Designing Labs for a Sustainable Future

Ana Carolina Rodrigues
Joshua Cubista
Rowan Simonsen

Blekinge Institute of Technology
Karlskrona, Sweden
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Examiner: Dr. Henrik Ny Ph.D.
Supervisor: Professor Karl-Henrik Robèrt
Primary advisor: M.Sc. Marco Valente
Secondary advisor: M.Sc. Sophie Hallstedt
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Ana Carolina Rodrigues, Joshua Cubista, Rowan Simonsen

School of Engineering
Blekinge Institute of Technology
Karlskrona, Sweden
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Abstract:

Through this thesis the authors explore how Labs can be designed in order to catalyze systemic sustainable change by A) contributing to systemic socio-ecological sustainability, B) providing an adaptive and experimental alternative to forecasting and traditional planning, and C) providing forums for collaboration, collective impact, capacity building, and the emergence of systemic solutions to local and global challenges. Through their research the authors performed a literature/field review, reviewed organizational documents, and analyzed a select set of Lab theories, processes, and cases. Additionally the authors interviewed leading experts in Lab design/facilitation, sustainability, the Framework for Strategic Sustainable Development (FSSD), systemic change, and transformative action. The synthesis of this research is offered to emerging Lab designers, practitioners, and facilitators interested in moving society toward a sustainable, regenerative, and thriving future.

Keywords: Labs, Sustainability, Systemic Change, Complex Adaptive Challenges, Collaboration, Innovation.
Statement of Contribution

From the beginning of this project we as a team have focused our attention on our group dynamics, clarified expectations, created shared values, and a vision of success that guided our overall working process and supported us to create the conditions for active learning and effective action. We have been supporting each other both in creating our thesis and also had our focus on how this can work serve beyond this project into our work and contributions in the field.

With his background in Sustainable Community Development, Integral Psychology, Human Potential Facilitation, Experiential Process Design, and Strategic Action Joshua has contributed with a high awareness of creating a good and focussed working environment for the group and supported us to see the bigger perspective. Joshua has been the storyteller of the group, holding the narrative, the supreme interviewer, weaver of ideas and concepts, and helped us remember our values; while never shying away from speaking his truth which very often offers a unique perspective that we may not otherwise have seen and that elevated our work.

With her background in journalism, communications, marketing, and community engagement, Ana Carolina brought clarity, precision, and rigor to our research through an attention to detail that has raised the quality of our work and created depth and breadth in this study. Furthermore, Ana brings her passion for design aesthetics, a sense of beauty and elegance to the process, commitment to creating a meaningful contribution in the world, a project management focus for structuring our working process, aligning the flow in our writing process, and all the while bringing style, excellence, and depth to our research and working process.

With his background in social entrepreneurship, the design and facilitation of participatory processes, nature based leadership programs, adult education, and his experience in global networks of change agents Rowan brought a wealth of tools and practices that brought out the best in our collaborative and creative working process. Additionally Rowan, brought to bear his commitment to creating spaces for transformational education which deepened the character of this work while at the same time he acted as the groups prime networker reaching out to experts in the field and extending the reach and relevance of this work.

We have worked in highly collaborative ways often testing the ideas found within our research such as working iteratively, prototyping possible ways forward, and shared a beautiful experimental dance of trial and error, moving ahead, sometimes moving backward; taking action, learning, and refining our commitment and ability to work in the world toward the resolution of systemic challenges through generative action and commitment to a sustainable future.

It has been an amazing learning experience through which we have all learned, stretched, and planted important seeds for future endeavours, ventures, and adventures.

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Ana Carolina Rodrigues            Joshua Cubista            Rowan Simonsen
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With gratitude,

Ana, Joshua, and Rowan
Executive Summary

Introduction

Society is facing a variety of challenges that are increasingly systemic, complex and global (Kahane 2010). These challenges have been called wicked problems (Mootee 2013, 35) as they contribute to systematically increasing socio-ecological unsustainability on a scale unknown before in human history (Scharmer and Kaufer 2013). One way to envision the sustainability challenge humanity faces is through the metaphor of a funnel, depicted below, that shows that as human population and current modes of activity systematically increase, the Earth’s carrying capacity is systematically degraded over time increasing pressures on society.

In response to the interrelated complexity of the challenges society faces people have sought to remedy the situation by focusing on finding simple and/or complicated ways to deal with increasingly complex issues. Society has tried to tackle the sustainability challenge by focusing attention in silos of inquiry and action promoting specialization. While working in silos has fostered many positive innovative breakthroughs for society, the drawback is that it can also promote, to our peril, what the physicist David Bohm called fragmentation of thought, action, and society (Bohm 1980). Many approaches aiming to address the sustainability challenge often seek to address complicated problems, trying to analyze and understand the details at play assuming that the connection between cause and effect can be easily found by categorization and analysis. It is important to consider the high level of complexity of the whole system, rather than a fragmented view on just the parts (Mebratu 1998). At the heart of the challenge society faces is the reality that complex challenges that require adaptive solutions will not be solved with technical solutions alone and therefore humanity needs a more suited way to resolve these challenges than we have in the past. Addressing the sustainability challenge requires an approach that is systemic, participatory and emergent, enabling an approach that is adaptable and responsive to the changing nature of the challenges we face (Reos Change Lab 2013).

The Framework for Strategic Sustainable Development (FSSD) provides a systems perspective of the sustainability challenge to support society to navigate complexity towards a sustainable future. In this research, the FSSD provides the definition of sustainability through its Sustainability Principles (SP’s) as follows:

In a sustainable society, nature is not subject to systematically increasing concentrations of substances extracted from the Earth’s crust; concentrations of substances produced by society; degradation by physical means (Holmberg 1995; Broman et al. 2000; Ny et al.
2006); and people are not subject to systematic barriers to personal integrity; influence; competence; impartiality; and meaning (Missimer 2013).

In order to address the systemic, complex, and adaptive challenges facing society a field of action and inquiry is emerging that of laboratories or “Labs” dedicated to resolving complex adaptive challenges by creating innovative solutions through collaborative processes. The concept of a laboratory has been evolving throughout time; the focus of this research is on a new kind of Lab committed to addressing root causes of societal challenges rather than superficial solutions where the focus is on the symptoms rather than root causes (Hassan 2014). The fusion of systems thinking, complexity science, group psychology, participatory processes, design thinking, cross sector collaboration and social innovation gave birth to these new kinds of Labs. These emerging Labs are often characterized by multi stakeholder engagement, collaboration, participatory methods, emergence, iterative design, prototyping, and the inclusion of personal and collective leadership development. The following research focuses upon how this emerging type of Labs can contribute toward transitioning society toward a sustainable future by exploring the following research question (RQ): How can Labs be designed in order to move society strategically toward a sustainable future by incorporating the FSSD?

Methods

This research was divided into five phases. In the first phase the authors conducted a literature review in order to understand the depth and breadth of the Lab field, and to identify possible gaps that could clarify the scope of this study. Also in this phase, a first round of interviews took place with a wide focus on Labs using design lenses such as the FSSD, The 8 Breaths of Process Architecture, and The Chaordic Stepping Stones to understand the aspects of designing for the resolution of complex challenges.

With the research question in mind, the second phase focused on creating a draft design of a Lab in order to make sense of the information gathered in the first phase of interviews and also to access blind spots, all of which informed the design of the following interviews. The third phase included a second round of interviews where the authors sought to understand design elements of Labs in more depth. In total, 21 people from 10 different countries were interviewed in two distinct groups: Lab Practitioners who work with a variety of Lab approaches in the field and FSSD Practitioners involved in The Natural Step’s newest approach, The Sustainability Transition Lab.

Phase four focused on data analysis of both rounds of interviews, the information gathered was organized in categories that represented the aspects of inquiry important for answering the research question and then clustered accordingly. The information was then organized in a Five Level Framework (5LF) to identify possible gaps and patterns, and to present results in an organized and objective way. During phase five the authors created a prototype synthesis of their research in order to test assumptions and to create a shared vision of the design of Labs that increase the probability of successfully moving society toward a sustainable future.

Results

Based on the interviews and documents provided by interviewees, the authors completed a structured analysis of the elements needed in Labs in order to move society toward sustainability using the Five Level Framework. The analysis illuminated patterns and gaps in the design of labs that seek to move society towards sustainability.
On the *Systems Level* a pattern of defining key elements was observed. It included defining the challenge that the Lab focuses on, the stakeholders, resources, timeframe, and the process were themes that emerged from both group of interviewees. The authors noticed that defining the process spoke to the intentional construction of processes that could support reaching success. The FSSD practitioners group also highlighted the need to define how learning will take place throughout the Lab.

In the *Success Level*, when talking about definitions of success, patterns emerged such as Labs becoming long-term platforms for systemic change, and building trust. Results revealed that Lab Practitioners do not use a shared definition of sustainability when defining success in their activities. Scalability was mentioned by both groups, as was barriers that could prevent Labs to achieve success such as lack of trust, resources, and legitimacy, all related to the difficulty to measure results.

Under the *Strategic Level*, Hassan suggested that in the Lab approach strategic action was needed rather than traditional planning approaches that are based on forecasting. Adopting an appreciative approach and building on what works, rather than focusing only on problem solving, was also mentioned by Lab Practitioners as a contributing factor to achieving success. On the Actions Level, when talking about convening Labs Practitioners mentioned that the convening team should represent the system the challenge is focused on. When talking about design approach, both groups mentioned two themes: the importance of designing for context, and the value of co-designing with stakeholders the process that will be taken in order to achieve success in the Lab. On the *Tools Level*, Theory U was the most cited tool between both groups, followed by the FSSD, which was emphasized by the FSSD Practitioners group.

In order to make sense of the findings of this research, to answer the research question, and to test the application of the results in the field the authors developed a prototype as a conceptual framework for understanding the design of Labs. The prototype highlights that in order to address complex societal challenges a Lab has the highest probability of success when their portfolios of innovations and/or processes are oriented in the following ways:

- Addressing systemic root causes
- Utilizing collaborative, multi-stakeholder, and cross-sector processes
- Focusing on action, experimentation, prototyping and iterative processes
- Focusing on learning, research, documentation, and theory
- Creating new models of relationship and engagement
- Returning agency to people as leaders of change and innovation
- Developing innovations toward a socio-ecologically sustainable future
- Developing capacity and leadership for systemic change

Furthermore, Labs addressing societal challenges have traditionally been viewed as innovation and problem solving processes and/or projects with relatively short and finite timelines and are now evolving from a process/project focus toward an organizational model that employs many processes to resolve complex challenges over longer timeframes (Kahane; Hassan).
Prototype and the FSSD

As highlighted in the above prototype image within the Lab space, four elements were identified:

- Define which focuses on the need the Lab addresses, its purpose, the challenge, the vision of success, the current reality, and the resources needed for success
- Design which focuses on designing structures within the Lab (e.g.: governance), processes, and the intended outcomes
- Act which focuses on the experience in the Lab space and actions taken in which many tools and processes are applied
- Evolve which is dedicated to the reflection and evaluation of actions, feedback on learning and research, the development of metrics of success for Lab actions, and the scaling of innovations when appropriate.

These elements are approached iteratively meaning that the pattern of actions in a Lab most often follows a spiral form of action that incorporates feedback loops rather than a linear process.

When highlighting how Labs can move society strategically toward a sustainable future, one interviewee suggested, “In order for you to be strategic, you have to know where you’re going” (Robért). With that and the Results in mind, the authors suggest that the usage of the Sustainability Principles in the Lab space as depicted in the image above is valuable in order to create a vision of success that includes a basic definition of sustainability so that innovations created in the Lab space can be in alignment toward a sustainable future.

Discussion

Based upon the findings collected, the authors recommend that Lab Practitioners focus their efforts in the following ways to increase the probability of designing labs that move society strategically toward a sustainable future: A) co-design spaces, processes and architecture with their core team and stakeholders B) create a portfolio of innovations that increase the probability of creating successful solutions C) contribute to sustainability as described by the SP’s, while using Backcasting from success principles in dynamic ways focusing on both strategic action and experimentation. Furthermore, the authors propose that the benefits of
both the Lab approach and the FSSD be combined to increase the probability of creating successful innovations and resolutions to systemic complex challenges.

**Conclusion**

This research explored how Labs, as an alternative way to dealing with complexity, can be designed in order to move society strategically toward a sustainable future, and how the FSSD contributes toward this endeavor.

In relationship to sustainability, it became clear that all the organizations working with labs that were approached within the scope of this study were focusing their efforts in order to solve an aspect of the sustainability challenge with different tactics. The majority of the lab practitioners were not working with any specific definition of sustainability that could guarantee that their actions were not somehow contributing to another sustainability problem, therefore it became clear that it could be valuable to use the Sustainability Principles as a way to articulate the success boundaries of actions within the Lab space in order to increase the probability that new solutions and innovations created within the lab space can in fact move society toward a sustainable world.

Labs provide a unique adaptive, experimental, and collaborative approach to the resolution of complex challenges, and the FSSD provides the basis for understanding the systemic and complex nature of the sustainability challenge as well as offering ways to align strategic action toward global socio-ecological sustainability. The unification of these two approaches has the potential to assist humanity in navigating toward a sustainable, regenerative, and thriving future for all.
Glossary

**ABCD Process:** A four step planning process used to help organisations and communities move toward sustainability, utilising Backcasting. It includes the following steps:
A) Systems Awareness and creating a shared vision of success based on the organisation’s vision and four sustainability principles; B) Assessing the organisation’s Current Reality; C) Brainstorming compelling measures to move from current reality towards the shared vision; D) Prioritising measures based on certain strategic planning prioritisation principles (Ny et al. 2006).

**Complex Adaptive Challenges:** Ronald Heifetz talks about the importance of understanding the difference between technical problems and adaptive challenges. The problems that require leadership are those that the experts cannot solve. We call these adaptive challenges. The solutions lie not in technical answers, but rather in people themselves (The Innovative Instructor 2014).

**Backcasting:** A planning method that starts by defining the desirable future and then actions that can lead to that future.

**Change Lab:** The Change Lab is a multi-stakeholder dialogic change process. It is designed, inspired by the U process to generate the shared commitment and the collective insight needed to produce breakthrough solutions to complex social problems. Each Change Lab is convened around a particular problem that appears to be stuck with no obvious solution in sight. Zaid Hassan refers to the Change Labs as first generation Labs, as they were focussed mainly on the process rather than the long-term nature of the Lab (Hassan 2014).

**Collaboration:** The act of groups working together and sharing knowledge to achieve a common goal.

**Complexity:** A context in which the relationship between cause and effect are only seen in retrospect due to the immeasurable amount of variables and its interconnectedness. Change can only be seen in long time frames in this context.

**Collective Impact:** Collective Impact is a framework for facilitating and achieving large scale social change. It is a structured and disciplined approach for bringing cross-sector organisations together to focus on a common agenda which results in long-lasting change.

**Design Labs:** Tend to place emphasis on the quality of the ideas or solutions being generated with a particular focus on incorporating different (often "user" or "citizen") perspectives in the development of specific the solution (technical innovation, likely a product, object or service).

**Innovation:** Is a process focused on finding new ways of taking action toward the application of improved solutions that take in consideration new requirements, needs and contexts.

**Iterative Processes:** Processes for arriving at a decision or a desired result by repeating rounds of analysis or a cycle of operations. The objective is to bring the desired decision or result closer to discovery with each repetition or iteration (BusinessDictionary 2014).
Emergence: The means by which complex systems and patterns arise out of informal individual interactions or collaborative processes connected around a common purpose. The system that emerges contains features not previously observed and holds greater power than could ever be predicted by examining the individual parts (Cretney et al. 2011).

Five Level Framework (for Planning in Complex Systems): A model that provides a structured understanding for analysis, planning and decision making in complex systems. It consists of five distinct, interrelated levels – Systems, Success, Strategic, Actions and Tools.

Framework for Strategic Sustainable Development (FSSD): A planning framework that takes a systems perspective based on the Five Level Framework (for Planning in Complex Systems) applied to sustainability. Other elements of the framework are the Sustainability Principles, as a way to identify the ecological and social conditions essential for life on the biosphere; and Backcasting.

Labs: A facility that is defining a domain, searching for solutions in that area, running experiments and documenting the search (Hassan 2014).

Multi stakeholder process: A very broad term that describes groupings of civil society, the private sector, the public sector, the media and other stakeholders that come together for a common purpose. It is often used with words like “partnership” and “consultation”. In multi-stakeholder partnerships the partners have a shared understanding that they play different roles and have different purposes, but that they can pursue collective goals through collaboration and common activities. These partnerships are voluntary, with participation driven by the perceived benefits they may see emerging from the process (Association for Progressive Communications 2013).

Prototyping: A prototype is an early sample, model or release of a product built to test a concept or process and learn from it in order to improve the solution before scaling it. A prototype is designed to test and trial a new solution to enhance precision by system analysts and users.

Systemic Change: Change that pervades all parts of a system, taking into account the interrelationships and interdependencies among those parts (Systemic Change 2014).

Strategic Sustainable Development (SSD): Planning and decision making to actively transition the current, globally unsustainable society towards a sustainable society based on first-order sustainability principles.

Sustainability: A state in which the socio-ecological system is not systematically undermined by society. The four basic Sustainability Principles must be met in order to have a sustainable society

Sustainability Principles: Based on scientific knowledge of the basic mechanisms that causes an unsustainable society, the Sustainability Principles define what society should stop doing in order to preserve the ecosystem services essential for supporting life on the planet. They state that in a sustainable society, nature is not subjected to systematically increasing of concentrations of substances extracted from the Earth’s crust; concentrations of substances produced by society; degradation by physical means; (Holmberg 1995; Broman et al. 2000; Ny et al. 2006) and in that society people are not subjected to systematic barriers to personal integrity; influence; competence; impartiality and meaning (Missimer 2013).
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1 Introduction

1.1 The Sustainability Challenge: Toward a Sustainable Future

In the world today society within the biosphere is facing a mosaic of interrelated socio-ecological challenges. These challenges are increasingly systemic, complex and global (Kahane 2010) and have been called wicked problems (Mootee 2013) as they contribute to systematically increasing socio-ecological unsustainability on a scale unknown before in human history (Scharmer and Kaufer 2013).

The sustainability challenge faced in the world today is characterized by an array of interconnected problems such as increasing population, demand for natural resources, economic growth in the face of growing inequality, (Scharmer and Kaufer 2013) as well as wide range of ecological issues including climate change, increasing ocean acidification, biodiversity loss, increasing nitrogen and phosphorus inputs to the biosphere, chemical pollution and land use, these problems show the disturbing systematic degradation of the biosphere in which all life is contained (Rockström et al. 2009, WWF 2010).

In the face of these challenges there are numerous definitions of sustainability that aim to identify the direction humanity might take to navigate toward a sustainable future. A common definition comes from the Brundtland report: 'Our Common Future' commissioned by the UN World Commission on Environment and Development in 1987. It states: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland 1987, 43).

One way to understand what it means to not compromise the ability of future generations to meet their needs is depicted by the Funnel metaphor below (see Figure 1.1) which uses a funnel as a representation to express that as the challenges society face become more drastic the pressure and ability to overcome these challenges will become more complicated, (Holmberg and Robèrt 2000). This challenge is illustrated by the narrowing walls of the funnel, which suggest that the room to maneuver towards sustainability becomes more limited. In this metaphor the walls of the funnel represent the Earth’s carrying capacity for life. As human population and demand for resources systematically increase, the Earth’s carrying capacity and ability to provide these resources is systematically decreased, as is illustrated by the narrowing walls of the funnel.

The challenge for humanity is to find ways to navigate toward a sustainable society, as illustrated by reaching the funnel opening or society will “hit” the walls of the funnel which implies the collapse of the socio-ecological system, at which point it may be too late to transition towards a sustainable society.
Currently, society has been defining its success using indicators based on economic growth which are dependent on increasing production and consumption (Rees 2008, Meadows et al. 1992). The result of this unbridled development has created some of the biggest and most complex challenges known in history, because of which it becomes more and more imperative that society is able to transition to a way of operating that is not systematically undermining its own subsistence (Hodgkin 2014).

Given the increasing scope and complexity of social challenges in the world today new ways of dealing with these challenges are needed. Conventional planning, development, and strategic responses to these challenges have proven inadequate because they have failed to address the deep complexity and unpredictability of the situation (Mintzberg 1994). Addressing the sustainability challenge requires approaches that are systematic, participatory, and emergent all at the same time, enabling a grounded approach that is simultaneously adaptable and responsive to the changing nature of the challenges we face (Kahane 2004).

This line of inquiry has inspired the authors to delve into the emerging field of Labs, or Laboratories that are dedicated to addressing complex challenges and innovating solutions toward a sustainable future.

1.2 Complexity and Systemic Challenges

Through this research the authors have highlighted the complex systemic nature of the problems society faces as both a source of increasing social challenge and as a potential leverage point in understanding how we can work collaboratively toward strategic sustainable development.

1.2.1 The Cynefin Framework

The Cynefin Framework offers a way of understanding the states that a system can be in: simple, complicated, complex, and chaotic. This framework offers a guide of how to approach the different kinds of system challenges, by employing appropriate ways of thinking and acting in order to achieve the best possible results for a given endeavor. The diagram below suggests that when dealing with complex issues, there is a need to develop processes that can support people to “probe, sense, and respond”. It is important that the approaches dealing with complex problems are designed specifically for complexity and not
for simple, complicated or chaotic situations (Kurtz and Snowden 2003). Often approaches for dealing with the sustainability challenge are being treated as an issue falling into the complicated domain. Here the response is trying to analyze and understand the details of the system, assuming that a connection between cause and effect can be found. It is important to consider the high level of the complexity of the whole system, rather than having a fragmented view of just the parts (Mebratu 1998); by understanding the nature of the challenge at hand it becomes easier to identify the appropriate approaches for a given type of challenge.

![Figure 1.2 The Cynefin Framework describes the relationship between cause and effect in contexts that are simple, complicated, complex and chaotic. (Adapted from Snowden and Boone 2007)](image)

### 1.2.2 Social, Dynamic and Generative Complexity

In order to work with complex systems in a more effective way, Scharmer and Senge define three types of complexity; social complexity, dynamic complexity, and generative complexity (Senge and Scharmer 2001).

- **Dynamic complexity** highlights the quality of complexity that is present when cause and effect are far apart in space and time. When working with dynamic complexity a systemic approach must be taken in order to address root causes.

- **Social Complexity** highlights the more participatory nature of complexity that arises when different people have different perspectives and goals, when people do not agree on the solutions or even on their definition of the problem. Here it is important to include a participatory approach to let diverse viewpoints be heard to gain a shared understanding of the system of focus.

- **Generative Complexity** is characterized by the emergent quality of complexity that highlights the lack of predictability. When a system is characterized by generative complexity an emergent approach should be taken to creatively improvise and adapt to change in the system.
In response to the complexity of the challenges society faces we have sought to remedy the situation by focusing on finding simple and complicated ways to deal with increasingly complex and chaotic issues. One way we have tried to do that is by focusing our attention into silos of inquiry and action promoting specialization and expertise (Burge 1993). While this kind of thinking and acting has fostered many positive innovations for society the drawback is that it can also promote detrimentally, what physicist David Bohm called fragmentation of thought, action, and society (Bohm 1980). When the challenges we face are complex at the root cause level they tend to also be more adaptive to change. Heifetz and Linksky argue the difference between “adaptive challenges” as opposed to “technical challenges,” in their book Leadership on the Line. They articulate the difference as:

“Every day people have problems for which they do, in fact, have the necessary knowhow and procedures. We call these technical problems. But there is a whole host of problems that are not amenable to authoritative expertise or standard operating procedures. They cannot be solved by someone who provides the answers from on high. We call these adaptive challenges because they require new experiments, new discoveries and adjustments from numerous places in the organization or community. Without learning new ways – changing attitudes, values and behaviors – people cannot make the adaptive leap necessary to thrive in new environments. The sustainability of change depends on having the people with the problem internalize the change. Complex challenges that require adaptive solutions will not be solved with technical solutions. It is impossible for example to “fix” racism, homelessness or drug addiction. These are problems that need to be addressed. And because there is no clear relationship between cause and effect, research into root causes is often not helpful” (Heifetz and Linsky 2002, 29).

In order for humanity to address these complex adaptive challenges we must be willing to utilize approaches that can increase the probability of addressing these systemic issues.
1.3.1 The FSSD

The Framework for Strategic Sustainable Development offers a scientifically sound and strategic approach to dealing with the complexity of the sustainability challenge. The framework was originally developed by Dr. Karl-Henrik Robèrt in 1989 and gained scientific consensus as a way to understand the systemic nature of the sustainability challenge and how to move strategically toward a sustainable future. The FSSD offers both a scientific understanding of the definition of sustainability and a stepwise planning approach to more sustainable ways of operating in a complex and adaptive system (Robèrt 2000).

The following eight Sustainability Principles provide the boundary conditions within which humanity can foster a sustainable society and form the foundation upon which the definition and discussions on sustainability within this document will be based:

In a sustainable society, nature is not subject to systematically increasing...
1. ...concentrations of substances extracted from the Earth’s crust,
2. ...concentrations of substances produced by society,
3. ...degradation by physical means (Ny et al. 2006).

and...people are not subject to systematic barriers to…

4. ... personal integrity
5. ... influence
6. ... competence
7. ... impartiality
8. ... meaning
(Missimer 2013)

The FSSD is based on the generic Five Level Framework (5LF) that provides the ability to categorize complex information a way of separating and clarifying different levels of a system; it uses Backcasting, as described below, from the eight sustainability principles (8SPs) (Missimer 2013).

<table>
<thead>
<tr>
<th>5LF</th>
<th>FSSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems</td>
<td>The system that is relevant to the overall goal/success</td>
</tr>
<tr>
<td>Success</td>
<td>The definition of success</td>
</tr>
<tr>
<td>Strategic</td>
<td>The strategic guidelines used to select actions that move towards success in the system</td>
</tr>
<tr>
<td>Actions</td>
<td>The concrete actions that follow the strategic guidelines to reach the vision of success.</td>
</tr>
<tr>
<td>Tools</td>
<td>The tools that support the process</td>
</tr>
</tbody>
</table>

*Table 1.1 The Five Level Framework and The Framework for Strategic Sustainable Development (FSSD) (Robèrt 2000; Robèrt et al. 2002; Robèrt et al. 2010)*
Backcasting from sustainability principles, known as the A,B,C,D Process, is a methodology used for strategic sustainability action planning in organizations; during which the first step (A step) is to define a vision of a desired future that is not violating the sustainability principles (Holmberg and Robèrt 2000). The second step (B Step) is to define the current reality, the third step (C Step) consists of identifying the gap between vision of success and current reality (A and B) and come up with a list of ideas for actions that can bridge that gap. The actions are then strategically prioritized (D Step) in order to take the right steps on the path towards success. To prioritize the actions three prioritization questions are asked about whether actions are 1) oriented in the right direction toward the vision, 2) providing a flexible platform from which future actions can continue to build toward the vision, and 3) providing a return on investment (ROI) either financial, social, or ecological (Holmberg and Robèrt 2000, Robèrt 2000).

Backcasting is very different from forecasting. The latter focuses on predicting what will happen in the future based on current trends, past actions and patterns. As these patterns and trends are often part of the problem, forecasting is not the best approach when dealing with complex challenges (Holmberg and Robèrt 2000; Robèrt 2002; Dreborg 1996).

Backcasting as described in the A, B, C, D Process is very useful when:

- The problem to be studied is complex
- There is a need for major change
- Dominant trends are part of the problem
- The problem, to a great extent, is a matter of externalities
- The scope is wide enough and the time horizon long enough to leave considerable room for deliberate choice (Dreborg 1996; Robinson 1990).

![Backcasting from sustainability principles and the A, B, C, D Process](image)

**Figure 1.4 Backcasting from sustainability principles and the A, B, C, D Process**

### 1.3.2 Prototyping Toward a Sustainable Future

As suggested above, complicated issues or technical problems require analytical and reductionist solutions to be successful. This can be an effective strategy for complicated endeavors such as manufacturing a car or designing a building where the innovation to be created or the solutions to be worked toward have a clear outcome (Ackoff 1994). In contrast, systemic complex issues or adaptive challenges require a more dynamic approach where the actions taken to address the challenges are able to be adapted as the needs and context of the
challenges change. When dealing with complex adaptive challenges there are no one size fits all answers, there are just solutions and actions that offer one possible option of many for addressing a given challenge (Kahane 2004). In the face of complex challenges however people often fall back on traditional planning methods as a way to address these challenges. Henry Mintzberg suggests however, that the act of planning builds on the idea of predetermination in the prediction of the environment and the ability to impose planned strategies on an environment; which he suggests is a fallacy because people are unable to predict the future (Mintzberg 1994). In contrast to traditional planning approaches that assume predictability of the future, Zaid Hassan suggests that what is needed are new ways of dealing with complex social challenges that focus on an experimental and prototyping approach to creating a portfolio of solutions that can increase the probability of resolving complex challenges; an approach he calls Social Labs:

“A social lab is a strategic approach toward addressing complex social challenges. As a strategy, it isn’t too hard to grasp. It can be stated simply. Bring together a diverse, committed team and take an experimental, prototyping-based approach to addressing challenges systematically, that is, at a root-cause level. Keep going. That’s it” (Hassan 2014).

With the above in mind, the sustainability challenge that humanity faces today with all of its inter-related complex adaptive challenges requires dynamic approaches that can address these challenges at the root cause level. While traditional planning methods work for complicated challenges the sustainability challenge may be one of the most complex challenges humanity has faced throughout history. Therefore, this research is dedicated to exploring how Laboratories, as described below, that are designed for addressing societies most complex and systemic challenges can be partnered with the FSSD as described above in order to prototype innovations and solutions that lead toward a truly sustainable future.

1.4 The Evolution of Labs

The concept of a Lab or Laboratory has traditionally been used in science and technology as a facility that provides controlled conditions in which research, experiments and measurement may be performed (Encyclopedia Britannica 2014). The focus of laboratories as a space for discovery and innovation has evolved over time from focus of chemistry to biology, to psychology or production such as Thomas Edison’s famous Menlo Lab in the 1800’s where the telephone and the light bulb were invented (Kelly 2005). Likewise, John Dewey’s Laboratory dedicated to education and community cooperation (Schulman 2013). Furthermore, in addition to the more traditional focuses of Labs mentioned above Labs are also being created in diverse fields of endeavor such as technology of all kinds, innovation of finance, food systems, transportation, education, organizational change, sustainability, and societal transition. The concept of creating intentional spaces and focusing resources toward experimentation, discovery, and innovation has over time demonstrated the relevance of Labs for invention and development, scientific advancement, medical research, and new technologies as well as the emerging application toward solving complex societal challenges.

The research presented in this paper will analyze the latter form of Labs that are designed to create forums for both personal and collective (organizational, community) learning and transformation; Labs that integrate rapid prototyping, action learning, and leadership development for stakeholders from different sectors and disciplines in society in order to
address complex socio-ecological challenges at a systemic level. The Labs in focus within the scope of this study maintain some of the aspects in common with the technical and natural science laboratories mentioned above, such as experimentation, learning by trial and error, and focusing on innovation. These new kinds of Labs hereafter referred to by the authors as “Labs” have many forms and names such as Design Labs, Social Innovation Labs, Change Labs, Sustainability Transition Labs, Social Labs or a variety of other names and definitions as explained by Hendrik Tiesinga, one of the interviewees within this research, in his PhD research on Labs:

“The use of the name ‘laboratory’ outside the natural sciences has a certain history in academia, in particular interactive media studies (e.g. MIT’s Media Lab) and it has recently gone beyond and different forms of ‘innovation labs’ are popping up inside businesses, in civil society, arts (Edwards 2010). Some of these labs are no different from conventional networks or think tanks; others are really experimenting with new forms of social organization. A societal laboratory can thus have widely different meanings” (Tiesinga 2012).

Furthermore, Zaid Hassan suggests that within the space of a Lab the goal is to define a domain and search for solutions in that space by conducting experiments and documenting the results. When the Lab approach is applied to the social domain practitioners are therefore searching for social domain solutions. Hassan suggests that the characteristics of Social Labs are:

1. Social - Actions within the Lab are taken collaboratively by a diverse group of stakeholders who represent the system of the challenge being addressed

2. Experimental - Experimentation is emphasized in order to increase the probability of creating a portfolio of successful solutions

3. Systemic - A systems perspective is applied within the Lab in order to address root causes and foster systemic solutions.

The emergence of Labs that address complex societal challenges has been influenced both by the traditional concept of laboratories and also as seen in Figure 1.5, an array of contributing fields of inquiry and endeavor such as systems thinking, complexity science, group psychology, participatory process, design thinking, cross sector collaboration, social innovation, and a wide variety of tools and methods such as Theory U, Appreciative inquiry, dialogue, prototyping, and computer modeling/iterative software development strategies such as Scrum, Agile, and the Spiral Prototyping methodology.
The purpose of Labs, within the scope of this paper, focuses on addressing complex problems in society by convening diverse groups of stakeholders, to engage in open ended processes of learning, collaboration and innovation in order to generate solutions that address systemic socio-ecological challenges (Senge 2008). Furthermore, Labs of this focus have been evolving from a relatively short-term process/project focus toward a more long-term organizational focus. The latter of which is the emphasis of Labs investigated by this study. In order to make explicit the nature of such Labs, the authors have compiled the following characteristics of the Labs explored within this study, they are:

1. Addressing root causes of our societal challenges rather than superficial solutions where the focus is on the symptoms rather than the causes (Hassan 2014).
2. Action oriented, experiential, and experimental rather than employing forecasting or traditional planning methods.
3. Focused on learning, research, documentation, and developing theory.
4. Focused on creating innovative solutions and systemic change.

Additionally the Labs within the scope of this study utilize a variety of approaches within the Lab space such as:

A) Multi stakeholder engagement: Convening a group of stakeholders representing the system at hand
B) Collaboration: Co-creation of creative solutions, through participatory methods
C) Emergent: Letting new solutions emerge
D) Iterative: Continuous learning, trial and error and adjustment
E) Prototyping: Foster dynamic creation across sectors
F) Personal and collective leadership development: Provide tools and experiences that can support personal development toward shifting mental models (Senge 1994);
There are many examples of Labs from the field that share similar characteristics such as:

- The Helsinki Design Lab
- Mind Lab
- The Sustainable Food Lab
- The Sustainability Laboratory
- Socialab
- The Finance Innovation Lab
- Parsons DESIS Lab
- MARs Solutions Lab
- Living Labs

Within the timeframe of this research Lab approaches and cases that have been focused on in depth have included:

- Social Labs/Change Labs by Reos Partners including cases such as the Sustainable Food Lab and the Gigatonne Lab in which Reos Partners has convened and/or participated in convening and facilitating Labs that address global challenges such as the future of food systems and the lowering of global CO2 emissions.

- Sustainability Transition Labs by The Natural Step Including cases such as Gold-standard Benchmark for Sustainable Business and the Sustainability Literacy Lab that are characterized by the Natural Steps unique contribution to the Lab field of bringing to bear their expertise in the application of the FSSD.

- The Greece Case as articulated by Maria Scordialos in which she highlights the 2008 financial collapse in Greece as the beginning of a literal living of the Lab experience in which, to paraphrase, the Lab idea became alive and emergent, an un-orCHEstrated systems change through citizen lead innovation in which Scordialos and others found themselves, in the face of collapse, prototyping systemic transformation.

1.5 This Research

In the face of the rising complexity of the systemic socio-ecological challenges within society, the sustainability challenge presents one of the most complex issues facing humanity today. Labs focused upon innovating solutions to these challenges within complex situations have the potential to play a deeply valuable role in transitioning society toward a sustainable future. However, it has been observed that to date Labs have been designed with varying levels of shared language, awareness, and clarity as to what defines the healthy boundaries of a sustainable society. Therefore the role of Labs fostering a truly sustainable future has yet to be fully understood. Furthermore, only as of 2013 have Lab approaches been unified with the FSSD. Therefore, this research has been organized around the following research question which has informed the scope, direction, methods, and focus of results of this research:
1.5.1 Research Question

*How can Labs be designed in order to move society strategically toward a sustainable future by incorporating the FSSD?*

1.6 Scope and Limitations

This paper focuses on Labs and how to design Lab spaces to move society strategically towards a sustainable future. Due to time limitations and accessibility the research has focused mainly on practitioners working with Reos Partners, The Natural Step and The Finance Innovation Lab.

The main point of exploration in this paper has been the design aspect of labs, which means that the paper does not investigate the implementation or evolution of the labs, other than what is connected to the design.

In this paper other approaches for working with Labs, such as Design Labs, Public Innovation Labs and Labs embedded in academic institutions have not been directly included.

The paper uses the FSSD as the main reference for how to incorporate a strategic mindset and a definition of sustainability into the design of Labs. Other sustainability tools and frameworks have not been introduced.

The intended audience for this paper is emerging Lab designers and practitioners who are interested in utilizing the Lab approach to move society toward a sustainable future. The goal has been to provide an overview of the findings as represented in the prototype.
2 Methods

2.1 Overall Research Design

The research design process conducted by the authors was very iterative and evolved throughout time. As new information from literature and the field arrived, the authors adapted their way of conducting research in order to honor the evolving levels of clarity during the course of the project. For that reason, the authors used Maxwell’s Model for Qualitative Research (Maxwell 2005) as a guide because it is a nonlinear framework that supports the focus of the research question without losing sight of the ultimate goal of the research; the strategies to get and make sense of data and how to decrease as much as possible the influence of author bias on the final results.

The figure below describes the way the authors have organized the research in Maxwell’s model.

2.2 Methods in Depth

Having the research question at the centre (Maxwell 2005), this section will explain in more detail how the chosen methods were applied during the exploration of the research question (RQ).

2.2.1 Literature Review

A literature review was conducted in order to identify the scope of this research as well as understand the depth and breadth of the Lab field, the historical contexts of Labs over time, the concepts that support them, identifying Lab cases both past and present, and to understand how this research could add new information to the field.

As part of the literature review six external advisors were interviewed. The advisors had a variety of backgrounds including experienced Lab practitioners, design thinking experts, and systems thinking experts. This group was approached as overarching advisors that helped the authors understand the field of Labs and the information that was being gathered. The advisors brought unique perspectives on subjects related to Labs such as sustainability, design and systems.

2.2.2 Interviews

As mentioned during the introduction, the field of Labs is relatively new and up-to-date documentation and especially peer-reviewed research has only begun to be generated. Because of that, the authors have assumed that the main source of data to answer the research question would come from the field. With that in mind, the focus of resources was on getting the highest number of interviews possible within the limited time frame of this project. Twenty-one interviews were conducted and they were distributed by three different phases, which will be explained below.

The interviews were semi-structured, guided by prepared questions and asked in a systematic order. All interviews were conducted either by Skype or phone and varied from 45 minutes to one hour. At least two authors were always present and divided into two roles: the interviewer, who would frame the research focus, present the authors, conduct a quick check
in and ask the prepared questions; and the note taker, who would record information. As suggested by Maxwell on recommendations for qualitative data collection, the authors analyzed the interviews as they were conducted, making a 30 minutes debrief after every interview in order to capture in real time what was emerging so that data could be accessed and inform next steps with more clarity on what was needed next (Maxwell 2005). All the interviews were recorded and accessed afterwards to check the accuracy of the notes taken in real time.

**Design of interviews**

**Round 1**

The first round of interviews took place from March 11th until April 1st, 2014 and included 13 people from Israel, Zimbabwe, Canada, Sweden, Switzerland, Greece and United Kingdom. Five of them were from the organization The Natural Step (TNS), therefore familiar with the FSSD, 4 working directly with the Sustainability Transition Lab, a new initiative that TNS is testing and consists on the application of the FSSD within the Lab approach. The second group of interviewees included practitioners from the Lab field having worked or currently working in organizations such as The Finance Lab, Reos Partners, and Social Innovation Generation. Because these two groups offered unique perspectives both within the Lab field and regarding the Framework for Strategic Sustainable Development the authors decided to make a distinction between the results from both sources.

**Lenses for designing:**

- Framework for Strategic Sustainable Development (Robèrt 2000),
- The 7 Breaths of Design Architecture
- The Chaordic Stepping Stone.

The intention for choosing these lenses to design the interviews was to:

1) Understand the system fully by crafting questions that could provide information on all 5 levels of the five level framework (see Chapter 1.3.1), and the relationship of Labs approach to the FSSD approach. The system levels focused on in this round were System, Success and Strategic.

2) On the design level, the usage of models for participatory processes in dealing with complex issues supported the authors to formulate questions that were relevant to the Lab field in which participatory processes are utilized in order to navigate complexity. To see the design of the first round of interviews, see Appendix C

**Designing draft exercise:**

A draft framework for designing Labs were created to inform the design of the questions for the second round of interviews, which were focused on the design of labs. The draft was inspired by methods such as design thinking (Cross 2011) and agile development (Johnson 2005). To ensure the best understanding and include feedback and test assumptions early in the process, the authors performed an ideation exercise exploring the design elements needed for designing a Lab from beginning to end (or evolution). This exercise was based on information from the literature review, and first round of interviews. Each author created a
draft of the design of a Lab, presenting it to the team and finally creating a shared proposal of what a Lab design process may entail. This informed the discussion of our current knowledge and what yet was to be discovered in the second round of interviews. The results of this draft exercise greatly influenced the design of the second round of interviews.

Round 2
The second round of interviews took place from 8th to 18th of April, 2014 and included 8 people from The United States, The United Kingdom, The Netherlands, Israel, Brazil and Canada. In this round, there were three interviewees from The Natural Step working with The Sustainability Transition Lab approach and five Lab practitioners who work or have worked in organizations such as Reos Partners (Brazil, UK and The Netherlands), A Finance Lab (Hendrik Tiesinga PhD candidate researching in the Lab field) and United Way Calgary were also interviewed. A summarized list of every interviewee is available on Appendix A. Also in this round the two groups were analyzed separately because they offered unique perspectives both within the Lab field and regarding the Framework for Strategic Sustainable Development the authors decided to make a distinction between the results from both sources.

Lenses for designing the interview questions included:
- Design draft exercise, where the authors could access blind spots and focus on new questions to address them;
- Framework for Strategic Sustainable Development (Robèrt 2000),
- The 8 Breaths of Participatory Process Architecture
- The Chaordic Stepping Stone.

The intention for choosing these lenses to design the interviews was the same as for the first round of interviews. The lenses served to design the interview questions only and not to organize or structure any of the findings. When designing, the FSSD inspired questions about the role of: Building a shared awareness /language, creating a shared vision of success, assessing the current reality, brainstorming actions, strategic prioritization and action planning. The 8 Breaths of Participatory Process Architecture informed questions regarding the stages of design and the exploration of generic and specific concepts. The Chaordic stepping stones inspired questions regarding principles for design and questions to ask during the designing process. The design of the second round of interviews can be found in Appendix D.

Taking into consideration both rounds of interviews, the interview process was a way of refining our findings from a broad scope of understanding Labs to more targeted focus on the design of labs as represented in our research question.

2.2.3 Data Analysis

Similarly to the research design process, the design of the data analysis was also very iterative and interactive. The authors began with a clear plan of how to approach the analysis of the information collected, but maintained flexibility in order to gather connections and clarity that emerged from being exposed to data over time. Therefore, Maxwell’s advice was followed to focus on the research question to plan strategies that can fit the data collected, changing whenever was necessary while addressing potential validity threats (Maxwell 2005).
Step one: for all rounds of interviews, the authors revisited first notes listening to the recordings once again, adding more detail to the notes where the information was not clear. Then utilizing the recording, the authors added data to what was missed during real time note taking and also analyzing documents that were made available by interviewees that could clarify what was said.

Step two: with all the data written, the authors created organizational categories (Maxwell 2005) to sort data for further analysis. These categories were inspired by the interview questions, which reflected the areas of knowledge that were relevant to answer the research question. Because the Lab field is both new and adaptive it was important for the authors to remain open to the emergence of new categories as well. To increase collaboration and synergy on new categories this process was done on an online platform (Google Docs) where the authors could see each other’s work in real time and also place information in the new categories as they emerged. Because both rounds of interviews had overlapping categories and were both focused on answering the research question; and due to the fact that the interviewees talked about the subjects of categories in different questions, the authors decided to sort information across rounds and across questions. A matrix with all categories was created (see Appendix B). With Maxwell's warnings in mind about the loss of context when categorizing information, interview notes were carefully filed in order to revisit and correct possible misinterpretations. Information that was not directly related to answering the research question was discarded.

Step three: Next, was to identify main concepts from the matrix that could be simplified in order be further clustered and compared. It was important for this research to be continually exposed to the data in order to capture patterns; concepts were then placed in sticky notes and distributed in their categories, which had been organized in large areas on a wall. This step was very important in order to make potential clusters (and themes / concepts) visible. Next step was to cluster the concepts to understand what was emerging in each category.

Step four: With all the information clustered in each category, what was emerging from each group of interviewees (Lab and FSSD practitioners) became clearer. Next step was to merge some of the categories that were similar in order to present the information with as much clarity as possible. Two authors did this process at all times in order to decrease bias.

Step five: Utilizing this process, and the 5LF as a guide it became clear that to successfully design a Lab it is important to understand how they are being defined (The system), what they (Labs) are trying to achieve (Success), how to strategically design a Lab (Strategic) and how they are trying to achieve its goal (Actions, Tools). In order to make sense of these levels the findings were organized in the categories of the generic Five Level Framework (5LF) for Planning in Complex Systems.

2.2.4 Prototype

Combining the analysis of the interviews, the literature review, the revision of key documents, author’s experiences and tools that could be of value, a prototype with the was created and is explained in more depth in the Results (see Chapter 3.3).
2.3 Validity

2.3.1 Cultural, political and social context

In qualitative research it is impossible to eliminate the researcher’s theories, beliefs and perceptual lens (Maxwell 2005). Bryman also suggests that knowledge from a reflexive position is always a reflection of a researcher’s location in time and social space (Bryman 2012). Therefore, it is important to name these biases in order to understand how the research and conclusions may have been affected and how the authors have planned in order to minimize such interference. Because in qualitative research validity is not the result of indifference, but of integrity (Maxwell 2005), section 2.3 will present the authors short bios and a few actions taken in order to increase the validity of this research.

Ana Carolina Rodrigues: Brazilian, graduated in journalism, with post studies in corporate communication having worked for five years as a marketing coordinator. She has a management background and started to work participatory processes within a project on urban farming in a slum in Rio de Janeiro, Brazil.

Joshua Cubista: Canadian/American, having lived and worked internationally for 9 years facilitating Human Potential Trainings, designing experiential processes, and strategic action consultation. Studies include Waldorf education, and a B.A in Sustainable Community Development and Integral Psychology from Prescott Collage, A.Z, U.S.A.

Rowan Simonsen: Danish, studied Business Administration and Social Entrepreneurship at The KaosPilots. Has lived internationally for the last 6 years. He has worked with participatory process design and facilitation and The Art of Hosting for 7 years.

2.3.2 Reliability & Validity

Internal reliability (Bryman 2012) was addressed overall in the research with a high collaboration effort. All the decisions made and points presented on the research were extensively discussed between all the authors. Additionally the authors committed themselves to developing the group dynamics in order to work together, taking into account their different backgrounds, was emphasized as an investment in order to navigate through information and decisions to more deeply explore the research question in a collaborative way. That work paid off especially given the time constraints that can force researchers to divide tasks in order to move faster. In addition to the extremely collaborative overall decision-making process, the authors have calibrated thoughts and concepts on the following ways:

1. Debriefing of every interview
2. Calibration of categorizing information
3. Calibration of highlighting main concepts
4. Double check on clustering of information
5. Two authors organizing the categories into the 5LF

In order to improve trustworthiness (Bryman 2012), all the notes taken were sent back to each interviewee together with the recordings in order to review accuracy. Additionally, documents provided by interviewees were taken into consideration in order to confirm and complement their answers. To limit, cultural bias ten countries were represented in the
interviews in order to gather diversity of culture and experience. Still on the pursuit of trustworthiness (Bryman 2012), and the root of all these actions lies the authors’ good faith and constant effort to minimize as much as possible personal values and inclinations to manifest into this research and the conclusion made within it.
3 Results

This section presents the results found by interviewing Lab and Sustainability practitioners when exploring the research question “How can labs be designed in order to move society strategically toward a sustainable future by incorporating the FSSD?”

The list of interviewees is presented in Appendix A. All citations within the results section include only the last names of the respondents as all were interviewed in 2014. Full citations are available in the reference section.

The interview process had two rounds: Round 1 focused upon understanding the field of Labs while Round 2 focused on the design of Labs. The results presented below are drawn from both rounds.

3.1 Five Level Framework Analysis

In order to organize and understand the findings presented in this section the authors organized findings into the levels of the generic Five Level Framework (5LF) for Planning in Complex Systems. Patterns have been identified in each of the following levels and are emphasized by being underlined in the material presented below:

- System: Definition of labs
- Success: What are Labs trying to achieve?
- Strategic: Strategy of Labs
- Actions: Actions to take
- Tools: Tools to use

3.1.1 System

Definition of Labs

Lab Practitioners:
When asked to describe their definition of a Lab, six themes emerged: Collaborative was mentioned as a key characteristic of labs by 4 out of 10 interviewees (Scordialos; Hassan; Knuth; Tiesinga). Maria Scordialos mentioned that this collaboration is cross sector and Knuth highlighted that a Lab is a space for sustaining relationships.

Experimentation was another key characteristic mentioned by 5 out of 10 (Hassan; Scordialos; Knuth; VanAntwerp; Tiesinga).

Response to complexity was mentioned by 4 out of 10 (Scordialos; Hassan; Millar; VanAntwerp). Millar mentioned that “labs are a way to organize around complexity” and “a collective response to systems failure”.

Scordialos noted that they are emergent and safe spaces; while Bojer went on to say that they are “safe spaces to build relationships when the future is uncertain.” Furthermore, when talking about what is generic to Labs, Bojer highlighted iterative processes as a key characteristic.
Lack of common definition of Labs was mentioned by 3 out of 10 (Hassan; Kahane; VanAntwerp). The lack of definition in this case referring to the fact that many people talk about labs but mean very different things: “Whenever there are two people in an elevator they call it a lab” (Kahane).

**Sustainability Practitioners:**
When interviewees were asked to define a Lab, five main areas emerged:

Collaboration was mentioned by 4 out of 7 as a key defining characteristic of Labs (Daniel; Nyoni; Robèrt; Carstedt).

Exploratory was mentioned by 4 out of 7 as a defining characteristic (Daniel; Nyoni; Robèrt; Carstedt). “Labs reframe the customer/client relationship, and provide new ways to create impact together” (Daniel).

Experimentation was also mentioned by 4 out of 7 (Park; Robèrt; Carstedt; Daniel). Robèrt highlighted the aspects of action research and testing concepts as core to Labs.

Sustainability and innovation was pointed out as being inherent to labs by Daniel: “The best way of doing sustainability is innovation. The best way to innovate is to collaborate. We need to put sustainability into collaboration and innovation”.

Lack of common definition of Labs was mentioned by Daniel, who said that the Labs seem to be a trend, as everybody seems to be starting labs.

**Defining key elements:**
Interviewees were asked “what kind of questions do you ask yourself when designing a Lab?” This question generated a variety of responses the main categories of which include topics such as: defining the system that is being considered; the current reality, including the challenge; possible resources; stakeholders; the process and the vision of the Lab. The areas presented below have been chosen when 2 or more questions arose that represented the strategic guiding topic.

**Lab Practitioners:**
When asked what questions the interviewees ask themselves when designing a Lab, six themes were found:

Defining the current reality as an important starting point was mentioned twice (Pohlman; Tiesinga). This includes identifying what is needed, what kind of innovation is most appropriate, what is already going on in the field, and what are the challenges, opportunities and leverage points.

Defining the challenge by identifying the problem situation to be addressed and the problem at the center of focus of the Lab was mentioned twice (Bojer; Tiesinga).

Defining the stakeholders by identifying who needs to participate in the Lab to address the challenge, who has a stake or interest in the results of the Lab and determining what level of involvement the stakeholders are invited to have was mention twice (Bojer; Nieuwerth).
Securing resources was mentioned three times as a key aspect and highlights the need to identify what resources are needed, what are already present, where the resources are held and who is needed to access them (Bojer; Hassan; Tiesinga).

Defining the process including structure, methods, and dynamics was cited twice (Nieuwerth; Bojer).

Defining timeframe was mentioned twice including timelines, milestones, and when there should be time to stop and reflect (Nieuwerth; Bojer).

**FSSD Practitioners:**

When asked what questions they ask themselves when designing a Lab six topics were identified:

Defining the challenge including identifying core values and trends within the system if focus, the challenges and opportunities that are present, and why it would be appealing for stakeholders to participate in resolving the issue of focus (Daniel).

Defining the stakeholders by identifying who is essential to the process, who are the stakeholders, how the participants/stakeholders are a part of the problem and also the solution (Daniel).

Finding the resources by identifying what are the resources present and how they best be used (Daniel).

Defining the process was a key point mentioned twice (Daniel; Hodgkin) including identifying how the Lab creates breakthrough results, and identifying the rules of the process.

Defining a long term vision by looking 5, 10, 20 years into the future, understanding what kind of collaboration is desired, what are the stages to get there and what methods fit best to achieve this was mentioned twice (Aanraad; Daniel).

Learning was mentioned as a key feature including ongoing learning, exploring what is missing, and how to move beyond what is currently known. Connected to learning is defining what kind of information should be measured (Daniel).

**3.1.2 Success**

_Need for Labs_

**Lab Practitioners:**

When asked about the need that Labs are endeavoring to address, five topics emerged:

Change both on the personal and the systems level was mentioned by 3 out of 10 (Millar; VanAntwerp; Scordialos). When asked about the need that Labs address today, Charlotte Millar commented “There is a deep disconnection from meaning. I think that that is what Labs do, Labs explicitly say that we are here to connect you to the things that really matter and others on a similar quest” (Millar).
New ways to tackle the challenges that we are facing was mentioned by 2 out 10 (VanAntwerp; Hassan). Hassan commented that “strategic planning fails 99% of the time, we need a new way to address the complex challenges we are facing”.

Creating Spaces for Collaborations was mentioned by (Kahane; Millar) as an important need for Labs. Kahane also stated that there is a “need to work together in unconventional ways for new solutions.”

Accelerating systemic solutions was mentioned twice (Kahane; Millar).

Changing paradigms as a need and possibility was mentioned by (Scordialos) who commented “We are prototyping consciousness” (Scordialos).

FSSD Practitioners:
When asked about the need that Labs are endeavoring to address the following four areas where highlighted:

Role modeling was mentioned by (Carstedt; Hodgkin). Carstedt highlighted the importance of “Showing people that it is possible to do things differently” (Carstedt).

Collaboration was mentioned by (Daniel; Nyoni) who reflected that working together is the only way to address the sustainability challenge.

Accelerate systemic solutions was cited by 2 out of 7 (Daniel; Hodgkin).

The need to see work in a new way and become conscious about one's own bias was mentioned by (Carstedt; Nyoni).

Definition of Success
Lab Practitioners:
When asked about the definition of success of Labs, six topics emerged:

Labs as long term platforms for systems change was mentioned by 5 out of 10 (Millar; VanAntwerp; Kahane; Hassan; Tiesinga). Labs were referred to as ecosystems for systemic change and innovation, platforms that work on various initiatives for creating new solutions to the challenge at hand. Hassan suggested that Labs need to be long term platforms that have infrastructure to support long term innovations for systemic change.

Building relationship and collaboration was mentioned as one of the most important parts of the success of labs by 4 out of 10 interviewees (Millar; Bojer; Knuth; Kahane). Kahane suggested that “Often it is relational innovation, not intellectual that is important, because otherwise you would think that what is needed is new ideas. New ideas are not in short supply, but what is in short supply is coalition, people who are willing to work together to implement the ideas” (Kahane).

Addressing the challenge the Lab set out to resolve by creating a measurable change in the problematic situation was mentioned by twice (Kahane; VanAntwerp).
Difficulty of measuring success was mentioned by twice (Bojer; Pohlmann) Bojer commented “We measure and yet there are things that can never be measured and that’s ok” (Bojer).

Scale and replicability of solutions was mentioned twice (VanAntwerp; Millar).

Shared Language was highlighted by (Tiesinga): “with shared language people move faster” (Tiesinga).

**FSSD Practitioners:**
When asked about definition of success, six topics emerged:

Sustainability was mentioned by 4 out of 7 interviewees as an important part of the definition of success; the use of the FSSD with the Sustainability Principles as a way to define sustainability was emphasized (Hodgkin; Nyoni; Aaraand; Robèrt). Interviewees commented: “You need a principle based vision of a sustainable future to Backcast from, then you can play the game in a million different ways” (Carstedt) and “We need to understand that the future cannot be systematically undermined” (Hodgkin).

Scalability and replicability were mentioned by (Hodgkin; Daniel) referring to the need to have systemic impact on a large scale to be successful.

Empowerment was highlighted (Nyoni; Aanraad) and it was suggested that “We need to be putting people back in the driver’s seat of change” (Aanraad).

Building trust was cited twice (Robèrt; Hodgkin) while relationship building as a key success component was highlighted.

Shared language was cited by 3 out of 7 interviewees (Robèrt; Nyoni; Daniel) who talked about the importance of a shared language and how the FSSD can help understanding the systemic complexity.

A shared vision was mentioned twice (Daniel; Hodgkin) as unique aspect highlighted by the FSSD, and it was suggested that clarifying a shared vision is a very important point for effectively designing a Lab.

**Barriers to Labs Creating Systemic Change**

**Lab Practitioners:**
When asked about the barriers to successful Labs, five main themes were mentioned:

Divergent worldviews was mentioned twice (VanAntwerp; Scordialos) and Scordialos suggested that “We need to understand our worldviews and assumptions so we can trust and collaborate for systemic change” (Scordialos).

Lack of resources was mentioned by 4 out of 10 (Millar; Kahane; Tiesinga; Ugarte). Millar pointed out the difficulty of securing funding for Labs when it is hard to identify what specific outcomes of the Lab will be because fundamentally they are experimental.

Lack of theory and understanding of the field was mentioned twice (Millar; Hassan). Hassan mentioned the value creating a research base of theory for Labs: “I would argue that
in a mature field you don't need to be so aware of theory to practice, but in an immature field it is important to know the theory” (Hassan).

The difficulty of tracking and validating outcomes of Labs was highlighted as a challenge (Tiesinga).

**FSSD Practitioners:**
When asked about the barriers for labs to be successful, four key topics were identified:

Personal barriers such as lack of personal capacities including competence, passion, or commitment of the conveners, facilitators and/or organizers of labs was mentioned 3 times (Carstedt; Hodgkin; Nyoni).

Lack of resources including time, money and human capital was highlighted (Park).

Lack of trust between partners and stakeholders was highlighted (Carstedt).

Lack of collaboration between labs was mentioned as a limiting factor for the success of the lab field: “I see a need of lab of labs! There are so many labs happening in the world and they are not coordinated” (Hodgkin).

### 3.1.3 Strategic

**Strategic Guidelines**

**Lab Practitioners:**
When asked to reflect upon the role of strategic guidelines for designing a Lab, three reflections emerged:

Using a combination of intuition and rationality for prioritizing actions was mentioned by 2 out of 10 (Mille; Kahane): “In general, as the issues are too hard to compute we want a combination of rationale and intuition” (Kahane). When commenting on the prioritization of initiatives Millar asks: “How ready is your initiative to scale? How aware and conscious is the group?”

Strategy as action in a Lab was highlighted as the capacity to act strategically in a situation in contrast to the traditional process of strategic planning in the traditional sense, which is not promoted in the Lab space (Hassan).

An appreciative focus was mentioned by 2 out of 7 interviewees (Knuth; Tiesinga) who commented upon the value of building upon what is already working well and identifying the innovations that are already taking place in the system and connecting them rather than focusing only on problems to be addressed.

**FSSD Practitioners:**
When FSSD practitioners were asked about the role of strategic guidelines, two topics were identified:
Identifying leverage points was pointed out by 2 out of 7 (Hodgkin; Park) who mentioned the importance of having a vision first to inform what leverage points could help influence the process of achieving the vision of success.

The 3 FSSD Prioritizing questions were mentioned by Nyoni who suggested assessing the strategic direction of actions taken in the Lab by asking the three FSSD prioritization questions.

### 3.1.4 Actions

When investigating into the key actions within a Lab the actions of convening a Lab and designing a Lab were mentioned as important actions to take. Convening and designing could also be placed in other levels of this analysis, however because the interviewees suggested that these two elements are two actions to be highlighted the authors describe the findings within the Action level.

**Convening**

**Lab Practitioners:**
When investigating into how to convene a Lab two topics emerged:

*The convening team has to represent the system* was mentioned by 4 out of 10 interviewees (Kahane; Bojer; Pohlman; Hassan). “Convening almost never works with someone from outside the system. It should be initiated by a small group of actors from the system who want to do something” (Kahane).

Co-convening was highlighted as an important part of the Lab approach and it was suggested that convening be done by a team of diverse stakeholders (Nieuwerth).

**FSSD Practitioners:**
When asked about convening one main theme emerged:

*Shared language* for the convening team was mentioned three times connected to how the FSSD can help create a shared vision of success (Daniel; Hodgkin; Robèrt).

**Design Approach**

**Lab Practitioners:**
When asked about what is important to include when designing a Lab, three themes emerged:

Co-designing with core team, stakeholders, and/or lab participants as a key approach was mentioned by 3 out of 10 (Pohlmann; Nieuwerth; Tiesinga).

Designing in stacks e.g. governance, capacity building, information and learning, innovation or problem solving etc. rather than designing a problem solving process was mentioned by (Hassan; Kahane)

Design for context including the challenges and opportunities of the stakeholders and the unique realities of the chosen focus of the Lab (Tiesinga).
FSSD Practitioners:  
When asked about what is important when designing a Lab, two topics appeared:

Co-designing with stakeholders, core team, and participants was mentioned as a way to foster share ownership of outcomes (Aanraad).

Design for context including “meeting people where they are at” and making sure that you are speaking the same language as the people you are trying to engage was mentioned as a key concept (Hodgkin).

3.1.5 Tools

Tools and Concepts

Lab Practitioners:  
Throughout the interviews there was reference to different tools and concepts that are being used in Labs:

Theory U was mentioned by 6 out of 10 (Tiesinga; Hassan; Pohlman; Nieuwerth, Bojer; Kahane).

The Art of Hosting as a participatory methodology was mentioned twice (Hassan; Scordialos).

Other tools mentioned were Evaluative Learning (Scordialos), Scenario Planning (Pohlman; Hassan), Computer modeling and Social innovation (VanAntwerp) and Scordialos mentioned Connecting with Nature as a way of deepening the capacity of the core team.

FSSD Practitioners:  
The FSSD was mentioned by 7 out of 7, Theory U was mentioned by 2, (Hodgkin; Nyoni), Basic Human needs by Max-Neef was mentioned once (Nyoni); Collective impact, Developmental Evaluation and Design Thinking was also mentioned (Hodgkin).

Additionally FSSD practitioners highlighted the value of revealing the relevance of the FSSD through its application which was mentioned 3 out of 7 times (Park; Aanraad; Hodgkin). Additionally it was suggested that the FSSD be introduced subtly in context relevant ways. “On a deeper level, people don’t get the FSSD, we need to reveal the utility of the approach in its application.” (Park).

3.2 Patterns of the analysis

What follows are highlights of the interview data relevant to the research question and the creation of the prototype in the following section below.
3.2.1 System

The authors observed that both groups of interviewees include in their definition of Labs collaboration and emphasize Labs as places for experimentation. Another point of consistency between both groups was the fact that there is a lack of definition of Labs mainly because the field is very young. One point that was only cited once, but was important to the authors in order to answer the Research Question, was the iterative nature of the Lab process, mentioned by Bojer.

When talking about what kind of questions both groups ask themselves when designing a Lab, aspects that were highlighted included defining the challenge, the stakeholders, resources, and the process. The Lab Practitioners also mentioned defining timeframe of the Lab, while the FSSD practitioners emphasized the long term perspective for creating systemic change.

3.2.2 Success

When investigating into the need that Labs address in society two themes were consistent between both groups: 1) accelerating systemic solutions, and 2) the need for doing things in a different way in order to address complex challenges. Additionally, the Lab Practitioner group highlighted the need for change both on the personal and on a systemic level mentioned by 3 out of 10.

Labs as long term platforms for systemic change was mentioned by 5 out of 10 Lab practitioners indicating the importance of allowing time for resolving societal challenges.

Relationship building was mentioned by 4 out of 10 Lab Practitioners, and building trust, as a result of building relationships, was mentioned twice by the FSSD practitioner group.

Sustainability was mentioned only by the FSSD practitioner group (4 out of 7) as an important part of defining success and emphasized the use of the Sustainability Principles as important to construct sustainable visions of success. This contrast highlights how Lab practitioners do not use a shared definition of sustainability when defining success in their activities.

Scalability and replicability was mentioned by both groups as important to really achieve systems change.

Having a shared language was mentioned by both groups as an important element of success.

When talking about barriers for Labs to be successful both groups of interviewees highlighted a lack of trust and resources. This barrier related to the difficulty of defining the field due to the lack of theory and the difficulty of measuring long term results in a way that makes the Lab approach able to compete for resources in the market.
3.2.3 Strategic

Under Strategic Guidelines, Hassan highlighted the idea of strategy as action or the capacity to act strategically in a situation as opposed to the traditional planning that relies mostly on forecasting and predictability. The over reliance on this kind of planning was highlighted as a problem when dealing with complexity in the introduction.

Having an appreciative focus as a strategic action orientation by building on what works in the system was also mentioned by 2 out of 10 in the Lab Practitioner group as important in opposition to the problem solving approach. The FSSD practitioners group mentioned the importance of identifying leverage points and the FSSD Prioritisation Questions.

3.2.4 Actions

In the Lab practitioner group, 4 out of 10 spoke to the need for the convening team to represent the system that it is working with. Under design approach, both groups highlighted the importance of designing for context by meeting people where they are at and taking into account culture and worldviews. Another point agreed upon between both groups, was the necessity of co-designing with stakeholders.

3.2.5 Tools

Theory U was the most cited tool between Lab practitioners, the authors highlight that most of this group works for the organisation Reos Partners, who uses the tool in their Change Labs. It was also cited by FSSD practitioners (2 out of 7).

The FSSD was cited by 7 out of 7 as a tool for using with the Lab approach and that the FSSD is best utilized in context relevant ways without the reliance on technical terminology, and that its utility is best seen through application in the field.

3.3 Prototype

In order to answer the research question, test the application of the results, and to test the assumptions of the authors in relationship to the designing of Labs that move society strategically toward a sustainable future, the authors developed a prototype as a conceptual framework for understanding the design of Labs. The content of the prototype was generated from data collected in interviews, literature review, field notes, and from the past design and facilitation experience of the authors. The prototype is not a prescriptive model; it suggests a light framework focusing on a Lab as a space within which iterative processes happen by moving through a learning spiral. By choosing this generic perspective the aim of the prototype is to provide a framework that can be applied to any Lab with the goal of moving society toward a sustainable future. Furthermore, the authors’ aim in creating the following prototype was that it may offer starting points for further discussion within the Lab field as to how Labs can move society strategically toward a sustainable future by including the FSSD.

In the model of the prototype below, Labs are described as a space with four elements inside that are addressed in an iterative way. The focus of the prototype is on the design process
which was chosen as a generic approach to understanding the dynamics of a Lab that is focused on constant learning and prototyping. Various other approaches that were more time bound and process oriented were considered. These approaches were found to be more linear, context dependant, and already documented in various forms which encouraged the authors to find a model that describes the learning process within the space of Labs in a more dynamic way. The circle offers a way to understand the space of the Lab, while the four elements highlight aspects to consider when engaging in an action learning space, such as a Lab. Finally the spiral offers a representation of the iterative nature of these kinds of spaces, incorporating the learning from the last round to constantly improve. Below is a summary of the key points of the prototype.

3.3.1 Orientation of The Lab

In order to understand how to design a Lab for a sustainable future it became clear that it is important to understand the orientation that the Lab must have in order to achieve such a goal. Therefore, before designing a Lab space and/or the processes within it, it is important that Lab designers and practitioners determine whether a Lab approach for resolving complex challenges is suited for the intended purpose. The following characteristics as summarized from the introduction and results sections of this document present a set of guidelines to support the orientation of a Lab toward the qualities and processes that come into play when using Lab spaces and approaches to address complex societal challenges. A Lab in this context therefore has the highest probability of success when it focuses on:

- Addressing systemic root causes (Hassan; Kahane; Hodgkins; Millar; VanAntwerp; Scordialos)
- Utilizing collaborative, multi-stakeholder, and cross-sector processes (Carstedt; Scordialos; Hassan; Knuth, Tiesinga)
- Focusing on action, experimentation, prototyping, and iterative processes (Hassan; Scordialos; Knuth; VanAntwerp, Tiesinga; Park; Robèrt, Carstedt, Daniel)
- Focusing on learning, research, documentation, and theory (Hassan, Daniel, Robèrt)
- Creating new models of relationship and engagement (Millar; Scordialos; Hassan; Bojer; Knuth)
- Returning agency to people as leaders of change and innovation (Scordialos and Millar)
- Developing innovations toward a socio-ecologically sustainable future (Hodgkins; Park; Robèrt)
- Developing capacity and leadership for systemic change (Millar and Hodgkins)

3.3.2 Lab Space

Labs addressing societal challenges have traditionally been viewed by and large as innovation and problem solving processes and/or projects with relatively short and finite timelines. Expanding this notion, as mentioned in the introduction and seen in the Results chapter, Labs are evolving from a process/project focus toward an organizational model that employs many processes to resolve complex challenges over longer timeframes (Kahane; Hassan).

In order to depict the space where activities take place in the Lab, the authors simplified this concept by representing it as a circle in which everything within the Lab takes place.
Furthermore the Lab space is defined by the characteristics that the Lab focuses on; in this case determined by a synthesis of the Lab characteristics presented above in the “Orientation of the Lab” section above.

During the research various interviewees and documents pointed to an evolution in how labs were being defined, from having been focused more as innovation process to becoming more of a platform for creating lasting innovations over time. In the results, Labs as long term platforms for systems change was mentioned by 5 out of 10 (Millar; VanAntwerp; Kahane; Hassan; Tiesinga).

![Figure 3.1 Lab Space represented by the circle](image)

### 3.3.3 Lab Elements

Within the Lab space the following elements were identified by the authors during the data analysis phase as ways of understanding the dynamics of what is at play at various moments in the Lab experience. Each element is both an individual area for action and collectively the four together make a whole greater than the sum of their parts which are what makes up the interior of the Lab experience. It is the intersection of each element and the relationship between them that makes up the dynamics within the Lab.

![Figure 3.2 Lab Elements](image)
**Define**

Within the Define Element the key area of focus is the System of the Lab including: the need the Lab addresses and its purpose (Pohlman; Tiesinga), the challenge and/or solution (Bojer and Tiesinga; Daniel), the vision of success (Aanraad; Daniel), the current reality of the situation which include defining the scope of resources present, the vision of success including financial and human (core team and stakeholders) (Bojer; Nieuwerth; Hassan; Tiesinga; Daniel). The Define element has appeared as a pattern that exposed that in the Lab field, there is a space where the definition of some given elements are explored and can be seen under the Systems Level, on the analysis. On many occasions it was observed that many of these definitions happen in the early stages of a Lab, and it was alerted that the order and even the need for one or other actions is context dependent (Hodgkin; Tiesinga) and tend to be revisited as described in the iterative nature of Labs cited before.

**Design**

When exploring the topic of design with the interviewees, the authors found that there were multiple focus areas, such as the design of the Lab space, the structures within the Lab (e.g.: governance), innovation and other processes (Hassan; Kahane), and the intended harvest or outcome that the Lab is being designed for. Observed in results was an understanding that design has traditionally been focused primarily on the process and outcomes and currently is expanding to include other aspects needed to create a Lab as a space, such as governance and feedback processes (Hodgkin; Daniel; Hassan). Design therefore needs to be part of many levels at many times to ensure the success of a Lab.

**Act**

The Act Element focuses upon the experiences within the Lab space including the experimentations and prototyping toward innovations; the development of capacities of the people within the Lab to create systemic change and toward action learning and research dedicated to addressing the vision of success that has been defined for the Lab. As the main focus of the research was on design of labs, the action part was not explored with depth. This is the space where everything that has been designed for is executed, in which many tools and processes are applied. For Labs the importance of documenting and learning from the actions taken was highlighted in the Results section (Daniel; Hodgkin; Robert; Tiesinga; Hassan).

**Evolve**

The Evolve Element is dedicated to the reflection and evaluation of actions, feedback on learning and research, the development of metrics of success for Lab actions and the scaling of innovations. A key part of this element is iteration in the Lab processes to incorporate the feedback, learn, and move forward to scale innovations when relevant to the vision of success of the Lab. It is important to have constant adaptive learning from failure and feedback (Hassan 2014, Reos Change Lab 2014, Mootee 2013) and therefore, this was included in the model to ensure the focus on the learning and iterative nature of the Lab over time.

### 3.3.4 Lab Spiral

When asked “What phases/stages do you need to consider when designing a Lab”,
interviewees suggested that the Lab approach and therefore the design of Labs is extremely context dependent. Furthermore, it became clear to the authors that rather than being linear, Lab spaces are very often iterative, meaning that the pattern of actions in a Lab most often follows an iterative spiral form of actions that incorporates feedback loops rather than a straight line, going strictly from one phase to the next. This means that while there are directional and temporal aspects to Labs in that they do have a beginning, middle, and end/evolution (depending on the type), Lab designers and facilitators often revisit core aspects of each stage throughout the lifespan of the Lab continuously widening the scope and/or focus of each stage and the Lab space as a whole. This iterative design process is mirrored in iterative software development and prototyping, which is very similar to the Lab approach, in which it is understood that:

“Iterative design is an approach of incrementally developing and refining a design based on feedback and evaluation. Iterative design can apply to a learning experience, the creation of media, or the development of learning systems” (Instructional design 2014).

Figure 3.3 The Spiral representing the iterative nature of Labs

In summary the authors understand Labs as spaces in which the elements of Define, Design, Act, and Evolve are addressed in an iterative way, as represented by the spiral while innovating toward solutions that address the challenges that the Lab is oriented toward as depicted below.
When highlighting how Labs can move society strategically toward a sustainable future, one interviewee suggested, “In order for you to be strategic, you have to know where you’re going” (Robèrt). Similarly in order for Labs to contribute to moving society strategically toward a sustainable future Lab practitioners must have a clear vision of how to align Labs with strategic sustainability at the system, success, strategic, action, and tools levels as summarized in the FSSD table below.

<table>
<thead>
<tr>
<th>System</th>
<th>A Lab within the global socio-ecological system; Overview of sustainability challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>A Lab that complies and contributes to transitioning society toward a sustainable future within SP’s</td>
</tr>
<tr>
<td>Strategic</td>
<td>Backcasting from success principles and Lab vision of success; 3PQ’s</td>
</tr>
<tr>
<td>Actions</td>
<td>Experimentation, innovation, and prototyping that moves the global socio-ecological system toward sustainability</td>
</tr>
<tr>
<td>Tools</td>
<td>Application of tools that support Lab goals and efforts to reach global sustainability</td>
</tr>
</tbody>
</table>

*Table 3.1 Strategic Sustainable Labs according to the FSSD*
Labs traditionally rely on prototyping as a key process for innovating solutions, however as depicted in the image below prototyping without boundary conditions for a vision of success within the Lab as defined by the SP’s may or may not move society toward a sustainable future; even more importantly a given innovation or action may in fact contribute toward unforeseen unsustainable implications.

![Figure 3.5 Prototyping without Sustainability Principles](image)

Backcasting from sustainability principles as depicted in the A, B, C, D Process on the other hand, as described in the introduction of this report and as depicted below, offers a way for Lab practitioners to design and create Labs in which solutions to be innovated and actions to be taken can in fact move society strategically toward a sustainable future.

![Figure 3.6 Backcasting from sustainability principles](image)

Through the synthesis of these findings as highlighted in section 3.2 Prototype of this report, and in order for labs to contribute to strategic sustainable development the authors recommend that Lab Practitioners endeavor to design and create Lab spaces that are within the Sustainability Principles, as depicted by the outer circle in the image below, and develop innovations that therefore do in fact move society toward a sustainable future.

Furthermore, as highlighted below in the top-right of the image, some aspects of the A, B, C, D Process: vision of success and current reality, are already part of the Lab approach as
mentioned in the define element above. Lab practitioners when designing and/or facilitating a Lab develop these areas naturally as aspects of the design process as seen in the research. At the same time, because Labs are iterative and dynamic in nature and Backcasting from principles as an approach emphasizes non-linear strategic action, the authors suggest that rather than prescriptive delineations as to where the steps of the A, B, C, D process are placed within the prototype each step or aspect is best incorporated in a context relevant way both in the design process and with participants and stakeholders within the Lab ((A) creating an envisioned future within the sustainability principles, or B) understanding the current reality, or C) brainstorming actions to bridge the gap, or D) prioritizing actions).

Figure 3.8 Prototype & FSSD
4 Discussion

In this section the authors will discuss the implications of this research to strategic sustainable development, its validity, and areas for future research in order to support emerging Lab Practitioners to design Labs that move society toward a sustainable future.

4.1 Implications of Research to Strategic Sustainable Development

As proposed within the introduction of this report, society within the biosphere faces a mosaic of socio-ecological challenges, or wicked problems (Mootee 2013, 35), that are increasingly systemic, complex and global (Kahane 2010), on a scale unknown before in human history (Scharmer; Kaufer 2013). In order for society to transition toward a sustainable future and resolve the complex challenges before us, it is imperative that a way of operating that does not systematically undermining our own subsistence is found (Hodgkin 2014). Through this research the intersection of two specific approaches to resolve complex adaptive challenges by creating innovations and solutions toward a sustainable future has been explored: 1) Labs that seek to address complex adaptive challenges on a systemic level, and 2) the Framework for Strategic Sustainable Development. In order to understand the implications and contributions these two approaches can make toward strategic sustainable development, this research has focused on the exploration of the research question “How can Labs be designed in order to move society strategically toward a sustainable future by incorporating the FSSD?”

Based upon the findings collected in the results section of this report and in answer to the above research question, the authors recommend that Lab practitioners focus their efforts in the following ways in order to increase the probability of designing Labs that do in fact move society strategically toward a sustainable future:

1. Co-design Lab spaces, processes and architecture with their core team and stakeholders, as mentioned in the Results section, under the Action Level, and have them (core team and stakeholders) represent the system of interest, as mentioned by 4 Lab practitioners

2. Create a portfolio of innovations that increases the probability of finding successful solutions, innovations, and therefore addressing the complex adaptive challenge the Lab seeks to resolve, as suggested by Hassan when highlighting “strategy as action” in contrast to relying on traditional planning

3. Contribute toward systemic global socio-ecological sustainability as described by the SP’s, while utilizing Backcasting from Sustainability Principles in dynamic and context relevant ways focusing on strategic action and experimentation as a way to create a common definition of success that includes sustainability.

The authors propose that the benefits of both the Lab approach and the FSSD be combined to increase the probability of creating successful innovations and resolutions to systemic complex challenges that lead toward a sustainable future. The benefits of the Lab approach include innovation toward systemic solutions through experimentation, prototyping, multi-stakeholder process, capacity building, and relationship building; while the FSSD offers a way to understand systemic complexity while promoting strategic action, partnered with
Backcasting toward success from Sustainability Principles. The authors suggest that by uniting the Lab approach with its emphasis on iteration, experimentation, and dynamic spaces and processes, with the FSSD and its emphasis on Sustainability Principles, Backcasting, and ways to understand the levels of the system of focus, the probability of creating successful innovations and collaborations toward a sustainable future is increased; as depicted in the image below:

![Figure 4.1 Prototype & FSSD](image)

The above elements of the Prototype are offered to Lab practitioners as a light conceptual model to understand the dynamics at play when designing a Lab space. The four elements Define, Design, Act and Evolve are each addressed within the Lab space as defined by the characteristics in the Lab Orientation in an iterative way as described by the Lab Spiral. During the process of moving through the four Elements, different areas of focus are addressed such as in Define: shared vision and current reality, among others, in Design: Lab space and processes, in Act: focusing on experimentation and prototyping, and in Evolve: focusing on learning and iteration in the Lab space and scaling innovations when appropriate. These concepts emerged as the author’s synthesized data in the analysis phase. The conceptual framework of the prototype model offers a starting place for emerging Lab Practitioners when designing the Lab space, processes, and structures in order to increase the probability of creating a successful Lab that can in fact move society towards sustainability. Furthermore, the FSSD provides an integral way of articulating the boundary conditions, as articulated by the Sustainability Principles, which could provide the basic frame of the vision of success for a Lab in order for the actions within the Lab space to be in alignment with global socio-ecological sustainability. In order for a Lab to be strategic as mentioned above it is important to utilize a Backcasting approach from Sustainability Principles while
prioritizing actions and utilizing tools that do in fact comply with a sustainable vision of the future. However, because of the iterative and context dependent nature of Labs it is imperative to incorporate Backcasting from Suitability Principles in context relevant ways depending on the goals and needs of the stakeholders within a given Lab. If not, practitioners run the risk of innovating solutions that only address surface problems rather than the root causes of systemic challenges.

4.2 Validity

4.2.1 Research & Results: Strengths and Limitations

Strengths

One of the main strengths of this research is the Data sets of sustainability practitioners and Lab practitioners that were interviewed. The Lab practitioner sampling represents some of the people and organizations with most practical experience in the field in the world, one of them launching a book on the subject during the time of this research Social Labs Revolution: a new approach to solving our most complex challenges (Hassan 2014). The FSSD practitioner sampling included a diverse set of leading edge practitioners at the forefront of applying the FSSD toward transitioning society toward a sustainable future and the unifying of the FSSD and Lab approaches as exemplified in the Sustainability Transition Lab model. The diversity of culture and social context of the sampling was also a strength: 10 countries and 4 continents were represented.

Additionally the iterative nature of the research approach was also a strength in that it allowed the authors to keep learning throughout the various phases of research continually naming and accessing their blind spots in order to improve processes as fast as possible and correct possible mistakes and bias influence. More on specific methods in order to improve validity is exposed in the chapter 2.3.

Limitations

The relative short timeframe of the project meant some constraints to the depth of the study, in particular around the selections of methods. On a bigger time frame, more methods could have been used to triangulate and validate the results with more strength.

Due to the fact that the field is very new and still being defined, there was little academic peer reviewed research found and that resulted in relying on websites and online informal documents from the organizations that are working with the Lab approaches. This meant that much of the materials that were used had the characteristics of field notes, evaluations, and best guesses from the practitioners.

The interviewees had different levels of experience: some had not had experience of all phases of a lab, only representing their recent experience of initiating labs which meant that the authors had access to little information on later stages of Lab life cycles.

The interviewees mainly represented experience from three organizations namely: Reos Partners, (six people), TNS (seven people) and The Finance sustainability lab (three people). It is very possible that the results would look different, had the interviewees represented other organizations working with labs.
Many of the interviewees were facilitators and consultants and not necessarily representing
the point of view of the convener or participant. Widening the research could have improved
the validity by presenting different points of view.

The interviews were semi structured, which meant that the questions were not always
answered in the exact same way and that not all questions were asked to all interviewees, due
to mainly time constraints of some interviewees. When the results were quantified in the
results section, they were quantified on the basis of the total amount of interviewees in each
of the two sampled groups, not specifically on how many were asked a specific question. Had
the questions been more structured and informed by a broader perspective of design, the
results could possibly have been strengthened.

Lack of time also played an important role on the data analysis: with more of this resource in
hands, the authors could have made more connections between the information gathered and
reached a higher level of clarity in order to present stronger results. The documentation of the
interviews was also not transcribed on a word-by-word level, which could have improved the
accuracy of the results.

Another possible limitation is that it is assumed that Labs is an effective approach for
creating long-term systemic impact in complex adaptive systems. There is no empirical
evidence to support this though as the field is so relatively new and systems change usually
takes long time. Another assumption that is a limitation for our research is that the FSSD has
a space on Lab field.

4.2.2 Prototype: Strengths and Limitations

Strengths
The prototype offers a light conceptual framework to understand the dynamics at play in a
Lab which is a strength in that when endeavoring to unite the two perspectives of Lab and
sustainability practitioners the authors were able to bring to bear the contributions of both
perspective in an inclusive and open way. Because the authors understand that a lot of the
work performed in the Lab field is very context dependent, there was a special attention
brought to understanding the generic and context driven aspects in order to suggest points of
discussion and inspiration that could serve the audience of this research. The understanding
that this prototype does not suggest a recipe to design Labs is also strength in that this open
development of the prototype invites future testing, discussion, and debate in the field.

Limitations:
For the prototyping exercise the biggest challenge was due to time constraints. The goal was
to be able to get feedback from practitioners and have a field test to make it stronger within
the scope of this project. It is understood that the exercise of creating the prototype was very
important for the authors clarity of this research and it is furthermore understood that this
prototype could have been of more value with feedback and field-testing.
The lack of time also reduced the amount of information drawn from other Lab Practitioners
and practitioners of tools utilized within Lab design and facilitation that could have been of
value in complementing the information that lacked on the later stages of a Lab life cycle.
4.3 Areas for Potential Future Research

Within the scope and timeframe of this research seven potential areas for future research have been identified and are presented below:

4.3.1 Labs for a Sustainable Future

It has been identified that there is a need for further understanding of the role of Labs in the resolution of long-term systemic challenges; and how to scale innovation toward the long-term resolution of local and global challenges. Both subjects appeared on the interviews by both groups and the former point was hard to understand in more depth given the early age of this field and the difficulty to understand what are the implications of Labs in a long term basis. The latter point, related to scalability was also mentioned by both groups when talking about definition of success as an important part of the Lab approach, but due to time constraints, the authors didn’t focus on this point and offer it as a suggestion for further studies.

4.3.2 Metrics for Success

It has been observed that as the Lab field evolves it is becoming increasingly important to evaluate the metrics of the impact of Labs in regard to long term systemic change. When talking about barriers for Labs to create more systemic change, most of the interviewees mentioned lack of trust, resources and legitimacy mostly related to the difficulty to measure the results of the Lab. This particular point would help the field to be stronger in attracting resources such as legitimacy, funds and partners.

4.3.3 Sustainability & the FSSD within the Lab Space

When exploring the role of the FSSD in the Lab space the following areas have been highlighted as specific places where in-depth research could be explored:

- Field testing the role of Sustainability Principles as sources of shared definition and success conditions for Labs, as it was evident, from the interviews that Lab practitioners are not using any shared language around the sustainability piece;
- Identifying where and how to bring in the details of the FSSD into the Lab space and process;
- How to promote the FSSD in an accessible and inclusive way, taking into consideration the diversity of culture and knowledge of participants, since FSSD practitioners have mentioned that a new way of communicating the tool is needed in order for participants to be more willing to use it.

Furthermore, we see a direct link between Labs and the FSSD as ways of fostering innovation toward a sustainable future and recommend that Lab Practitioners and FSSD practitioners collaborate in order to more effectively address the sustainability challenge.
4.3.4 Labs as Organisations

As stated above it has been observed that Lab practitioners are shifting the focus of Labs from process/project focus toward a more organizational focus which has highlighted the following areas for potential future research including:

- How to position socio-ecological sustainability laboratories in the scientific community in a similar way to natural science labs in order to address global and local systemic challenges?
- How to design the Governance structures of Labs as organizations
- The role and relationships of specific stakeholders in Labs as organizations
- How to apply Labs processes such as prototyping as or within an organizational culture

4.3.5 Prototyping, Scaling Solutions, & Learning to Evolve

Because of the timeframe and sampling chosen for this research, three very important aspects of Labs were not so deepened and are very important to its success. The authors, therefore, suggest further studies to understand the aspects of:

- Prototyping: how to prioritize prototyping and possible tools that can support this phase
- Scaling solutions: how to scale new solutions in an effective way
- Learning to evolve: with the trend of the Labs moving from process to organizations/spaces, it seems important to understand what is needed to take place in order to learn and evolve throughout time in order to achieve new levels of clarity and solutions.

4.3.6 Solution Oriented or Problem Focused

Traditionally Labs have been focused on problem solving and the resolution of challenges as a way to determine the direction of innovation within society. Taking a more appreciative approach in the Lab space has been highlighted as a potential strategic advantage, it is therefore suggested that testing be done regarding how Lab spaces and process could benefit from focusing on building upon strengths and opportunities rather than focusing primarily on challenges and problems.

4.3.7 Capacity Building & Personal Development in Labs

How do the people in the Lab effect the innovations created? How does the inner state of the convener, facilitator, or participant in the Lab space affect the outcomes of the Lab? These questions have lend the authors to suggest further research in the role of capacity building and personal development in the Lab space and how it can affect the viability of participants to create solutions that foster systemic change rather than reinforcing past unsustainable models of engagement. Therefore, it is suggested that future research includes exploring and testing the depth and degree to which capacity building and personal development can be brought into the Lab space.
5 Conclusion

One definition of insanity that is often wrongly credited to Albert Einstein is to do things over and over again expecting different results (author unknown). Given the wide range of challenges society faces, in order to transition toward a sustainable future there is a great need to experiment, collaborate, and employ agile strategic approaches that can quickly be adapted to constant change; what is needed are new ways of thinking and working that create results that lead to a truly sustainable future. As the interviewee Margaret Wheatley suggest, “We need a whole new way of thinking, you can't get there from here” (Wheatley). While Monica Pohlmann, also an interviewee in this study suggests that “we need the biggest ‘We’ we have had in a 100 years” in order to have a chance to succeed in moving society toward a sustainable future (Pohlmann).

This research explored how Labs, as an alternative way to dealing with complexity, can be designed in order to move society strategically toward a sustainable future, and how the FSSD contributes toward this endeavor. The authors have interviewed two distinct groups: Lab practitioners and FSSD practitioners. Evidence was found that indicates that there is an evolving clarity of the definition of Labs and because the field is very new and adaptive, there is a lack of alignment on what a Lab is, its characteristics, and the theories that support actions within Lab space. Another important pattern that was observed was the momentum of Labs from a process/project focus toward a space/organization forum. This pattern was reinforced by the necessity stated of longer periods of time in order to be able to witness systemic change. The relational aspect of success was also mentioned by 4 out of 10 Lab Practitioners in the success level as an important point of attention; one of the most important outcomes of Labs seems to be the unique way that Labs are working to increase collaboration among sectors and borders, which increases trust in the system, which in turn supports society to become more resilient and adaptive to challenges.

In relationship to sustainability, the majority of Lab spaces have been designed with varying definitions of sustainability, which means that there is no guarantee that the actions taken within those spaces are not somehow contributing to unforeseen sustainability challenges. Therefore, the authors suggest that the inclusion of the Sustainability Principles, communicated in a inclusive and context dependant manner, as a way to articulate the success boundaries of actions taken within the Lab space can contribute toward increasing the probability that new solutions and innovations created within the Lab space can in fact move society toward a sustainable world.

Labs provide a unique adaptive, experimental, and collaborative approach to the resolution of complex challenges, and the FSSD provides the basis for understanding the systemic and complex nature of the sustainability challenge, as well as offering ways for taking strategic action toward global socio-ecological sustainability; the unification of these two approaches has the potential to assist humanity in navigating toward a sustainable, regenerative, and thriving future for all.
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Appendices

Appendix A - List of interviewees
Note: website addresses listed below are current as of 07.2014 and may be subject to change.

List of interviewees: Sustainability practitioners
Karl-Henrik Robért - Founder - TNS: naturalstep.org
Berend Aanraad - Executive Director - TNS Netherlands: thenaturalstep.nl
Saralyn Hodgkin - Director - TNS Canada: naturalstep.ca
Ronny Daniel - Co-founder - TNS Israel: naturalstep.org
Goran Carstedt - Executive Leadership - Volvo, Ikea, TNS: naturalstep.org/en/g-ran-carstedt
Stanley Nyoni - Senior Advisor & President - S2 Sustainability - TNS: naturalstep.org
Chad Park - Executive Director - TNS Canada: naturalstep.ca

List of interviewees: Lab practitioners
Julian Ugarte - Founder - SociaLab: socialab.com
Adam Kahane - Co-founder - Reos Partners: reospartners.com
Zaid Hassan - Co-founder - Reos Partners: reospartners.com
Charlotte Millar - Co-founder - The Finance Innovation Lab: thefinancelab.org
Maria Scordialos - Co-founder - Living Wholeness Institute - Politeia 2.0 Lab: politeia2.org
Satsuko VanAntwerp - Manager - Social Innovation Generation: sigeneration.ca
Maaiianne Knuth - Co-founder Pioneers of Change and Kufunda learning village: kufunda.org
Hendrik Tiesinga - Founding Partner - Natural Innovation: societal-innovation.org
Batian Nieuwerth - Partner - Reos Partners Netherlands: reospartners.com
Mille Bojer – Partner - Reos Partners Brazil: reospartners.com

List of interviewees: external advisors
Tim Merry - Director - Myrgan: timmerry.com
Joeri van den Steenhoven - Director - MaRS Solutions Lab: marsdd.com/systems-change/mars-solutions-lab/
Eduardo Staszowski- Director - DESIS Lab - The New School: newschool.edu/desis/
Margaret Wheatley - Co-founder Berkana Institute: margaretwheatley.com
Darcy Winslow - Managing Partner Academy For Systemic Change: academyforchange.org
Michael Ben-Eli - Founder & Director -The Sustainability Laboratory: sustainabilitylabs.org
Appendix B - Data analysis sample of spread sheet

Appendix C - Round 1 interview questions

How can Social Labs be designed to move society strategically towards a sustainable future?

Introduction:
Time for interview? Can we record to use for research and possibly website?
Intro to us and our topic
Introduce Interview process + roles - main host, note takers.
Introduce research topic and why we wanted to talk to them

System:
How would you define a Lab? What is a lab for you?

Success:
What is the “outcome” of Labs?
What is the potential of labs?
What are the challenges?
What do you see as the need and purpose that labs are addressing in society?
What role can labs play to create systemic change in society?
How do you see Labs define success? (Definition of goals - where you want to go)

Strategy
What makes labs an attractive strategy to use?
Do you see labs having strategic guidelines? Prioritizing actions?

Actions
How do Labs develop personal capacity? Personal development/changing mental models

Tools:
How do you measure whether you are coming closer to success?

Gaps
What are the greatest barriers for Labs creating more impact?
What are the limitations of Labs in general? When should they not be used
Do you have any needs in your work that this thesis could serve if possible?
(What are the biggest questions that labs are asking about their work?)

Design of labs
How to define the challenge? (Who - where - timeframe, type of challenge)
How to create the convening team?
What is the core of the invitation when inviting people to be part of a lab?

Closing questions
Is there anyone else that you would recommend us to interview?
Are there any documents that you can share with us about tools and process

Appendix C - Round 2 interview questions

How much time? Can we record? Roles of interview (Introductions of us if there is time)
Overview of thesis, where we are at now, from exploratory to design focus:

How can Social Labs be designed to move society strategically towards a sustainable future?

SUB RESEARCH QUESTIONS
How can the FSSD serve the design of labs?

Framing of what do we mean by Labs:
Working on complex societal problems on its root causes
A) Multi stakeholder: Convening a group of stakeholders representing the system at hand
B) Collaboration: co-creation of creative solutions, through participatory methods
C) Emergent: Letting new solutions emerge
D) Iterative: Continuous learning, trial and error and adjustment
E) Prototyping: foster dynamic creation across sectors
F) Personal and collective development: provide tools and experiences that can support personal development towards a shift on mental models,

What is your relationship to labs?
1) What phases/stages do you need to consider when designing a Lab from the beginning?
2) What is generic - what is specific for a lab design?
3) What questions do you ask yourself when designing each of these parts?
4) Do you see overall design principles being valuable in the design process?
5) How do you see the role of the (A, B, C, D) in the design of labs?
   • Building a shared awareness/language
   • Creating a shared vision of success
   • (boundary conditions)
   • Current reality assessment
   • Brainstorm actions
   • Strategic prioritization
   • Action planning
6) What are the deliverables/results of a Lab that you are designing for?
7) What is the most important part of designing a lab to ensure success?