting with multiple provincial systems who have varied policies, procedures and regulatory constraints across Canada

5.2.2 Typology

Table 5: Typology Implications for the Federal Government Innovation Hub

	Dimension	Classification	Implications (Why it matters)
Federal Government Innovation Hub	Funding	Funded by an initial cash infusion. Funding however became precarious with a change in leadership. A shift in the governance model resulted in a smaller budget, but it was more secure.	This underscores the importance of aligning with strategic priorities in order to secure funding. The opportunity to shift and adapt funding models to ensure the survival of the lab in a changing governance environment
	Focus	Mixed (Technology, service, policy)	Public, service, policy. Reporting back up to the steering committee can result in policy change.
	Collaboration	Closed innovation - Targeting retired police and military. Working with stakeholders from federal and provincial healthcare providers and associations	The method of collaboration is largely influenced by the higher-level departmental mandate.
	Mandate	Top-down	Heavily dependent on governance structure. Initially had their own Director General but has since become a directorate in their own right.

5.2.3 Process model

The process followed by the Federal Government Innovation Hub aligned broadly with the model proposed in Chapter 4, while also demonstrating unique adaptations reflecting the organization's policy-heavy mandate and longer project timelines. Unlike the CRA Innovation Accelerator, which faced constraints due to rigid project timelines and limited influence over problem scoping, the Federal Government Innovation Hub had more latitude in shaping the problem space collaboratively with internal partners.

At the outset of the project, the Innovation Hub was presented with a problem space that was notably under defined. Unlike typical engagements where a top-down directive from leadership provides a clear focus, this initiative emerged from internal uncertainty and the client partner recognized the need for change but lacked clarity on where to begin. This shift created an opportunity for a more bottom-up, exploratory approach. The Hub responded by facilitating a structured alignment phase designed to guide the organization through systems mapping and collaborative framing exercises. These activities surfaced interdependencies, clarified roles, and enabled stakeholders to coalesce around a shared understanding of the problem space.

While this bottom-up approach extended the timeline of the initial phase, it yielded a more strategic and confident basis for discovery. With a narrowed focus, the team was able to approach subsequent research activities with greater precision. At this stage, user-centred techniques such as proto-personas were introduced to help frame engagement strategies and align the team around user needs and emotional context.

Team composition followed a hybrid model. The core Innovation Hub team led the facilitation, design, and coordination, while subject matter experts were brought in based on the specific needs of the project. Given that the department operates in many ways like an insurance provider, evaluating and processing complex health-related claims collaboration with external healthcare professionals (e.g., audiologists, physiotherapists, and prescribing physicians) was essential. The inclusion of these domain experts ensured that the innovation process remained grounded in operational realities

5.2.3.1 Lab Setup

The Federal Government Innovation Hub originated from a desire to introduce innovation capacity into an organization with a historically top-down, operational culture. Although initially conceived through a management consulting engagement, the lab gradually internalized design practices and shifted toward a user-centred innovation mandate. The problem space was typically pre-defined by internal stakeholders (e.g., senior leaders or departmental priorities), but the lab retained autonomy to shape how those problems were framed and explored. This created a semi-structured environment for innovation, with bounded autonomy. The lab typology emerged as primarily direct public-funded, focused on policy and social innovation, with a directional orientation that mixed top-down authorization with bottom-up exploration.

Over time, however, the lab's funding model evolved in response to shifting political priorities and leadership transitions. During periods of uncertainty, the lab operated in a leaner mode, with limited capacity to hire or retain staff. By 2024, the Hub had been repositioned closer to senior decision-makers, and its credibility helped restore operational funding and the ability to recruit new talent. This trajectory underscores how funding stability in public sector labs is closely tied

not only to formal budget allocations, but also to political capital, executive sponsorship, and the ability to communicate value internally.

The mandate of the Federal Government Innovation Hub reflects a deliberate effort to institutionalize innovation within a complex federal department responsible for serving a highly diverse and vulnerable population. Initially established through a ministerial directive and housed as its own directorate, the lab had a clear mandate to introduce user-centred innovation practices and to build internal capacity for problem-solving across the department. This top-down origin gave the lab legitimacy and access, enabling early projects to align with departmental priorities while exploring new methods of service and policy design.

Over time, the lab's governance evolved in response to leadership turnover and changing political contexts. While it lost formal directorate status during a period of leadership transition, the lab adapted by demonstrating continued value through project delivery, capacity-building initiatives, and its ability to generate executive trust. This led to its repositioning within the Assistant Deputy Minister's (ADM) office, a move that elevated the lab's strategic visibility and reaffirmed its role as a cross-cutting enabler of departmental transformation.

The Hub operates under a governance model that blends accountability to senior leadership with consultative, project-based engagement. It does not own implementation; rather, it supports internal partners in designing and de-risking new solutions, which are then transitioned back to operational units. This positioning allows the lab to function as both a service provider and a strategic advisor, with a mandate that encompasses project delivery, organizational learning, and cultural change. While it retains a strong degree of autonomy in how it executes its work, its

legitimacy is continually reinforced by the alignment of its outcomes with departmental goals and its ability to navigate internal political landscapes.

The Federal Government Innovation Hub demonstrates a hybrid model of collaboration that blends inclusive design practices with context-sensitive engagement strategies. While collaboration is a defining trait of innovation labs in general, the GoC Hub has tailored its approach to reflect both the sensitivities of the veteran population and the complex intergovernmental policy environment in which it operates.

Collaboration begins early in the process, during the Align phase, where teams engage internal and external stakeholders to map out the systems, hierarchies, and emotional landscapes that shape the problem space. This includes generating proto-personas of not only end users, but also of project partners and decision-makers. These personas guide engagement tactics and help ensure that co-design efforts are emotionally resonant and politically strategic.

The Hub's collaboration strategy is best described as inclusive. Rather than being fully open to all, or entirely closed, the team purposefully includes individuals and groups that bring critical lived experience and often marginalized perspectives, especially service users with healthcare, housing, or service access challenges. Co-design workshops are structured to accommodate this diversity, using facilitation techniques that prioritize equity, trauma-informed care, and trust-building.

In practice, the collaborative process adapts depending on the nature of the project. For policy-intensive challenges, internal stakeholders such as policy analysts and legal experts are engaged

throughout to ensure regulatory feasibility. For service-oriented initiatives, collaboration expands outward to include healthcare professionals, frontline GoC staff, and service users themselves. The ability to calibrate the openness of collaboration has become a core strength of the Hub.

Moreover, the Hub has developed a reflexive approach to collaboration that includes ongoing negotiation of roles, responsibilities, and narratives. Projects are framed and re-framed collaboratively with client partners, and deliberate efforts are made to ensure that ownership of outcomes is shared. This is particularly important in the department's context, where the Hub operates in a consultative role and hands off project deliverables to operational groups.

5.2.3.2 System Definition

Team composition was built iteratively, reflecting the tension between internal constraints and the desire to establish a more adaptive, multidisciplinary team. While some initial team members were seconded or assigned, the lab's leadership gradually curated a team with shared values and complementary skills. Over time, the hub developed an informal internal "design curriculum" to cultivate a baseline understanding of UCD practices across team members and partners. Problem definition typically occurred through a combination of stakeholder interviews, document review, and co-creation workshops. The hub employed user research methods such as empathy mapping and journey mapping, and gradually built out the operational capacity to support these efforts. Triaging of ideas used desirability, feasibility, and viability lenses, often supported by internal working sessions and concept refinement workshops.

5.2.3.3 Co-Design

The lab used a range of co-design and prototyping methods, including sketching, scenario development, and low-fidelity prototyping. While the pace of delivery was slower than in the CRA Innovation Accelerator, the trade-off allowed for deeper engagement with stakeholders and iterative refinement. Co-design processes were structured, inclusive, and often extended over several months, reflecting both the complexity of policy domains and the sensitivity of working with veteran populations. Evaluation was often embedded into pilot implementations or policy simulation exercises, but the resource constraints meant that formal usability testing or iterative cycles were limited.

5.2.4 Playbook

There are two main processes that the department uses to make sure that processes are repeatable. They have adopted a generic, high-level process that serves as the foundation template for all their initiatives. The steps they use are" Align, Discover, Design, Validate and Roadmap. The department team enhances the model as needed to account for complexity of projects by incorporating elements of user-centricity and systems thinking.

The team also places a strong emphasis on post-project communications, including briefings, visual artifacts, storytelling, and presentations to senior leadership. These could be explicitly included as "plays" in the Playbook for scaling by socialization, especially useful when policy recommendations must be absorbed across a large federal agency. The team has an explicit goal

of empowering others who are within the department, but outside of the innovation hub as innovators.

5.2.5 Results

In addition to the CRA case study (see section 5.1), the leader of a second federal government department innovation lab appreciated the clear articulation of project phases and the emphasis on co-design, which matched their goal of increasing client-centricity. This result indicates that our framework is generally useful across the Canadian federal government and not specifically one department. One criticism however was that the linear visual presentation of the model felt too rigid; the department's projects often required circling back (e.g. redefining problem after prototyping). In response, iteration loops were added between stages as a refinement of our process model. The model now visually reflects cycles between problem definition, prototyping, and evaluation in order to more clearly communicate the iterative nature of the human-centred innovation process.

The Typology helped classify the department as publicly funded, policy and service-focused, closed, and bottom-up (in some projects). However, the funding model described by the department indicated that while understanding the funding structure is critical to many aspects of setting up a successful lab, public vs. private or PPP is not a nuanced enough distinction to capture the complexities of public funding structures and the implications of those complexities. The concept of the nature of the funding, whether it is dedicated, long term, or shared between multiple public sector agencies will need to be explored further.

The department recognized a playbook would be a useful capacity-building and knowledge transfer tool, especially after consultant support was removed. With their stated focus on process, communication and empowerment, they have already integrated elements into stakeholder engagement and policy design. For example, in terms of co-creation, the team used playbook tools (e.g., stakeholder maps and ecosystem diagrams) to shape co-design engagements this facilitating the decision-making about whom to involve and how. They did however feel that they would have benefited from more explicit guidance as staff struggled to choose appropriate plays without a clear narrative guide. This provides strong evidence for the usefulness of a playbook, and it is encouraging that many aspects already exist.

5.3 Case Study 3 – NouLAB Provincial Mental Health and Addictions Lab, New Brunswick

5.3.1 Overview

The NouLAB operates under the Pond-Deshpande Centre at the University of New Brunswick. It is built on the assumption and experience that increasing complexity in social problems demand new ways of solving them. One of their core beliefs is that these solutions are more comprehensive and more readily owned if they are co-created by the stakeholders impacted by the challenge.

They employ three core strategies for addressing complex social challenges: they are social, experimental, and systemic. Social labs start by bringing together diverse participants to work in a team that acts collectively. They are ideally drawn from different sectors of society, such as government, business and community. The integral participation of diverse stakeholders, as opposed to teams of experts, defines the social nature of social labs. Social labs are not one-off experiences. They are ongoing and sustained efforts. The team takes an iterative approach to the challenges it wants to address using prototyping interventions, incorporating feedback, and managing a portfolio of promising solutions. The ideas and initiatives developed in social labs go beyond dealing with symptoms and address the root cause of why things are not working.

5.3.2 Typology

Table 6: NouLAB Typology

	Dimension	Classification	Implication (Why it matters)
NouLAB	Funding	Public – Initial funding primarily internal from the Pond-Deshpande Centre at the University of New Brunswick via federal government grants, later the province of New Brunswick funds more than 50% of NouLAB's budget.	Initial high funding enabled early experimentation and use of external consultants. Later budget constraints pushed team toward lean operations and internal capacity building. This influenced the sustainability and autonomy of the lab over time.
	Focus	Social and Policy Innovation – Focused on systemic social issues and the resulting policy challenges that impact various vulnerable communities in New Brunswick	Social and policy issues within the provincial context overlap nicely. This clearly defined focus leads to clearly defined collaboration criteria.
	Collaboration	Inclusive – Co-design includes stakeholders from marginalized and affected	Inclusive collaboration required deliberate stakeholder recruitment, culturally sensitive facilitation, and

		populations including immigrants, those suffering from addiction, children and those facing housing insecurity along with community service providers	policy-sensitive design methods. Increased project legitimacy and relevance, but also extended timelines.
	Mandate	Top-down & Bottom-up – Projects often initiated in partnership with executives but designed to evolve through ground-level discovery and engagement	A hybrid governance approach enabled alignment with organizational priorities while fostering innovation through co-creation. Direction from executives provided legitimacy, while bottom-up engagement grounded solutions in lived experience.

5.3.3 Process model

The Provincial Mental Health and Addictions Lab (NouLAB) follows a process model that aligns closely with the framework proposed in Chapter 4, while offering a distinctive expression of each phase grounded in systems thinking, UCD, and policy sensitivity. The lab's iterative design process is deliberately adapted for each project depending on complexity, stakeholder readiness, and the social-emotional landscape of the issue space.

The overall approach aligns with a developmental evaluation model, drawing on the work of Michael Quinn Patton, where the goal is not only to deliver immediate outputs but to support adaptive learning and capability development throughout the innovation process.

5.3.3.1 Lab Setup

NouLAB was established with the explicit aim of addressing priority policy challenges in New Brunswick through a user-centred innovation approach. The problem space was typically identified in collaboration with Executive Council Office, ensuring alignment with the provincial government's strategic commitments. These often stemmed from platform commitments or pressing interdepartmental issues. The lab typology was both inclusive and top-down/bottom-up hybrid. While the initiative was supported by senior leadership (including deputy ministers and CEOs of participating agencies), efforts were made to involve citizens and community groups particularly from marginalized populations depending on the focus of the project.

In terms of maturity, NouLAB operated in a provincial context where innovation was gaining traction, but the institutional design maturity was still emerging. The parent organisations were assessed as having a mid-level maturity (around 2.5 out of 5), with openness to new methods and some fluency in design and innovation concepts, albeit lacking dedicated practices or strategy. This positioned NouLAB as a critical capacity-building mechanism: both solving problems and serving as an incubator for public sector innovation competencies.

Team composition was deliberately structured to ensure representation from across organizations and disciplines. Priority was given to identifying participants who demonstrated openness to new approaches and a tolerance for uncertainty, often described internally as "early adopters." At the outset, the team sought system-level representation to ensure alignment across agencies, followed by the inclusion of individuals with relevant disciplinary expertise. For example, engineers contributed to the process mapping activities, while design skills were supplemented through collaboration with an existing innovation hub. Many of the participants had spent their entire

careers within government, which informed the team's approach to navigating risk. Rather than emphasizing the degree of risk, the lab focused on building shared understanding around how risk could be managed responsibly within the public sector context.

Primary research activities were conducted by the team responsible for process mapping. These activities included stakeholder interviews and in situ observations to understand frontline realities. In this case, research preceded formal problem definition. The team began by studying existing processes and conducting ethnographic fieldwork, including a learning journey to the United Kingdom to examine how the National Health Service approached similar challenges. Insights from this work were synthesized into design artifacts, including personas, journey maps, and process maps. These artifacts were then used to anchor a series of co-design workshops in which the problem definition was collaboratively refined. This process closely mirrors the principles of Theory U, particularly in its emphasis on deep listening and emergent framing.

5.3.3.2 System Definition

The foundation of each NouLAB project was grounded in an intentional team composition process. Participants were drawn from across sectors and disciplines, selected for their readiness to engage with complexity and work outside traditional silos. This included public servants, clinicians, and community representatives. Special emphasis was placed on establishing what Nick Scott termed "common codes" shared expectations, vocabulary, and norms that helped bridge disciplinary differences and reduce friction in collaboration. This aligns with literature noting the importance of linguistic and cultural adaptability in cross-sector innovation teams.

Problem definition was anchored in robust primary research, including ethnographic interviews, learning journeys, and process mapping conducted by cross-functional teams. The resulting system maps and personas were used not only to define the problem space more accurately but also to ground participants in a shared understanding of context and need.

NouLAB's model notably emphasized the iterative interplay between research and problem definition. Research activities often informed or reframed the challenge being addressed. In some instances, this resulted in a broadening of the problem space mid-process for example, expanding a healthcare transition initiative to include mental health and addictions demonstrating the flexible responsiveness of their system definition approach.

5.3.3.3 Co-Design

The co-design stage at NouLAB was characterized by an integrated application of UCD methods. Building on early research, cross-sector participants engaged in workshops structured around ideation, prototyping, and evaluation. Prototypes included service concepts, policy interventions, and process innovations. Facilitated activities included journey mapping, stakeholder value mapping, low-fidelity prototyping, and system-level ideation.

A unique aspect of NouLAB's approach was the early involvement of executives in reviewing provocative, boundary-pushing proposals what Scott termed "provocative proposals." This method functioned as a kind of stress-test for organisational risk tolerance and helped validate the lab's appetite for radical change. Feedback from these sessions demonstrated a surprising openness to transformative ideas, which emboldened teams to pursue bolder interventions.

5.3.4 Playbook

NouLAB's approach to building capacity and institutionalizing knowledge was rooted in the recognition that many participants lacked formal training in innovation or UCD methods. To address this, NouLAB developed the *NouLAB Academy*, an applied learning environment designed to equip public servants with the tools and mindsets needed to participate meaningfully in lab-based innovation. While not a static document, the academy served as a structured curriculum and hands-on training program that introduced participants to core innovation techniques, facilitation methods, and systems thinking approaches. This was operationalized through a combination of workshops, mentorship, and live project work, creating an informal apprenticeship model. Participants who demonstrated interest and aptitude were identified as potential facilitators, reinforcing a culture of peer learning and internal capacity-building. Though the formal codification of the playbook was still evolving, the academy format provided consistent scaffolding for skill development and knowledge transfer within the Government of New Brunswick's innovation ecosystem.

5.3.5 Results

The application of the process model to NouLAB revealed several notable results. Firstly, there did not appear to be any significant difference in applying the process model to a provincial lab, compared to a federal lab. The typology, process model and playbook concept aligned well with the way the lab was set up and run. The leader of the lab indicated the overall usefulness and applicability of the typology and process model. The second notable result is related to the effectiveness of UCD methods in the context of a provincial public service innovation lab. The findings from this case study support a central assumption of this thesis: that labs which integrate

UCD practices throughout their operation demonstrate greater clarity in problem definition, stronger team cohesion, and a higher likelihood of generating scalable innovations.

NouLAB's implementation of the lab setup phase demonstrated the practical utility of the proposed typology. By explicitly identifying the lab's funding structure (public, provincial), focus (service and policy innovation), collaboration style (inclusive, focusing on newcomers, children and in this case, those suffering from addiction), and mandate (hybrid top-down and bottom-up), the lab team was able to tailor project selection, stakeholder engagement, and governance structures to fit their operational context. This alignment facilitated a coherent organisational narrative and strategic focus, which was critical in maintaining support from senior executives and in selecting participants with the appropriate level of openness and readiness. One shortcoming of the process model was that in the case of NouLAB, the maturity assessment would have been useful earlier in the process as teams had prematurely committed to an overly ambitious direction. The feeling was that an honest assessment of UCD and Innovation maturity would have served to set expectations. Another criticism was that the "focus" dimension felt too broad as many projects spanned both service and policy making classification appear reductive.

The system definition phase produced tangible benefits for team formation and problem framing. Nick Scott's use of "common codes" across diverse participants aligns with findings from the literature on collaborative innovation, which emphasize the importance of shared language and expectations. The deliberate approach to team composition and early stakeholder engagement enhanced participant cohesion and reduced friction in collaborative work. Research and problem definition activities especially ethnographic interviews, system mapping, and stakeholder

engagement provided a robust foundation for subsequent design activities and helped surface latent issues that were not initially apparent to the client organisation.

During the co-design phase, the application of UCD methods (e.g., persona development, journey mapping, low-fidelity prototyping) contributed to the development of interventions that were not only contextually appropriate but also embraced by stakeholders. Workshops were well-attended and featured active participation from both public sector representatives and community members, including individuals from marginalized groups. The "provocative proposal" technique used to test the boundaries of executive risk tolerance proved particularly valuable, as it affirmed an organisational appetite for more ambitious solutions than initially assumed.

While scale was not a core part of the process model at the time of implementation, NouLAB's practice of embedding scale considerations into early-stage activities (e.g., through stakeholder alignment, adoption readiness assessments, and policy integration strategies) yielded positive results. The scaling framework used up, deep, and out provided a structured way to assess readiness and identify enablers and barriers. This approach not only strengthened the credibility of final deliverables but also increased the likelihood that promising prototypes would transition from pilot to system-wide adoption.

An important secondary outcome of the process was the development of innovation capabilities among participants and client organisations. The expert panel review emphasized that the work of NouLAB served as a capacity-building mechanism, equipping teams with tools, methods, and mindsets they continued to use beyond the life of the project. The lab's contribution to institutional learning was not limited to deliverables; it also included soft outcomes such as

increased openness to experimentation, stronger cross-departmental relationships, and a shared understanding of UCD principles.

5.4 Case Study 4 – HXLab Singapore

5.4.1 Overview

In Singapore, the Human Experience Lab (HXLab) focus was on the growth of design thinking capabilities and applying user-centric methods to improve public service delivery. The HXLab was located within the Public Sector Division, a government ministry that steered efforts to build a future-ready Singapore Public Service by developing talent and promoting capabilities and culture to support effective government and quality public service delivery. The project discussed centres around the HXLab, and its efforts to champion UCD and innovation. This case reveals an approach to innovation in Singapore that blends top-down directives with bottom-up initiatives, often borrowing from private sector practices.

Initially, Leon Voon worked in the Public Sector Division (PSD) where he managed grant schemes for public-private sector R&D. He observed limitations in traditional, efficiency-driven government approaches, sparking his passion to work in public service dedicated to user experience. He helped to start the HXLab at PSD and co-led the team there from 2012 – 2016.

A key aspect of the HXLab project was shifting the focus from purely quantitative measures of efficiency to understanding the citizen's experience. Leon explains how this shift involved

incorporating design thinking to reveal the emotional and practical challenges users faced in accessing government services, like social assistance.

5.4.2 Typology

Table 7: Typology Implications for HXLab

	Dimension	**Classification**	**Implications (Why it matters)**
Human Experience Lab (HX Lab)	Funding	Multiple sources of funding	HXLab was funded by PSD's budget but there were also funds available from a central innovation fund that was available to every government ministry specifically to facilitate innovation.
	Focus	Mixed (Technology and service innovation)	The HXLab's creation was rooted in Singapore's public service drive to be more user-centred. The specific case was explicitly a case of service innovation.
	Collaboration	Open	The project included participation from citizens and public servants alike. It addressed a service that had implications for potentially anyone in Singaporean society.
	Mandate	Top-down	The mandate for PSD was explicit as well as the mandate associated with funding from the Central Innovation Fund. In this instance of being top down, the HXLab was also strongly championed by leadership, which ensured they had support navigating bureaucratic hurdles.

5.4.3 Process model

The HXLab's operational model showcases a deliberate approach to integrating UCD and innovation within a complex bureaucratic system. While navigating challenges related to scaling

and evaluation, the lab demonstrates a commitment to improving service delivery and fostering a more user-centric approach within government.

5.4.3.1 Lab Setup

The HXLab represents a deliberate effort to embed UCD practices within a technologically advanced public service ecosystem. Although it does not use a formal typology, it can be understood as a hybrid lab model. It combines the characteristics of a service design lab, focused on improving user experiences, with those of a technology innovation lab, exploring digital service delivery to citizens and businesses, as part of a broader alignment with Singapore's national "Smart Nation" strategy, a top-down mandate to improve public services through digital transformation.

At the organizational level, PSD demonstrates a relatively high degree of innovation maturity. It allocates dedicated funding for innovation, supports experimentation through hackathons and protected project time, and offers structured training for civil servants. While UCD maturity is less clearly articulated, the lab's focus on empathy and user research suggests a growing internal culture of UCD. Team composition within the lab includes designers, researchers, and program managers, reflecting a commitment to multidisciplinary collaboration. Leadership plays a critical role in sustaining the lab's relevance and in navigating bureaucratic constraints.

5.4.3.2 System Definition

HXLab's problem identification approach blends both top-down strategic direction and bottom-up discovery. National priorities like the Smart Nation initiative set a broad innovation agenda, but the lab also solicits project ideas through staff suggestion schemes and time allocated for civil

servants to explore individual initiatives. This dual-channel approach allows the lab to remain responsive to lived user experiences while aligned with high-level government goals.

In defining problem spaces, HXLab applies UCD principles, conducting user research and stakeholder engagement to surface the human experience behind service failures. In its work on the social assistance application process, for example, the lab moved beyond analysing form completion rates to understanding the emotional stress and practical barriers applicants faced. These insights were surfaced and framed through participatory design thinking workshops, which Leon described as “injecting empathy” into the system.

Although the lab’s specific method for triaging ideas is not documented in detail, it likely incorporates mechanisms from broader PSD practices, including hackathons and internal project selection committees. Given its service design orientation, it is likely that feasibility, alignment with strategic direction, and user need are the primary filters for prioritization.

HXLab’s evaluation practices reveal a tension between standard performance metrics and more meaningful indicators of change. Leon expressed concern with the public sector’s reliance on quantitative KPIs, arguing instead for holistic approaches that assess transformation in mindset, service culture, and long-term impact on user behaviour. This suggests the lab uses both qualitative and quantitative evaluation to assess success, particularly when evaluating internal capacity shifts or the downstream effects of design-led projects.

5.4.3.3 Co-Design

The HXLab actively engages in rapid prototyping as a way to explore, test, and refine service and technology solutions. Leon also identified a significant barrier to scaling government procurement systems. Successful pilots frequently fail to transition into scaled services due to tendering processes that prioritize low-cost bids over continuity, often resulting in the loss of institutional knowledge developed during the prototyping phase.

This gap between successful co-design and institutional adoption reflects a structural limitation in the system. It highlights the need for procedural and policy changes to better support the scale of innovation outputs. In effect, the HXLab's experience underscores the broader insight that scaling innovation within government is not merely a design or technical challenge, but one of governance, procurement, and policy integration.

5.4.4 Playbook

In Leon Voon's interview, he does not mention a formal playbook being used by HX Lab per se, but he does describe a consistent process and philosophy that functions similarly to one. Here are the key points relevant to how HX Lab uses structured guidance or playbook-like approaches:

HX Lab as a Competency-Building Initiative

Leon explains that HX Lab was formed partly in response to the realization that external consultants, while talented, struggled with the bureaucracy of government. As a result, they built an in-house team that could navigate these constraints. Over time, this team developed internal ways of defining standardized approaches, training content, and cultural

expectations that, while not explicitly called a playbook, served similar functions for consistency and replication.

Training Public Officers in Design Thinking

HX Lab partnered with institutions like the Civil Service College and Singapore Polytechnic to train hundreds of public officers. This wide-scale training initiative included elements that are typically found in playbooks principles of design thinking, common methods, and case-based learning. These structured training activities helped create a shared baseline of understanding, which is one of the main goals of a playbook.

Embedded Process over Formal Artefact

Rather than distributing a document titled "HX Lab Playbook," Leon describes a deeply embedded culture of practice. They used ethnographic research, rapid prototyping, and iterative problem-solving methods. These approaches were internalized by the team and gradually diffused into the broader bureaucracy via project work and training initiatives. This suggests an implicit playbook, one that was operationalized through projects and mentorship rather than printed or formalized.

Cultural Reflection and Organisational Design

In both the interview and the expert panel review, Leon strongly supports the idea that a playbook (or similar artefact) should begin not with just method guidance, but with lab formation, team composition, and organisational culture. Singapore, much like in the CRA department there was a cultural reluctance to challenge decisions because it was perceived to be disrespectful of leadership to challenge the way things are done. This compromises

idea generation and triage, and this is a factor in innovation maturity. It was necessary in the playbook phase to address this issue to ensure effective operation of the lab. He argues these are often skipped in traditional toolkits and are critical for success. His emphasis on these "pre-conditions" suggests that any playbook he would endorse would be organisationally situated, not just methodologically instructional

In short, while HX Lab may not use a playbook in the conventional sense, it operates with a structured, repeatable, and teachable model of innovation practice the very qualities a playbook aims to formalize.

5.4.5 Results

The HX Lab case study illustrates how a strategically embedded, culturally adaptive, and methodologically consistent approach can enable a public sector innovation lab to thrive within a high-functioning bureaucracy. The results of mapping HX Lab's practices against the process model revealed a high degree of alignment, while also offering novel insights into how certain functions such as playbooks, team design, and training can be operationalized implicitly rather than formally. There were no significant differences in applying the framework to an innovation lab run by an Asian city state, in fact the previously mentioned reluctance of workers to challenge leadership decisions has been seen in some Canadian government departments like the CRA. Whereas this reluctance was described as part of Singaporean culture, the observed reluctance in Canada was more of a departmental culture and was not present in the other Canadian federal government innovation lab.

HX Lab exemplifies a mature, embedded innovation unit whose practices align closely with the proposed process model while also extending it through a strong emphasis on cultural scale, embedded capacity-building, and hybrid team design. These results affirm the model's utility and suggest that public sector labs seeking long-term impact should prioritize not only design method fidelity, but also internal adaptability, mentorship, and sustained cultural integration.

The process model resonated with the lab's structured innovation cycle. HXLab appreciated the model's emphasis on stakeholder alignment and co-design, however cultural and contextual differences made some language/terminology feel unfamiliar or overly Western. As a result of feedback, we reworded some model language to reflect international public sector realities. Specifically, the term "problem space" was reformulated into "opportunity space" to reflect a more positive approach to solving systemic challenges.

The typology helped distinguish the lab's unique status as a *centrally funded*, *tech-enabled*, *service-oriented* innovation entity with a *top-down* mandate, but some tension existed between the dimensions of the typology and lived complexity e.g., the lab was top-down funded but operated with bottom-up methods. HXLab's feedback further highlighted the need for the typology to accommodate hybrid governance and funding structures.

PSD operates with a repertoire of repeated/repeatable strategies or "plays," such as reorganizing existing structures to increase agility and breaking down bureaucratic silos to enable innovation. These practices resemble what would be documented in an actual playbook. So, while HXLab doesn't describe a formal, documented playbook, feedback makes clear the value and utility of codified, repeatable innovation practices, functionally aligning with the playbook concept.

Chapter 6 Evaluation

Ultimately, the goal of using UCD methods in an innovation lab is to produce long-term sustainable improvements in the viability, outcomes, and outputs of said innovation labs. For the purposes of this thesis, however shorter-term evaluation is necessary. Comparing our artefacts (process model, typology, playbook) against related works described in the literature in terms of their perceived benefit and usefulness for the innovation labs we have experience with (as described in chapter 5) is one approach we have taken. In addition to that, we conducted an expert review panel with the lab managers for our case studies in chapter five in order to have their feedback and assessment of the usefulness and perceived benefit of our thesis artefacts.

6.1 Related Works

In this section we compare the three artefacts described in Chapter 4 (typology, process model, playbook) with the three related works identified and summarized in section 3.4 The first is a comparison of our multi-dimensional typology with the typology proposed by Chen et al. in their 2020 paper (Chen et al., 2020). Secondly, our process model is compared with the International Organisation for Standardisation's standard on innovation management. (*ISO* , 2019) Finally, our Public Sector Innovation Lab Playbook is compared to the OECD public sector playbook (OECD, 2020)

6.1.1 Typology

In evaluating the typology against a seminal work, we chose Chen et al. (2020), as it deals directly with a typology of public sector innovation.

Across the four case studies examined in this thesis, our proposed typology demonstrated distinct advantages over Chen et al.'s (2020). While their typology provides a high-level categorization of public sector innovation along strategic and operational dimensions, it lacks the granularity required to guide the setup and functioning of innovation labs. In contrast, our typology's focus on funding, focus, collaboration, and mandate proved useful for surfacing important strategic considerations. For instance, Milena Tasic explicitly mapped her lab's funding evolution over time, showing how initial top-down funding and autonomy shaped their operations, and how fluctuations in leadership impacted sustainability. Nick Scott also engaged directly with the typology's dimensions in describing how his lab assessed mandate (top-down vs bottom-up) and designed governance structures accordingly. Case study participants consistently leveraged these dimensions to make informed decisions about lab structure, team composition, and stakeholder engagement.

The expert panel evaluators discussed the alignment (or misalignment) between lab activities and broader organizational or policy goals, and whether their work was meant to influence strategy (e.g., policy reform, system change) or improve operations (e.g., service delivery, internal processes). Chen et al.'s typology includes an important distinction between "strategic" and "operational" innovation labs, which does not have a direct equivalent in our current typology,

and this missing dimension was implicitly echoed in the panel discussion and interviews as something useful.

The main difference between the typology proposed in our thesis and the one developed by Chen et al. (2020) lies in their respective units of analysis and intended applications. Chen's typology focuses on classifying types of innovation within public service organizations based on two dimensions: innovation focus (strategy, capacity, operations) and innovation locus (internal vs. external). This yields six possible types of innovation according to their typology: mission, policy, management, partner, service, and citizen. This typology is well suited for classifying the nature of public sector innovation but falls short of operational and contextual dimensions which inform how labs function.

Our typology classifies public sector innovation labs themselves along four operational dimensions: funding, focus, collaboration, and mandate. It is intended as a practical tool to guide the setup and functioning of innovation lab initiatives, particularly in the Canadian public sector context. While Chen's model offers a theoretical lens for understanding innovation outcomes within a system, our typology provides a structural lens to assess and tailor the form and function of the labs producing those innovations.

In conducting this part of the evaluation, we are ultimately seeking to answer RQ1: What are the characteristics of public service innovation labs that determine their effectiveness at managing and supporting innovation projects?

Table 8: Typology Comparison

Feature	Thesis	Chen
Funding	Private, Public & PPP.	Chen et al. do not explicitly address funding per se. The imply funding as part of external element of their Locus dimension by defining the external locus as collaboration between public sector and private (PPP) or NGOs.
Focus	Distinction between broad problem space of technology, policy, service and process innovation. Chen focuses on outputs, whereas we focus on outcomes.	Chen refers to "strategy, capacity or operations"
Collaboration	Open, closed and inclusive	Distinguishes between internal and external as part of their Locus dimension.
Mandate	We have a more sophisticated spectrum for governance. Top-down, bottom-up, hybrid…	Chen et al. do not categorise a lab's mandate or governance

6.1.2 Process Model

Across the four case studies, the process model proposed in our thesis offered greater practical utility than the existing standards, OECD Public Sector Innovation Lifecycle and ISO 56002:2019 innovation guide by providing a more actionable, context-sensitive roadmap for public sector innovation labs. Unlike the more abstract or generic phases in the OECD and ISO frameworks, the thesis model delineated concrete activities such as lab setup, system definition, co-design, and scale that closely reflected the day-to-day realities faced by lab practitioners. Participants found value in the early emphasis on typology and team composition, as well as the structured approach

to triaging problems and methods. This provided clearer operational guidance than either international framework, which both tend to assume a pre-existing organizational readiness or innovation capacity. However, a notable gap in our process model was its limited treatment of iterative reflection and organizational learning, which are more explicitly embedded in ISO 56002 through its Plan-Do-Check-Act cycle. Additionally, while the thesis model foregrounds scale as a necessary outcome of innovation, the OECD framework offers a more comprehensive view of diffusion and system-level change, including the political and cultural dynamics that enable adoption.

This section addresses: RQ2: How can User-Centred Design methods be leveraged for innovation in the context of public service innovation labs? Table 9 presents a comparison of our thesis process model for user-centred public sector innovation labs alongside two internationally recognized frameworks: the OECD Public Sector Innovation Lifecycle (OECD, 2020) and ISO 56002:2019 Innovation Management System Guidance (*ISO 56002:2019, Innovation Management - Innovation Management System - Guidance*, 2019). While both international models offer valuable high-level guidance on innovation processes, they are designed for broad organisational contexts and are not specific to the operational realities of innovation labs within the public sector. This comparison highlights how the thesis model complements and extends these frameworks by integrating UCD principles and offering a more granular, practice-oriented structure tailored to the unique challenges of public service innovation.

Table 9: Process Model Comparison

	Thesis	ISO 56002:2019 –	OECD PSI Lifecycle
Innovation Lab Process model	Step by step process model	Guidance for an innovation management system	Innovation process model geared towards public sector organisations
User-centred design	Oriented to incorporate UCD methods and techniques as the main basis for innovation	No UCD, or any other philosophy to guide innovation. Strictly management focused.	No UCD specific focus in their innovation model
Phases	Lab setup, System Definition, Co-Design, Scale	Planning, Support, Operation, Evaluation	Identifying problems, Generating Ideas, Developing Proposals, Implementing Projects, Evaluating Projects, Diffusing Lessons
Lab Setup	Identify problem space, lab typology, maturity model.	Not present, subsection of planning, focused on organisational structures	Not present but speaks of learning where and how an innovating response is needed.
System Definition	Team composition, Problem definition, Idea triage. UCD aspects are absent from ISO	Does not prescribe structure for teams, it emphasizes principles and considerations for effective team composition. Does not explicitly isolate "problem definition" as a standalone step, it provides guidance on related activities	Guidance on teams, idea triage completely absent, this model jumps to idea generation
Co-Design	Journey mapping, persona creation, stakeholder value mapping, low-fidelity sketching, usability walkthroughs. Explicitly human-	Promotes a high-level, systematic approach to innovation management but does not explicitly address co-design.	No specific mention of collaborative design

	centred and collaborative		
Scale	Barely discussed. Mentioned as a necessity in the definition of "innovation"	Mentioned as a necessity in the definition of "innovation"	This model speaks of diffusing lessons, using what was learned to inform other projects going forward.

6.1.3 Public Sector Playbook

No two innovation labs will be the same. There are many important factors that can cause significant differences in their operations and management. Each lab needs its own playbook to reflect its uniqueness. The most important things in figuring out what the playbook needs to be are the typology of the lab, and the desired outcomes. In conducting this part of the evaluation, we are ultimately seeking to answer RQ3: What guidance can be given to public service innovation labs?

Both the OECD OPSI Innovation Playbook (2022) and the playbook developed through this thesis aim to guide public sector innovators through the complexities of transforming services, systems, and policies. However, their orientation and intended application differ in key ways. The OECD Playbook is structured as a high-level, principle-driven guide intended primarily for senior leaders and middle managers. It offers a broad, accessible three-step journey that starts with identifying innovation challenges, assessing current capabilities, and choosing relevant "plays" to build innovation capacity across government systems. Its design emphasizes strategic reflection and systemic alignment rather than the operational detail of delivering innovation projects.

By contrast, the playbook proposed in this thesis is more tactical and project-focused, grounded in the day-to-day realities of delivering innovation within public sector labs. It was iteratively developed through case studies and expert feedback, and is intended for lab teams engaging directly in UCD work.

It provides concrete tools, methods, and templates to support the execution of individual innovation projects, ensuring consistent application of UCD methods, capacity building, and knowledge transfer. In this sense, while both playbooks share a commitment to user-centricity, the thesis playbook is more closely aligned to the operational needs of project teams, whereas the OECD Playbook addresses strategic alignment and systemic conditions for innovation.

Table 10: Playbook Comparison

	Thesis	OECD – OPSI Playbook
Purpose	Captured decisions and provide guidance from initial setup of the lab so that projects are repeatable.	Diffuse lessons and share practices
Content	Core values and governance of the lab are built into the standardized process for lab projects	High level hard to enact guidance
Application	Guidance: When, where and how to use which UCD methods in a lab process	Specific templates from non-OECD sources that are difficult to apply to specific contexts
Structure	Standardize a set of metrics for evaluation of projects	Combination of high-level guidance based on OECD research, and third-party artefacts for each stage in the playbook.
Evaluation Metrics	Standardized evaluation metrics tailored to lab typology and project goals. Emphasizes adaptability and longitudinal tracking across projects.	Offers high-level evaluation criteria with limited specificity. Metrics are implied but not standardized or directly actionable.
UCD Techniques and Methods	Provides detailed, phase-specific guidance on applying UCD techniques (e.g., stakeholder mapping, proto-personas, rapid prototyping, service blueprinting). Includes artefact templates and when/how to use them in context.	Describes general UCD concepts without specific tools or implementation guidance. Limited to abstract mentions of co-creation and user involvement.

6.2 Expert Panel Review

6.2.1 Overview

The expert panel was composed of seasoned practitioners / managers from the four public service innovation labs with which we were familiar. These experts, with their diverse backgrounds and extensive experience in applying UCD methods within governmental contexts, provided a critical evaluative lens to the research conducted. The panel's primary role was to assess the practical applicability, relevance, and effectiveness of the proposed typologies and process models developed for fostering innovation in public services.

The selection of the panel members was strategic, ensuring input from different sorts of innovation labs (local, regional, and national), and thereby encapsulating a wide spectrum of insights and practical knowledge. Each member brought a wealth of expertise in UCD methodologies, lab operations, and the intricacies of innovating within the public sector's unique constraints and opportunities.

The evaluation process undertaken by this panel followed a structured approach, including a feedback session, survey, and in-depth discussion. These activities were designed to challenge and refine the thesis' propositions and contribute to the development of a robust, actionable playbook for public service innovation labs. The feedback obtained directly informed the final recommendations, ensuring they were grounded in real-world expertise and were of high operational value.

Thematic analysis was the primary method of analysing the interview and expert panel data. Thematic analysis is a widely used method for analysing qualitative data, such as that obtained from interviews and group discussions (Fereday & Muir-Cochrane, 2006). This method involves identifying, analysing, and reporting patterns (themes) within data. It organically emphasizes the how and why of participant experiences and can be used to conduct a detailed and nuanced analysis of large qualitative datasets.

The thematic analysis followed a pragmatic approach rooted in our research objectives. We used a hybrid deductive–inductive coding strategy that began with categories informed by our process model (lab setup, system definition, co-design, and scale), but remained open to emerging concepts during analysis. Our analysis was qualitative, first organizing the transcripts in terms of relevance to the process model, then identifying recurring concepts, tensions, and strategies that practitioners described. These were then iteratively refined into thematic insights that either validated, nuanced, or challenged aspects of our typology, process model, and playbook. The analysis was also shaped by our dual role as both practitioner and researcher, allowing for a situated interpretation of participants' responses within the real-world functioning of innovation labs.

In addition to the thematic analysis, we employed descriptive statistics, to analyse the survey questions, as they serve as a valuable adjunct to thematic analysis in qualitative research, offering quantifiable insights that enhance the interpretative richness.

6.2.2 Experts

Anything used from this expert panel review in this thesis or for publication will name the experts as collaborators or co-authors with full authority and opportunity to change, comment or redact any text describing this panel review. Our thesis framework is intended for innovation professionals like these experts, and their feedback is critical.

Anne White – Canada Revenue Agency Innovation Incubator

Anne is the founder of The Good Governance Project, a research initiative examining the relationship between public governance frameworks and societal outcomes. She has a wealth of experience amassed over twenty years of working in the public and private sectors, both in Canada and internationally. Her focus is on researching and implementing outcomes-based partnerships that align industry, governments, and relevant stakeholders on targets and enable joint accountability.

Anne was the founding director of the Canada Revenue Agency Innovation Incubator.

Milena Tasic – Federal Government Department Innovation Hub

Milena is a designer with a wealth of experience in the private sector (Management Consulting) and public sector (Federal Government of Canada). She is a creative problem solver who employs strategy, systems-thinking, research, and foresight to help organisations grow and meet the needs of their users. Milena's superpower is that she brings an operational side to the creative world of design, and she loves managing a team and coaching others.

Milena has led an award-winning Innovation Hub within the Canadian public service since 2021, and is an accomplish educator, speaker and advocate for design.

Nick Scott – NouLAB Provincial Mental Health and Addictions Lab, New Brunswick

Currently the CEO for ShiftFlow Consulting, he was Executive Director of Open Government and Innovation with the Government of New Brunswick from 2017 - 2021. In this role he established an innovation team, a collaborative workspace and a public innovation framework, facilitating initiatives addressing public mobility, literacy, second language acquisition, natural resource development, municipal reform, and child protection.

Nick has also been a part-time lecturer at St. Thomas University and University of New Brunswick. He was instrumental in the foundation and running of the NouLAB in New Brunswick.

Leon Voon – HXLab, Singapore

Leon Voon has spent over 10 years driving innovation and design thinking in government, and 3 years in an innovation lab for a Fortune 500 insurance company. He was a founding member of The Human Experience Lab (HX Lab), applying human centred design to improve citizens' experiences in social assistance, housing applications and career decisions.

At the Lab, he experimented with how ethnographic & qualitative research insights could inform the policy-making process, and how rapid prototyping could improve services and touch points, on projects like Our Tampines Hub integrated service centre, as well as on letters and websites, etc. Leon has also trained several hundred public officers in design thinking, with his partners in

the Civil Service College and Singapore Polytechnic.

6.2.3 Review Session

To evaluate the relevance, coherence, and applicability of the proposed framework, which includes the typology, process model, and project playbook, a structured expert review session was conducted. This session brought together the four senior practitioners who had led the innovation labs featured in the case studies described in chapter 5. Each expert had previously participated in semi-structured interviews and contributed to earlier iterations of the framework. Their continued involvement allowed for a comprehensive validation through both retrospective reflection and critical dialogue.

The review session was held virtually and structured as a two-hour facilitated discussion. Participants received advance copies of the visual process model and summaries of the typology. The session followed a guided discussion format (Appendix B) that focused on three main areas: the clarity and completeness of the framework, how well it reflected lived experience, and its potential for use by future lab leaders.

Participants began by individually reflecting on the artefacts and offering initial observations. We then guided a collective walkthrough of the process model, prompting discussion about the logic and sequencing of phases, the placement of the maturity model, and whether the structure adequately captured the iterative nature of public sector innovation. This was followed by a comparative review of the typology dimensions: funding, focus, collaboration, and mandate, alongside their own lab experiences. The session concluded with a review of the playbook's practical relevance and discussion of tools or formats that could support implementation.

Throughout the session, real-time feedback was collected on a shared digital whiteboard. Participants annotated the artefacts with comments, raised questions, and proposed refinements. This visual co-creation approach allowed for both active engagement during the session and review afterward. Following the discussion, participants completed a brief online survey (Appendix C) that included Likert-scale questions assessing each component's coherence, completeness, and usability.

The results of the session were constructive and affirming. Participants agreed that the framework achieved a balance between conceptual structure and practical flexibility. The process model was praised for providing clarity while also accommodating iteration. Participants particularly valued the inclusion of the maturity model, which they saw as a prompt for early strategic reflection. Some suggested that it might be more effective if positioned at the outset of the lab setup phase, to support diagnostic use before typology selection.

Feedback on the typology confirmed that the four core dimensions were relevant, but participants proposed enhancing them with subcategories or concrete examples. The collaboration dimension generated the most discussion, with participants recommending that the framework account for changing engagement approaches over the course of a project, rather than assigning a fixed mode of collaboration at the outset. The panel discussion further validated an adaptive model of collaboration. Participants emphasized the importance of building emotional trust with partners early and sustaining that trust through visible co-ownership of results. As Milena Tasic noted, "we need [our partners] to be so entrenched as if they were right there with us the whole time... so that the story that we've done becomes their story."

Regarding the playbook, participants emphasized the need for modularity and contextual flexibility. There was strong agreement on the importance of documenting emergent practices, including stakeholder alignment techniques and post-project communication strategies. Participants also suggested that a companion facilitation guide could help operationalize the playbook for less experienced lab teams.

The review session served to validate the framework while also offering actionable insights for improvement. The expert feedback provided evidence that the artefacts resonated with real-world lab practices and highlighted opportunities to enhance their practical utility for the broader public innovation community.

6.2.4 Survey Results

Following the expert panel review session, a follow-up survey was conducted to collect structured feedback on the key components of the proposed framework. The survey included 17 Likert-scale items focused on the typology, process model, and project playbook. Each item was rated on a scale from 1 (strongly disagree) to 5 (strongly agree).

6.2.4.1 Overall Alignment with Framework Principles

Responses indicated strong support for the framework's foundational concepts. The most common rating, or mode, for the importance of defining the general problem space before commencing innovation activities was 5. The relevance and clarity of the innovation lab typology also received a mode of 4, while identifying the type of lab before beginning work received a

mode of 4. These results reinforce the emphasis in the framework on early-stage definition and strategic alignment.

6.2.4.2 Maturity and Team Composition

Understanding the maturity of the parent organization was rated with a mode of 5, indicating consensus that this insight is essential to effective lab management. In contrast, the mode for respondents' ability to select team members with specific skills was 3, suggesting limited control over staffing. When asked whether understanding the typology, problem space, and maturity should occur before selecting team members, the mode was 4, reflecting general agreement with this sequencing.

6.2.4.3 Process Model Components

The components of the process model received consistently high ratings. The formal problem definition process received a mode of 5, as did iterative evaluation during co-design and the effectiveness of the co-design process itself. The idea triage process and low-fidelity prototyping each had a mode of 4, indicating that these activities were seen as useful but with some variation in perceived efficiency. The high ratings across these areas affirm the value of structured, user-centred, and iterative methods in public sector innovation contexts.

6.2.4.4 Methods in Use

Respondents reported extensive use of a wide range of UCD methods. Frequently used techniques included personas, empathy mapping, low-fidelity prototyping, iterative design, participatory design, usability testing, storyboarding, scenario-based design, wire-framing, task analysis, and

game storming. The responses suggest a high level of methodological fluency among the labs represented, with all participants employing multiple qualitative research and co-design tools.

6.2.4.5 Scaling and Reflection

The process for scaling up promising ideas received a mode of 3, indicating some inconsistency or difficulty in translating prototypes into broader implementation. In contrast, the usefulness of post-mortem analysis for generating learning received a mode of 5. These results highlight a potential gap between design and delivery, where reflection practices are well-established, but system-wide adoption of solutions remains a challenge.

6.2.4.6 Perceived Utility of the Framework

The proposed process model received a mode of 5 when respondents were asked whether it would improve innovation outcomes. Similarly, the dimensions of the typology were rated with a mode of 4 in terms of their importance to managing a successful public sector innovation lab. These responses suggest strong overall confidence in the framework's practical value, while also indicating areas where further refinement or supporting resources could enhance implementation.

6.2.4.7 Summary

The survey responses confirmed the validity of the framework's core principles and highlighted specific operational realities faced by lab leaders. There was consistent support for the early use of problem framing, maturity assessment, and typology selection. While the methods and co-design processes were strongly endorsed, responses pointed to common challenges related to staffing autonomy and scaling impact. These insights will inform future iterations of the

framework and support the development of additional guidance materials tailored to public sector innovation practitioners.

Table 11: Expert Panel Survey Summary

Survey Item	**Mode**	**Median**
Define general problem space before starting	4	4.5
Lab typology was relevant and well-defined	4	4.0
Identify type of lab before commencing activities	4	4.0
Understand parent organization's innovation maturity	5	5.0
Ability to choose team members with specific skills	3	3.0
Understand typology, problem space, maturity before team selection	4	4.0
Formal problem definition clarified challenges	4	4.5
Idea triage process was efficient	4	4.0
Low-fidelity prototyping refined ideas	4	4.5
Iterative evaluation improved prototypes	5	5.0
Co-design uncovered useful user insights	5	5.0
Effective process for scaling ideas	3	3.0
Post-mortem analysis provides useful insights	5	5.0
Process model leads to better outcomes	4	4.5
Typology dimensions are essential to lab management	4	4.0

6.2.5 Themes, Key Comments and Recommendations

The expert panel review suggested some improvements for the thesis and pointed out some aspects of the process model that did and didn't work well based on their experience. The expert panel review discussion directly evaluated the practical applicability, relevance, and effectiveness of the proposed typology, process model, and playbook framework. The panellists, leaders from the case study labs, offer perspectives grounded in their extensive experience. Their feedback provides valuable qualitative data that speaks directly to our research questions:

RQ1: What are the characteristics of public service innovation labs that determine their effectiveness at managing and supporting innovation projects?

The panel's discussion reinforces and elaborates on the characteristics proposed in our typology. Key themes discussed:

Funding and Governance Direction: Panellists highlighted how funding structures and the source of mandates significantly impact a lab's operation and security. Milena Tasic shared how lobbying to move her team closer to senior leadership (in the organisational structure) secured more stable, long-term funding. This underscores the importance of governance, particularly having executive champions or a steering committee with senior leaders, who provide "permission" to innovate and help mitigate or manage resistance. Anne White noted how executive level mandates set the general subject area for innovation, balancing top-down direction with bottom-up problem selection by employees at CRA. The thesis's typology includes Funding

and Direction/Governance as key dimensions, and the panel's discussion validates their critical influence.

Focus and Purpose: The discussion emphasized that a clear purpose or well-defined "problem space" is crucial. Anne White contrasted labs with an ill-defined problem space (leading to lack of purpose, fear, and change management issues) with those having a clear ethos focused on citizen outcomes. This links to the thesis's Focus dimension in the typology. White describes a unified purpose bringing a multidisciplinary team together because of a belief in a well-articulated common purpose.

Collaboration (Locus) and Team Composition: The panel implicitly and explicitly discussed the "who" of innovation. Nick Scott noted the power of creating spaces where people can embody different ways of being, connecting his sociology background to the collaborative nature of labs. The discussion on **team composition** highlighted the balance needed between external talent (skills) and internal "veterans" (loyalty, knowledge of government processes). Milena Tasic and Nick Scott stressed the value of having **autonomy in choosing team members** for greater success. The thesis framework emphasizes Team Composition as part of System Definition, and the panel's comments underline its practical importance and complexities in the public sector context.

Organisational Maturity: The concept of assessing the parent organisation's maturity in UCD and innovation was seen as highly valuable. Panellists suggested this could act as a "reality check" and influence the choice of lab typology or approach, potentially even coming before defining the lab's type. Anne White used the CRA as an example, stating that knowing the low innovation

maturity and high propensity for risk aversion upfront would have changed the approach. The thesis includes a Maturity Model step in the Lab Setup phase, and the panel's input strongly validates its relevance for characterising the organisational environment.

RQ2: How can User-Centred Design methods be leveraged for innovation in the context of public service innovation labs?

The discussion evaluated the proposed process model, which integrates UCD methods, highlighting both the utility and challenges of these methods in practice.

Themes Discussed:

Process Model Structure and Iteration: While the proposed process model diagram was linear, the panel stressed that innovation is fundamentally non-linear and iterative. Milena Tasic described it as "nested," with lab setup being one phase and project work (including co-design, prototyping, evaluation) being iterative loops. Leon Voon suggested visually incorporating elements like the Double Diamond to reflect divergent and convergent stages within the process. The thesis process model incorporates iteration in the Co-Design phase, but the panel's feedback suggests this needs clearer visual representation throughout.

Problem Definition (UCD Methods): UCD methods like interviews, ethnography, journey maps, and personas are used in the Problem Definition stage. The panel agreed on the **critical importance of well-framed problems** before brainstorming. Milena Tasic noted the challenge of helping internal clients articulate specific problems and how their lab has developed ways to pull out and reframe these. This validated the necessity of dedicated effort and UCD methods in this stage to ensure the innovation work is focused on real user needs.

Co-Design, Prototyping, and Evaluation (UCD Methods): The Co-Design phase involves iterative rapid prototyping and evaluation using UCD methods. We shared that getting people to "blue sky" and prototype was challenging at CRA due to the culture. Leon Voon noted that qualitative assessment of citizen experience (part of evaluation) is possible if prototyping is allowed, but this requires “air cover” from leadership. The panel's comments highlight that while UCD methods like prototyping and user feedback are valuable, their application and effectiveness are heavily influenced by organisational culture, risk aversion, and leadership support. The thesis's inclusion of these methods in the process model is validated, but the panel's feedback underscores the practical barriers to their ideal implementation.

Metrics for Success: The panel discussed the difficulty of measuring success in the public sector, where metrics differ from the private sector (ROI, profitability). They suggested metrics like user satisfaction, service accessibility, policy impact, and indicators of cultural shift. Leon Voon mentioned the UK BIT's 10x ROI idea triage heuristic but acknowledged the challenge of quantifying citizen experience financially. This aligns with the thesis's discussion on public sector metrics, suggesting that UCD methods that provide qualitative insights (like user feedback) are crucial for demonstrating value beyond simple financial measures.

RQ3: What guidance can leaders of a public service innovation lab give to innovation projects that employ a User-Centred Design approach?

The panel discussion provided extensive practical guidance and highlighted critical enablers and barriers for PSIL leaders and practitioners, directly supporting the need for a playbook and actionable advice.

The Need for a Playbook/Manual: The panel strongly supported the idea of a playbook or manual. Milena Tasic suggested it's essential for novice government workers tasked with running labs, as the process model might otherwise seem like "buzzwords". Anne White agreed, emphasizing the need for something that "walks you through this" with stories and case studies. This validates the thesis's proposal of a practical playbook.

Governance and Executive Sponsorship: This was a dominant theme for successful guidance. Nick Scott highlighted executive sponsors' role in providing permission, managing resistance, and validating radical ideas. Milena Tasic's experience showed how senior proximity secured funding. Guidance should include finding and leveraging these champions.

Team Composition and Culture: Guidance should address building balanced teams with diverse skills and a common philosophy or "common codes". Leon Voon suggested the "grafting" metaphor for integrating external talent with loyal internal veterans. Anne White noted the challenge of skills vs. fear in teams and how lack of purpose exacerbates this. Guidance must cover managing this change management aspect.

Managing Risk and Resistance: The panel discussed how risk aversion in government impacts innovation. Strategies for overcoming risk aversion include presenting a balanced portfolio of incremental and radical ideas. A suggestion was made by Leon Voon to reframe "problems" in the process model as "opportunities" to reduce defensiveness. Executive sponsorship also helps manage the "buts" or resistance.

Scaling and Dismantling: The most significant practical challenge discussed was scaling successful innovations, often requiring the difficult process of dismantling existing systems. Panellists noted that labs are often sandboxed, and moving beyond the sandbox is disruptive. Guidance needs to address change management strategies for scaling and the political challenges involved. Nick Scott added that the lab itself is an innovation needing adoption, and prototypes should be treated as probes to understand how to affect the system.

Problem Framing: Guidance is needed on how to effectively define problems, especially helping clients who struggle to articulate them clearly. Reframing as opportunities can be a valuable technique.

Process Model Visualisation: Practical guidance is enhanced by clear communication tools. The panel's feedback suggests visually representing the non-linear, nested nature of the innovation process is important for practical guidance.

Decision Support: Anne White's suggestion of a tool to highlight risks or guide decisions implies a need for practical support in navigating the complexities of public sector innovation.

The Expert Panel Review discussion robustly validated the core elements of our thesis framework and provided nuanced insights into the practical realities of applying UCD-informed innovation in the public sector. Their feedback highlights the critical interplay between organisational context (characterisation/typology), the structured process (leveraging UCD methods), and the essential need for practical guidance and support structures (playbook) to navigate the unique challenges of government. Key areas for practical guidance emphasized by the panel include

governance, team dynamics, managing risk and resistance, and the significant challenge of scaling innovations through dismantling existing systems.

6.2.5.1 Suggestions for Improving the Thesis

Address the concept of "dismantling": This emerged as a new concept for the process model to address. Anne White noted that in order for innovation to take root at a cultural level and for innovation labs to ultimately be successful, pervious systems needed to be consciously dismantled. The panel suggested incorporating it into the process model. The panel concurred and indicated that actively dismantling existing systems and processes is crucial for scaling innovations.

Explore the impact of culture: The panel highlighted the need to examine how organisational culture influences innovation labs and vice versa. The CRA case study exemplified the challenges of promoting innovation in a hierarchical, risk-averse environment. While not unique to the public sector, as noted earlier in this thesis and confirmed by the OECD (OECD, 2020) report on public sector innovation, the public sector has an entrenched aversion to risk and is not culturally equipped to deal with failure. Leon Voon introduces the concept of grafting team members into the team. This concept needs to be further explored to understand how it can be applied in the playbook.

> "I found that if you go too much with the external talent, especially private sector, they're just not ready for the government red tape and they bring the skills and the fresh ideas, but they don't stay and sometimes, they're not there for the long haul. So I

have this kind of metaphor of grafting, right? You can put the whole plant in, and it just cannot cope with the soil or the environment. But if you graft, so you have a base and you're right, top down might not work because people that get put in there might not want to." – Leon Voon, HXLab - Singapore

Develop a comprehensive playbook: The panel recommended creating a detailed playbook to guide practitioners, especially those new to innovation labs. This playbook should explain key concepts, address common challenges, and provide practical advice on implementing the process model.

"I was kind of thinking through as you were talking, and I think I agree. And I wonder if it's about a manual that you described at the beginning? What is it that walks you through this? Because I do think somebody needs to be walked through and it's [the innovation lab's] case studies and stories or whatever to get them to understand."
– Anne White, CRA Innovation Incubator

Incorporate a decision support system: The panel suggested adding a decision support system to the framework. This could help lab managers navigate complex decisions, prioritize projects, and evaluate the potential impact of innovations. The author believes that a simple decision support system could be incorporated into the playbook to guide decision-making.

6.2.5.2 Strengths of the Process Model:

Emphasis on team composition: The process model correctly identifies team composition as critical for success. The panel agreed, highlighting the need for a balanced team with diverse

skillsets, loyalty, and a shared innovation philosophy. Furthermore, Leon Voon suggests a more iterative way of depicting team composition.

> "So your framework stands out because I haven't seen much emphasis on the formation of the lab and team composition and culture, etc. Typically, the focus is on the 2nd half of your framework [co-design]
>
> …
>
> Team composition was really interesting to have, and I really found the idea about team culture and organisational design, how teams getting along, something that hasn't been talked much about, so I am really glad your framework has it! [System Definition]
>
> …
>
> You could consider adding the 'hiring' aspects to Team Composition, which would include factors like, Market forces, Talent supply, etc.. And in turn the type of problem space would also influence the kind of skills you required, which in turn would affect who would be hired [system definition]"
>
> – Leon Voon, HXLab, Singapore

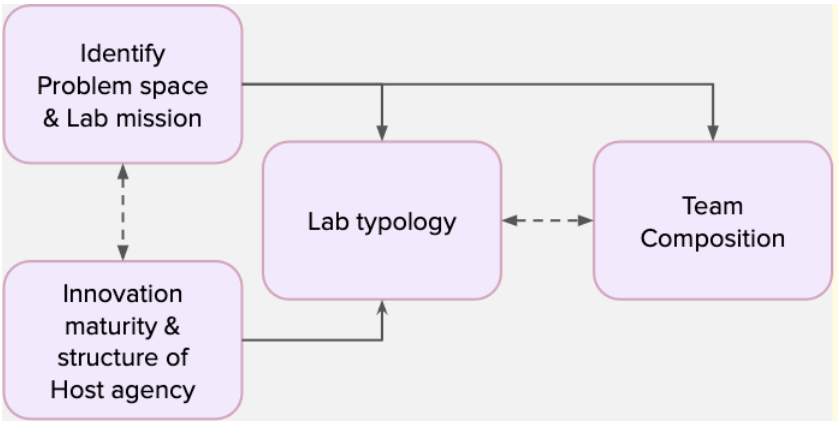

Figure 21: Formation and Set-up stages as proposed by Leon Voon, HXLab, Singapore

Focus on problem definition: The process model dedicates significant attention to problem definition, a crucial aspect that the panel also emphasized. This includes identifying a clear problem space, developing specific problem statements, and validating the problem with stakeholders.

Iterative approach and feedback loops: The process model incorporates an iterative approach and feedback loops, mirroring the panel's emphasis on continuous refinement and adaptation.

Inclusion of UCD methods: The process model integrates various UCD methods, which the panel generally supported and found valuable in their own experiences.

6.2.5.3 Weaknesses of the Process Model:

Linear representation: The panel criticized the process model's linear representation, arguing that the innovation process is non-linear and iterative. They suggested visually representing the model to reflect this non-linearity and interconnectedness.

> "It looks like it's all on one plane, on one level, but it's not because what we're talking about at the very beginning is lab setup and then eventually you get into kind of initiative or project level process. It is nested and so I think visually that you need to do something about that…" – Milena Tasic, Design Leader, Federal Government of Canada

> "I see the first four definitely not as I think we're all hardened practitioners, so we know it's never linear. So, I always think like if your framework is linear, you've not

failed often enough, it's always going to be the design squiggle or some kind of circular mess or something."

– Leon Voon, HXLab, Singapore

More detailed representation of the nature of project process. The panel suggested that even though it is referenced as a foundational framework, visually adding aspects of the British Design Council's double diamond would serve to further reinforce the nature of project execution in an innovation lab.

"For the double diamond, which I think really helps to map the stage intuitively on whether it is a divergent or convergent stage, I tried out a sample graphic to see how well it works"

- Leon Voon, HXLab, Singapore

Lack of emphasis on scaling: The process model does not adequately address the challenges of scaling innovations beyond the lab environment. The panel highlighted the need to consider "dismantling" and change management strategies when scaling innovations.

"I think everyone's touched a little bit on it in terms of capacity building legitimacy etc. But to think about that [the Lab] as an innovation to be adopted through an organisation, it's really important. And I think that's part of the postmortem is organisation, the lab itself needs to be continuously learning about the system in which its operating. So, every prototype that leaves the lab, there

needs to be some kind of aftercare follow-up that you're treating as a probe into the system that's giving you more insight about how to affect the system."

– Nick Scott, NouLAB, New Brunswick

Limited consideration of governance and risk: While the process model acknowledges the importance of governance, it does not explicitly address the role of executive sponsorship, funding models, and risk mitigation strategies. The panel emphasized the need for strong executive champions and a clear governance structure to support innovation lab success.

"I was just reflecting that you could add in a box on "Innovation pipeline" which is an important and tricky challenge for Labs (especially those starting out). Things like budget, funding vs cost recovery, how they hunt for projects, i.e. scavenger / opportunistic vs formally mandate as part of an agency program)"

– Leon Voon, HXLab, Singapore

Insufficient attention to opportunity framing and storytelling: While the process model focuses on problem definition, it does not explicitly address the power of opportunity framing and strategic storytelling. The panel suggested reframing "problems" as "opportunities" to encourage a more positive and proactive approach, especially when engaging with resistant stakeholders.

These suggestions and critiques highlighted areas for improvement and further development of the process model, emphasizing the importance of considering organisational context, stakeholder engagement, and the complexities of scaling innovations in the public sector.

6.3 Assumptions, Limitations and Threats to Validity

6.3.1 Assumptions

It is important to acknowledge that this research was not undertaken from a position of neutrality. My prior experience in and around government innovation labs, many of which struggled with longevity and measurable impact, has invariably influenced my interpretation of the data and my emphasis on practical, operational outcomes. This is the bias I bring: a belief that innovation in the public sector must ultimately lead to implementation, adoption, and scale, not just conceptual frameworks or theoretical insights. Far from diminishing the credibility of this qualitative inquiry, this bias strengthens it by grounding the analysis in lived experience and practical understanding. It enables a more nuanced interpretation of the expert perspectives gathered, allowing theory to be continually tested against the realities of institutional inertia, political cycles, and capacity constraints. In this way, the research remains faithful to both its academic purpose and its pragmatic intent: To help public sector innovation labs produce outputs that support their strategic objectives and can be deemed successful.

This research is grounded in several underlying assumptions that enabled the creation, application, and refinement of the proposed framework. First, the thesis assumes that existing maturity models for innovation and UCD, adapted from widely accepted sources, are sufficient to assess organizational readiness in public sector contexts. These models were not modified or extended during the course of the research, and their applicability was not explicitly tested beyond their descriptive utility in the case studies.

A further assumption implicit in the framework is a degree of homogeneity across public sector organizations. Although the case studies span federal and provincial levels of government, the framework does not account for the considerable structural, cultural, and operational differences that may exist between municipal governments, crown corporations, universities, and non-profit entities. The thesis also assumes that the framework's focus on early-stage innovation work is compatible with downstream activities such as scaling, even though scale is treated as out-of-scope for this research. It is assumed that the core framework could interface successfully with future work focused on scale, despite no empirical evidence having yet been gathered to support that linkage.

This thesis assumes that it is good to incorporate UCD methods in innovation lab processes, but it does not seek to prove that hypothesis (other than citing references in the literature that would seem to make it a reasonable assumption).

6.3.2 Limitations

This study also presents several limitations that constrain the generalizability and scope of its findings. Most notably, the framework was only applied within a narrow range of public sector contexts. The four case studies included two Canadian federal departments, one provincial innovation lab, and one international city-state. Municipal governments, academic institutions, crown corporations, and NGOs were not included in the sample, which limits the transferability of insights to other public service environments.

Additionally, while the maturity model was useful in assessing lab readiness across the case studies, it was adapted from existing sources and not critically evaluated for fit within the specific domain of public sector innovation. Nor was the typology tested at scale to determine its reliability or predictive utility across a broader sample of labs. These components remain promising but require further empirical study to be considered robust.

The thesis process model for innovation does not consider any other approaches to innovation other than UCD and does not consider situations in which additional approached to innovation may be useful, or situations in which UCD may not be appropriate.

6.3.3 Threats to Validity

There are several threats to validity that must be acknowledged.

The contextual fit between the framework and the organisations studied may have influenced the results. Factors such as timing, executive sponsorship, team culture, and openness to innovation likely contributed to the successful uptake of the framework. Whether it would be equally effective in more resistant or less mature environments remains unknown.

A further limitation, related to the construct validity of the research, is the potential for confirmation bias. The research process, while grounded in the DSR paradigm, involved a close cyclical relationship between the development of the framework artefacts (e.g., the typology and

process model) and the empirical investigation of the case studies. The researcher was involved in both the synthesis of the framework and the analysis of the cases, which was then followed by a final validation step with an expert panel. This process, where the same researcher interprets both the "problem" (from literature and early cases) and the "solution" (the framework), introduces a risk that the case study data was interpreted in a way that preferentially supports the pre-defined artefacts. While the use of an external expert panel for the final validation phase was intended to mitigate this threat by providing an independent assessment, the risk of a confirmation bias shaping the intermediate case study analysis remains a notable limitation of the research design.

The degree of support may have been overstated due to the fact that the experts were acquainted with the author, and our presence in the expert panel discussion and the interview meant that their feedback was not anonymous. While we can trust their professionalism, and that they would indicate disagreement if they disagreed, the degree of agreement may have been exaggerated by this effect, and the degree of disagreement may have been understated due to this effect. Also, there is the possibility that although we may have experience with several innovation labs (personally and through literature reviews) we may have displayed a bias towards those labs that would benefit from our approach.

Chapter 7 Conclusions and Future Work

7.1 Conclusion

As captured in our three research questions from Chapter 2.1, this thesis set out to explore how public sector innovation labs can be characterized to inform better practices, how UCD methods can be effectively leveraged to enhance innovation processes, and what specific guidance can be given to public service innovation projects to address their unique operational contexts. We have proposed three artefacts (typology, process model, and playbook) to address each of those questions respectively. We evaluated and refined the artefacts through four case studies at public sector innovation labs across different types of public sector organizations (federal/provincial/city state). In an expert panel review with the leaders of those four innovation labs, the feedback indicated that the artefacts had the potential to dramatically improve outcomes of PSILs and warranted further study.

We also compared our three artefacts against similar artefacts mentioned in academic literature. The comparison highlighted the benefits our approach brings, indicating that they were more fit for purpose than other artefacts that focus on high level guidance in the hopes that they are applicable to the broadest possible audience.

In particular, our typology makes it possible to understand what *kind* of lab is being established, which is fundamental to making informed decisions about how to set it up, compose the team, manage its operations, and choose appropriate methods thereby ensuring that the lab's structure and strategy are fit for purpose within its organisational and policy context.

Our process model makes it possible to manage public sector innovation labs more effectively by delineating four essential stages: lab setup, system definition, co-design, and scale; each of which addresses a critical set of activities needed to move from intent to impact in a structured and repeatable way.

Finally, our concept of a playbook makes it possible to provide tailored training and guidance on the principles and practices of user-centred innovation that align with the specific characteristics of a public sector innovation lab, as defined by its typology; ensuring that as labs evolve in their innovation and UCD maturity, they have a consistent yet adaptable foundation to support capability-building and effective practice. The key idea is that PSILs are constantly evolving in their innovation and UCD maturity levels, and a playbook is needed to ensure appropriate and training and guidance on the principles and practices of a specific PSIL based on their Typology

Together, these artefacts provide a foundational blueprint for lab leaders and public sector practitioners seeking to establish, operate, and sustain effective innovation labs in a government context. The research findings suggest that UCD methods, when intentionally embedded into lab setup and project delivery, improve clarity of problem definition, enhance team cohesion, and increase the likelihood of producing scalable, citizen-centred innovations. However, these benefits are significantly influenced by the maturity of the host organization in both innovation capability and user-centred practice. Organisational readiness, leadership support, and the ability to navigate internal constraints such as procurement, staffing, and risk aversion are critical enablers of success.

Beyond validating the framework through Canadian and international case studies, the work contributes to a deeper understanding of how innovation labs can balance structure and flexibility, experimentation and accountability, and vision and delivery. The insights gathered from expert collaborators across multiple jurisdictions confirm the practical value of the framework, while also highlighting the need for further refinement in areas such as scaling strategies and organizational culture.

7.2 Future Work

Given the early and exploratory nature of this research, there are multiple avenues for future work that could extend, strengthen, and operationalize the framework proposed here. First and foremost, there is a need for empirical validation of the typology across a more diverse and representative sample of innovation labs. While initial results suggest the four dimensions are useful, further testing could reveal new sub-dimensions, gaps, or alternative categorizations that enhance its explanatory power.

The research has also discovered that the typology dimension of funding is much more nuanced and complex than originally thought. While the current model adequately describes funding in broad strokes, more dimensional detail may prove useful in better understanding labs and structuring them for success.

A major opportunity lies in the development of a complementary framework for scaling innovation. Currently treated as a distinct phase, scaling innovation in the public sector likely

requires its own logic, processes, and success criteria. Future research should examine whether the current process model adequately sets the stage for scale or whether additional steps such as early policy alignment, systems readiness, or long-term resourcing strategies need to be embedded earlier in the lab lifecycle.

There is also room to revisit the maturity model matrix. While sufficient for the purposes of this study, future iterations of the framework could benefit from a custom maturity model that reflects the unique barriers and enablers present in public sector innovation environments. Elements such as political volatility, public accountability, and service delivery mandates may require alternative evaluative dimensions beyond those found in existing models.

Another critical next step is evaluating the usability of the framework in contexts where the researcher is not involved. Trials where independent teams apply the typology, process model, and playbook, relying solely on the published materials would provide valuable insight into whether the artefacts are sufficiently clear, actionable, and adaptable.

Additionally, expanding the framework's use to other parts of the public sector could test its broader relevance. Case studies involving municipalities, academic research centres, crown agencies, or public–nonprofit partnerships could reveal whether the same assumptions, techniques, and sequencing apply in those contexts, or whether meaningful adaptation is required.

Lastly, some participants in this research expressed interest in the development of a digital playbook or toolkit. Future work may explore how the framework could be made more accessible

and scalable through digital means, including web platforms, interactive templates, or scenario-based decision support tools.

While the artefacts presented here have demonstrated value in early applications, their full potential can only be realized through continued refinement, broader testing, and deeper engagement with the systemic conditions that shape innovation in the public sector. Future research may extend this work by applying the framework to labs operating outside of Canada, by quantitatively assessing the impact of UCD integration on lab outcomes, or by building digital tools that embed the typology and process model to support lab practitioners in real time. As public sector institutions continue to grapple with complexity, legitimacy, and changing citizen expectations, innovation labs, if well-designed, have the potential to be not just centres of creativity, but catalysts of meaningful public value. This thesis offers a step forward in helping them realize that promise.

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Appendix A: Example of Playbook Content

This appendix presents a selection of pages from the Public Sector Innovation Lab (PSIL) playbook developed for the CRA Innovation Accelerator. The playbook is intended to codify key methods and artefacts essential to the sustained functioning of the innovation lab. The following visuals are excerpts from a slide deck representing the synthesis of methods and artefacts that allow for the operationalisation of UCD within PSILs, ensuring a disciplined approach to innovation, rooted in proven methods that leads to meaningful, measurable, and replicable outcomes.

The first slide demonstrates the structure and composition of a well-crafted *"How might we"* problem statement—emphasizing clarity, specificity, and alignment with user needs as the foundation for productive innovation work.

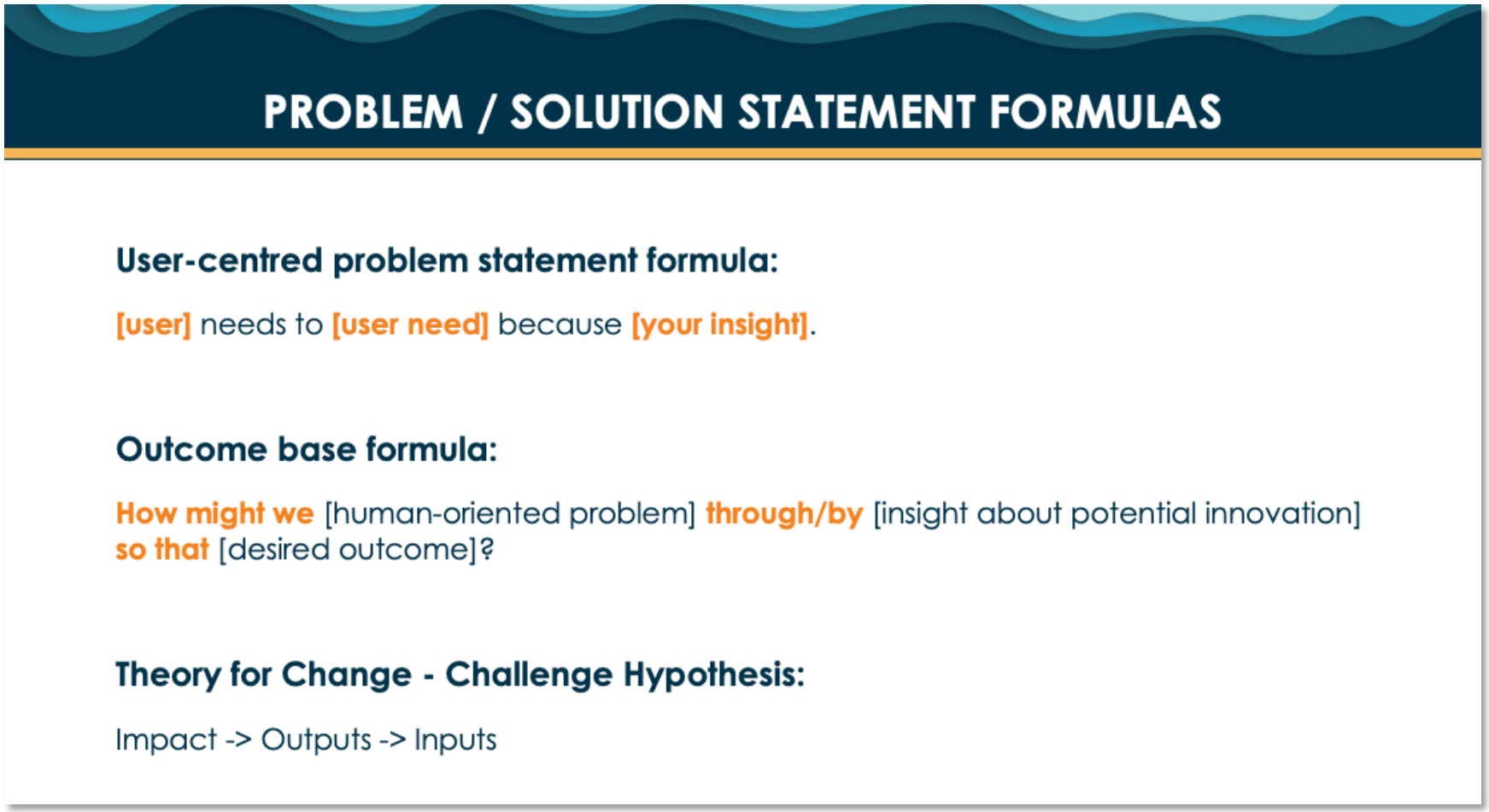

Figure 22: Example of instruction on problem definition

The second slide features a photograph of renowned anthropologist **Dr. Jane Goodall** and introduces *ethnography* as a powerful methodology, borrowed from anthropology that enables innovation teams to observe and understand users in their real contexts to uncover unmet needs and pain points.

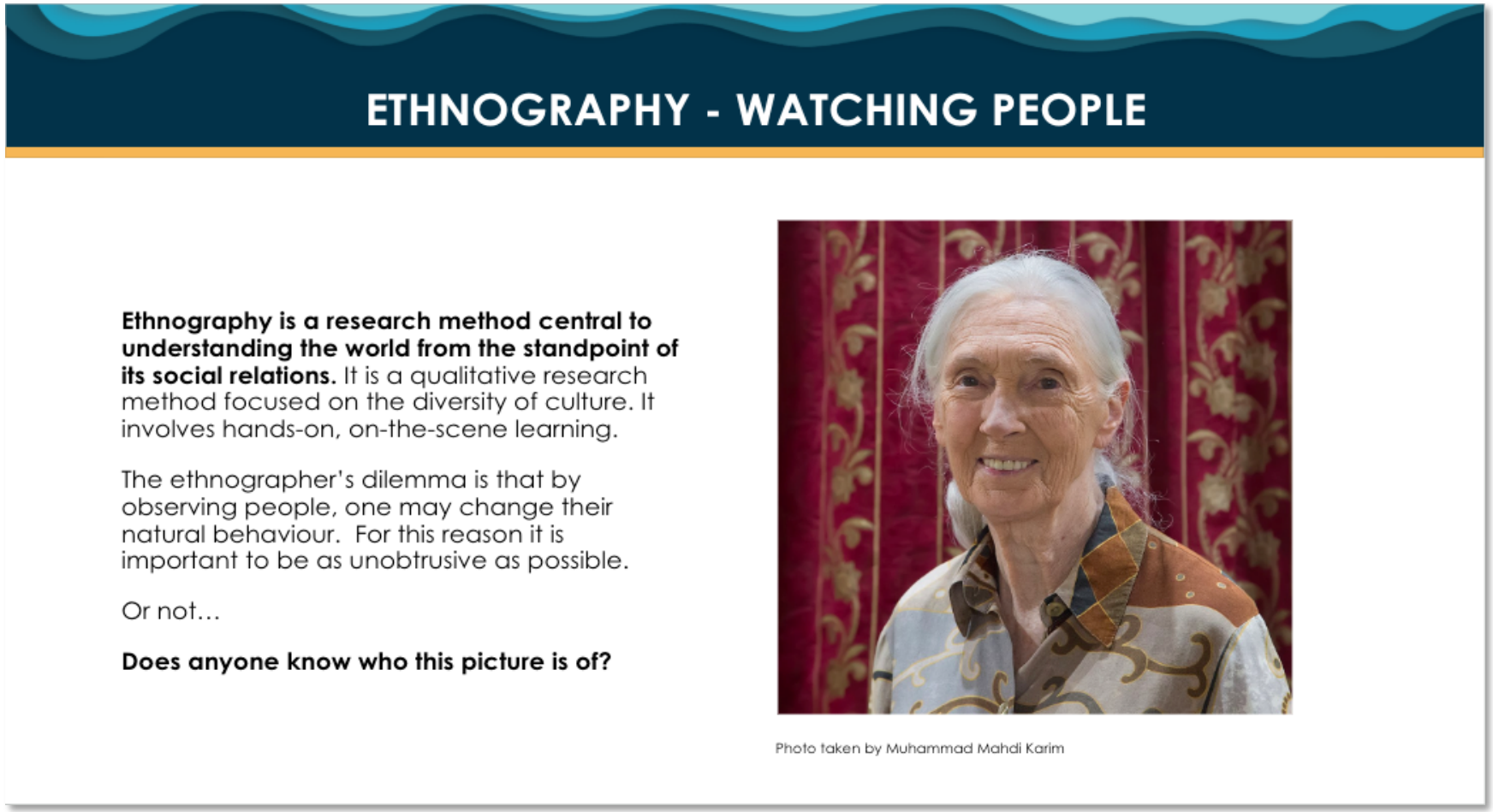

Figure 23: Example of UCD research method recommendation (ethnography)

The third slide explains the purpose of a *stakeholder map* and illustrates the various actors, relationships, and influences that shape a given service ecosystem—helping labs identify collaborators, decision-makers, and affected user groups.

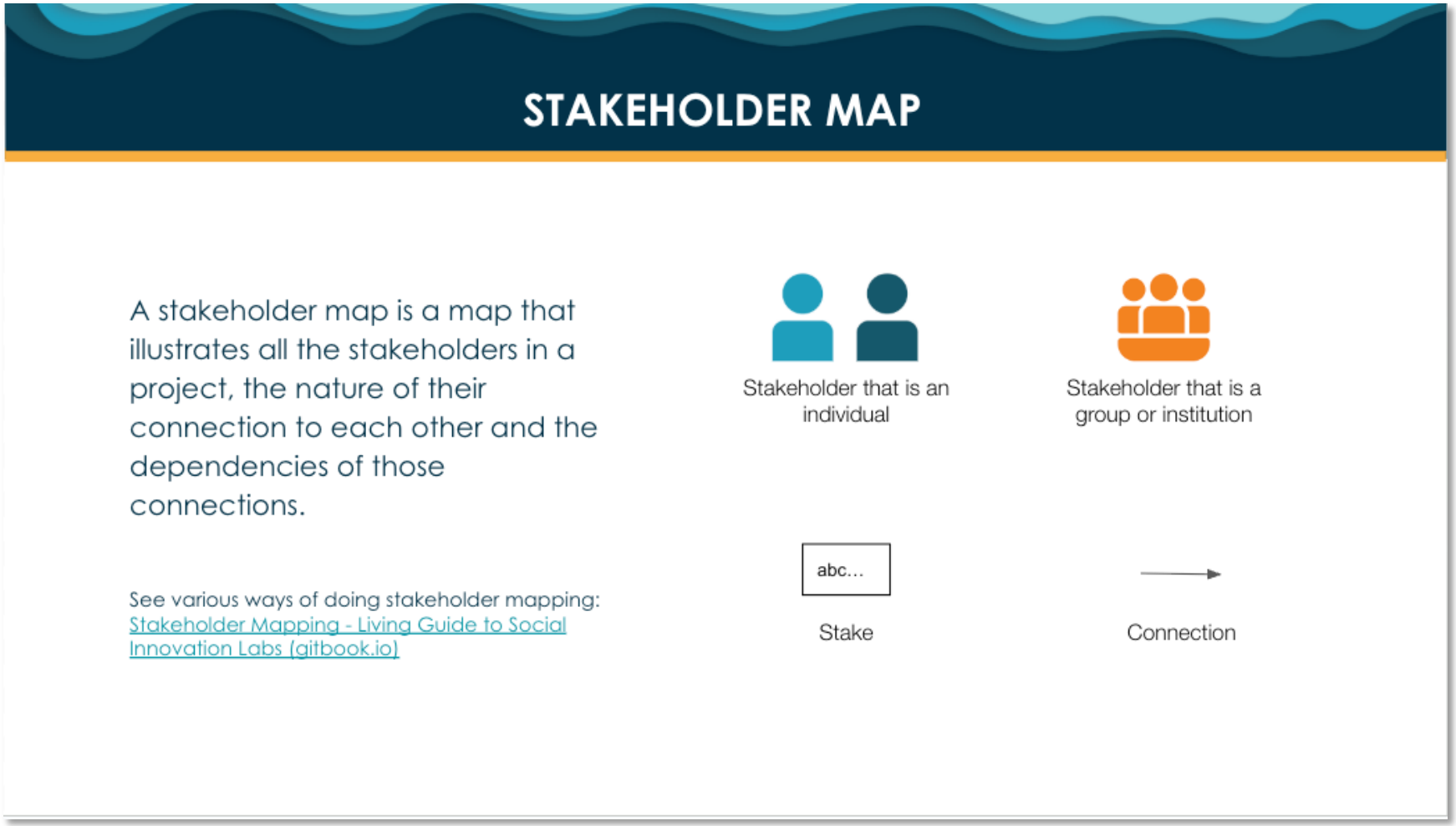

Figure 24: Example of recommended artefacts (stakeholder map)

The fourth slide focuses on defining *success metrics*, discussing how qualitative and quantitative indicators can be used to measure the impact of lab activities and ensure alignment with organizational objectives.

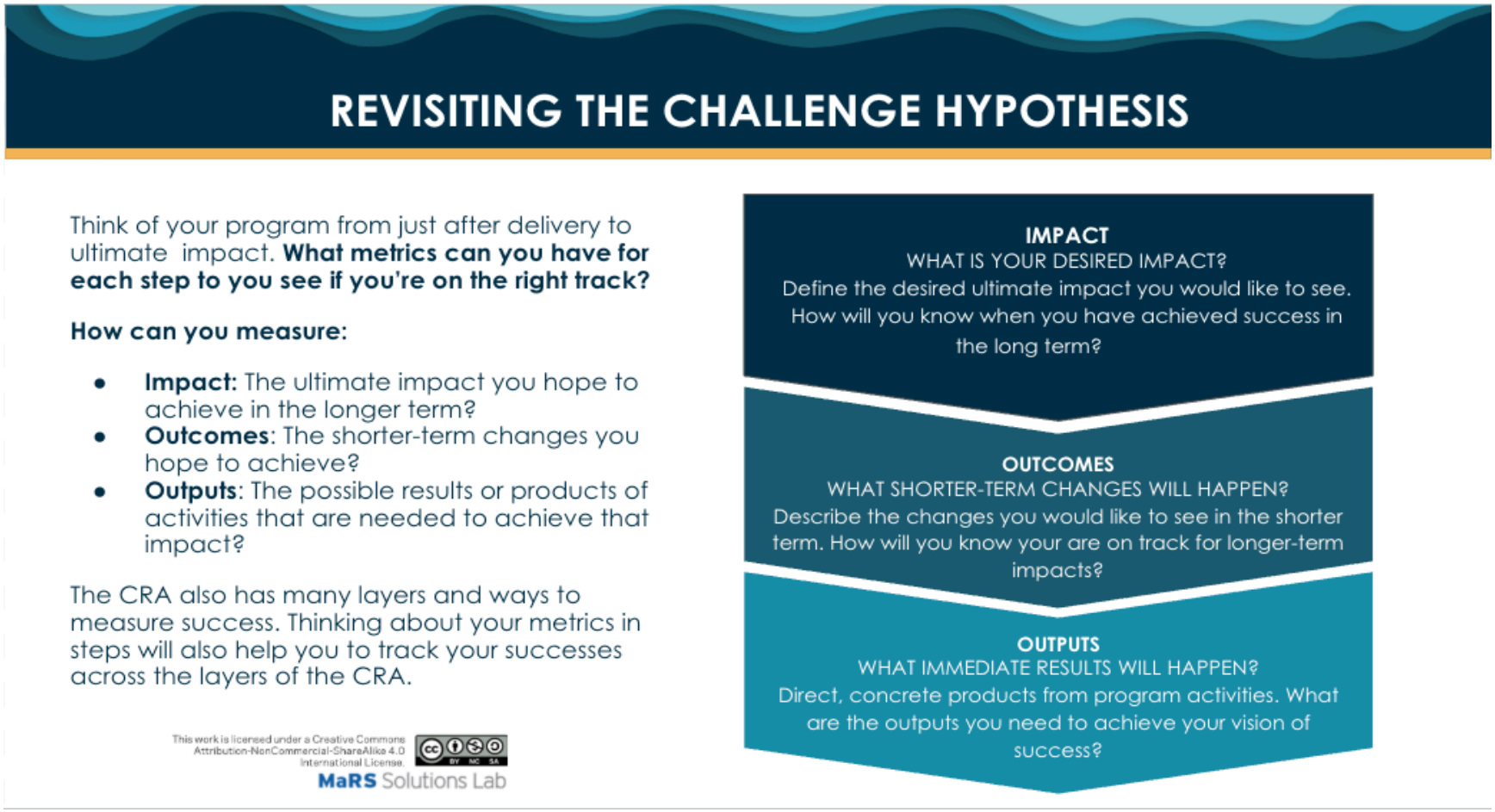

Figure 25: Example of instruction on metrics specific to CRA

Appendix B: Certificate of Approval from the REB

26/11/2024

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE I CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	H-10-24-9939
Titre du projet / Project Title	Expert Panel Review for: Leveraging User-Centred Design Methods in Canadian Public Service Innovation Labs
Type de projet / Project Type	Thèse de doctorat / Doctoral thesis
Statut du projet / Project Status	Approuvé / Approved
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	26/11/2024
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	25/11/2025

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Dominira SAUL	École de science informatique et de génie électrique / School of Electrical Engineering and Computer Science	Chercheur Principal / Principal Investigator
Liam PEYTON	École de conception et d'innovation pédagogique en génie / School of Engineering Design and Teaching Innovation	Superviseur / Supervisor

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Appendix C: Expert Panel Discussion Questions

Focused Interview Questions

The purpose of these questions is to facilitate the expert panel discussion and evaluate the thesis artefacts.

Stage 1: Lab Setup

1. In the proposed user-centred innovation process model the first step is to identify the high-level problem space, is that relevant to your lab? How? (RQ1).
2. How accurately did the innovation lab identify the problem space? (RQ1, RQ2)
3. Are there any influences external to your organisation that impact the problem space focus?
4. Is the typology proposed in the user-centred innovation process model useful?
5. Was the typology of your innovation lab clearly defined and communicated before the innovation process began? (RQ1)
6. How would you rate the user-centred and innovation maturity of your parent organization? (RQ2, RQ3)
7. Is UX and Innovation maturity of the parent organisation relevant to operation of the innovation lab?
8. Funding is a dimension identified in the typology; can you talk about how you funding structure impacted your outcomes?

Stage 2: System Definition

9. Was the composition of the team administering lab activities well suited to the innovation tasks? (RQ3)
10. How effective was the problem definition process in clarifying the innovation challenge? (RQ2)
11. How well did the idea triage process work in prioritizing ideas for development? (RQ1, RQ3)

Stage 3: Co-Design

12. Were rapid, low-fidelity prototyping sessions used in your lab, were they effective in refining ideas? (RQ2)

13. Were any specific UCD methods used in your co-design process? (RQ2)
14. Did the co-design process help in uncovering new user insights? (RQ2)

Stage 4: Scale

15. How successful was the scaling process for the most promising ideas? (RQ1, RQ3)
16. Rate the effectiveness of the post-mortem analysis in identifying lessons learned. (RQ3)
17. How well did the entire process contribute to achieving better innovation outcomes? (General)

General Questions Addressing Research Questions

18. Are the four stages of the user-centred innovation process model presented to you relevant to your lab?
19. How would you characterize the types of innovation that were most prevalent in your lab's outcomes? (RQ1)
20. In what ways were user-centred design methods leveraged during the innovation process? (RQ2)
21. What guidance emerged from your lab's experiences that could be shared with other public service innovation labs? (RQ3)

Appendix D: Expert Panel Review Survey Questions

Likert Scale Ratings

Please give a rating for each of the following statements corresponding to each stage of the HCIL process, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree:

Stage 1: Lab Setup

1. It is important to define the general problem space before a lab commences innovation activities.
2. The typology of the innovation lab was relevant and well-defined.
3. It is important to identify the type of innovation lab before commencing innovation activities.
4. Understanding the level of user-centred and innovation maturity of the parent organization is necessary when managing an innovation lab.

Stage 2: System Definition

5. I have the ability to choose resources with specific skills and experiences to work in my innovation lab.
6. Understanding elements of the typology, problem space and maturity are essential BEFORE selecting team members.
7. A formal problem definition process effectively clarified the innovation challenges.
8. A formal idea triage process was efficient in prioritizing viable ideas for development.

Stage 3: Co-Design

9. The rapid, low-fidelity prototyping sessions significantly contributed to the refinement of ideas.
10. The iterative evaluation process during co-design was valuable in improving the prototypes.
11. The co-design process was effective in uncovering new and useful user insights.
12. Please select all of the methods you have used in your lab:
    a. Personas
    b. Empathy mapping
    c. Low fidelity prototyping

d. Iterative design
e. Participatory design
f. Task analysis
g. Scenario-based design
h. Usability Testing
i. Storyboarding
j. Wireframing
k. Gamestorming (creative brainstorming activities)

Stage 4: Scale

13. We have an effective process for scaling up the most promising ideas.
14. A post-mortem analysis provides significant insights for future innovation projects.

General

15. Using the process model will lead to better innovation outcomes.
16. The dimensions of the typology are the most important in terms of understanding how to manage a successful public sector innovation lab.