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Sustainable Food Initiative

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Sustainable Business & Innovation

Identifying the most feasible way to set up a living lab for food sustainability in the Netherlands
A case study for the Sustainable Food Initiative

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Abstract

Agricultural intensification, global climate change and a growing population are putting pressure on global food systems. The Netherlands plays a unique role in these systems because of its international hub of agricultural science, high agricultural productivity and responsibility for many negative effects of agricultural intensification. To achieve a transition to more sustainable agri-food systems, a living lab can help by providing an effective arena for cross-sector collaboration and experimentation. While academics argue for the use of living labs in fostering agri-food transitions, little research into this topic has been conducted. In this research, the feasibility of a living lab for agri-food transitions in the Netherlands was studied through a case study for the Sustainable Food Initiative (SFI). Desk research was used to construct a theoretical framework for the analysis of the feasibility of an agri-food transition living lab. Semi-structured interviews with SFI network partners were conducted to provide empirical data on stakeholder's views on the SFI living lab and the concepts from the theoretical framework. Hybrid thematic analysis was used to analyse the data, resulting in themes that were deduced from the conceptual framework and induced from the data. The analysis shows that there are both strong differences and strong similarities along the respondents' views on an SFI living lab. Most importantly, the results show that SFI network actors are interested and see the added value of a network with various actors from the value chain, experimentation in real-life settings and the use of co-creation. However, they struggle to see the role of the SFI in this, do not see the added value of involving citizens and governmental organisations as stakeholders and indicate that there is a lack of examples. Additionally, there is ambiguity regarding the definition, goal and organisation of an SFI living lab. These issues and some of the differences – amongst actors themselves and between actors' views and theoretical feasibility– need to be addressed in order to maximise the feasibility of an SFI living lab. To aid in this process, this research provides 28 recommendations for the SFI to adhere to when setting up a living lab.

Keywords: living lab • agri-food transition • agri-food system • agriculture • innovation • transition theories • feasibility • agroecosystems • sustainability • food • Sustainable Food Initiative

Executive Summary

Worldwide agricultural production is highly dependent on biodiversity, nitrogen, phosphorous and a stable climate. Yet agricultural practices are largely responsible for the planetary boundaries of these very elements being exceeded. The forest fires and floods happening around the world in 2021 are a clear example of the stable climate disappearing and its impact on agriculture. In a world of hunger and malnutrition where climate change and human population are ever-growing problems, this system needs to change in order to ensure a sustainable future for humankind. Research shows that such large-scale change should be considered from the perspective of agri-food systems –including all actors and processes involved in agricultural production– rather than a silo perspective. Recently, researchers have suggested a novel approach to stimulate this change, which is the use of living labs.

In short, a living lab is a "*user-centred, open innovation ecosystem based on a systematic user co-creation approach integrating research and innovation processes in real life communities and settings*" (European Network of Living Labs, n.d.). It is a method for innovation aimed at societal transitions. A living lab tries to achieve such a transition by working with private, public, academic and civil actors who co-create experiments in a multidisciplinary setting. Important is that the experimentation takes place in real life settings, where users experience innovations in a natural environment and provide feedback on their experience.

The Sustainable Food Initiative (SFI) is a network organisation in the Netherlands with the ambition of "*Using the full potential of all agricultural produce to create a new generation of sustainable, safe, nutritious and delicious products while reducing the total footprint to zero in 2050*" (SFI, n.d.). They are interested in the use of living labs to reach their ambitions but are unsure how a living lab can best be set up in the most feasible way within their network. Therefore, the aim of this research was to identify the most feasible way for the SFI to set up a living lab for the promotion of agri-food transitions in The Netherlands.

First, a conceptual framework for the feasibility of living labs for agri-food transitions was developed. Based on a literature review, four factors were identified that influence the feasibility of a living lab: the network, attributes, building blocks and principles. For the network, it is important to have public, private, academic and civil actors involved and to fulfil the identified network roles as much as possible. The living lab attributes are public-private-people partnerships, stakeholder collaboration, real-life setting, network orientation, co-creation, user involvement, multi-method approach, geographical context and learning & evaluation. These attributes should all be considered when establishing a living lab. The building blocks are ideation, scope, participants, planning and organisation, outcome, impact, review & evaluation and internal learning. Some of these building blocks have some overlap with the attributes but these all need to be agreed upon by all stakeholders involved to establish a living lab. Finally, thirteen principles were identified that can stimulate the effectiveness of a living lab.

To analyse how the SFI living lab can be established in the most feasible way, semi-structured interviews were conducted with 13 (potential) SFI partners to discuss the above-mentioned factors. These interviews were transcribed and coded so that emergent themes from the data could be identified and analysed. When related to literature, these themes provided insights into the feasibility of an SFI living lab. From these insights we identified 28 recommendations for the SFI to establish this living lab in the most feasible way. For

the convenience of the reader, we included an overview of these recommendations in table I (see page 5).

The recommendations from table I should not be implemented at random, but we suggest a certain structure of implementation of these recommendations. First, focus on the network. Ensure that you build a network of dedicated and diverse actors that understand the concept of a living lab and are willing to work in a committed, open and transparent way. In order to get the network actors behind the idea, they will want to see examples and clarity on what a living lab is and does. Therefore, while building the network, it is important to look for (and stimulate) examples and to co-create a shared definition, goal and ideation of the living lab. This can be a long and iterative process, but once you have a motivated network that stands behind a shared conceptualisation of an SFI living lab, the living lab ball can start rolling. This is when you start putting the building blocks together with the help of the recommendations. Without a clear goal, organisational structure and funding it is not possible to work on the attributes, so it is best to start here. It is particularly useful to read section 4.3 of this report, as this section explains the current tendencies among SFI partners regarding the building blocks. Once the building blocks are taking shape, think about how to incorporate the living lab attributes that yield more successful results, also using the recommendations. The work on the building blocks and attributes is a parallel and iterative process, where co-creative sessions, a living lab canvas, additional research and external expertise can help with making the right decisions. Be sure to read chapter 5 of this report, as this chapter explains the recommendations in more detail. While in this process make sure to avoid some of the pitfalls that are identified in this research. For example, do not let mere private company interests set the agenda of living labs, do not wait too long with implementing monitoring and evaluation systems, make sure that clear agreements are made about sharing information and commitments, and avoid organisations that do not want to consider governments and citizens as stakeholders in a living lab.

In conclusion, it is possible to establish a feasible living lab for the SFI to promote agri-food transitions in the Netherlands. We argue that if all recommendations are adhered to, this living lab will be set up in the most feasible way. These recommendations were constructed with the utmost care and rooted in both the interview data and living lab theory. There are of course some limitations to this study, related to the fact that the research was conducted by a single researcher with a small sample and analysing a novel topic. However, within the scope of these limitations, by applying thorough desk research, methodology and analysis, we have ensured that the resulting recommendations are as close as possible to stimulating the most feasible living lab.

No.	Recommendation
1	Construct and communicate a clear definition of a living lab
2	Ensure that the network has a correct understanding of a living lab
3	Identify a shared ideation and goal of the living lab
4	Consider additional supporting tasks to facilitate living labs
5	Clarify the role of the SFI and its relation to other similar organisations
6	Use the living lab canvas to co-create an organisational structure
7	Work towards an SFI living lab platform, rather than a single SFI living lab
8	Be open to change in the process
9	Decide whether to start building an example or to start building a platform
10	Seek external funding for additional organisational tasks
11	Use living lab best practices and handbooks to guide the process
12	Educate stakeholders about public-private-people partnerships
13	Ensure that the motivations and gains for each stakeholder are clear and that a minimum of shared value is created per project
14	Include partners that understand that all participants, including users, should be stakeholders with decision power
15	Attribute a central, powerful and steering role to the SFI for each project, so that the living lab can be enabler-driven
16	Find companies that show serious commitment to the overarching goal
17	Stimulate a real life setting by working with educated partners and using the suggestions from respondents
18	Use the various recommended methods to stimulate co-creation
19	Include partners that are willing to continuously co-create with all actors for a long term
20	Ensure a citizen-centred focus along the partners
21	Ensure long-term, continuous contact with users, reach users through agents, reward users and involve different kinds of users
22	Facilitate expertise on multidisciplinary research and experimentation
23	Identify the geographical scope of the operation and the geographical contextual implications of projects
24	Start early with setting up systems for measurement and qualitative evaluation
25	Stimulate learning trough agreements, communication and business expertise
26	Make clear agreements up front
27	Ensure fairly distributed inclusion of each of the stakeholder types
28	Aim for fulfilment of the living lab network roles for open innovation

Table I. Overview of the recommendations that have followed from this research. The list in non-hierarchical.
Source: Author

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List of abbreviations

ALL	Agroecosystem Living Lab
ATLL	Agri-food Transition Living Lab
IP	Intellectual Property
P4S	Public-private-people Partnerships
R&D	Research & Development
SFI	Sustainable Food Initiative
SME	Small and Medium-sized Enterprise
ULL	Urban Living Lab
WUR	Wageningen University & Research

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1. Introduction

In 2020, between 720 and 811 million people were faced hunger (FAO, 2020). In 2017, 11 million people died from dietary risk factors (Afshin et al, 2019) and roughly one third of produced food was wasted (FAO, 2019) worldwide. Simultaneously, the world's land, soil, water and ecosystem resources are degrading and the planetary boundaries for biodiversity, nitrogen, phosphorous and climate change have all been exceeded already (Rockström et al., 2009). The production of food is not only heavily dependent on these natural systems, but also heavily responsible for the disturbances in these systems (Southgate, Graham & Tweeten, 2012). With an ever-increasing human population, the pressure on food production systems is likely to increase even further, bringing along further threats to food security and environmental sustainability (Southgate et al., 2012; Curry, 2011). Despite efforts of research institutes, non-governmental organisations, private organisations, governments and other agencies, each of the mentioned factors has been worsening for the last five years or more. This calls for a change in the ways we produce and consume our food.

The ways in which we produce and consume our food has changed a lot since the green revolution in the early '60s. With the support of agricultural science bringing new knowledge and technologies, agricultural production systems shifted to mass production through agricultural intensification, leading to highly efficient yields (Southgate, 2012). However, through monoculture, pesticide and nitrogen overuse, it was also this agricultural intensification that (along with e.g. a surge in meat production) brought along the environmental problems that we now face, such as soil degradation, water degradation, climate change and biodiversity loss (Southgate et al., 2012; Goudie, 2013). This is why agricultural intensification is now being criticized for 'running up to its limits' and having an excessive environmental and social footprint (Bos, Smit & Schröder, 2013; Spaargaren, Oosterveer & Loeber, 2013; Rasmussen et al., 2018).

In order to avoid the risks to food security and environmental collapse that agricultural intensification brings, a transition towards a more healthy and sustainable food system is required (El Bilali, 2018). However, while the necessity of a sustainable food transition is widely known, little progress has been made in the past decades. Private food companies, farmers, consumers and governmental organisations all still contribute directly or indirectly to unsustainable agricultural practices (Spaargaren et al., 2013). To change the behaviour of each of the above-mentioned societal actors, academics argue that the change should be instigated at the level of the system that considers all these actors together, along with the processes along the value chain of agricultural products (McPhee et al., 2021; El Bilali, 2018; Gamache et al., 2020). Such a system is also known as an agri-food system.

The lack of the required transition in agri-food systems is often described through the perspective of transition theories. These theories aim to describe how socio-technological systems (such as agri-food systems) function, while providing a model for both the barriers *to* and the facilitation *of* a transition towards sustainability within such systems. Several transition theory models describe the agri-food system as a socio-technological system that is locked in by factors as size, complexity, path-dependency and institutionalisation, hindering the required transition for sustainability (Smith, Stirling & Berkhout, 2005; Spaargaren et al., 2013; El Bilali, 2018). As Spaargaren et al. mention, *"Systems of*

industrialized food consumption and production (…) do not seem able to deal with the emerging environmental and health risks and the new (animal well-being) concerns among food consumers" (Spaargaren et al., 2013 p.6).

While there are many different transition theory models, there are certain elements that they all suggest will facilitate a transition in the locked in food industry, such as a system level approach, stakeholder collaboration, co-creation and innovation (Spaargaren et al., 2013; El Bilali, 2018). These elements are also found in the concept of a living lab, which explains why researchers studying transition theories and agri-food transitions have suggested that living labs form a potential pathway to foster the required transition in agri-food systems (Gamache et al., 2020; Eweg & van Hal, 2014; McPhee et al., 2021). A living lab aims to tackle complex societal problems by bringing a variety of societal actors together in a co-creative innovation process (Stuckrath & Rosales Carreón, 2021). By giving users or citizens a central role in this process and by constantly testing ideas in real-life settings with these users, a living lab can move innovation processes away from closed laboratories and closer to society (Steen & van Bueren, 2017a). In fact, because entrepreneurs, academic institutions, incumbent companies and governmental organisations are all included as stakeholders and co-creators in living labs, they represent a large part of society's institutions. By involving them all, living labs aim to stimulate public-private-people-partnerships to reach the living lab's goals (Evans et al., 2019).

Despite the theoretical match of living labs with transition theories' elements to foster the required agri-food transitions, literature and case examples of agri-food transition living labs are limited (Gamache et al., 2020). Moreover, while literature demonstrates that transition theories have much potential in fostering a transition in agri-food systems (Grin, 2008; Spaargaren et al., 2013; El Bilali, 2018), agri-food systems are still strongly underrepresented in transition literature in general (El Bilali, 2019). Given the urgency of a transition in agri-food systems to prevent global food-related crises such as food shortage, water shortage or environmental collapse, it is imperative for a sustainable future for humanity that the potential of a living lab to foster this transition is further explored. In this thesis, this potential is researched in collaboration with the Sustainable Food Initiative in The Netherlands.

1.1 Research Focus

The Netherlands has been one of the biggest promoters and practitioners of agricultural intensification. The country has long been a frontrunner on agricultural sciences, with its Wageningen University & Research ranking #1 in the Shanghai Global Ranking of Agricultural Sciences since the introduction of the ranking in 2017 (ShanghaiRanking, n.d.). It is the second largest exporter of food worldwide, despite ranking #134 in country size and #26 in population density worldwide (Viviano, 2017; Largest countries in the world (by area), n.d.; Countries with the highest population density worldwide, 2021). The advancements in agricultural technologies and specifically agricultural intensification have led this country to highly efficient yields, allowing it to produce so much on such a small area (Smith, 2005). These new practices have come at an environmental price, which is currently exemplified by the nitrogen crisis in the Netherlands. The country has had to halt construction projects, limit agricultural production, lower the highway speed limits and take other measures for the past 2 years because of this crisis largely caused by the agricultural sector (Stokstad, 2019). However, regardless of its own flaws, because the country plays a large role in global agricultural development, it is considered a very

important instigator for the required changes in global food systems (Bos et al., 2013). If the food systems are to change in the world, the Netherlands is the place to start.

The Sustainable Food Initiative (SFI) is a network organisation in The Netherlands for the promotion of food sustainability. They are a collective of private and public actors, entrepreneurs and knowledge institutes that strive for the ambition of *"Using the full potential of all agricultural produce to create a new generation of sustainable, safe, nutritious and delicious products while reducing the total footprint to zero in 2050"* (SFI, n.d.). By bringing together actors from various corners of the system, they hope to accelerate change on a systemic level. While they are currently using collaborative R&D projects and field labs to facilitate system-level innovations, they lack an established method to include users (or *citizens* or *consumers*) into their innovation practices. Living labs appropriate a central role to users as co-creators and focus on innovation rather than a pre-specified outcome (Stuckrath & Rosales Carreón, 2021), which makes them suitable to complete the gap that the SFI currently aims to fill.

The SFI is interested in including living labs in their collaborative activities as they anticipate that a living lab could play a key role in further stimulating innovation for sustainable food systems in The Netherlands. However, the SFI does not have the organisational capacity to research whether such a lab would be desirable and if so, how it should be implemented (Kwant, 2019). The implementation of such a lab requires multiple internal and external stakeholders to work together (Evans et al., 2019), but it is unclear which roles can be played by which actors in this collaboration. Besides, the organisation lacks the knowledge of best practices for living labs and how a living lab can successfully be established. There is much uncertainty regarding the implementation of a living lab in this specific case, because examples of living labs for agri-food transitions are limited. The problem that the SFI now faces is the need to know how an SFI living lab can be established in a way that is most feasible, with the resources and network they have available.

1.2 Research Aim and Questions

The problem of the SFI provides an opportunity to conduct academic research *on* and stimulate practice *of* living labs for agri-food transitions. Both are necessary to 1) fill the literature gap linking living labs with agri-food transitions and 2) facilitate agri-food transitions through innovation. To tackle both these problems, the aim of this research is to identify the most feasible way for the SFI to set up a living lab for the promotion of agri-food transitions in The Netherlands. This will be done by answering the following research question:

Main Research question
What is the most feasible way for the SFI to set up a living lab for agri-food transitions in The Netherlands?

In order to answer the main research question, three sub-questions have been established. By combining the answers to the sub-questions, the main research question can be answered.

Sub-question 1
What are the main characteristics of an agri-food transition living lab?

As living labs are conceptualised very broadly and it is a relatively new concept, this question helps to demarcate what a living lab for agri-food transitions constitutes of and aids in answering the following 2 sub-questions. The focus on agri-food transitions is derived from literature and the goals that the SFI wants to achieve with the living lab.

Sub-question 2
What factors can enhance or reduce the feasibility of an agri-food transition lab?

This information is required in order to identify how to make a set-up that is most feasible. To answer the question, information about the working and feasibility of living labs in general and more specifically of living labs focusing on agri-food transitions is required.

Sub-question 3
How do the views of the SFI stakeholders relate to the feasibility factors of the living lab?

Once the factors that influence feasibility are known, this question guides the search for the SFI stakeholders' views and their relations to the feasibility factors. This knowledge can produce recommendations on how the feasibility of the living lab can be maximised, which will help answer the main research question.

1.3 Structure of the remaining document

The remainder of this document is structured as follows. After this chapter, the theoretical framework is provided, which includes a theoretical background of living labs for agri-food transitions and a conceptual framework to analyse the feasibility of such labs. After the theoretical framework, the methodology of the research is described. Following on the methodology, the results from the data analysis are presented and recommendations are derived from these results by comparing them with theory and case studies. This is then followed by a discussion and a conclusion.

2. Theoretical Framework

Before conducting the empirical research, a theoretical exploration was conducted using desk research. This provided a theoretical base and a conceptual framework that were used later in the empirical research. In this chapter, the concepts of agri-food transitions and living labs are further elaborated, the conceptualisation of a living lab for agri-food transitions is described, feasibility factors for such a living lab are identified and a conceptual framework is presented. By describing the conceptualisation of the lab and its feasibility factors, the first two sub-questions of this research are answered.

2.1 Agri-food transitions

There are many solutions available for most of the unsustainable practices that occur in agri-food systems. Agricultural science provides a plethora of solutions for more sustainable production, packaging, distribution and consumption of food. The problem of unsustainable food production lies in the lack of adoption of these more sustainable methods, rather than in the availability of them. This lack of adoption can be traced back to the barriers that are nested in global agri-food systems. An agri-food system is a system that *"encompasses the social, political, economic, environmental, and ecological processes of producing food and agricultural products (including fibres, fuels, and raw materials such as animal feed) from production to waste"* (McPhee et al., 2021, p.1). There are various similar system demarcations with various names (agroecosystem, agricultural system, food system), which are all very much alike if not identical. The term 'agri-food system' is chosen in this research because it is commonly referred to in publications that are influential in the application of living labs in this field (see e.g. Gamache et al., 2020; McPhee et al., 2021; Eweg & van Hal, 2014; El Bilali, 2020).

To understand and overcome the barriers that are incumbent in any socio-technical system (such as an agri-food system), transition theories have emerged and received growing interest in recent years (Markard et al., 2012; El Bilali, 2020). Using various frameworks and conceptualisations (e.g. Multi-Level Perspective, Technological Innovation System or Strategic Niche Management) these theories aim to identify how systems can transition into a more sustainable state. The lenses of some of these transition theories identified that agri-food systems struggle with the transition towards sustainability (El Bilali, 2019, Gamache et al., 2020, Spaargaren et al., 2013; Smith et al., 2005), because they are characterised by typical barriers of complex systems such as institutionalisation, path-dependency, lock-in, human practices and counterproductive business models (Markard, Raven & Truffer, 2012).

As a way to overcome such barriers, transition theories seek solutions at a systemic level, meaning that they identify all the relevant actors in the system and aim to orchestrate a coordinated transition amongst all of them. Authors that adopt transition theories point to experimentation with actors from across the system as a way to facilitate institutional change (Fuenschilling, Frantzeskaki & Coenen, 2019; von Wirth et al., 2019) and potentially even function as a governance mechanism of systems (Bulkeley et al., 2016; Bulkeley et al., 2019).

2.2 Living Labs

One way to stimulate such system-wide experimentation is with the use of living labs. As an arena for experimentation in natural settings with a wide range of actors (Schliwa, 2013), living labs yield much potential to support institutional change (Gamache et al., 2020). As the concept of living labs is partially based upon transition theory heuristics (Bulkeley et al., 2016; McPhee et al., 2021; Gamache et al., 2020), they are intrinsically aimed at facilitating system transitions. Research shows that living labs have already proven to provide solutions for systems innovation barriers in many cases worldwide. Many examples come from sectors such as ICT, smart homes and healthcare (Evans et al., 2019; Veeckman et al., 2013; Steen & van Bueren, 2017a), but recently there have been more cases of sustainability-oriented living labs (Steen & van Bueren, 2017a; Veeckman et al., 2013) and living labs with an agricultural focus (Sutherland et al., 2017; McPhee et al., 2021).

To understand what a living lab for agri-food transitions looks like, a deep dive into living lab literature is required. This literature provides many living lab typologies, and each has its own set of specific characteristics and applications. Because of this, the definition of a living lab is not a strict one. Rather, most authors agree that a living lab can be understood as a combination of several attributes. Some of these attributes are commonly agreed upon, while others are less frequent. For example, sometimes the term living lab is used for a set-up where there is no co-creation, limited user engagement and no real-life setting, while on other occasions, living labs are specifically focused on user engagement and co-creation in combination with a real-life setting (Veeckman et al., 2013, Steen & van Bueren, 2017a). These variations are no surprise, as a living lab for healthcare services at home looks very different than a living lab for internet services or agricultural practices. To provide some uniformity along the range of definitions, the largest documented living lab network –the European Network of Living Labs (ENoLL)– decided on the definition of '*user-centred, open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real life communities and settings*' (Steen & van Bueren, 2017a). The broadness of the definition of a living lab allows the flexibility to determine which living lab elements are important for an agri-food transition living lab. On the other hand, this broadness also requires clear specification how such a living lab is conceptualised if it is to be researched.

To build towards a specific conceptualisation of any living lab typology, it is useful to create an understanding of Urban Living Labs (ULLs) first, because ULLs are the original and most commonly studied form of living labs. Living labs started in urban environments because in urban geography, the notion of multi-stakeholder experimentation to facilitate societal innovations, sustainability and governance has been growing significantly in recent years. Simultaneously, the urban context has been receiving increasing attention within transition studies (Wolfram & Frantzeskaki, 2016). This combination of transition studies, urban governance and experimentation provided a perfect platform for Urban Living Labs to emerge. Cities are complex, diverse and rich in resources, (Frantzeskaki et al., 2017) and they are identified as particularly important places for sustainability transitions/innovations (Fuenfschilling et al., 2019), contributing to their popularity as a context for living labs. As a result, Urban Living Labs (ULL) have emerged as a typology of living labs with growing interest and a similarly growing base of literature.

With ULLs growing to be the most common typology of living labs, several authors have coined definitions for an ULL, but while most definitions don't vary much, there is no single agreed-upon definition. Steen & van Bueren (2017b) define a ULL by its

characteristics through the lens of its goals, activities, participants and context. This lens is based on a bibliometric analysis and is cited often in ULL literature. These factors, along with the fact that it provides a clear overview, makes it a useful overview to demonstrate the concept of an urban living lab. The characteristics, sorted by their aspects, are displayed in table 1 to demonstrate a common understanding of an ULL.

Aspects	Characteristics
Aims	Aimed at **innovation**
	Aimed at **formal learning** for replication
	For urban living labs: Aimed at increasing **urban sustainability**
Activities	**Development** (all phases of the product development process)
	Co-creation
	Iteration (feedback, evaluation, and improvement)
Participants	**Public actors**, **private actors**, **users** and **knowledge institutes** participate in the living lab activities
	All actors involved have **decision-making power**
Context	The living lab activities take place in the **real-life use context** of the innovation. In many urban living labs, this is a territory or a space-bound place.

Table 1. Overview of the key characteristics of an Urban Living Lab
Source: Steen & van Bueren (2017b)

The agricultural application of living labs –as opposed to the urban application– is relatively new and therefore explored less than ULLs. However, recent research shows that agricultural living labs could provide a promising avenue to support the development of healthier and more sustainable local agri-food systems (Gamache et al., 2020). A recent working group of representatives of national agricultural research institutes from 10 countries and the European Commission (G20-MACS, 2019), found that Agroecosystem Living Labs (ALLs) can *"increase the relevance and impact of scientific activities; accelerate innovation and adoption; and empower participants to tackle more complex challenges facing agroecosystems"* (McPhee et al., 2021, p.2).

An ALL is a relatively new typology of living labs, and to fully understand what sets it apart from other living lab typologies, more empirical data would be needed, as the concept is very young. What is clear now is that in comparison with ULLs, the main differences are that they are not particularly nested in urban areas and that they primarily focus on the agricultural sector. However, McPhee et al. (2021) argue that ALLs have more in common with ULLs than they have with, for example, other agricultural living labs that are *non-place-based*. They argue that ALLs and ULLs have significant similarities regarding their focus on sustainability, complexity and a place-based context. Because these similarities are strong and research into ALLs is limited, ULLs could serve as a best-available proxy of understanding in cases where research into ALLs is lacking. To identify the differences between a ULL and an ALL, McPhee et al. (2021) analysed ALL cases in France and

Canada. Using the dimensions created by Steen & van Bueren (2017b), they identified specific ALL characteristics, which are shown in table 2.

Dimension	Characteristics
Aims	• Aimed at sustainability and resilience of agriculture and agri-food systems • Innovation can be expressed through technology, best management practices, or processes • Knowledge production and knowledge network creation
Activities	• Exceptionally high level of evaluation and data management • Long/seasonal innovation cycles with high uncertainty due to external factors • Scaling up and out to outcomes at the level of agriculture and agri-food systems
Participants	• Emphasis on public sector researcher participation • User roles may be diverse and can evolve • Often driven by the public sector or academic institutions • High diversity and number of partners, interests, and values requiring complex governance schemes
Context	• The living lab is embedded within and examined at the scale of agroecosystems

Table 2. Characteristics of Agroecosystem Living Labs, described through the lens of the dimensions posed by Steen & van Bueren (2017b)
Source: McPhee et al. (2021)

The overview from table 2 can function as a set of guiding characteristics for aspiring ALLs and research into ALLs. For this purpose, some extra findings of McPhee et al.'s (2021) work are of particularly relevant, as they showcase how an ALL differs from a ULL. Firstly, in the aims, ALLs show a specific interest in innovation for *resilience* of the agri-food system, on top of only *sustainability*. This puts an emphasis on creating a sustainable system (both ecologically and economically) that can endure disturbances without losing its systemic balance. Secondly, along the activities, apart from a focus on co-creation, co-development, co-production and iteration, it was found that ALLs have *"a greater need for qualitative and quantitative measurement, evaluation, and scientific activities"* (McPhee et al., 2021, p.17). Thirdly, concerning participants, ALLs are often governed by public sector actors, pointing to the classification of an enabler-driven living lab, as identified by Leminen et al. (2012). Lastly, as mentioned above, ALLs are embedded in an agroecosystem, which makes them place-bound. The real-life use context was often working farms, specific fields or farming activities, but the effects were applied to the broader context of the agroecosystem it was embedded in.

2.3 Defining characteristics of a living lab for agri-food transitions

The urban and agroecosystem living lab typologies discussed in section 2.2 share many aspects with living labs for agri-food transitions. However, both typologies do not provide a complete definition a living lab for agri-food transitions. ULLs are different because of a difference in geographic context and sectoral focus. ALLs are different because they are specifically oriented around public sector actors and specifically have real-life settings on farms. Therefore, a bespoke definition for living labs for agri-food transitions is required in order to understand how their feasibility can be researched.

To specify the definition of a living lab for agri-food transitions, attributes from literature can be synthesized. As there are many articles (systematic reviews, scientific papers, case studies and handbooks) identifying attributes that belong to a living lab (see Verhoef & Bossert, 2019; Veeckman et al., 2013; Evans et al., 2019; Stückrath & Rosales Carreón,

2021; Gamache et al., 2019; Hossain, Leminen & Westerlund, 2019; McCrory et al, 2020; Steen & van Bueren, 2017a; Eweg & van Hal, 2014; Molinari, 2011; Ståhlbröst & Holst, 2012; McCormick & Hartmann, 2017; Leminen, Westerlund & Nyström; 2012; Leminen & Westerlund, 2012), the list of living lab attributes provided by literature is a long one. However, when the overlap between these attributes is filtered out, only those that are relevant for an agri-food transition living lab and only those that are agreed upon by several authors are considered, one could argue that only the following key attributes remain: public-private-people-partnerships, stakeholder collaboration, real-life setting, network orientation, co-creation, user involvement, a multi-method approach, a specific geographical context, learning & evaluation. A description of these attributes is provided below.

2.3.1 Public-private-people partnerships

Public-private-people partnerships (4Ps) are identified as one of the main reasons that living labs can contribute to systemic change, as they call for all stakeholders of the system to be involved (Leminen et al., 2012; Nyström et al., 2014; Ståhlbröst & Holst, 2012). These partnerships can emerge through the involvement of the *quadruple helix*: representatives of public and private sector, academia and people (Evans et al., 2019). The linkages between these four sectors are indispensable for boosting innovation and productivity growth (Imset, Haavardtun & Tannum, 2018) and are crucial for ensuring integrated outcomes on a systemic level (Verhoef & Bossert, 2019; Maas, van den Broek & Deuten, 2017).

2.3.2 Stakeholder collaboration

An important element in properly functioning 4Ps is stakeholder collaboration. It is important that *"all participants, including the users, have decision power in the various stages of the innovation process"* (Steen & van Bueren, 2017a, p.11). A high level of collaboration is stimulated when the involved actors have clear motivations for their involvement in the living lab (Veeckman et al., 2013). There are various distinctions to be made in the way that stakeholders are involved and living labs are governed.

Leminen et al. (2012) differentiate between four types of living labs, where stakeholders collaborate differently: utilizer-driven, enabler-driven, provider-driven and user driven. Enabler-driven and utilizer-driven labs are likely to yield incremental innovation outcomes, while enabler-driven and provider-driven labs are more likely to yield radical innovation outcomes (Leminen, 2015). Enabler-driven living labs are often organised and/or funded with public-sector actors, universities and regional development programs and they pursue societal improvements. This typology is most strongly linked to an agri-food transition lab, following the reasoning of McPhee et al. (2021) who identify ALLs as enabler-driven as well. Leminen et al. (2012) state that with enabler-driven living labs, sufficient company participation is often a problem because companies fail to see the value of participation. A benefit is that these living labs last longer than other typologies, as they create and share much information across their networks and their goals often have a larger horizon.

Bulkeley et al. (2019) differentiate differently between three types of urban living labs. Their definition of a ULL shares many characteristics with living labs for agri-food transitions but is specified to an urban context (Bulkeley et al., 2019 p.319). Therefore, this distinction can become relevant when these are deployed in an urban context. The three types are strategic, civic and organic. Strategic labs are oriented on specific, strategic, often corporate goals. Civic labs are often organized by public actors aimed at societal or economic

transformation. Organic labs are organized by civil society, taking a grassroots approach and focusing on themes that emerge from the context.

2.3.3 Real-life Setting

The use of a real life setting in experimentation is mentioned as a key element of living labs across all articles reviewed, even though not all studied cases proved to adhere strictly to this. Verhoef & Bossert (2019) explain the argument for a real life setting in living labs with three arguments: *"First, in real life issues emerge and can be tested which are impossible to test in a confined laboratory environment. Second, stakeholders identified and not identified may perform research, and third, real actions and decisions are taken in real contexts, thereby increasing the validity of the outcomes and improving the impact for replication and upscaling."* The real-life setting is often mentioned as being both of increased and underestimated importance (Veeckman et al., 2013; Steen & van Bueren, 2017a; Evans et al., 2019; Gamache et al., 2019; Verhoef & Bossert, 2019; Maas et al., 2017). McPhee et al. (2021) identify working farms, specific fields or farming activities as common real-life settings for ALLs.

2.3.4 Network orientation

Living labs are frequently described as either a network in itself (Leminen et al., 2012; Nyström et al., 2014; Imset et al., 2018) and/or as intrinsically being part of an innovation network (Leminen et al., 2017; von Wirth et al., 2019). Therefore, the orientation of the role of a living lab within a network plays an important role in the definition of a living lab. Internally, there are various stakeholder roles that can contribute to a successful living lab network (see Nyström et al., 2014) and a careful deliberation of the fulfilment of these roles can therefore contribute to more successful outcomes of a living lab. Externally, a living lab can exist within a network of multiple living labs which can in turn have various geographical, institutional and size-dependent characteristics (see Leminen et al., 2017).

2.3.5 Co-creation

The use of co-creation is an integral part of a living lab and sets the concept of living labs apart from other sustainability-oriented innovation methods (McCrory et al., 2020). Yet its increased importance is still often underestimated in living labs (Veeckman et al., 2013; Steen & van Bueren, 2017a; Evans et al., 2017; Gamache et al., 2019; Verhoef & Bossert, 2019; Maas et al., 2017). The reason that co-creation is an integral part of living labs, is that if users and all other stakeholders become co-creators of innovation, it will create mutually valued outcomes beyond the level of a simple product (Evans et al., 2017; Veeckman et al., 2013; G20- MACS, 2019), which contributes to the systemic innovation that is needed for an agri-food transition. For true co-creation it is important that input from all stakeholders is equally considered from the earliest to the latest development stages (Steen & van Bueren, 2017a; Evans et al., 2017; Verhoef & Bossert, 2019). To improve the outcomes of co-creation, the use of participatory and iterative methods is recommended (Veeckman et al., 2013).

2.3.6 User involvement

There is strong agreement among authors that the user (sometimes called end-user, consumer or citizen) plays a central role in a living lab (McCrory et al., 2020; Steen & van Bueren, 2017a; Evans et al., 2019; Verhoef & Bossert, 2019; Ståhlbröst & Holst, 2012; McCormick & Hartman, 2017). This is considered imperative for the success of a living lab, because it reveals the latent needs of users and enables unforeseen outcomes (Leminen & Westerlund, 2012). The user is not only important as a co-creator and co-designer, but

also in evaluation and learning processes (Leminen & Westerlund, 2012; Evans et al., 2017; Gamache et al., 2020). Case studies show that the extent to which the user is integrated in living labs is often not sufficient, leading to less positive outcomes (Veeckman et al., 2013; Steen & van Bueren, 2017a). Schliwa & McCormick (2016) identify living labs where users merely provide input for the research as user-centred, while living labs where the user is also taken along as a citizen stakeholder are identified as citizen-centred. The citizen-centred approach is better suited for agri-food transitions, as it *"supports the production of contextualized, actionable knowledge to contribute to inhabitants' empowerment and the concrete transformation of territories."* (Gamache et al., 2020, p.102).

2.3.7 Multi-method approach
As multiple stakeholders and disciplines are involved (Hossain et al. 2019), multiple methodologies can be used within a living lab. In fact, multi/transdisciplinarity and a multi-method approach are encouraged in living lab literature to stimulate outcomes that are innovative on a systemic level (McPhee et al., 2018; Verhoef & Bossert, 2019; Steen & van Bueren, 2017a; Maas et al., 2017; Molinari, 2011; Veeckman et al., 2013). A critique on this approach is that this openness to methods positions a living lab as a 'everything is possible' concept without a structure, allowing anything to be portrayed as a living lab (Stückrath & Rosales Carreon, 2021). However, this trade-off is likely worth it, as all living labs, but specifically ALLs particularly can benefit from mixing natural and social sciences, improving their effectiveness (McPhee et al., 2021).

2.3.8 Geographical context
While part of the aim of living labs is to foster society-wide transitions, the labs are always embedded in a certain local context. In some cases, the majority of the living lab is bound to a digital environment, but mostly, they are embedded in a geographical context. In fact, the geographical embeddedness plays a central, distinctive role in living labs and urban living labs (Gamache et al., 2020; Voytenko et al., 2016; Bulkeley et al., 2019; Steen & van Bueren, 2017a;). Especially in agricultural cases, the geographical context plays a large role, because agricultural practices vary strongly across different places (McPhee et al., 2021). Like ULLs, ALLs are place-based, but embedded within and examined at the scale of agroecosystems (McPhee et al., 2021). The integration of the local context with the wider (global) context should be consciously considered to stimulate successful outcomes of the living lab (Verhoef & Bossert, 2019; McPhee et al., 2021).

2.3.9 Learning & Evaluation
Learning & evaluation within living labs are often underestimated, which limits the incorporation of new knowledge in broader activities, but also limits access to funding because successes are not monitored (McCormick & Hartmann, 2017). Living labs function through experimentation (Fuenfschilling et al., 2019; Gamache et al., 2020), but without learning, the goals of experimentation are not met. Eweg & van Hal (2014) argue that learning should be the core element in agricultural transition living labs and McPhee et al. (2021) found that ALLs have a greater need for measurement and evaluation than ULLs, since they are embedded in agri-food systems, which are highly complex, including a unique emphasis on the levels of social, environmental, and economic contexts, plus a high and diverse number of partners involved (McPhee et al., 2021).

2.4. Defining factors for the feasibility of an agri-food transition living lab
The list of attributes described above can be read as a conceptualisation of agi-food transition living labs (ATLLs). In other words, a lab that adheres to those attributes can be considered a functioning ATLL. However, knowing about the attributes is not sufficient to study the feasibility of an ATLL. In order to understand the feasibility of a project, two questions need to be answered:
1. How can the project be made possible?
2. How can the project be realised in the most successful way?
These questions are addressed in the following subsections.

2.4.1 Possibility
Living lab literature provides step-by step guides for the successful implementation of urban living labs (Steen & van Bueren, 2017a) and university campus-based living labs (Verhoef & Bossert, 2019) for sustainability. The aim of these guides is to stimulate the likeliness of a new living lab being successfully established. Therefore, these guides form a crucial feasibility factor for sustainability living labs that are in the early phases of development. To stimulate the possibility of the living lab being realized, two factors were identified: Building Blocks and Best Practices. They are outlined below.

Building Blocks
Verhoef & Bossert (2019) propose a framework to guide the collection of information throughout the planning stages that will help maximise the benefits of a living lab (Verhoef et al., 2019). For practical application of this framework, it has been transformed into a 'living lab canvas', which works similarly to the business model canvas developed by Osterwalder (2004). The living lab canvas contains the following elements:
- Identification & ideation
- Scope
- Participants
- Planning and Organisation
- Outcome
- Impact
- Review & Evaluation
- Internal Learning

If this canvas can be filled in, that means that the stakeholders in a living lab can come to an agreement on what the living lab should look like. According to the authors, these are the main elements that are needed that are required to build a living lab. Therefore, having a shared understanding of these building blocks has a positive influence of the possibility to realise a living lab.

Best Practices
To support the process of realising a living lab, authors have developed various guidebooks and step-by-step methods. These guidebooks have been included as a feasibility factor, because adherence to proven steps increases the possibility of successful realisation of a living lab. The guiding steps presented by Steen & van Bueren (2017a) are identified as most promising because they are based on the largest sample of case studies (80), the cases are all from the Netherlands, their work synthesizes theory and practice, and their work is often cited in the other works that were included in this theoretical chapter. Their work proposes a step-by-step method for a 'living lab way of working'. In their first step –

initiation– they describe how a living lab can emerge and what factors to consider. They describe that first, an idea or problem needs to be identified, then, partners who are interested and committed to this idea/problem need to be identified, and finally, a project and a location need to be decided on. In the second step –plan development– the focus lies on finding a shared vision, gathering the right capabilities, following a process design and developing appropriate process management. The two steps described above are the steps that belong to the start-up phase of the process, before design and implementation takes place. Since this research concerns itself with the pre-establishment feasibility of the living lab, these are the steps that are included as feasibility factors.

2.4.2 Success

The success of living labs is often measured in terms of outcomes (Veeckman et al., 2013; Bulkeley et al., 2019; Sutherland et al., 2017), e.g., a living lab is considered more successful if it produces a more positive outcome. This means that by stimulating the outcomes, you can stimulate success (Veeckman et al., 2013).

Literature provides suggestions for how the outcomes of a living lab can be maximized. Firstly, for each of the attributes previously identified in this theoretical framework, literature suggests that proper implementation of the attribute positively influences the outcome. Therefore, the right implementation of the identified living lab attributes simultaneously functions as a feasibility factor. If these living lab attributes are non-existent or not orchestrated well, the resulting development does not fulfil the requirements to be considered an ATLL.

Secondly, several authors that were considered in the identification of living lab characteristics also provide principles and recommendations for the successful implementation of a living lab. As these are also aimed at maximizing a positive outcome, they too can function as feasibility factors. As opposed to the primary feasibility factors, the principles and recommendations do not prescribe what an ATLL should look like. Rather, they describe how the outcome can be maximized. The principles and recommendations identified in literature are described below.

Principles
Molinari (2011), Ståhlbröst & Holst (2012) and Verhoef & Bossert (2019) describe principles that contribute to the effective outcomes of a living lab. Combined, the principles they describe are openness, sustainability, value, realism, influence, continuity, empowerment, spontaneity, transparency, fairness, open mindedness, diversity and curiosity. In contrast to the living lab attributes mentioned in section 2.3, these principles cannot be operationalised, and their effects cannot be specified to exact outcomes. Rather, they operate as principles to adhere to on an overarching level of all living lab activities. Based on case studies, these principles are lessons from practices that indicate what is important in order to achieve overall performance of a living lab.

Recommendations
Similar to the principles, the recommendations are also taken from case studies and therefore they too can have a positive contribution to the outcome of the establishment of a living lab. While some recommendations are found in multiple case studies, some only occurred once. As living labs are very context-dependant, the recommendations can also vary per context. This means that these recommendations can only be considered in the

light of their context. An overview of the recommendations identified in literature is provided in table 3.

Recommendation	Explanation	Author(s)
A clear strategic intention	The strategic intention should be thoroughly discussed at the start of the initiative and should be clear for everyone involved.	Veeckman et al. (2013), Leminen et al. (2012)
A minimum of shared value creation and sharing among all stakeholders	Create *"shared motives for collaboration, so that the living lab resources can be made available to each stakeholder."* (p.14). *"it is of vital importance that value can be created and shared amongst every stakeholder when joining the living lab initiative."* (p.13)	Veeckman et al. (2013)
A minimum level of openness	This regards the openness of sharing intellectual property and embracing new partners. More openness embraces more perspectives, which can stimulate more innovative approaches.	Veeckman et al. (2013)
A minimum set of users and establish a strong communication	If this is not the case, *"there will be a need to recruit new people each time a new project starts, which means more effort and a loss of accumulated knowledge. In addition, community support will keep users motivated to participate in a living lab."* (p.14)	Veeckman et al. (2013)
A mixed set of living lab tools to discover new opportunities	A mixed set of living lab tools can stimulate the possibilities of finding new opportunities or innovative ideas, plus it would provide better support for living lab projects.	Veeckman et al. (2013)
Passion	Building on previous research and case studies, they identify passion as one of the key elements in the recipe for a successful living lab.	Leminen et al. (2012)
Knowledge and skills for a living lab	There is specific knowledge about involved topics, context and stakeholders that needs to be in the living lab for it to be successful. Additionally, there are specific skills required to stimulate innovation, co-creation and collaboration.	Leminen et al. (2012), G20-MACS, 2019)
Give greater importance to the notion of commons central to experimentation in agri-food related living labs	*"In our opinion, living labs can support local communities' capacity to invent and experiment with more sustainable lifestyles, provided that the notion of commons central to experimentation is given greater importance."* (p.102)	Gamache et al. (2020)
Common-based living lab	*endeavouring to connect different initiatives united by a common goal. This allows for the sharing of resources, knowledge, know-how and experience, gradually strengthening the dynamics. This more horizontal approach fits with an effort to multiply connections with the dominant regime in order to influence it*	Gamache et al. (2020)

When developing a living lab, first focus on strong internal organisation, before moving to external	In their research for the development of a living lab, the authors find that while end users are key stakeholders in living labs, it is immature to include them in the process before having a common agreement with central stakeholders to commence with a living lab approach, as well as more solid funding.	Imset et al. (2018)
Continuous contact with end user	*"most important lesson learnt: being in direct and permanent contact with end-users creates the perfect environment for serendipity and opportunities"* (p.56)	Evans et al. (2019)
Reaching and rewarding the users	*"The main lesson has been related to how to reach the end-users: this can be best achieved through training agents, who will be in charge of replicating and contextualizing the workshop."* (p.57)	Evans et al. (2019)
Involvement of all stakeholders	Case examples show that ensuring that all stakeholders are involved increases credibility, innovation outcomes, trust and co-creation	Evans et al. (2019), Veeckman et al. (2013)
Involvement of different kinds of users	*"we would suggest to have a broader look on the community, i.e to engage in the co-creation with other profiles different from those considered as "targets". Even if they are not going to be end-consumers of the product/service they are going to force you to "have a look out of the box" and that is when serendipity and opportunities spark."* (p.57)	Evans et al. (2019)
Be open to changes in the process	*"The idea has evolved and matured during the project and each pilot has given new information that had led to change of direction for the ENEGA web. It has been an inva- luable experience to go through this process"* (p.62)	Ståhlbröst & Holst (2012), Maas et al. (2017)
Do not underestimate the complexity of including many stakeholders and running to many projects at the same time	*"One lesson learned is that we should have made some delimitation and tested one innovation at the time. It was too many innovations tested for the first time outside of lab."* (p.62) *"In the end the product will include all these stakeholders input and it was good to have them onboard. But, we were a bit naive on the complexity. Next time we will be better prepared to manage such a complex setup."* (p.62)	Ståhlbröst & Holst (2012)

Table 3. Overview of the recommendations and best practices for living labs identified in literature
Source: Author

2.5 Conceptual framework for analysing the most feasible set-up for an agri-food transition living lab

The concepts that are discussed in sections 2.3 and 2.4 all contribute in their own ways to the feasibility of an ATLL. As many different concepts have been touched upon, they are displayed schematically in figure 1. What figure 1 shows is that the feasibility is the result of two factors: possibility and success. Both are determined by the way in which the stakeholders contribute to the respective feasibility factors: *possibility factors* and *outcome factors*. The figure shows which stakeholder types are required at a minimum in the set-up. It also shows that the possibility of the living lab being realised is dependent on how the selected formation of stakeholders can agree on the building blocks and follow the best practices. Similarly, the success of the living lab is stimulated by the way in which the selected formation of stakeholders covers a complete array of stakeholder types, can facilitate all the ATLL attributes and to what extend they can follow the principles and recommendations.
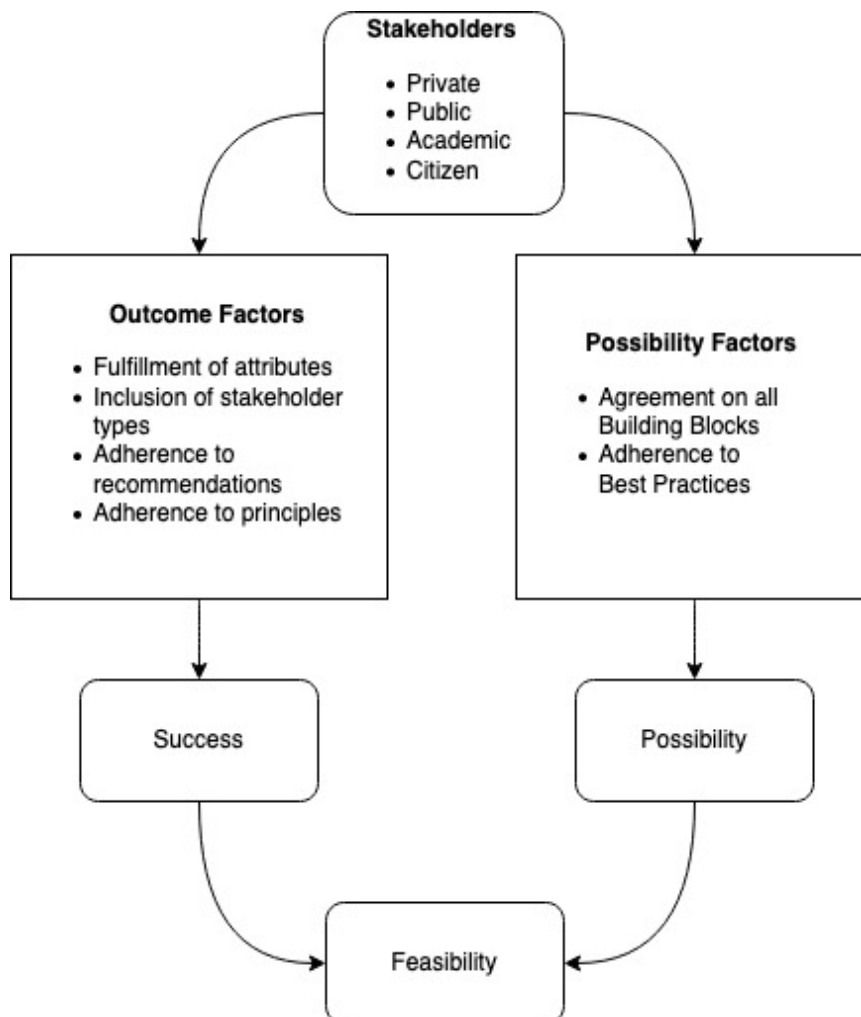
Figure 1. Schematic overview of the factors that determine the feasibility of an ATLL
Source: Author

The outcome factors and possibility factors each have their respective characteristics, which are displayed in figure 2. Figure 2 aims to provide a more complex, but comprehensive overview of all the factors that are concerned with the feasibility of an ATLL. This overview also shows how the feasibility factors are interrelated with the use of arrows. The stakeholder types contribute to an effective selection of stakeholders, the recommendations contribute to effective application of the living lab attributes, the best practices stimulate effective filling in of the building blocks and the principles influence the overarching system.
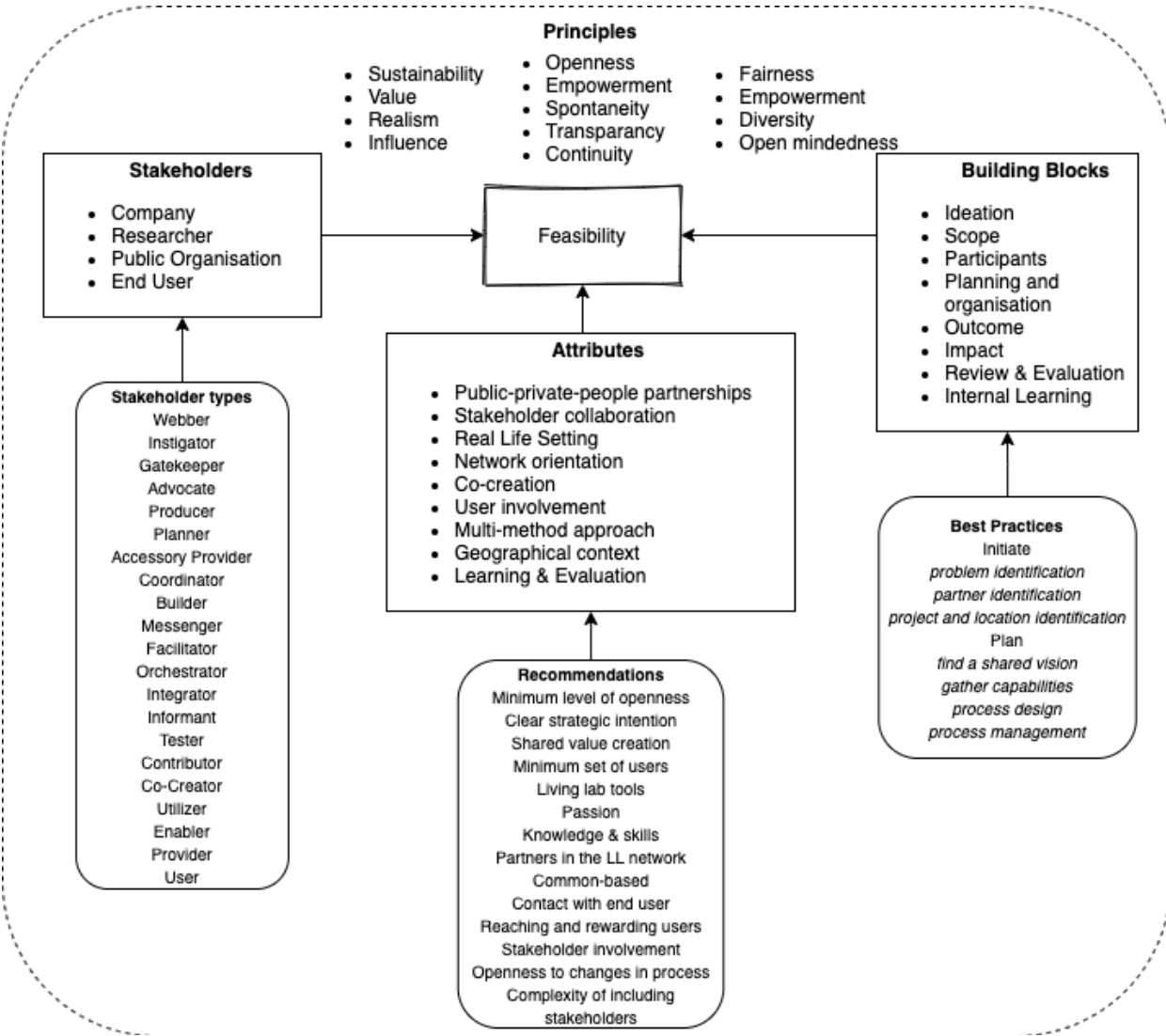
Figure 2. Conceptual framework for identifying a feasible living lab
Source: Author

3. Methodology

The aim of the research was to analyse how a living lab within the SFI can be set up in the most feasible way. The theoretical framework provided the answers to the first and second sub-question of this research and it provided the conceptual framework that was required to gather and analyse data for the third sub-question. The methodology that was used to answer the third sub-question is described in this chapter. That question is: *How do the views of the SFI stakeholders relate to the feasibility factors of the living lab?*

3.1 Research Approach

Since the research focuses on the specific case of a living lab for the promotion of the SFI goals in the Netherlands, we specifically looked for an extensive 'in-depth' analysis of this case. Rather than looking for results that can be generalised for other cases, the case of the SFI living lab was of interest in itself. Since these are typical characteristics for a case study (Yin, 2014; Bryman, 2008), this research was approached as a case study.

The design of this case study used qualitative research methods. The conceptual framework of living lab feasibility was used as a base to conduct a stakeholder analysis. Traditionally, stakeholder analysis often includes analysis of factors like interest, influence, impact, position and network (Brugha & Varvazovsky, 2000). However, not all these factors fitted within the aim, scope and capacities of our research. The stakeholder analysis conducted in this research solely focuses on the positions of stakeholders towards the SFI living lab, their network orientation within it and their relation to the pre-identified feasibility factors for an ATLL. The aim, data collection and data analysis methods are described below.

3.2 Stakeholder analysis

3.2.1 Aim
The aim of the analysis was to understand how stakeholders can form a living lab in a most feasible way. The stakeholder analysis was used to identify in what way the stakeholders relate to the feasibility factors, building blocks and network orientation that were identified in the conceptual framework.

3.2.2 Data collection
Qualitative data was collected using semi-structured interviews. Semi-structured interviews were most useful because they allow both the structure needed to cover the feasibility factors and the freedom for unexpected topics to emerge from the interviews. Additionally, given the complexity of the topic and the variety of respondents, the required data could not have been expected to be simple answers to the exact same question for each respondent. The freedom to ask follow-up questions and let respondents speak freely was imperative for retrieving data that was relevant to the research.

An interview guide was developed to provide a protocol for the interviews. The interview guide describes how respondents are approached, how informed consent is handled, how the interviews are conducted and recorded. It also includes the item list for the interviews and describes how its contents relate to the conceptual framework. The item list of the interview guide was tested using 2 test interviews. After the first test interview, a few alterations were made to ensure that the resulting data includes the relevant concepts. After

the second test interview, no alterations were needed, and the item list was considered ready. The complete interview guide can be found in Appendix A.

3.2.3 Sampling

A combination of purposive sampling and theoretical sampling was used in our research, allowing to strategically select relevant stakeholders at first with a key informant approach, while staying open to other emerging actors that might be relevant to analyse.

Purposive sampling

In purposive sampling –a very common and often recommended sampling method in qualitative research (Bryman, 2008)– the respondents are chosen for strategic reasons to answer the research question. A strategic motivation for sampling decisions allowed for the selection of respondents that were expected to be relevant for the formation of a specific living lab. To select the relevant interview respondents, the SFI organisation was used as a key informant. They provided a list of 17 actors that employ senior positions at SFI partner organisations that are interested in contributing to the SFI living lab project. These 17 partners constitute the full extent of the initially identified relevant stakeholders for the case. Based on this list, in consultation with the SFI, a selection of 13 respondents was made, including at least two of each the stakeholder types academic, private and governmental. Civic actors were not yet included as they are not part of the SFI network. From the selected 13 respondents, 10 were interviewed. The other three either declined or suggested another respondent. Because of the cancellations, only one respondent solely represented a governmental institution in the final sample.

Theoretical sampling

In theoretical sampling –a variant of purposive sampling (Bryman, 2008)– data collection and analysis influence each other in the research, leading to an iterative process of data collection and analysis. Järvelin & Kankaala (2007) and Imset et al. (2018) stress the importance of working with several iterations when conducting stakeholder analysis for the development of a living lab. This is supported by the work of Reed et al. (2009), who stress that stakeholder analysis should be conducted in an iterative manner. To stimulate theoretical sampling, the respondents were asked to identify other stakeholders they consider to be relevant. Based on the identified relevant stakeholders and in consultation with SFI, more respondents were selected. Civic actors were not included in the sample, as Imset et al. (2018) found that it is not useful to include the civic actors in the earliest of organisational stages of the formation of a living lab. As a result of theoretical sampling, 3 extra respondents were included in the sample.

3.2.4 Data analysis

The interviews were recorded and then transcribed with the aid of online transcription software Trint. Trint was chosen because it is well-suited for the transcription of Dutch spoken text, which the majority of the interviews contains. The transcriptions were all imported in qualitative analysis software Nvivo, which was used to organise the processes of coding and the identification of quotes for the data analysis.

Hybrid Thematic Analysis

To analyse the data, a hybrid thematic analysis was conducted, following the approach of Fereday & Muir-Cochrane (2006). This analysis method provided the structure and rigor that is often hard to maintain in qualitative analysis methods. With a thematic analysis we were able to identify themes that are important for the description of the SFI living lab.

The specific application of hybrid analysis was preferred because both *inductive* and *deductive* thematic analysis were relevant for this data. The deductive approach was suited to analyse themes that relate to the concepts identified in chapter 2. The inductive approach was suited to identify relevant factors that were not identified in chapter 2, but still emerged from the data. The hybrid approach of Fereday & Muir-Cochrane (2006) follows six steps, as shown in figure 3. In addition to the six steps from Fereday & Muir-Cochrane (2006), 2 additional steps have been added in order to come to an answer to the research question. The two additional steps are also shown in figure 3.
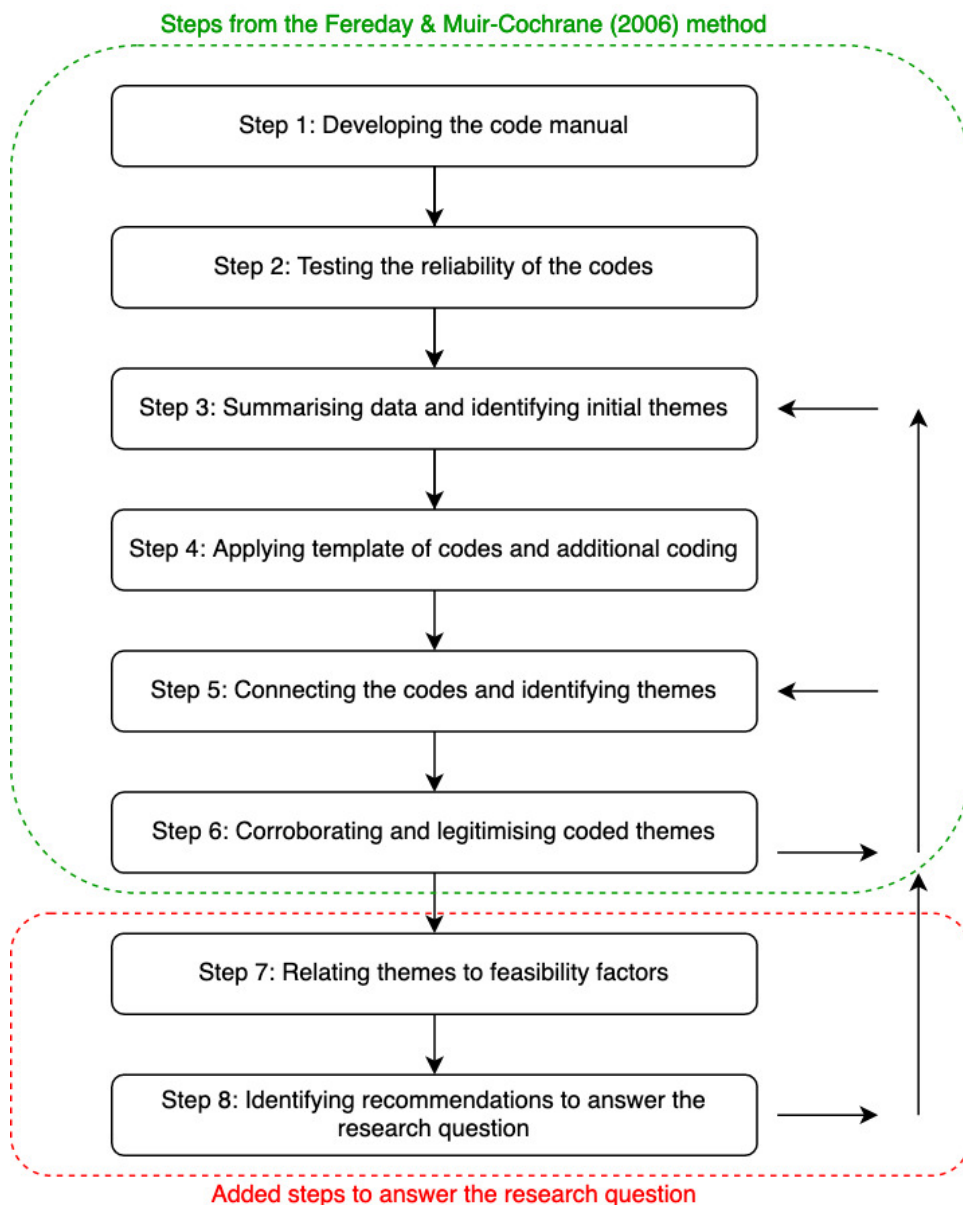
Figure 3. Overview of the six stages of the method of Fereday & Muir-Cochrane (2006) and the two added stages to answer the research question. The meaning of the arrows on the right side is explained in section 3.2.4 (see 'sixth step' and 'eighth step').
Source: Author, adapted from Fereday & Muir-Cochrane (2006)

In the first step, a code manual was developed. This manual describes codes that are identified before analysing the data. These codes are derived from the theoretical framework in Chapter 2. The coding manual is attached in Appendix B.

In the second step, the reliability of the codes was tested. For this purpose, one of the transcribed test interviews was analysed independently by both the author and a colleague. The coding results from both analyses were compared to see if any discrepancies emerged in the application of the coding manual. Some discrepancies were found and discussed to decide upon a final coding manual that is more reliable.

The third step involved reading, listening to, and summarizing the raw data. The topics from the item list were used to summarise the responses per topic. As a result, initial themes were identified that emerge within the topics that were identified.

In the fourth step, codes were attributed to the interview transcriptions, using the software Nvivo. This way, all code-related text from across all respondents could be identified and compared. Initially, the code manual was applied to the dataset. Secondly, during this coding process, inductive codes were assigned to segments that described any new themes observed in the text.

In the fifth step, relationships between and within the codes were identified by going over the coded texts and individual nodes. This way, themes and patterns were discovered in the data. This is where similarities and differences among stakeholder types were identified and elaborated.

The sixth step was aimed at corroborating and legitimating the coded themes. To do so, the identified themes were compared to the original text, codes and data summary to ensure that the themes were indeed present in the data. This process is indicated by the arrows in figure 3. After this process, the themes are categorised into main themes, based on the categorisation of the feasibility factors from chapter 2.

The first six steps resulted in an overview of the themes that emerged from the interviews. However, to understand how a living lab can be established in the most feasible way, the themes need to be related to the feasibility factors from section 2.4. This was done in the seventh step, where each theme was compared with the feasibility factors to identify the practical and theoretical implications of the themes.

In the eighth step, the practical implications were analysed as a whole to define recommendations for the SFI to establish a living lab for agri-food transitions in the most feasible way. Here, an additional corroboration moment was included. By looking back at the coded data, the data summary and the coded themes, the recommendations were legitimised.

4. Results

In this chapter, an overview of the data is provided and the resulting themes from the data are described. The overview of the data (consisting of an overview of the respondents and an overview of the coding) is presented first. After that, an overview of the themes is provided. The themes are arranged according to the 6 top level themes: building blocks, attributes, network, living lab definition, interest and principles. The themes are supported with illustrative quotes. Because most of the interviews were conducted in Dutch but the language of this research is English, the quotes have been translated into English. An overview of the original Dutch versions of each quote presented in this chapter is provided in Appendix C.

4.1 Overview of the data

First, an overview of the respondents that are included in the dataset is provided. Then, a brief explanation is given on the codes that were used to analyse the data.

4.1.1 Overview of the respondents

An overview of the respondents, their organisations, their sex and the duration of the recordings is provided in table 4. The dataset consists of 13 transcribed interviews. 9 Respondents are female, 4 are male. 7 Respondents represented a private company, 3 respondents represented a university, 1 respondent represented a governmental agency and 2 respondents represented an innovation hub. All of them have senior positions in business, governmental or academic organisations. The average duration of the interviews was 36 minutes. All the interviews were conducted in Dutch, except for the one with Amelie Pecourt, which was conducted in English. The transcriptions of the interviews have been provided to dr. Jesús Rosales Carreón and can be requested from the author.

Name	Organisation (secondary organisation)	Organisation classification (classification of secondary organisation)	Sex	Recorded Duration	Notes
Petra Koenders	GPEC (Gemeente Bergen op Zoom)	Company (Government)	F	39m 53s	
Edith Feskens	Wageningen University & Research (Regiodeal FoodValley)	University (network organisation)	F	39m 13s	
Birgit Teunissen	Brightlands	Innovation hub	F	29m 56s	
Marc Laus	Avebe	Company	M	35m 09s	
Anniek Mauser	Unilever	Company	F	24m 16s	Anniek suggested it would be better to interview Wendy van Herpen
Wendy van Herpen	Unilever	Company	F	46m 11s	
Janny van der Heijen	Provincie Noord Brabant	Government	F	50m 12s	
Hans van Trijp	Wageningen University & Research	University	M	32m 19s	
Woody Maijers	Innovatiepact Zuid-Holland (Provincie Zuid-Holland)	Innovation hub (Government)	M	49m 21s	Hanneke van Nistelrooij (provincie) was initially contacted, but suggested Woody, as he is closely linked to her and the province
Lysanne van der Lem	Utrecht University	University	F	22m 42s	Suggested it would be better to interview Future Food Lab at UU
Amelie Pecourt	Groupe Bel	Company	F	27m 39s	
Gisella Frijlink	NIZO	Company	F	30m 57s	
Nils Sips	Cargill	Company	M	52m 43s	

Table 4. Overview of respondents, their (primary and secondary) organisations, sex and the duration of their interview.
Source: Author

4.1.2 Overview of the codes

The analysis was conducted using coding in Nvivo. In total, 391 pieces of text were coded for the analysis, using 6 layers of themes. Figure 4 displays what the highest level themes. The size of each square represents the coding frequency of that theme, relative to the other themes. Figure 5 shows all the codes in all the layers, their size representing their coding frequency. Codes that start with a capital letter are codes from the pre-established coding guide, codes starting without a capital letter are codes that emerged from the data.
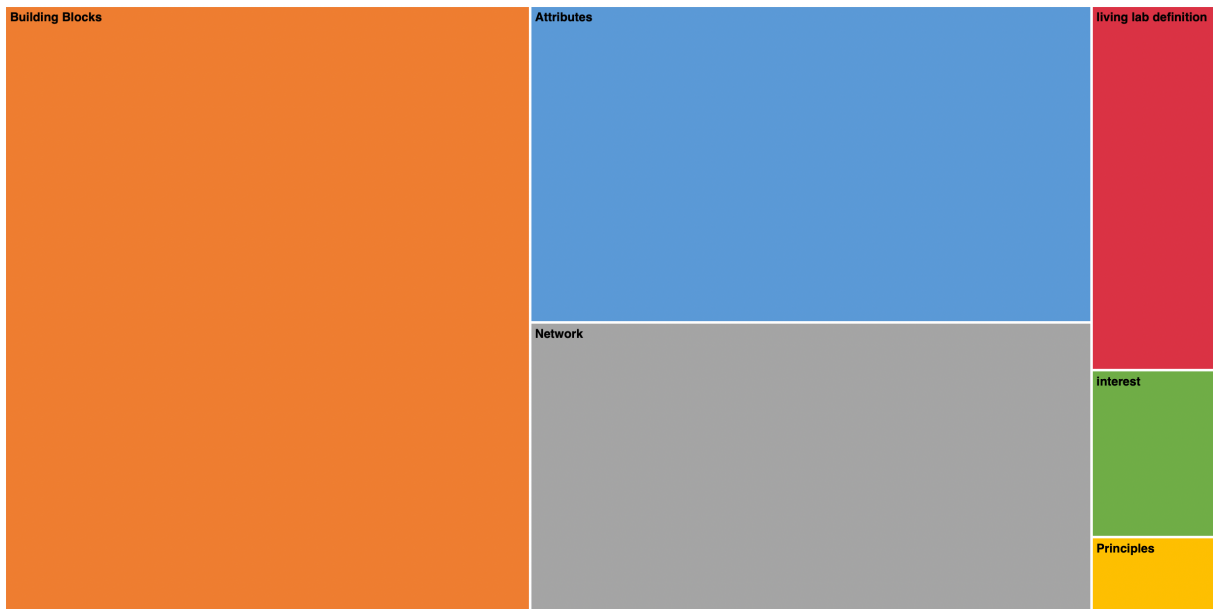
Figure 4. The 6 highest level themes, displayed in proportionally sized squares according to their frequency of use.
Source: Author. Created in Nvivo 12
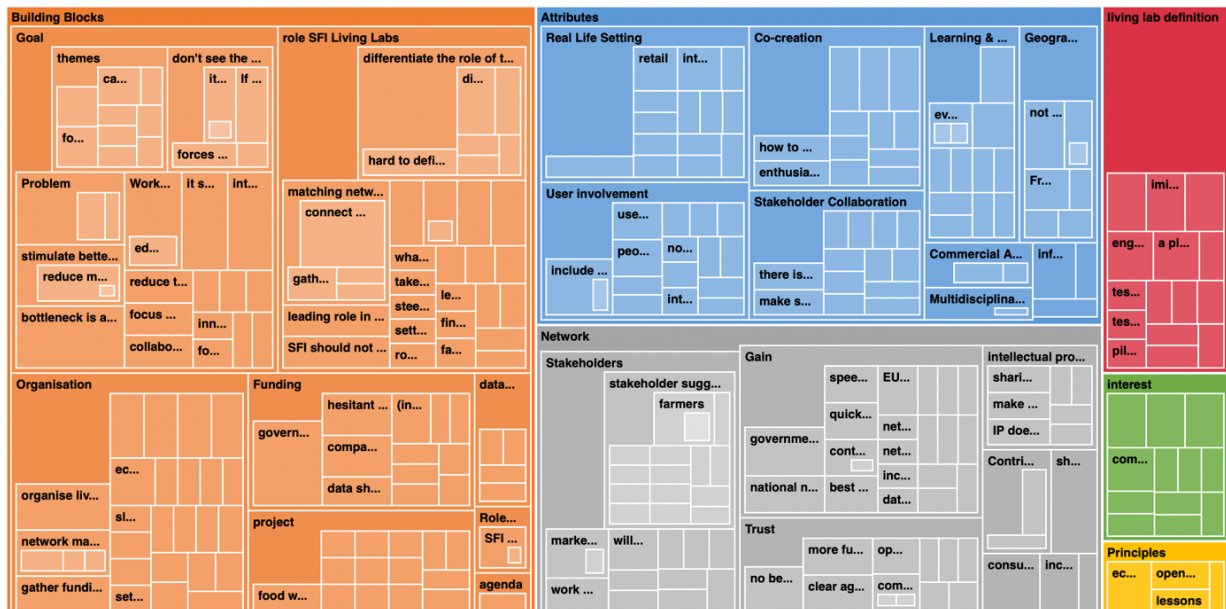
Figure 5. An overview of all used codes on all theme levels, displayed in proportionally sized squares according to their frequency of use.
Source: Author. Created in Nvivo 12

4.2 Main theme 1: Definition of a living lab

There are some commonalities and some differences in the ways that the responded provided a definition of a living lab. As a means to find common ground, a word cloud was created with the use of Nvivo. For this purpose, the 80 most frequently used words under the code 'living lab definition' were selected. The resulting word cloud is displayed in figure 6.

Figure 6. The 80 most frequently used words in the code 'living lab definition'. Only words with a minimum of four letters are included and stop words are excluded. No translation was applied in making this word cloud. Because the interviews were mostly held in Dutch, the presented words are Dutch words.
Source: Author. Created in Nvivo 12.

While this word cloud shows the main concepts that were mentioned as part of a living lab, it does not show the underlying differences between respondents. There is a strong variety in the ways in which respondents conceptualise a living lab. When asked how they would define a living lab, the quotes from the following respondents highlight this difference.

"Is it not one of those, it's another, erm... I think that's how it goes all the time, both in Europe as in the Netherlands, that you constantly get new names for the same things."
(Petra Koenders)

"A place where research is carried out, really in practice. A high TRL level research. [...] working towards the final validation of implementation of innovation. And you pointed out in a video that it's often with multiple parties and co-creation, multidisciplinary."
(Birgit Teunissen)

Other differences emerged around the specific focus that respondents gave. The most common focus was on 'testing'/'experimenting' with 'users'/'citizens' or in 'real life settings'. Some leaned more towards the inclusion of users for feedback and some leaned more towards the use of a real life setting, but mostly there was a general understanding of a combination of these two elements. Marc Laus used an animated example to highlight both elements in his definition of a living lab:

"I think a living lab is really those ladies that you see in the supermarket to test products in the supermarket." (Marc Laus)

Some displayed particular interest in the aspect of a wide network (or *ecosystem*) of stakeholders, as illustrated by the following examples:

"I think what is required is that there is an ecosystem [...]. And in the ecosystem, you need various things, facilities, you need services and depending on the innovation need, so depending on the societal transition you want to achieve, you should look at what you need to fill that ecosystem. [...] Look, what you always need and whether it is a living lab or whatever is, you need a financing service, the facilities surrounding it. Those, you always have to organize." (Petra Koenders)

Actors from universities and governments had a slightly different focus when talking about living labs than actors from businesses. The academic and public actors attributed more importance to the role and equal positioning of citizens in a living lab, while business actors considered them more in the line of 'users for consumer research'. The following two quotes illustrate the difference.

"We use a lot [...] the target. For example, we just take a look at the flexitarian, OK there is a lot of people who are flexitarian. But if I want something really specific, for example, from Vegan people [..]. It could be really interesting to tackle this kind of population. And after, I imagine, kind of living lab with an immersion possibilities
[...]
Thijs [00:21:22] But how how do you think you would motivate the users to actively participate in this?
Amelie [00:21:28] Pay them."
(Amelie Pecourt)

"Well yeah a living lab is something where also... Yeah the consumer, say the citizen needs to have access to. Not only B2B but also a very clear focus the civilian. This shows clearly in the examples you mention. You really have to see the societal focus that is inside."
(Janny van der Heijden)

4.3 Main theme 2: Building blocks

The building blocks form a main theme that is derived from the coding manual. These are the elements that are needed to set up a living lab. Specifically, the living lab actors need to come to be able to come to a common agreement on these elements. The analysis resulted in a different categorisation than the building blocks from figure 2 in section 2.5. The categories that are discussed are: ideation and goal, organisation, role of the SFI and

funding. Some of the building blocks from figure 2 are discussed under attributes in section 4.4, as there was some overlap between the content of building blocks and attributes.

4.3.1 Ideation and goal

A common theme in the overarching goal of the living lab is the fostering of a societal transition. The most profound transition that was mentioned is a sustainable food transition, which included a transition in protein, nutrition, food waste and packaging.

> "Well, look, the transition consists of several parts of course, but the major transition is that there should be ample food for everybody in 2050. The transition consists of several parts. Sustainability is a part of it. Preventing food waste for example. But it goes further. Packaging, everything that's part of that."
> (Janny van der Heijden)

The problem that the living lab could tackle is often related to the connection between society, business and science. Specific focus lies on collaborations between business actors to 'join forces' (as illustrated by the next quote) and on putting society in charge of steering the transition (as illustrated by the second quote).

> "Within the province, we do not want competition to emerge. In fact, we want them to work together. Preferably across borders [...] and then explore: "Where is this one, that one is strong at that, another has different competences and has that network." Well, have a look: How can you complement each other? Can you collaborate? And move things forward in that way? Instead of competing with each other, make sure you stand strong together."
> (Janny van der Heijden)

> "What you see often of course, especially in the Dutch landscape is that scientific research is funded. Then you get a technology push, where people want to bring technologies from science to practice because they think parties will be better off that way. And what I've seen often in the past, also in healthcare, is that those are not the things that healthcare actually needs. [...] So when you want to go test there in practice, you need to understand very clearly where the needs are of all parties involved. And make sure that the question also comes from society."
> (Birgit Teunissen)

Another interesting finding was that a living lab could help with looking further ahead in the future, as illustrated by this quote.

> "[...] the challenge with [...] large companies at SFI is that they are inclined to maybe look until 2030. As soon as it goes beyond that, I think that many people [...] 'I don't think it will be interesting, let's not look that far ahead'. While actually, for us, the living labs and field labs had offered us the chance to research those capabilities and opportunities. [...] So I think that is an area where a field lab, but also a living lab, can play a role to finally incorporate those [capabilities and opportunities to research beyond 2030], to support those. To bring it to life for a corporate."
> (Nils Sips)

The respondents mention that there is a demand for the organisation and guidance of a 'network', 'platform' or 'ecosystem' on an (inter)national level to promote the required transitions of our current society. By joining forces, respondents stated that multiple disciplines can be combined, new doors can be opened, innovation can be steered from the needs of stakeholders and more lobbying power can be exerted. Specifically, several respondents mentioned that there is a need for a network that connects actors based on shared strategic goals, ambitions and needs. They mention that such a network is currently missing. Several respondents also share the notion that there is a lack of involvement of citizens and of farmers in food innovation and that this could be addressed by a living lab.

4.3.2 Organisation

The current organisational system of the SFI for R&D and field labs is regarded as functioning well. Several respondents suggested that the living lab organisation should be an expansion of that same system. This way, the entire valorisation process is covered in the SFI community. As Birgit Teunissen puts it:

> "Just like we do it at the field lab, we can do it for a living lab"
> (Birgit Teunissen)

Regarding the way in which living labs should be orchestrated, two major themes emerged from the data. Firstly, respondents suggested to 'start small', to 'provide examples', 'learn' and then build it out step by step.

> Yes so actually you should have something to implement first. And I believe you need to take a step back in order to get there."
> (Hans van Trijp)

Secondly, respondents suggested to organise the living labs according to specific themes, as illustrated by the following quote:

> "The projects that we have now... How can [you] shape them in such a way that we always move towards a field lab and that we *need* to go to a living lab? That's what I think, or, then you keep such a living lab focused, like 'this is about the protein transition, this is about sustainability, this is over less energy consumption, less water consumption.' I think that in the setting up of a project, you should consider, or you should be able to specify 'this is what we are going to do with these living labs. These living labs will focus on this specific part."
> (Nils Sips)

There are several roles that have been suggested for the SFI to play in the living lab projects. Some of these roles may require further expansion of the team. The roles that have been suggested are listed in table 5.

No.	Organisational task of SFI
1	Expanding the network
2	Guiding network actors in search for collaborations (hands on, going around)
3	Stimulating and pushing collaborations and living lab projects
4	Providing a top-down structure of support for bottom-up projects
5	Gathering funding for projects
6	Providing aid with business development
7	Providing aid with forming consortia
8	Providing start up guidance (potentially trough third parties)
9	Providing (hired) living lab 'skills' such as co-creation, user engagement, communication (for learning and sharing) and multidisciplinary research and experimentation

Table 5. Overview of the organisational tasks that respondents have suggested for the SFI to take on to stimulate SFI living labs.
Source: Author

4.3.3 Role of SFI

They key role that was identified for the SFI to play in the establishment of living labs is that of a platform to connect the network. To gather what the network has and what it is looking for, so to match network actors who can collaborate. The SFI is asked to take a leading role in this and setting the agenda to push specific topics, collaborations and the use of living labs in general. The following quote highlights the role of the SFI to specifically look for collaborations based on shared interests.

> "Thijs [00:22:48] [...] So people should proactively look for the common denominators and for collaborations?
> Marc [00:22:56] I think that it's the task of the SFI to be distinctive on that front. Specifically bringing those parties together. What is the common interest? And can we work together on that interest to create a living lab?" (Marc Laus)

Some respondents would like the SFI to take a clear leadership role in pushing projects that they identify as feasible. Petra Koenders feels that there is too much freedom and too little guidance on the national goals for (food) sustainability and would like an organisation as SFI to take a leading role in this, in collaboration with government agencies as Economic Affairs / Social Affairs, going so far as forcing collaborations. The following quote illustrates her views.

> "It would be much better if Economic Affairs, Social Affairs, or in any case The Hague would open up those lines. They also have these for climate. [,,,] Erm, so SFI could play a very nice role if they would actually get assigned as a national coordination point for this" (Petra Koenders)

However, on the other side, many respondents have shared their concerns about not seeing the role of the SFI in this. As there are already many network organisations in food sustainability (e.g. Food Valley NL, Samen tegen Voedselverspilling, Green Protein Alliance, development agencies, the WUR network, Protein Cluster), most respondents would rather have less organisations to deal with than more. They mentioned that it would be good for the SFI to talk to these organisations, position themselves clearly and work in collaboration with them.

> "I don't think the SFI should develop anything next to that. I think the SFI should make use of what's already there. [...] I think that as SFI, you should not re-....I think you should look at what is available everywhere and how can we further support and strengthen that?" (Birgit Teunissen)

Most respondents found it 'hard to answer' how SFI differentiates itself from the other organisations and/or to explain what specific role the SFI plays. They clearly indicated a need for this to become clearer. Wendy van Herpen is very vocal about this, as illustrated in the following set of quotes.

> "But it's indeed hard for me to say, "we are part of the SFI because of this distinctive factor". Because we are also part of Food Valley but we are also in a Protein Competence Centre. We are also in the Top Institute for Food and Nutrition."

> "I think that the living lab, I think the living lab is a very cool concept. And I think there is a need for it. I want it to... the worry I have, does it have to be channeled through the SFI. Do you get what I mean?"

"Thijs [...] So you think: Go and talk to Food Valley NL (Wendy: Yes), with the innovation hubs that are already being developed (Wendy: Yes). And yes, what is the best way to do this? (Wendy: Yes)."
(Wendy van Herpen)

In search of a differentiating element of the SFI, two major suggestions have emerged. One is the national scale of operation (without limiting to strict country borders) and broad spectrum of food sustainability topics. The other one is the already present focus on valorisation through field labs. Both are illustrated by the quotes below.

"Look, SFI is much more than Brabant of course. What I've been saying, it is the national, international [...]. Well I think that that's what the SFI can bring for us."
(Janny van der Heijden)

"I think that the SFI, if I must say, currently distinguishes itself with that Field Lab part. So I think the combination of research and development and how you can add valorisation to that."
(Wendy van Herpen)

Possible suggestions to expand these two elements were provided by some respondents. First, by expanding the network to include user communities (civilian users, chefs, manufacturers or farmers) the power of the scale of the network can be extended. Second, by providing living lab-specific services such as help with ideation, user engagement, co-creation and transdisciplinary work, the focus on valorisation and field labs can be extended to include living lab expertise.

4.3.4 Funding

A major theme for funding was that (large) companies should contribute to living lab projects. The idea is that if a project is set up with partners that have a real strategic interest, they should be able to invest from their own strategically deployable funds. However, it was also mentioned that SMEs should have access to living labs, but because they do not have as much capital, it would be good if they could join without contributing (as much) to a living lab project. There is general faith in the willingness of companies to contribute, as illustrated by this quote:

"Along the way you see companies act from their intrinsic, actually well-intended motivation: "I'm taking a bit of the responsibility for a piece of development of our sector". Well, then I can imagine that they say we will deploy some manpower or we contribute €10.000, whatever or we bring in cases, or [...]. A few companies will contribute some money, most will contribute time." (Woody Maijers)

Another major theme in funding is the role of governmental organisations. The Dutch ministry for Economic Affairs has been mentioned multiple times as a funding partner, the ministry for Social Affairs and Groeifonds have been mentioned as well, as well as cities and provinces. The philosophy here is that these organisations should all have a serious stake in an organisation (such as SFI) managing sustainability transitions, as illustrated by the following quote.

"If you have a healthy mix of companies saying 'Together, we will now try to make a step with society to formulate a sustainability and R&D agenda', then I think that that's a project of national interest" (Hans van Trijp)

Some respondents mentioned that they would need a clear objective before allocating any more funding. They would not be willing to provide more funding for a general experimentation project for living labs, but rather for a specific living lab project that is aligned with their strategic goals.

> "I think i twill be very hard to get [internal] funding for "Okay, let's see how a living lab works". No, it needs to be, the topic needs to be spot on in terms of alignment with our strategy. Yes, that would be the first point of departure."
> (Wendy van Herpen)

This is in line with the suggestion from Nils Sips, that government funding would be needed to push companies to go the extra mile.

> "But I think if you create an environment within SFI, also with some support from the government. Then more opportunities will arise for those companies to say: 'Okay, than we can at least do that."
> (Nils Sips)

Janny van der Heijden suggested the possibility of funding trough data sharing within the living lab. By selling access (or a subscription) to data that is produced in the living labs, you can gain some funding. Nils Sips suggested looking into European subsidy programs for funding.

4.4 Main theme 3: Interest

'Interest' was one of the emerging themes from the data, that was not provided in the conceptual framework or the coding manual. With the term interest, we mean 'the level and the focus of interest that a respondent shows with regard to an SFI living lab'.

The main finding within this theme is that most respondents show interest in the concept of a living lab, but this interest fades away with uncertainty regarding the how and the why. The uncertainty of the role of SFI plays a key role in this, but also the lack of examples. The following quote explains this lack of examples.

> "I think that there is still a lack of one or two/three good examples where we've had a collaboration with a living lab or field lab –the same goes for both– in which we did things together of which we can say: "Hey, everybody was satisfied with this... We have been able to test a lot of things, develop things really quickly. We got instant feedback from consumers. Some good people were involved that helped us with some marketing, R&D or co-creation." So I think that that should still grow, following a couple of examples. I think that that is the big thing. To create these examples, I think it's good to know 'Okay, which, where do these living labs manifest? What are their focus areas? What are their opportunities?' But also, 'What are their capacities? Where can they add value? What are their specific capabilities?"
> (Nils Sips)

Another thing that Nils mentioned to support the argument for examples is the demonstration of an increase in percentage of market deployment from R&D, as illustrated here:

> "Everything that goes to market is just a tip of the iceberg of what R&D organisations are working on. [...] What gets to the market is a mere 10 percent of what has been in the pipelines. And I think that, if you tell a Cargill, or Unilever, or Danone: 'We think that with a living lab we can increase this 10 percent to 15 percent". I think that they will line up for you, because they could win such a large sum of money with that."

Another finding is the variety that was observed among the respondents. The majority of respondents showed interest in living labs but there is a variety in the specific elements of a living lab they were interested in and the level of interest they displayed. For example, some showed interest in clearly demarcated projects, while others showed interest in loosely defined 'iterative' projects. Some had interest in research that does not need to build new facilities, interest in access to a network, interest in access to users or interest in increasing the go-to-market ratio. Lastly, there is a difference in the focus points that are of interest. For example, some want to tackle food waste, while others want to create new protein sources and others want to tackle issues with human capital.

Another factor that influences interest is the gains that actors expect from participation. For example, one actor expects an increased go-to-market-ratio while another expects access to network and funding for its researchers. This will be discussed in detail in section 4.4.4 under 'expected gains'.

There were also some that were uncertain about or even opposed to the idea of the SFI focusing on living labs. Hans van Trijp thinks the SFI is very far away from living labs, Birgit Teunissen does not see the added value on top of field labs and Gisella Frijlink is strongly opposed, as she believes the bottleneck is not at the level of the consumer, but in the supply chain, which does not need a living lab. A section of the interview with her is displayed below as an example.

"Gisella [00:10:26] I said that a living lab is very much on the consumer side. And not circular on technology or chains or security. Or all the challenges that we are still facing now.

Thijs [00:10:44] Okay, so how would you picture it? Do we need to fix the backside of the value chain first? And then afterwards see if there is a connection with the consumer?

Gisella [00:10:56] Well, either is not such a big... Yes, I think that is not such an extreme challenge. If you look at meat alternatives now. I think they will find their way to the consumer."
(Gisella Frijlink)

Except for the outlying respondents that are sceptical, the majority of the respondents did display an interest in an SFI living lab and they were able to name the advantages they expect to gain from joining an SFI living lab.

4.4 Main theme 4: Network

The themes under building blocks highlighted that network plays a key role in the interest of respondents in the SFI and their expectations of the SFI's role in living labs. Expanding the network, bringing the network actors closer together, finding shared interests and fruitful collaborations in the network, these were all elements that are deemed important by the respondents. The themes related to the network are described in this section.

4.4.1 Stakeholders
Most respondents mentioned that it would be good to include the entire value chain, including farming, production, retail, food service and consumers. Especially involving actors that are user groups and can provide real life settings are deemed important, because many respondents found it hard to gain access to user groups. Apart from that, several

respondents suggested the involvement of other food network organisations, governmental agencies, research institutes, SMEs, NGOs and companies/actors that can provide specific expertise on communication, consumer research, interdisciplinary research, co-creation and user involvement. The focus on the value chain illustrated by this quote:

"I think that you should approach everything you do from the perspective of the entire value chain. So if you say we will involve the farmers and look at e.g. new production or something similar... Then it will be interesting if you have farmers working on it, that whatever is produced can also be processed. Subsequently you will arrive at the question: "Well, now we also have to make something tasty from this". So you should always be in this 'value chain way of thinking' if you go and do something. To me that is very important."
(Janny van der Heijden)

While companies and academic institutions were always suggested as stakeholders in an SFI living lab, users or citizens were hardly ever considered as stakeholders. Governments as a stakeholder were considered an interesting new avenue to explore by some and considered irrelevant by others. While most understand the interest that governments have in such a project and consider governments for funding, they do not see what a government role in an SFI living lab would look like, as suggested by the following quote:

"If you're talking about governments. That is only interesting to us if it's about services."
(Marc Laus)

Specific suggestions for stakeholders to include are listed in table 6 (see p.45). It was also suggested to look at completely different sectors like the sports or garment industry, as there might be non-competitive ways to collaborate and different new insights to share there.

No.	Stakeholder suggestion
1	Pilot plants (BPF, BBEPP, Bodec)
2	Chefs
3	Chef schools
4	Kitchens (such as at Avebe or Brightlands)
5	Food service industry representatives
6	Supermarkets (the retail sector)
7	Marketing companies (for help with sharing lessons and marketing innovations)
8	Start-up coaches
9	Start-ups
10	Entrepreneurs
11	Economic Affairs
12	Social Affairs
13	Green Protein Alliance
14	Samen tegen Voedselverspilling (Toine Timmermans)
15	HBO Universities (HAS, InHolland, Avans, Fontys)
16	Food Valley NL
17	Dialogue Center
18	New neighbourhoods
19	Festivals
20	Hospitals
21	World Food Centre
22	Innovatiepact Greenport
23	Consumentenbond
24	Consumers in the Wageningen area
25	Farmers
26	WEF Food Innovation Hub
27	Dutch government

Table 6. Overview of suggested stakeholders from respondents.
Source: Author

4.4.2 Stakeholder collaboration

To ensure good stakeholder collaboration, multiple respondents suggested matching actors based on shared ambitions. According to them, if there are shared ambitions, competitive issues and trust issues can be overcome more easily, stimulating co-creation and good stakeholder collaboration. Also, it is deemed good to focus on companies that display honest motivations and are willing to look at other factors than profit, companies that can collaborate on sustainability in a precompetitive setting. An example of matching on shared interest is provided in the quote below.

"Marc [00:22:56] [...]. What is the common interest? And can we work together to create a living lab?

Thijs [00:23:11] Yes, so look beyond 'What is practical? What do we have here, what do we have there?' But focus more on: "What is the real motivation and interest behind this?"

Marc [00:23:19] Yes, yes. I think that then you will have a distinguishing effect on that what's
already there."
(Marc Laus)

For good stakeholder collaboration, ensuring that all stakeholders are engaged with the project and carry the initiative is also considered important, as illustrated by the following quote.

"It is always important that all stakeholders carry the initiative and are engaged with it. And that all from everybody, and you only do that if you see the purpose of it."
(Birgit Teunissen)

This is in contrast with the suggestion that it might be better if collaborations are sometimes forced, as is explained in this quote:

"There, in that way, you should somehow be forced to collaborate in order to prevent doubles. Erm, because helping a scale-up and offering the right equipment to help such a company costs money. So you shouldn't have to buy those machines ten times in the Netherlands. You only have to buy a few in locations where they can be useful. And here you can enforce control. However, then you come to the point: control is against common opinions in the Netherlands: everybody can do anything, because SFI does not have power. We don't like power."
(Petra Koenders)

Two respondents (both with considerable living lab experience) mentioned that they experienced problems with different stakeholders speaking a 'different language', because they come from different disciplines, industries, socio-economical positions and because they work with different budgets, timescales and deliverables. They mention that this problem should not be underestimated when collaborating with multiple stakeholders. This quote illustrates the problem:

"[...] there are far fewer living labs than we would like, because people all speak a different language. So business and research speak different languages. They work with different deadlines and also with different partners. A company works with different deadlines and end products than a researcher does."
(Lysanne van der Lem)

Methods that were suggested to facilitate good stakeholder collaboration are 'don't involve too many parties', 'start small and grow slowly', 'use design thinking and agile methods', 'sign a pact up front' and 'carefully manage and frame a project to eliminate conflict of interest with e.g. NGOs that participate'.

4.4.3 Trust amongst stakeholders

The issue of trust has been defined by respondents as either a matter of competition, Intellectual Property (IP) or commitment. While the results clearly show that competition hinders collaboration, they also showed that this does not always have to be the case. In dealing with competition, respondents suggested that collaboration is possible if the focus of the living lab is more fundamental or when it is equally beneficial to all parties involved. However, any form of direct competition is still considered a barrier for collaboration by most. A way to overcome this is to choose partners that do not compete with each other but *complement each other.* For example, make sure you include actors in different stages of a value chain or from different value chains, but make sure that they can benefit each other. This is not easy, as explained in this quote:

> "You know, that you really take care not to have two dairy companies, but to make sure it is complementary. That is also an option, but indeed a difficult one."
> (Edith Feskens)

The matter of IP and data is one of making clear agreements, according to all the respondents mentioning this. There has been some critique on situations where one actor (WUR was mentioned several times) takes the IP and then shares it with others at a cost. This highlights that sharing IP is not always favourable. However, the respondents agreed that with clear agreements, there should not be a problem. Prioritising shared ambitions over IP ambitions could make a difference, according tot his quote:

> "Well, I think that that's really only possible if you define your common needs and try to set your IP ambitions aside."
> (Marc Laus)

Also mentioned that there is a rising question whether there is a future for IP in a world where innovations develop quicker than IP applications. This might help overcome some of the IP barriers.

> "During one of those SFI discussions [...] I believe someone from Danone said: "Is there still a future for IP?" And if you look at that, well erm, look, the market developments are so enormously quick and before you, if you develop something today and want to patent it, you will be waiting for 1,5 or 2 years before you can even think about going to market with it."
> (Nils Sips)

Lastly, the point of commitment is similar to the IP point. Ensuring a collaboration of actors that have clear shared intentions and agreeing on how far the project will be pursued can help in overcoming trust issues with regards to each other's commitments. The following quote illustrates this.

> "There are, of course, various co-creation models that you can work with and that you can use as an initial start for stakeholders to focus on your "What do you want to bring? What do you want to obtain?". To discuss these things openly and create some trust. I think that that's key. That everybody carries it and that you have a certain level of trust amongst each other. And wherever there are issues, that you can discuss them and agree what you will do with them."
> (Birgit Teunissen)

Data suggest that such an agreement can include topics as data sharing, lesson sharing, time commitment, human & financial capital commitment, topical focus, how to follow up on results and stakeholder equality.

4.4.4 Expected gains
The quote from Birgit Teunissen also demonstrates the most apparent theme related to the expected gains. Namely many respondents pointed out that it is imperative to know what each party can gain from a living lab project, so that there can be a transparent and motivated collaboration.

From the perspective of business, respondents are motivated by the prospect of gaining access to the network, allowing them to find the right partners, access to (inter)national funding, access to end users, consumer research, access to knowhow of how to run a living lab, a platform for dialogue with citizens, collaboration with governments and with farmers. They would like to speed up development, increase the visibility of their sustainability efforts and not miss any future opportunities.

From the perspective of research and another network organisation, the motivation lies in access to data and contacts that can help with this data. The data in question is specifically data that is produced in real life environments, so that it can be used to substantiate policy decisions. Also, research opportunities, funding and access to a society-wide network are benefits for these actors.

The respondent representing a governmental organisation explained an interest in the access to a network that goes beyond her province's borders that shares similar goals.

4.4.5 Contributions

Some organisations were able to identify specific contributions they could deliver. Many found it hard to describe what they would contribute, if they do not even know what they are getting. However, there is some optimism amongst respondents that companies would be willing to contribute time, expertise and funding. GPEC can contribute their space and machines to parties/entrepreneurs that want to experiment with new technologies. WUR can help with scientific expertise on food sustainability and measuring food, they also have a campus available which might be interesting as a real-life setting with an attached consumer base. Brightlands mentions the testing facilities at their campus and access to the Brightlands network. Avebe has pilot plants and a culinary kitchen available for testing.

4.5 Main theme 4: Attributes

The attributes are, similar to building blocks, elements that are needed to build a successful living lab. However, while the building blocks form organisational elements that are needed to start off, the attributes are elements that should be stimulated as much as possible so to come to a most successful outcome.

4.5.1 Public-private-people partnerships

The respondents seem unfamiliar with the concept of public-private-people partnerships. Public-private partnerships were mentioned, but only as a means of 'projects with government funding'. Public-private-people partnerships were not mentioned by respondents at all. As the term is a little specific, general collaboration between citizens, governments and stakeholders were discussed as well. While some respondents understand that users and governments are involved in living labs, they did not indicate an interest in forming a partnership with them for the living lab. Mostly, respondents indicated they had no experience with such partnerships in innovation, as indicated by the following quote.

> "Business, academia, citizen for sure. The governments, I think yeah. It could be interesting, but I never made it."
> (Amelie Pecourt)

4.5.2 Co-creation

Co-creation was a central theme for the majority of the respondents. Some actors already apply co-creation in their practices, but some are still reluctant to use co-creation. Most expected co-creation to be an integral part of living labs, as this quote illustrates:

> "I think that you [...] could bring a few parties together in a kitchen to test some things and do some product development. If you include potential customers to review these products, then you have some form of co-creation of a product. And then the feedback of the consumer will lead which direction you will go with your new product development."

(Marc Laus)

Co-creation was mentioned to have several purposes. It could be useful to gain a better understanding of what the user wants, it could stimulate a stronger support base for new innovations, and it could also stimulate improved collaboration along the value chain.

To stimulate co-creation, the following suggestions have emerged from the data: the use of co-creation models, ensuring everyone is open and can trust each other, a good chairman to guide the co-creation and energising people that stimulate active participation in co-creation. The SFI is suggested as having a role to provide the right people for this. Hans van Trijp suggested that effective co-creation should be long-term. For example, it could include monthly meetings with a group of value chain actors, scientists and citizens.

> "Yes, and then co-create! So don't go 'thanks, we've noted it, we will be back in 5 years.' But really take the responsibility to create a support base"
> (Hans van Trijp)

4.5.3 Real Life Setting

The interest in testing in a real-life setting is derived from a need to have a better understanding of contextual factors that apply in the use of innovations, so that innovations work better when they reach the market. The following quote demonstrates how respondents deemed the contextual factors to be important:

> "The aim of a living lab is to test your new product or new process under relevant conditions. I think that is when all environmental factors can influence your new product or process."
> (Marc Laus)

While most respondents displayed a keen interest in applying a real-life setting, there was no unified response. For example, Petra Koenders, when asked how to implement a real-life setting, responded with:

> "The question I would have is: Why would you want to do this?"
> (Petra Koenders)

While this quote displays a discrepancy of interest, the majority of the respondents understand the need of a real-life setting. Some also have suggestions for implementing a real-life setting, which are listed in table 7. Respondents mentioned that it would be a good role for the SFI to try to link these existing real-life settings with other relevant stakeholders.

No.	Suggestion
1	Involving SME's
2	Involving the hospitality industry
3	The World Food Center
4	Working with a hospital, GP or school to access specific users (focusing on e.g. diets)
5	Collaborating with a developing or newly built neighbourhood
6	The campus of the WUR (potentially)
7	Working with retail (there is an example case with a supermarket in Ede)
8	Professional test kitchens
9	Chef schools
10	Festivals that offer experimentation on site
11	People taking a certain product/innovation home for testing
12	Somebody comes by people's real environments to test something on a regular basis
13	Create a real life setting with a dedicated user group for a few days in a holiday park
14	Simulate a real life setting with images and sounds in a testing facility

Table 7. Overview of real-life setting suggestions from respondents.
Source: Author

Anniek Mauser explains she does not see a need for the SFI if she wants to test in a real-life setting, as illustrated by this quote:

> "So you mean... Because then you could say that you could use a focus group or conduct consumer research, but this will be to see if you can try it in a real life setting on a small scale (Thijs: Yes). Yes, and I see this more and more of course, but mostly amongst one another. Look, if we want to try something on a smaller scale, we will do that with retailer X in X amount of shops."
> (Anniek Mauser)

This is opposed to responses from other actors, that state that it is hard for them to gain access to retailers for experimentation in a real-life setting, as this quote demonstrates:

> "I would *really*, *that* would be a very nice one: If the retail could join the SFI and we could get more connection with the retail sector. [...] After all, it is difficult to get them to join, to get them involved within certain developments."
> (Birgit Teunissen)

4.5.4 User involvement

Being able to connect with users, get their feedback, co-create, test and even just have dialogue with them is one of the main reasons that respondents were interested in a living lab, as these would benefit the speed of development and the likelihood of innovations being successful on the market, but also because it would benefit societal transitions in general and it has the potential to educate both citizens and other actors involved. When discussing the involvement of users, Wendy van Herpen said:

> "I think that *that*, if you say that is the idea, then I think there are some opportunities. But then I'm not only thinking of, well citizens is a broad term, but you could for instance also think 'are we sufficiently including farmers in this?'"
> (Wendy van Herpen)

This quote also illustrates how users are conceptualised in different ways. Respondents noted that end consumers, supermarkets, chefs, restaurants, manufacturers and farmers are all users at a certain point. Co-creation with all these types of users can be valuable in achieving a sustainable food transition in the value chain. However, consumers and farmers were mentioned as the ones that were the most underrepresented and the hardest to gain access to. Specifically, farmers are hard to gain access to, as illustrated by this quote:

> "Now it appears that the connection between tech companies and food or the agro-food sector is pretty difficult. A) Because there is of course a large group of people, farmers, that is already struggling to survive. For a tech company, that means there is not so much to gain as with for example the pharma, health or automotive sector, you name it. [...] You [also] see a difference in speaking each other's language, they do not speak each other's language at all. [...] And you have a group that's not really organised that well, because every farmer is an independent business owner. [...] Plus, what's going on in tech, it seems relatively simple, but if you are dealing with a farmer on the land, you need to deal with rain, wind, dust, drought, you name it."
> (Janny van der Heijden)

Section 4.5.3 provides an overview of real-life settings that can provide access to end users, such as neighbourhoods, schools or festivals.

There is some concern about being able to reach end users that have lower education or income than average, as illustrated by the following quote:

> "Look, the health issues are more prevalent along less educated people. [...] Those people do not participate in our research as often, they are harder to reach for us. And I also think they would not join their neighbourhood participation as easily, and other similar things. [...] Mostly, I would like to say: make sure that you have strong enough roots in or input from let's say deprived neighbourhoods or the lower educated people because you see that, you even see this is politics, the difference between higher and lower educated people in the Netherlands is constantly growing and that is petty. And for this problem –food in general and the food supply, health and sustainability of it– that is very important. So I was thinking that when you say you've got government, NGO's, you've got researchers and you also have citizens somewhere. You should make sure that it is not only the higher educated citizen that participates in these things."
> (Edith Feskens)

Edith Feskens suggested that increased capacity and interpersonal skills are required to provide the outreach that is necessary to connect with people of lower income of education.

4.5.5 Multidisciplinarity
The multidisciplinarity of a living lab did not receive much attention from the respondents. While some considered that it might become relevant, there is some doubt whether a living lab always needs to be multidisciplinary, as illustrated by this quote:

> "And you already said in your video that it is often a co-creation with multiple parties, multidisciplinary. I've seen those variants. But I also know variants where it is basically pretty monodisciplinary. Where, from one field of research, certain innovations are tested in practice."
> (Birgit Teunissen)

On the other hand, some respondents did mention the inherent need for multidisciplinarity if various stakeholder types are involved, which leads to a need for proper management of multidisciplinary methods, which is often a struggle as this requires certain expertise. Edith Feskens suggests that it would be nice if the SFI could play a role in this.

"You will really go interdisciplinary or transdisciplinary. [...] Practice and theory is already combined, and then indeed including the consumer and the citizen, that makes it transdisciplinary. And it is pretty difficult to manage that. If the SFI would like to do that, that would be very nice."
(Edith Feskens)

4.5.6 Geographical Context

One major theme within the geographical context was the idea of a central 'living lab location' organized by the SFI. Some respondents conceptualised an SFI living lab as a single location, which initiated some opposing thoughts. As Birgit Teunissen put it:

"For me it does not really need to be a real entity, it does not have to become a physical entity with its own profit model, but more like a national umbrella over a variety of parties."
(Birgit Teunissen)

Respondents suggested it would be better to make use of currently existing locations for the initiation of living labs. To make use of the network and create a network of living labs, rather than creating a central living lab. Petra Koenders provided an example of what this could look like:

"He is just a large kitchen where he receives people. He would say somebody who developed a protein can come there and he will show in the kitchen that you can make a hamburger out of it. And then you can taste it all together, simple as that. And that needs to be somebody who can cook that. He needs interns, chefs, etcetera. So, I will help him involve this chef's school. And I do this on an organisational level, to ensure that a good connection is made. The SFI could do this on a larger scale. Because eventually he will need a large market to sell. Now he is only a pilot. Next year there will be a demo, yeah, than there will be millions of veggie chicken balls on the market. Those need to be sold."
(Petra Koenders)

Another theme in the geographical context is the complexity of it, as there are always several contexts at play (local, national and global). Most respondents describe a demand for a network/ecosystem connecting parties on a national scale that is not afraid to look over the borders (mostly Germany and Belgium). Companies like Unilever, Cargill and Bel are also interested in a global context. While the level of the EU could bring along interesting funding opportunities, it was also mentioned that an international focus (EU) can bring along a lot of complexity. A case project following a value chain to its origin might be interesting, which consists of a different geographical context. Regions such as the region around Wageningen are specifically mentioned as well. Respondents considered it important to not strictly limit the lab by any geographical context.

4.5.7 Learning & evaluation

One key theme from learning and evaluation is that sharing of lessons should be stimulated and that systems for this should be implemented for the start, as illustrated by the following quote:

However, the respondents showed different thoughts on how to do this best. There was one suggestion to create a revenue model based on sharing data and information from living labs. Most think it's best if the information is freely accessible, but in order to ensure learning some have suggested the use of communication experts or seminars to share lessons. Specifically, it is important to share the lessons of the 'frontrunners' and figure out how these lessons can be applied in other organisations. As long as only the broad outline is shared, there should be no worry of sharing sensitive information. Clear agreements need to be made up front regarding what information can and will be shared. Signing a 'pact' up front could not only help stimulate the sharing of information, but also to ensure that organisations follow up on living lab results, as some respondents are worried that the results end up in some report that is never read and then forgotten about. It is considered important to share both success and failure. For success, it can be hard to identify who gets a 'claim to success', so it is recommended to make clear agreements about that up front. For failure, Woody Maijers is piloting the idea of implementing an award for the 'biggest blunder'.

Aside from learning from the living labs, evaluation should be in place to improve the living lab processes. Respondents suggest starting this early and ensuring regular (but not too regular) qualitative gathering of information on the processes, the organisation, the degree of collaboration and other factors that would need to be pre-established. The following quote explains why it is important to start early on with evaluation:

"That is also an advice to integrate this as soon as possible. Because at some point, somewhere you will be measured by a party, often a funder, so it is better if you get a head start. In that way, you can provide some direction as to what you measure and how it is measured."
(Woody Maijers)

4.5.8 Commercial Application

Regarding the commercial application of user data, all respondents agreed that it is a matter of making intentions clear and having clear agreements with the users you involve. Any ethical issues can be avoided by being clear about how the data will be used. The following quote is illustrative of this:

"How we do that? With us, people signed an informed consent form. [...] I think it's good that you explain to people that if you collect data, which you do, because we would also happily do that to contribute. Let's say, to measure what the food intake of people is exactly –so we would really be interested to participate– then you can imagine that people realise 'Okay, this data is only used for research'. Something like that. At least make a statement about that. Something that people need to read consciously and they have to agree with consciously. Yes, yes, you know. And sometimes it happens anonymously, we also have examples of that. How it works exactly with privacy and stuff, the AVG?
Thijs [00:19:41] Yes, alright. So with informed consent you should...?
Edith [00:19:45] You should be fine, yes."
(Edith Feskens)

It was suggested that anonymising users can go a long way to enhance what you can do with user data. Hans van Trijp suggested that if there is a worry that companies that are

involved might use the data in a different way than was initially promised, then you are probably working with the wrong companies. He mentioned that understanding the integrity of the people and organisations involved should not be underestimated.

4.6 Main theme 5: Principles

None of the principles that were identified in the theoretical framework became a strongly represented theme among the respondents. However, a few are worth mentioning, as they have been mentioned several times in the data. Sustainability was –not surprisingly– mentioned often, and while it may be a little obvious, it is deemed important to keep that goal in sight. Transparency, an ecosystem approach and openness were also mentioned multiple times. Transparency is deemed important in order to retain trust among the network while openness adds to that that it can stimulate unforeseen innovation. The ecosystem approach relates to the role of an organization like SFI to try and fulfill all functions that are required for an effective innovation ecosystem between all the stakeholders involved. Lastly, one respondent mentioned the importance to not get distracted by the small details, but 'keeping your eyes on the ball'.

5. Recommendations

The aim of this study was to identify how a living lab for agri-food transitions can be set up in the most feasible way by the SFI. The final sub-question to support this aim was: *How do the views of the SFI stakeholders relate to the feasibility factors of the living lab?* The views of the SFI stakeholders on the SFI living lab and the feasibility factors have been explained in chapter 4. For this chapter, these views have been related to the theoretical framework on living lab feasibility factors. This process resulted in a set of recommendations that follow from a combination of data, theory and case studies. In total, 28 recommendations have been identified to stimulate the feasibility of the SFI living lab, which are described in the remainder of this chapter.

5.1 Explanation of the recommendations

In this section, the recommendations are explained and substantiated by examples from data, theory and case studies. An overview of the recommendations is provided in section 5.2.

5.1.1 Construct and communicate a clear definition of a living lab

The results show that in defining living labs or describing their interest in them, respondents apply a focus on different areas. While there are a few common aspects, such as testing and the involvement of users, there are still differences in other areas. Steen & van Bueren (2017a) state that a clear definition of a living lab is imperative to stimulate the involvement of participants, as they are otherwise 'left in the dark' and don't see how it compares to other innovation projects. This view is also supported by the data. Therefore, constructing and communicating a clear definition of a living lab for the SFI is an important step to stimulate involvement. As the definition needs to be broadly carried in the SFI community, we recommend facilitating co-creative workshops to construct a definition. Draft a document explaining the definition after the workshop(s), send it around for everybody to provide feedback on and then host an informative session where the definition is explained.

5.1.2 Ensure that the network has a correct understanding of a living lab

The results also show that some actors have a view that does not resonate with a living lab that is feasible according to the theoretical framework. These differences mostly regard the attributes, which are discussed in section 5.3. To stimulate feasibility, the actors that will be involved in the living lab need to have the right conceptualisation of a living lab. This can be achieved in two ways. One way is to select only those stakeholders that demonstrate a view of living labs that is in line with the feasibility factors and the definition that the SFI has constructed. Another way is to encourage others to join as well, but ensure they are educated about the concept of an SFI living lab through seminars, workshops, videos, documents and discussions.

5.1.3 Identify a shared ideation and goal of the living lab

The results indicate that there is a shared understanding about what the problems are and which themes need to be addressed. However, especially regarding the issue of how the living lab would function to solve these problems, the results still show some discrepancies in the views of the respondents. As mentioned in table 3 in section 2.4.2, *the strategic intention should be thoroughly discussed at the start of the initiative and should be clear for everyone*

involved. Steen & van Bueren (2017b) learned from case study examples that a shared vision fosters satisfaction and commitment from participants. They state that the problem statement, goals and ambitions should be jointly defined. Co-creative sessions (workshops) with the stakeholders that have different views towards the ideation and of the living lab could help come to a shared understanding of the living lab's ideation (Verhoef & Bossaert, 2019), as was done in Canada's Living Laboratories Initiative to co-develop practices with all partners involved to stimulate sustainability in the agricultural sector (McPhee et al., 2021). These workshops could very well be combined with the workshops to construct a definition.

5.1.4 Consider additional supporting tasks to facilitate living labs
The results suggest an extended array of tasks to be conducted by the SFI organisation in order to stimulate living labs. This suggestion resonates with table 3 in section 2.4.2, suggesting that specific living lab knowledge and skills are required for it to be successful. We recommend the SFI organisation to consider these tasks and determine which ones they seem feasible to integrate. The suggested extra tasks are summarised in table 5 in section 4.3.2.

5.1.5 Clarify the role of the SFI and its relation to other similar organisations
The results also suggest that there is some uncertainty surrounding the role of the SFI organisation, their distinctiveness and added value. Section 4.3.3 explains where the uncertainties lie and provides recommendations from respondents on how to differentiate the role of the SFI amongst other network organisations. We recommend the SFI to go over these results, understand where the problem lies and consider the respondents suggestions for overcoming uncertainties and clarifying the position of the SFI. After measures are taken to clarify the position of the SFI, this should be communicated clearly with the interested SFI partners. Several respondents suggest that the SFI should collaborate with other network organisations and organisations that strive for food sustainability. They suggest that many living lab elements are already there, someone just needs to connect the dots. This network orientation is important to consider for the living lab. As described in section 2.3.4, a living lab is a combination of an internal and an external network. We recommend connecting with the European network of Living Labs (EnoLL) to utilise the power of an international network of living labs.

5.1.6 Use the living lab canvas to co-create an organisational structure
It is important that all stakeholders have a shared and agreed upon understanding about how the living lab is organised in order to start the establishment of a living lab (Verhoef & Bossaert, 2019). To come to this shared and agreed upon understanding, Stuckrath & Rosales Carreón (2021) provide a living lab canvas that can be used to set up a living lab project. The use of a canvas for setting up living labs has provided useful before in the case of living labs at festivals to come to an agreed upon understanding of the organisation and the aims of a living lab (Boonstra & Dijkstra, 2021). The canvas from Stuckrath & Rosales Carreón (2021) is an adaptation of the canvas by Verhoef & Bossaert (2019) but was developed with a specific focus on the SFI. While we specifically recommend this canvas for the SFI, we did not use it in the theoretical framework. This is because at the start of this research, the canvas was not ready yet.

5.1.7 Work towards an SFI living lab platform, rather than a single SFI living lab

The results also suggest that the SFI living lab should likely not be set up as a single living lab project but rather, the SFI should act as a network facilitator to stimulate the development of SFI-related living labs, similarly to how they organise field labs. This distinction has vast implications for the role of the SFI organisation in the living lab and also for the use of the suggested canvas. In this new set-up, the living lab canvas can still be useful for setting up the living lab organisation, but the canvas should also be filled in for each project that the SFI aims to stimulate. From this platform, we recommend working with specific living lab themes. The data shows that there is a demand for a topical 'push' from the SFI regarding themes it wants to address. This can help organisations understand where they can fit a living lab into their practice. Maas et al. (2017) point out that living labs are set apart from other innovation practices because of a strong focus on finding solutions for specific themes and specialising in facilitating those themed living labs trough e.g. funding.

5.1.8 Be open to change in the process

As J. Rosales Carreón (personal communication, April 16, 2021) put it, *"setting up a living lab is a living lab in itself"*. This quote resonates with the recommendation from section 2.4.2 to 'be open to changes in the process' and the identified principle of openness. This openness to change shows clearly in the process of this research, as the interviews with all stakeholders have led to a change in the perception of the living lab from a single lab to a platform for living labs, as just described in section 5.1.7. It is important not to be locked in by a narrow vision of what a living lab should be, as it is an iterative process and it can take many forms. Therefore, we recommend to keep an open mindset along the process of setting up and running the living lab.

5.1.9 Decide whether to start building an example or to start building a platform

A question that the SFI needs to concern itself with is how to start the living lab endeavour. One route is to start building the platform and see what living lab projects emerge. The other route is to start with one example and then further expand the platform. On one hand, the respondents indicated a need for a platform to connect actors, set a living lab agenda, push living lab projects and deliver living lab supporting services. On the other hand, respondents indicated a need for examples to understand why and how a living lab would be interesting. they also mentioned it would be good to start with a small project and slowly, organically develop it. We recommend looking at a combination of both these routes, but stress the importance of finding an example as soon as possible, as this can also provide valuable lessons.

5.1.10 Seek external funding for additional organisational tasks

There is a relation between the organisational implications of the data and the funding implications, because any extended tasks would require more funding. This is problematic, as section 4.3.4 shows that several respondents noted they would not be willing to pay for the implementation of an SFI living lab framework, but only to a specific living lab project which fits with their interests. Hence, in order to fulfil the living lab-related organisational tasks, external funding might be sought, as suggested in the results through certain (inter)national governmental organisations such as Economische Zaken, Sociale Zaken or the European Union.

5.1.11 Use living lab best practices and handbooks to guide the process

The best practices that are described in section 2.4 can provide a guiding light in the process of starting a living lab. Steen & van Bueren (2017a) suggest that the first two stages of this process are initiation and planning. The SFI is currently in a position where it has made a few steps in both these stages, but still has more work to do to complete them. We recommend following their handbook when completing these stages of the living lab, as their lessons are based on experience with 90 living labs in the Netherlands. It provides aid on how to identify projects, locations and partners and on how to find a shared vision and gather capabilities. These are all steps that the SFI needs to work on in order to establish a feasible living lab. Additionally, we recommend using the work *Understanding and Planning a Living Lab* by Stuckrath & Rosales Carreón (2021), as it was developed specifically with the SFI in mind.

5.1.12 Educate stakeholders about public-private-people partnerships

While theory clearly mentions public-private-people partnerships (4Ps) as an important attribute of living labs, the respondents had little experience with such partnerships and as such had little to say about it. The results show interest in business working together with citizens and governments, but actual partnerships were not highlighted. This could be problematic for realising an effective outcome of the living lab. P4s are a key reason why living labs are considered to be effective in stimulating systemic change (Leminen et al., 2012; Nyström et al., 2014; Ståhlbröst & Holst, 2012) and without them, the 'new form of governance' as suggested by Bulkeley et al. (2019) and Gamache et al. (2020) is not reached. The conceptualisation that respondents have of a living lab will need to be changed so that there will be interest in P4s. This can be done through education by means of seminars, workshops, discussions, documents or videos. We recommend bringing in experts to educate partners about the use of P4s.

5.1.13 Ensure that the motivations and gains for each stakeholder are clear and that a minimum of shared value is created per project

The notion that clear motivations and gains for all the involved stakeholders stimulates high levels of collaboration (Veckman et al., 2013) is supported by the respondents in the dataset. The results add to this that clear motivations contribute to trust among stakeholders, possibly less issues with Intellectual Property (IP) and better stimulation of learning and continuation after completion of a living lab project. Therefore, ensuring clear motivations, gains and commitments of each stakeholder to be involved is a key element in achieving stakeholder collaboration. This requires a culture of openness and transparency between living lab partners, which should be clear from the beginning. Both openness and transparency are principles that were also found in the data. The recommendations from table 3 in section 2.4.2 recommend fostering a *'minimum of shared value creation'*. We recommend that when setting up a living lab project, a minimum of shared value creation between all stakeholders is always sought and clear to everyone involved.

5.1.14 Include partners that understand that all participants, including users, should be stakeholders with decision power

The notion that *"all participants, including the users, have decision power in the various stages of the innovation process"* (Steen & van Bueren, 2017a, p.11) is not supported by all of the respondents in the dataset. Yet the recommendations in section 2.4.2 suggest the *'involvement of all stakeholders*. This means that ensuring the inclusion of partners that agree

with this notion will be important in maximizing the outcome of the living lab. From the partners that were interviewed, the following respondents displayed a tendency towards this view: Petra Koenders, Edith Feskens, Marc Laus, Wendy van Herpen, Janny van der Heijden, Lysanne van der Lem, Hans van Trijp.

5.1.15 Attribute a central, powerful and steering role to the SFI for each project, so that the living lab can be enabler-driven

Following Leminen's classification, the SFI living lab would either be enabler-driven or utilizer-driven, depending on the organisation (see section 2.3.2). If the SFI living lab aims to foster a positive societal transition, an enabler-driven living lab is preferred. However, if the power and will of companies' interests is not curbed, the living lab will likely be utilizer-driven, yielding benefits for individual participating actors. If the SFI can ensure a more central role in the steering of the living lab projects and if more public funding can be involved, an enabler-driven living lab could be set up, which yields results for societal improvements, rather than private interests. Bulkely's classification provides a similar distinction. If companies' power and private interests are not curbed, a strategic living lab is more likely to emerge, aimed at specific, strategic, often corporate goals. However, if managed properly, there is potential to make the SFI living lab a civic living lab, aimed at societal transformation. This supports the recommendation that, in order to ensure the SFI living lab fosters societal transformation, the powers and private interests of companies should be curbed. The theory does not offer any suggestions on how to accomplish this position for the SFI and no case studies were found that mention this. The results showed that some respondents want to do their own projects and some are really keen to see SFI set the agenda for projects to push. We recommend to start working with those partners that display an interest in following the lead of the SFI.

5.1.16 Find partners that show serious commitment to the overarching goal

Section 2.3.2 explains that enabler-driven living labs are suitable for stimulating agricultural transitions. It also explains that enabler-driven living labs often struggle with not finding enough commitment from companies. The challenge of finding the right companies is also supported by the results in section in 4.4.2 (finding companies with honest motivations) and the recommendations in section 2.4.2 (passion). Therefore, finding the right organisations that can deliver serious commitment should be considered a key priority to set up an enabler-driven living lab. The data shows support that this is possible, as one respondent mentioned: *"you do not need many"* (Woody Maijers). Going further than a commitment to the goal, Maas et al. (2017) suggest that organisations that are willing to change the status quo should be included too, which is supported by some of the respondents as well.

5.1.17 Stimulate a real life setting by working with educated partners and using the suggestions from respondents

As a real-life setting is a key element that makes a living lab a living lab, it is important ensure that experimentation is done in a setting that is as close to reality as possible. Or as some respondents put it, *"considering all contextual factors"* (Marc Laus). Luckily, the majority of the respondents agreed that a real-life setting is a key element in a living lab, so it is likely that this element will be realised. However, not all respondents had the same idea of how close to reality a real life setting should be and didn't consider it relevant. SFI should beware of this, as literature suggest that it is not unlikely for the importance of a real life setting to be underestimated in a living lab (see section 2.3.3).

To find a real life setting for a living lab, most respondents agree that the real-life setting is dependent on the project at hand. Nevertheless, some respondents provided examples of how a real life setting could be integrated into an SFI living lab. An overview of these examples is presented in table 7 in section 4.5.3 and we recommend considering these options when setting up a living lab.

5.1.18 Use the various recommended methods to stimulate co-creation

Co-creation plays a crucial role in ensuring that all contributors create mutually valued outcomes, which can stimulate the level of trust and participation, both factors of which respondents think that they will be difficult to maintain. However, the results also show that it can work the other way round. If high levels of trust, openness and transparency can be created, for example by focusing on shared problems or shared value creation, then effective co-creation is also more likely to emerge. Several stakeholders suggested that there is a myriad of methods to stimulate co-creation, using these methods would be beneficial to the outcome of the living lab. Examples of these methods are participatory and iterative methods (Veeckman et al., 2013). The suggestions from respondents in section 4.5.2 can be used as a base for inspiration when looking to stimulate co-creation. As mentioned in 2.3.5, for true co-creation it is important that input from all stakeholders is equally considered from the earliest to the latest development stages.

5.1.19 Include partners that are willing to continuously co-create with all actors for a long term

Not all respondents displayed an equal dedication to the use of co-creation in a living lab, so it would be good for the SFI to follow the suggestion of Hans van Trijp in section 4.5.2 to ensure to only include those partners that are willing to co-create and stick together with companies & citizens for the long run. This resonates with the conclusion from Maas et al. (2017) that in order to achieve impact on the level of a societal transition, long-term commitments between partners is required, governed by clear structure and coordination.

5.1.20 Ensure a citizen-centred focus along the partners

The suggestion from Hans van Trijp also resonates well with the theory that for effective living lab outcomes, you should not merely include a user for input, but include a citizen as co-creator, co-designer and key actor in learning & evaluation processes (see section 2.3.6). The results show that there is a focus on both the user-centric and the citizen-centric approach. The citizen-centric approach is deemed especially important for a living lab for agri-food transitions (McPhee et al., 2021), so ensuring this citizen-centred focus is important for the SFI. This can be done by choosing the right partners, educating them or determining a citizen-centred focus for projects.

5.1.21 Ensure long-term, continuous contact with users, reach users through agents, reward users and involve different kinds of users

Many respondents mentioned that it is hard to gain access to users and do not know how to include them in the process. Table 3 in section 2.4.2 provides several recommendations for that: ensure long-term, continuous contact with users, reach users through agents, reward users for participation and involve different kinds of users. For long-term and continuous contact with end-users, the results suggest going into an agreement with all living lab partners for several years and sitting together on a monthly basis, while the user group explains their findings and provides input for new experiments. As a way to reach users through agents, section 4.5.3 (on incorporating real life settings) provides several suggestions on how to reach user groups trough e.g. housing projects, universities or

festival organisers. As for rewarding users, the only suggestion from data has been to pay them, but we recommend not to follow up with this, as this would not lead to a mutual relationship with users and the other stakeholders. To involve different kinds of users, it is important to consider the suggestion from respondent Edith Feskens that it is particularly important to include citizens with lower income and educations, but that they are much harder to reach and include (see section 4.5.4). This resonates with the findings from Tonkens et al. (2015) that civilian participation in the Netherlands is often not representative of the population. To avoid this issue, increased effort should be taken to ensure the inclusion of these citizens. Edith Feskens suggests that increased capacity, innovative ways of access and proven social skills are key ways to include the citizens that would otherwise be left behind.

5.1.22 Facilitate expertise on multidisciplinary research and experimentation
While most respondents agree that multidisciplinarity is inherent to the approach of a multi-stakeholder living lab, they also mention how hard it is to manage this and how they lack expertise with it. Section 2.3.7 suggests that a multidisciplinary approach is the key to stimulate outcomes on a systemic level, so as some respondents have suggested, it would be wise for SFI to facilitate expertise on multidisciplinary projects.

5.1.23 Identify the geographical scope of the operation and the geographical contextual implications of projects
The complexity of operating on different geographical scales that is suggested in section 2.3.8 is supported by the results in section 4.5.6. In spite of this complexity, in order to ensure effective outcomes, the integration of the local context with the wider (global) context should be consciously considered (Maas et al., 2017; Verhoef & Bossert, 2019; McPhee et al., 2021). This means two things. Firstly, the scale and reach of the SFI living lab should be set. As respondents indicated an interest in access to a network that operates on a national scale with overflow at direct borders, this is the recommended geographical context for the organisation of SFI living labs (however, this context should never form a limitation to a project). Secondly, the relationship between local projects and regional, national or international implications should be clear when starting up a living lab project. Consider what needs to be measured and what local factors need to be mapped in order to understand how the lessons of a living lab can be applied in a different geographical context. According to Maas et al. (2017), understanding how a real-life experiment can be applied in a different context requires a series of experiments, which, in turn, requires a long-term, structured and coordinated collaboration of multiple parties. This demanding task will be worth the effort because it will not only help drive the large-scale impact that a living lab seeks, but it will also help to attract funding.

5.1.24 Start early with setting up systems for measurement and qualitative evaluation
Section 2.3.9 explains why learning and evaluation are increasingly important in living labs for agri-food transitions. Most respondents agree that learning and evaluation are an important element. To stimulate evaluation outcomes, it is recommended to follow the suggestions from the respondents to start early with setting up a qualitative evaluation system, measuring progress on both an organisational and project level and regularly sharing the evaluations with the stakeholders. Not too little, not too often, every three months seems like a reasonable period of time. We recommend to start at an organisational level. Measure how many collaborations are formed, how many grant applications, how many people have joined. Later you can move into how many users you have involved, how many products you have tested/developed and eventually how

much impact you have made in terms of i.e. waste/emission reductions. It is also important to measure satisfaction with the organisation, the projects and the processes.

5.1.25 Stimulate learning trough agreements, communication and business expertise

To stimulate learning outcomes, it is recommended to follow the respondents' suggestions to make clear agreements up front about what will be shared, who will get a claim to success, sharing failures, who will be included in sharing lessons and how living lab results will be followed up on. Additionally, the suggestions to hire someone with communication/marketing expertise and to organise webinars will benefit the learning effectiveness of the message being shared. Lastly, the results show that lessons from one organisation are often hard to implement in another. This requires thorough business analysis and some business expertise would be useful to facilitate this.

5.1.26 Make clear agreements up front

Several of the recommendations mention agreements. Agreements can help with the following aspects: trust, contributions, expected gains, IP handling, learning, information sharing, commitment, use of consumer data, privacy, stakeholder equality and the timescale of the living lab. All these elements are considered in the recommendations for a feasible living lab. Therefore, we recommend considering all these elements when going into a partnership agreement for a living lab.

5.1.27 Ensure fairly distributed inclusion of each of the stakeholder types

All the four types of stakeholders that are identified in theory (private, academic, public organisation and end user) are also identified in the data. This means that there is potential for a collaboration among all these four actor types and form a living lab. However, the results show that the role of governments in an SFI living lab is unsure and also that not all actors consider users to be stakeholders. Without these four types of stakeholders, the resulting project or programme cannot be considered a living lab and will not be effective in achieving the desired goals of a sustainable food transition. Out of 90 projects that identify with the term living lab, Maas et al. (2017) discovered that only two of them fit the description, mostly because they properly included local governmental and citizen stakeholders. Additionally, to ensure that a living lab can foster a transition on a societal level, they conclude that several levels of governments should be involved, ranging from municipalities to the European Commission. The issue of stakeholder inclusion needs to be addressed before establishing the SFI living lab.

5.1.28 Aim for fulfilment of the living lab network roles for open innovation

Additionally, to build a successful open innovation network for living labs, there are various more specific actor roles that should be fulfilled (Nyström et al., 2014). Based on the data, a few suggestions for actor roles in an SFI living lab network can be made.

The **coordinator** has the role of "*represent[ing] a certain group of actors such as users as well as providers collecting and organizing information about user needs, requirements, and desires.*" (Nyström et al., 2014 p.486). The data shows an interest among respondents in a central organisation that collects exactly this information so that collaborations can be identified. The SFI could either take the role of coordinator for each of the actor groups or organise coordinators to represent each group.

A **builder** *"establishes and promotes the emergence of close relationships between participants such as users and companies in the living lab"* (Nyström et al., 2014 p.486). The data shows that there is a need for specific skills to build such relationships and it would be beneficial to them and to the collaboration of a living lab if the SFI network could provide these skills.

The role of the **messenger** is to forward and disseminate information within the network. This role could play a key part in the learning strategies suggested in the data. Sharing lessons learned, successes, examples and new developments is key to ensure that the living lab can promote system innovation. Suggestions from the data for this role differ, there is interest in the SFI taking up this role, hiring marketing/communication professionals to take up this role or network actors providing these professionals to take up this role. It is important to decide early in the process how this will be managed, as communication will be an important element from the start of the living lab.

A **facilitator** has the role of motivating participants and providing intangible resources. This role is most related to the suggestion by Edith Feskens that someone with specific social skills would be needed in order to reach users, specifically those with lower income and lower education. This person could be designated for a living lab project where it is relevant, but in the long run, it might be useful for the SFI to be able to offer this role in-house.

Orchestrator

The role of the **orchestrator** is most likely the key role of the SFI core team. Taking up this role means orchestrating the whole living lab network, guiding and supporting its activities and encouraging network actors to follow the example that the orchestrator demonstrates him/herself. The results indicate that the SFI should show leadership and initiative to set up living labs. Specifically, results mention that the SFI should identify, stimulate and 'push' collaborations to set up living labs and that they should set an agenda that steers projects towards specific themes and towards living labs.

An **integrator** *"has the task of integrating heterogeneous knowledge, development ideas, technologies, or outputs of different living lab actors into a functional entity"* (Nyström et al., 2014, p.487). This relates strongly to the data showing an interest in the SFI to provide support in working with interdisciplinarity. Somebody with expertise on how to unify data and people that come from different backgrounds is crucial in stimulating an effective outcome. Having such a person in-house would be a strong addition to the SFI as a living lab facilitator.

The **informant**, **tester**, **contributor** and **co-creator** are four roles that are reserved for the users in the living lab. The user as informant and tester is something that most respondents were interested in, but some fear that their role as contributor and co-creator might be neglected. Ensuring that each of these roles is fulfilled by the users will benefit the outcome of the living lab.

5.2 Overview of the recommendations

All the recommendations that are explained in this chapter are listed in table 8 (see p.64).

No.	Recommendation
1	Construct and communicate a clear definition of a living lab
2	Ensure that the network has a correct understanding of a living lab
3	Identify a shared ideation and goal of the living lab
4	Consider additional supporting tasks to facilitate living labs
5	Clarify the role of the SFI and its relation to other similar organisations
6	Use the living lab canvas to co-create an organisational structure
7	Work towards an SFI living lab platform, rather than a single SFI living lab
8	Be open to change in the process
9	Decide whether to start building an example or to start building a platform
10	Seek external funding for additional organisational tasks
11	Use living lab best practices and handbooks to guide the process
12	Educate stakeholders about public-private-people partnerships
13	Ensure that the motivations and gains for each stakeholder are clear and that a minimum of shared value is created per project
14	Include partners that understand that all participants, including users, should be stakeholders with decision power
15	Attribute a central, powerful and steering role to the SFI for each project, so that the living lab can be enabler-driven
16	Find companies that show serious commitment to the overarching goal
17	Stimulate a real life setting by working with educated partners and using the suggestions from respondents
18	Use the various recommended methods to stimulate co-creation
19	Include partners that are willing to continuously co-create with all actors for a long term
20	Ensure a citizen-centred focus along the partners
21	Ensure long-term, continuous contact with users, reach users through agents, reward users and involve different kinds of users
22	Facilitate expertise on multidisciplinary research and experimentation
23	Identify the geographical scope of the operation and the geographical contextual implications of projects
24	Start early with setting up systems for measurement and qualitative evaluation
25	Stimulate learning trough agreements, communication and business expertise
26	Make clear agreements up front
27	Ensure fairly distributed inclusion of each of the stakeholder types
28	Aim for fulfilment of the living lab network roles for open innovation

Table 8. Overview of the 28 recommendations that are identified in this research. The list in non-hierarchical.
Source: Author

6. Discussion

To provide more scientific context to the results and describe their relation to theory, this chapter explores the theoretical implications of the results and the limitations of the research.

6.1 Theoretical implications of the results

The research findings offer a lot of interesting implications for living lab theory, some of which provide novel avenues for further research. In this subsection, the relation between the findings and the theory is further explored and suggestions for further research are provided.

When reviewing living lab literature, it became evident that authors agree that the definition of a living lab is a vague one, and that the term gets used in many situations where it does not apply. The data from this research supports this view, as the views of respondents on what a living lab was lie far apart and are generally inconsistent. Yet, there were a few common attributes that suited the understanding of most respondents: the use of a real life setting (although there was some variation in the extent to which this setting needs to be 'real'), the use of co-creation and the importance of a network of various relevant actors. As this was a case study, more research would need to be done in order to discover the generalisability of these common attributes for living labs.

The attributes that did not find much resonance with the respondents were the use of public-private-people partnerships and in general the inclusion of both citizens and governments as stakeholders. These elements are a prerequisite if a living lab is to function as a 'new form of governance' (Bulkeley et al., 2016) and produce integrated outcomes on a systemic level (Verhoef & Bossert, 2019; Maas et al., 2017). If these functions are desired for a living lab, more attention to these elements would need to be given in both academics and practice, so to stimulate a better understanding of why and how these elements should be integrated.

Living lab literature provides lots of typologies for the organisation and functioning of a living lab (e.g., Leminen et al., 2012, Leminen, 2013, Schliwa & McCormick, 2016, Leminen et al., 2017, Bulkeley et al., 2019). However, when it comes to practice, there is no clear pathway of how a living lab should be set up. This became clear when analysing what recommendations follow from the data for the SFI. The typologies and related approaches are all described on a very abstract level and do not provide guidance on how to integrate them. The respondents and the SFI organisational team indicated that they did not completely understand how to proceed with the organisation. More detailed research into this, using case studies, as the handbooks by Evans et al. (2019) and Steen & van Bueren (2017a) do, would provide a useful toolbox for aspiring living labs to set themselves up.

Literature suggests that a multi-method / multidisciplinary approach is an integral part of the research and experimentation conducted in living labs, because these experiments cross technical, ecological, sociological and economical disciplines (see section 2.3.7). Our data shows that respondents agree that it could be an important element, but that they are unfamiliar with the use of multi-method approaches. There is a lack of understanding how

to execute such multi-method approaches and respondents also indicate a lack of expertise. The thorough study into the application of multidisciplinary methods is still relatively young, but in order to stimulate effective living labs, more research into the use of these methods in living labs could be useful.

The results show that academic and governmental actors are interested in a citizen-centred living lab approach, while business actors are more often interested in a user-centred approach. Literature suggests that a citizen-centred approach is much more likely to yield positive societal results and is often not achieved, while a user-centred approach is more likely to yield specific results that benefit a specific actor (see section 2.3.6). Academic actors and governmental actors are societal actors, as they act for the sake of human society in a direct way. Business actors, however, are first and foremost driven by their own gains. This could explain why academic and governmental representatives are more motivated than business actors to choose the approach that yields societally beneficial results, i.e. the citizen-centred approach. However, no studies have been found that analyse this difference. As the intended purpose of a living lab is to foster positive societal transitions and a focus on user-centred living labs could hinder this, it provides an interesting and perhaps important avenue for further research.

McPhee et al. (2021) argue that an agroecosystem living lab is embedded within and examined at the scale of agroecosystems. This means that for an agroecosystem living lab project, its implications on the larger scale of its agroecosystem should be clear. If we follow this line of thought and/or change it to the scale of agri-food systems, this was not found in the results. Examples that were mentioned were often of a smaller scale and it was especially hard to conceptualise how multiple value chain actors of an agri-food system (e.g., farmers, food production companies, retailers and consumers) could be united in one living lab, let alone conceptualise how to integrate citizens and governments. Additionally, for these small-scale living lab projects, respondents struggled to identify the larger scale impact of their projects. To living lab practitioners, this is an essential feature to achieve impact and acquire funding. Therefore, more experimentation and research on this topic is suggested to help understand how to embed living labs for agri-food transitions.

Gamache et al. (2020) make a strong case for the use of commons-based agri-food living labs. However, none of the respondents suggested anything that resembles such a living lab. While Gamache et al. (2020) suggest that it is a very interesting avenue to explore, our data shows that there is little to no resonance with this idea amongst current actors in agri-food systems. This gap would need to be overcome in order to successfully experiment with commons-based agricultural methods.

6.2 Limitations of the research

As there are no publicly available studies similar to our research, it is not possible to test the reliability of the data. It can be expected when conducting qualitative research, that the data is not fully replicable, as personal factors of the interviewer and interviewee play a role in this. Therefore, to ensure maximum reliability, certain measurements have been put in place, following the Fereday & Muir-Cochrane (2006) method as described in section 3.2. Firstly, the interview guide was tested to ensure that the resulting themes would be related to the feasibility factors from section 2.5. Secondly, the coding guide was tested with a double blind to ensure that the coding process is replicable. Lastly, the resulting themes from the coding process were corroborated by cross-referencing with the data

summary and with the coded text. By following this process for analysing the data, reliability was enhanced as much as is possible given the circumstances of this qualitative research that was conducted by a single researcher.

For this research, the validity of the research method is related to the thoroughness of the theoretical grounding of this study. The criterion validity cannot be measured as there are no examples of other similar studies, but the content validity and construct validity are based on the theoretical grounding of the measured concepts and the completeness of indicators to measure these. The theoretical framework was established by conducting thorough and intensive desk research, which reached theoretical saturation after describing 9 living lab attributes, 8 building blocks, 4 stakeholder types, 13 principles and 43 additional supporting factors. We therefore believe that the conceptual framework provides the measurement of the feasibility of a living lab with adequate levels of content validity and construct validity.

While the saturated inclusion of elements in the theoretical framework helped to stimulate validity, it also came at a price. The set of elements is very complex, because there is a lot of overlap between specific elements and the categorisation of those elements. For example, 'learning & evaluation' is an attribute, while 'review & evaluation' and 'internal learning' are building blocks. Because of the complexity and overlap in the theoretical framework, the description of the results and their implications sometimes became overly complex and included overlap as well. Because of this complexity, there were multiple pathways possible to write up the research. This method left it open to the researcher to decide which pathway gets chosen, which could negatively influence the reliability of this research. However, we argue that this limitation has had a minimal impact on the reliability of the results. While a second researcher might take a different pathway in writing up the results and implications, the conclusions that are drawn would be the same, as the same theory and the same data is used.

One limitation to the study is that in the final sample, only one respondent was included that solely represented a governmental organisation. The aim was to conduct interviews with at least two representatives of governmental, private and academic organisations. Additionally, one could argue that citizens should have been included in the sample as well. By using a combination of strategic and theoretical sampling, the option to include users was kept open. However, theory suggests that in the early stages it is better to focus on a small stakeholder group without the users (Imset el at., 2018), and the results suggested that the users to be involved should be chosen on a project basis and can therefore not be identified at this stage. For these reasons, the decision was made not to include citizens in this research.

The sample size of 13 respondents could be considered a small sample size for this type of research. However, 13 is exactly the number of actors that the key informant (SFI) provided, indicating that these 13 are the interested parties from within the network. Therefore, the sample provides good saturation of the population. Three of the suggested people were not interviewed. One of them suggested a better alternative respondent to interview, so in a way 2 out of 13 respondents were left out of the population, which means that the sample covers 85% of the population. As compensation, two extra interviews were conducted with other suggested actors. We consider the coverage of 85% to be sufficient for this case study.

The theoretical framework of this research involved a set of principles that was identified in literature. They were included in the theoretical framework because authors mentioned that adherence to these principles contributed to success in various case studies. However, no strong themes resulted from the interview data on the principles. This could mean that either the principles were identified incorrectly by their authors, or the respondents would not yield a fruitful living lab because they have no regard for these principles, or the principles were wrongly included in this research. Since the same principles were identified by several authors, their roles in success were witnessed in case studies and the studies were published in peer-reviewed articles, it is unlikely that the principles were wrongly identified by their authors. Since the respondents did have positive regard for sustainability factors from other elements of the framework and since there were 13 respondents, it is unlikely that all of these respondents have disregard for these principles. Therefore, the most likely conclusion is that the principles were wrongfully included in this research.

If the principles were wrongfully included in this research, either the principles did not belong in the theoretical framework, or the research design was flawed. The principles were not specifically mentioned to the respondents either in the video or the interviews. The goal of this was to see which principles the respondents would mention themselves, so to limit probing and to limit the time. It is likely that this method caused the principles not to bring forth any strong themes, as the respondents were not experts on living lab literature and had more pressing matters to discuss first. Therefore, it could be concluded that the inclusion of principles in this research was unnecessary or hardly necessary because it could not be fitted into the research design properly and therefore not yield proper results. Under different circumstances, the principles could still be a useful factor to include.

7. Conclusion

The aim of this research was to understand how the SFI could organise a living lab for an agri-food transition in the Netherlands in the most feasible way. To do so, the concepts of a living lab for agri-food transitions and the feasibility of such a lab have first been analysed through desk research to establish the conceptual framework that is presented in section 2.5. This framework did not only answer the first two sub-questions, but it was also used to provide guidance to the data collection and analysis. Thirteen interviews with SFI partner organisations have been conducted and they were analysed using hybrid thematic analysis, combining concepts from the conceptual framework with emerging concepts from the data. The third sub-question was answered by relating the resulting themes to the theoretical framework, which led to 28 recommendations for a feasible SFI living lab. The findings also provided contributions to the existing body of literature surrounding living labs (for agri-food transitions) and new avenues for further research. To conclude the research, the gained insights are used to answer the main research question: *"What is the most feasible way for the SFI to set up a living lab for agri-food transitions in The Netherlands?"*

The feasibility of the living lab has been defined as a combination of possibility and success (see section 2.4). Additionally, the theoretical framework explains that a living lab consists of a network of stakeholders that influences the factors for possibility and success (see section 2.5). Therefore, to answer the main research question question, we need to know three things:
1. Which stakeholders should be involved in the SFI living lab?
2. How is it possible to set up the SFI living lab with these stakeholders?
3. How can the SFI living lab become successful with these stakeholders?

When looking at the stakeholders for the living lab, we found that there are some barriers that need to be overcome. A living lab should consist of at least the following stakeholders: business actors, public actors, academic actors and citizens. The SFI network consists mostly of business actors, a few academic ones and hardly any governmental actors, so if the network is to facilitate SFI living labs, it needs to be expanded to include citizens, but also more governmental actors. Specifically, a lack of retailers, user communities and farmers was identified in this research and we recommend that these should be considered. Another problem within the stakeholder network is that many SFI partners do not see the role of governments and citizens as equal partners and stakeholders. The SFI needs to ensure that the living labs are set up with actors who see the importance of forming public-private-people partnerships (P4s), as these are the driving force behind the societal transition that the SFI aims to stimulate. Careful stakeholder selection is necessary to ensure that selected living lab partners are open to P4s, but also to ensure that stakeholders are clear about their expected gains from participation, that they are willing to work in an open and transparent way, that they can reach shared value creation and can fulfil Nyström et al.'s (2014) network roles that help an open innovation network to thrive.

To understand how to make an SFI living lab possible with its stakeholders, we analysed the network and the building blocks that are required for a living lab. We found that there are still some barriers to the establishment of a living lab within this network, but they can be overcome. The most important thing for now is that there needs to be clarity throughout the network. Actors from the network have different views on what the living lab should achieve, who should be involved and how it should work. Besides, they state that it is unclear what the role of the SFI would be and what the definition of a living lab is. These

different views and unclarities can and should be taken away by organising co-creative sessions, workshops and seminars to jointly define these elements. Once some clarity and common agreement on these elements is reached, it should be broadly and clearly shared throughout the network. The living lab canvas by Stuckrath & Rosales Carreón (2021), people with expertise in co-creation and people with expertise in communication are useful tools to reach this goal. As SFI's partners would rather not spend funds on setting up the organisation, (inter)national governmental organisations and subsidies should be considered for funding this.

To understand how to make the SFI living lab successful, we analysed how the network could facilitate living lab attributes that enhance living lab outcomes. The most important elements of success also turned out to be the hardest to achieve, namely the facilitation of a real life setting and the engagement of users. Not all of the interview respondents demonstrated an understanding of the significance of involving users as 'citizens' or the significance of creating a setting that is as close to reality as possible, while these are both crucial elements of a living lab for agri-food transitions. Out of the respondents who did understand the significance of these elements, several came up with suggestions on how to stimulate these. For the SFI to establish a successful living lab, it is important that the living lab partners are educated about these elements, all the recommendations regarding these elements are followed and that the suggestions from the respondents are considered. By working with those stakeholders who share the dedication to including citizens and creating a real life setting, the success of the living lab can be enhanced. Other elements that were found to enhance the success is the integration of multidisciplinary research skills, professional facilitation of co-creation, a clear vision on the geographical context and measures to stimulate learning, evaluation and continuation of projects.

In total, we have provided 28 recommendations regarding the network, possibility and success of the living lab. When combined, these recommendations can act as a road map to develop the most feasible set-up of a living lab for the SFI to stimulate agri-food transitions in the Netherlands. However, these recommendations apply at different times and in different settings. Therefore, in order to develop the living lab in the most feasible way, it is important to prioritise as follows. First, focus on what is absolutely necessary. Getting a motivated and diverse network together with actors that understand the purpose and functioning of a living lab is crucial to get started. Getting these actors together also means getting them interested in the living lab, which requires clarity on the definition, organisation and the effectiveness of the living lab. This however, in turn, requires getting a network together. Because of this interdependence of issues, the initial development is an iterative process of organising workshops, networking and finding (or creating) examples. A success in any of these activities will have a positive influence on the others, which is how momentum can slowly be created. Once momentum is there, it is important to have a good look at all the recommendations and make sure the living lab is not moving in the wrong direction before it is too late. Some recommendations will always be easier to achieve than others, depending on the situation. It is good to start with the 'low-hanging fruit', as you never know where it might take you. For example, if the network provides easy access to a certain expertise, funding program, user community or real life setting, use that to start. You never know where it may take you, so remember to 'be open to changes in the process'. In the meantime, be sure to watch out for traps along the way, such as allowing the living lab to become utiliser-driven, not involving users or governments as stakeholders, not implementing monitoring in time or not defining clear agreements before starting projects.

The process of setting up a living lab is complex, novel and full of surprises. These same characteristics can be used to describe the process of conducting and writing up of this research. At times, the complexity and many different angles may seem daunting, and it might be hard to find structure and envision what progress will look like. Taking a step back, taking a different viewpoint and trying to do things step by step can help overcome these barriers. Remember, they are mere barriers on the way to the goal that awaits at the end. With the power of collaboration amongst a motivated network that provides various skills, viewpoints and societal roles, the goals for the SFI living lab project will most certainly be reached. It might just look a little different than you had imagined it from the start.

8. Acknowledgements

9. Literature

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Appendix A – Interview Guide

Protocol

The respondents are contacted by sending out an invitation along with a knowledge clip about living labs. In the invitation, they are asked to schedule free time for the interview and to watch the video. The video provides a brief explanation about the SFI living lab project, what a living lab is, why the SFI is interested, what some (non-food related) examples of living labs are and what the viewer can expect from the interview. The interviews can be conducted in a physical or virtual location, depending on COVID-19 restrictions and the wishes of the respondent. The invitation and a link to the video are included at the bottom of this appendix. When conducted virtually, Microsoft Teams will be used to conduct and record the interview. When conducted physically, the Trint application on the smartphone of the interviewer will be used to record the interview. The appropriated time for the interviews is 60 minutes, but the end time is not strict. The respondents are asked to confirm that they agree with the recording, storing, processing and publishing of the data beforehand by e-mail. If requested, the names of respondents can be taken out of the thesis publication on the website of Utrecht University. Before starting the interview, the respondent is asked once again for permission for recording.

Aim

The aim of the interviews is to understand how the different stakeholders can influence the feasibility of the living lab, both on an individual level and as a network. Chapter 2 provides an elaborate description of the factors that contribute to the feasibility of the living lab. In summary, feasibility is conceptualised as a combination of how the network can influence the possibility and the outcome. As a result, there are three elements to consider when studying the feasibility of the living lab: the possibility factors, the outcome factors and the network. Therefore, the item list provided in this interview guide is aimed at the identification of:
- Stakeholder visions on the possibility factors
- Stakeholder visions on the outcome factors
- Stakeholder's network roles and visions on the network

With this information, the analysis should allow us to:
- Identify how/whether the establishment of an agreed upon living lab is possible with a certain set of stakeholders
- Identify how the outcomes can be maximised through application of attributes, recommendations and network roles with a certain set of stakeholders

Item list

An item list is established to guide the interview with an overview of the topics that relate to the feasibility of the living lab. This list is not meant to function as a questionnaire, but rather as a support guide to help focus on specific areas or inspire a different topic when the interviewee runs out of content on a topic. Given the maximum timeframe of 60 minutes, it is not expected that each point on the item list will be covered in-depth in every interview.

The possibility factors, outcome factors and network roles from the conceptual framework are all incorporated in the item list. Elements with overlap are merged to shorten the list, as there are only 60 minutes per interview. The introductory question and the first three

questions under attributes have the function of identifying the respondent's view on the attributes, while limiting any probing. The questions under building blocks and remaining questions under attributes each relate to one of the elements identified in figure 1 in section 2.5. The aim of the questions under network are aimed at identifying the respondent's role in the network and view on the feasibility of the network. Additionally, inspiration for some of the questions was drawn from the authors experience with living lab development workshops, from discussions with the SFI and from the test interviews.

Two test interviews were conducted with people who have experience in researching living labs and the early stage of developing living labs, but who are not on the candidate list provided by the SFI. The test results provided some feedback to the questions which were altered, but mostly showed that the item list can lead to a broad coverage of the desired topics and can be completed in time without issue. Furthermore, they showed that the instruments for recording, transcribing and coding the data worked and that the interviews yielded useful data after transcribing and coding.

The item list is presented on the next page. Questions in grey are deemed suited only when the topic arises or when there is time left at the end of the interview.

Introduction
- How would you describe a living lab?

Building Blocks
- What is the **problem** that the SFI living lab should aim at solving?
- What **benefits** do you expect the living lab to bring in solving this problem?
- How do you think the living lab can have **impact** on a larger scale?
- How do you envision the **organization** of the living lab?
- Do you think living lab projects should grow **organically** into an organization or do you think there needs to be **top-down** implementation of projects?
- How do you think that the living lab could best be **funded**?
- How do you think progress should be **evaluated** in the living lab?
- How do you think that **ownership of data** should be managed in the living lab?

Network
- **Which stakeholders** do you think should be involved in the living lab?
- How do you think that **trust** amongst the stakeholders can influence the effectiveness of the living lab?
- What are the most important **contributions** you can bring to the living lab?
- What are your most important **expectations** from the living lab?

Attributes
- Do you have any **experience** with food-related living labs or other forms of open innovation, user innovation?
  - What **attributes** did you find important in these labs?
  - What **lessons** did you learn from these labs?

- Do you have any ideas for implementing a **real-life setting?**
- How do you think **co-creation** could be facilitated in the living lab?
- How do you think **user involvement** could be facilitated in the living lab?
- How do we ensure that everybody can **learn** from the activities of the living lab?
- How do you see the relationship between involving users and using their data for **commercial applications**?
- How do you think an element of **multidisciplinarity** can be ensured in the living lab?
- In what **geographical context** do you think the living lab should operate?

Other
- Is there anything **you would like to add**?
  - **Questions, comments, concerns?**

Invitation example

Sustainable Food Initiative

INTERVIEW UITNODIGING

HAALBAARHEIDSSTUDIE VOOR EEN **SFI LIVING LAB**

Beste mevrouw Freskens,

Naar aanleiding van de interesse in de eventuele ontwikkeling van een *living lab* voor de *Sustainable Food Initiative*, ben ik gevraagd om te onderzoeken hoe een dergelijk living lab zo haalbaar en effectief mogelijk tot stand kan worden gebracht. Als onderdeel van mijn onderzoek zou ik graag met u een interview afnemen om uw kijk op een *SFI Living Lab* te bespreken. Naar verwachting zal dit interview maximaal 1 uur duren. Het interview kan plaatsvinden op een datum, tijdstip en locatie naar uw keuze (een fysieke locatie heeft de voorkeur, maar online is ook mogelijk). Het interview wordt opgenomen, de opname wordt zorgvuldig bewaard en na afronding van het onderzoek vernietigd. De resultaten van het onderzoek zullen publiekelijk beschikbaar worden gesteld op de website van de Universiteit Utrecht. Indien gewenst, kunt u of uw organisatie anoniem blijven in de publicatie. Tijdens het interview kan worden afgesproken welke onderdelen specifiek anoniem dienen te blijven.

DOEL VAN HET INTERVIEW

Het doel van het interview is het inventariseren van uw kijk op het living lab. Hierbij kunt u denken aan:

- Uw verwachtingen van het living lab, haar werking en toegevoegde waarde
- Ideeën of zorgen die u heeft voor een locatie, financiering, organisatie, betrokkenen, onderwerp, onderzoek of andere aspecten van het living lab
- Hoe u uw eigen rol en bijdrage in het living lab voorstelt

VERZOEK

In de aanloop naar het interview, wil ik graag de volgende drie dingen van u verzoeken:

- Uw akkoord (per e-mail) voor het afnemen en opnemen van het interview
- Een voorstel voor een tijdstip (1 uur), datum (liefst voor eind juni) en locatie (beeldbellen met MS Teams is ook mogelijk) voor het interview
- Het kijken van en reflecteren op de kennisvideo die is bijgevoegd bij deze e-mail (12min)

Met vriendelijke groet,

Thijs Gieben
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Video
The video that is sent to respondents can be accessed through this weblink:
https://drive.google.com/file/d/1L-0nbisWODeS9mzvNvE_QTIVF1Quz7xN/view?usp=sharing

Appendix B – Coding manual

Code	Label	Definition
Code 1	Co-Creation	Respondent's view on the use of co-creation in the living lab
Code 2	Commercial Application	Respondent's view on the ethical discussion of the use of user data from living labs for commercial applications
Code 3	Experimentation	Respondent's view on the use of experimentation in the living lab
Code 4	Geographical Context	Respondent's view on the geographical context of the living lab
Code 5	Learning	Respondent's view on the implementation of learning in the living lab
Code 6	Multidisciplinarity	Respondent's view on the use of multidisciplinarity in the living lab
Code 7	Real Life Setting	Respondent's view on the implementation of a real life setting for the living lab
Code 8	Stakeholder Collaboration	Respondent's view on the use of stakeholder collaboration in the living lab
Code 9	User Involvement	Respondent's view on the involvement of 'end-users', citizens or consumers in the living lab
Code 10	Funding	Suggestions and views of the respondent regarding how the living lab could and should be funded
Code 11	Goal	Respondent's view on problem to be solved, the ideation, the scope, the outcomes and impact of the living lab
Code 12	Organisation	Respondent's view on how the living lab could and should be organised
Code 13	Contribution	The contribution that the respondent and his/her organisation is able to provide to the living lab
Code 14	Gain	What the respondent and his/her organisation expects to gain from participating in the living lab
Code 15	Stakeholders	What stakeholders the respondent thinks should be included in the living lab
Code 16	Trust	Respondent's view on the role of trust between the participants of the living lab

Appendix C – Applied quotes and their translations

This appendix consists of an overview of all the quotes from the respondents that are incorporated into this report. Because the original intention of a quote can never be truly translated into a new language, the original versions of each quote have been included as well. The quotes are listed in the same order as they appear in the report. The original comes first, the translation comes second. Quotes are separated by a '-' mark.

"Is niet zo'n, het is, het is weer een euh. Zo gaat dat volgens mij continu, zowel in Europa als in Nederland dat je continu nieuwe namen krijgt voor dezelfde dingen." (Petra Koenders)

"Is it not one of those, it's another, erm... I think that's how it goes all the time, both in Europe as in the Netherlands, that you constantly get new names for the same things."

-

"een plek waar onderzoek uitgevoerd wordt, de praktijk, in de praktijk eigenlijk. Een hoog TRL niveau onderzoek. [...] toewerken naar de laatste validatie van implementatie van innovatie. En aan een jij gaf in een filmpje aan dat het vaak met meerdere partijen en co-creatie, multidisciplinair." (Birgit Teunissen)

"A place where research is carried out, really in practice. A high TRL level research. [...] working towards the final validation of implementation of innovation. And you pointed out in a video that it's often with multiple parties and co-creation, multidisciplinary."

-

"Ik vind een living lab is eigenlijk die dames die je wel eens in de supermarkt ziet staan om producten te testen in de supermarkt." (Marc Laus)

"I think a living lab is really those ladies that you see in the supermarket to test products in the supermarket"

-

"Volgens mij wat er nodig is is is dat er een ecosysteem [...] En in het ecosysteem heb je diverse dingen nodig faciliteiten nodig, heb je diensten nodig en afhankelijk van de innovatie behoefte, dus afhankelijk van een maatschappelijke transitie die je wil doen, moet je kijken wat je nodig hebt om dat ecosysteem te vullen. [...] kijk, wat je altijd nodig hebt en of het nou living lab is of wat dan ook is dat je financieringsdienst nodig hebt, dat je de faciliteiten daaromheen. Die moet je altijd organiseren."

"I think what is required is that there is an ecosystem [...]. And in the ecosystem, you need various things, facilities, you need services and depending on the innovation need, so depending on the societal transition you want to achieve, you should look at what you need to fill that ecosystem. [...] Look, what you always need and whether it is a living lab or whatever is, you need a financing service, the facilities surrounding it. Those, you always have to organize."

-

"Ja nou ja een living lab is wel een iets zeg maar waar ook... Ja, euhm, de consument hè, zeg maar dat de burger toegang toe moet hebben moest niet alleen B2B, maar ook heel duidelijk dus zeg maar de burger waar je toe richt hè. Dat komt ook duidelijk naar voren in de voorbeelden die je noemt. Dus je ziet echt vooral maatschappelijkgerichtheid die erin zit."

"Well yeah a living lab is something where also... Yeah the consumer, say the citizen needs to have access to. Not only B2B but also a very clear focus the civilian. This shows clearly in the examples you mention. You really have to see the societal focus that is inside."

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"Ja, nouja, kijk, de transitie bestaat natuurlijk uit meerdere delen, maar de grote transitie is dat er gewoon voldoende voedsel moet zijn in 2050 voor iedereen. De transitie bestaat ook uit het aantal onderdelen. Duurzaamheid is daar een onderdeel van. Maar ja, het voorkomen van verspilling bijvoorbeeld. Maar het gaat ook verder. Verpakkingsmiddelen, alles wat daarbij zit."

"Well, look, the transition consists of several parts of course, but the major transition is that there should be ample food for everybody in 2050. The transition consists of several parts. Sustainability is a part of it. Preventing food waste for example. But it goes further. Packaging, everything that's part of that."

-

"Wij willen niet binnen de provincie dat je straks krijgt dat er concurrentie ontstaat. We willen gewoon juist dat die met elkaar gaan samenwerken. En het liefst nog over de grenzen [...] en ga dan kijken: 'Waar ligt nu bij de ene, die zit heel sterk daarin, bij de andere zitten de competenties daar en heeft dat netwerk. Nou ga eens kijken. Kun je elkaar aanvullen? Kun je samenwerken? En op die manier zeg maar dingen verder brengen? En in plaats van elkaar beconcurreren vooral zorgen dat je samen sterk staat'." (Janny van der Heijden)

"Within the province, we do not want competition to emerge. In fact, we want them to work together. Preferably across borders [...] and then explore: "Where is this one, that one is strong at that, another has different competences and has that network." Well, have a look: How can you complement each other? Can you collaborate? And move things forward in that way? Instead of competing with each other, make sure you stand strong together."

-

"Wat je heel vaak natuurlijk ziet, en zeker aan het Nederlandse landschap is dat heel veel wetenschappelijk onderzoek wordt gefinancierd. En dan krijg je een technology push, waarbij men technieken vanuit de wetenschap naar de praktijk wil brengen omdat men denkt dat daar de partijen heel beter van worden. En wat ik in het verleden vaak gezien hebben, ook in het zorglandschap, is dat dat dan niet de dingen zijn waar de zorg in feite op zit te wachten. [...] Dus op het moment dat jij daar in de praktijk wil gaan toetsen dan moet jij wel heel goed scherp op mijn netvlies hebben, waar nou we de behoefte ligt vanuit vanuit die partijen. En dat de vraag ook vanuit de praktijk naar je toekomt."

"What you see often of course, especially in the Dutch landscape is that scientific research is funded. Then you get a technology push, where people want to bring technologies from science to practice because they think parties will be better off that way. And what I've seen often in the past, also in healthcare, is that those are not the things that healthcare actually needs. [...] So when you want to go test there in practice, you need to understand very clearly where the needs are of all parties involved. And make sure that the question also comes from society."

-

"[...] wat natuurlijk de uitdaging is bij [...] grote bedrijven die bij SFI zitten. Die zijn geneigd misschien tot 2030 te kijken. Nou zodra het daar verder gaat, dan denk ik dat toch heel veel mensen [...] 'Ik denk niet dat het interessant is om dat te doen, maar laten we niet zo ver kijken.' Terwijl dat voor ons dan met living labs en field labs wel een mogelijkheid had geboden om juist die capabilities en die mogelijkheden te onderzoeken [...]. Dus daarin kan denk ik, een field lab, maar ook een living lab een rol spelen om eindelijk die stukken over te nemen of mee te, mee te ondersteunen. Om dat voor een corporate wel tot leven te wekken."

"[...] the challenge with [...] large companies at SFI is that they are inclined to maybe look until 2030. As soon as it goes beyond that, I think that many people [...] 'I don't think it will be interesting, let's not look that far ahead'. While actually, for us, the living labs and field labs had offered us the chance to research those capabilities and opportunities. [...] So I think that is an area where a field lab, but also a living lab, can play a role to finally incorporate those [capabilities and opportunities to research beyond 2030], to support those. To bring it to life for a corporate."

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"Net zoals we dat op het field lab doen, zou dat ook voor een living lab kunnen."

"Just like we do it at the field lab, we can do it for a living lab"

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"Ja dus je moet eigenlijk eerst iets hebben om te implementeren. En om daar te komen zou je volgens mij een stap terug moeten doen."

Yes so actually you should have something to implement firstt. And I believe you need to take a step back in order to get there."

-

"Hoe krijg ik die projecten die we nu hebben...? Hoe kan ik die zó vorm vormgeven dat we eigenlijk altijd naar een field lab en naar een living lab móeten gaan? Dan denk ik of euh, dan hou je ook bij zo'n living lab de focus van 'OK, dit gaat over die proteïne transitie, dit gaat over sustainability, dit gaat over minder energieverbruik, minder watergebruik.' Ik denk dat je eigenlijk in je project opzet rekening moet houden van, of een onderdeel moet kunnen aangeven van 'dít gaan we met die living labs doen. Dit onderdeel gaan we specifiek met die living labs doen."

"The projects that we have now... How can [you] shape them in such a way that we always move towards a field lab and that we nééd to go to a living lab? That's what I think, or, then you keep such a living lab focused, like 'this is about the protein transition, this is about sustainability, this is over less energy consumption, less water consumption.' I think that in the setting up of a project, you should consider, or you should be able to specify 'this is what we are going to do with these living labs. These living labs will focus on this specific part."

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"Thijs [00:22:48] [...] Dat mensen ook proactief op zoek gaan naar een gemene delers en naar samenwerkingen?
Marc [00:22:56] Ik denk dat dat de taak van het SFI dan om daar onderscheidend in te zijn. Juist die partijen samen moet brengen. Wat is de gemeenschappelijke belangstelling? En kunnen we daar samen in optrekken om een living lab te gaan creëren?"

"Thijs [00:22:48] [...] So people should proactively look for the common denominators and for collaborations?
Marc [00:22:56] I think that it's the task of the SFI to be distinctive on that front. Specifically bringing those parties together. What is the common interest? And can we work together on that interest to create a living lab?"

-

"Veel beter zou zijn is dat Economische Zaken, Sociale Zaken of in ieder geval vanuit Den Haag, dat die lijnen er zijn. Die zijn ook op het klimaat. [...] Uhm, dus er zijn dus SFI zou wel een hele mooie rol kunnen kunnen spelen als ze ook een opdracht hebben omdat landelijke coördinatiepunt daarvoor te zijn."

"It would be much better if Economic Affairs, Social Affairs, or in any case The Hague would open up those lines. They also have these for climate. [...] so SFI could play a very nice role if they would actually get assigned as a national coordination point for this"

-

"Ik denk niet dat het SFI daar nog iets naast moet gaan zetten, ik denk dat het SFI gebruik moet maken van wat er al overal is. [...] ik denk dat als SFI moet je niet nog een keer. Ik denk dat je moet gaan kijken wat is er al overal en hoe kunnen we dat verder ondersteunen en versterken?"

"I don't think the SFI should develop anything next to that. I think the SFI should make use of what's already there. [...] I think that as SFI, you should not re-....I think you should look at what is available everywhere and how can we further support and strengthen that?"

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"Maar ik vind hem heel moeilijk om inderdaad te zeggen van "we zijn onderdeel van SFI van deze onderscheidende factor", want we zijn ook onderdeel van Food Valley, maar we zitten ook in een Protein Competence Center. We zitten ook in het Top Instituut for Food and Nutrition."

"Ik denk dat de living lab, het living lab vind ik een héél gaaf concept. En ik denk dat daar behoefte aan is. Ik wil het, de zorg die ik een beetje heb, moet dat meteen via SFI gechanneld worden. Snap je wat ik bedoel?"

"Thijs [...] Jij denkt dus: ga praten met Food Valley NL (Wendy: Ja), met die innovatie hubs die nu komen (Wendy: Ja). En ja, wat is de beste manier om dit te doen? (Wendy: Ja)."

"But it's indeed hard for me to say, "we are part of the SFI because of this distinctive factor". Because we are also part of Food Valley but we are also in a Protein Competence Centre. We are also in the Top Institute for Food and Nutrition."

"I think that the living lab, I think the living lab is a very cool concept. And I think there is a need for it. I want it to... the worry I have, does it have to be channeled through the SFI. Do you get what I mean?"

"Thijs [...] So you think: Go and talk to Food Valley NL (Wendy: Yes), with the innovation hubs that are already being developed (Wendy: Yes). And yes, what is the best way to do this? (Wendy: Yes).

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"Kijk, SFI is natuurlijk veel, veel meer dan alleen Brabant. Wat ik al zeg, dus dat is het landelijke, internationaal. [...] Nou ja, dat is denk ik hetgeen waar, wat SFI kan brengen."
(Janny van der Heijden)

"Look, SFI is much more than Brabant of course. What I've been saying, it is the national, international [...]. Well I think that that's what the SFI can bring for us."

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"ik denk dat het SFI, ik zeg maar zelf nu onderscheid door dat stukje field lab. Dus volgens mij de combinatie van research en ontwikkeling en hoe dan je daar ook een valorisatie aan vast kan hangen."

"I think that the SFI, if I must say, currently distinguishes itself with that Field Lab part. So I think the combination of research and development and how you can add valorisation to that."

-

"Gaandeweg zie je de bedrijven echt gewoon vanuit hun intrinsieke, daadwerkelijk goed ingebedde motivatie: "Ik neem gedeeltelijke verantwoordelijkheid op een stuk ontwikkeling van onze sector." Nou, dan kan ik me voorstellen dat zijn zeggen we stellen wat menskracht beschikbaar of we leggen 10.000 euro in, whatever of we brengen casuïstiek in, of [...] een paar bedrijven die leggen wat geld in, de meeste tijd."

"Along the way you see companies act from their intrinsic, actually well-intended motivation: "I'm taking a bit of the responsibility for a piece of development of our sector". Well, then I can imagine that they say we will deploy some manpower or we contribute €10.000, whatever or we bring in cases, or [...]. A few companies will contribute some money, most will contribute time"

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"Als je een goede mix van bedrijven hebt die zegt 'Wij gaan samen nu proberen een step change te maken met de maatschappij om de duurzaamheids, de R&D duurzaamheidsagenda vorm te geven, dan denk ik dat dat wel een project van nationaal belang is"

"If you have a healthy mix of companies saying 'Together, we will now try to make a step with society to formulate a sustainability and R&D agenda', then I think that that's a project of national interest"

-

"ik denk dat het heel moeilijk is om een funding te krijgen "Oké, nu gaan we kijken hoe een living lab werkt." Nee het moet wel, dat onderwerp moet wel spot on zijn in termen van de strategie die wij hebben. Ja, dat is wel een eerste uitgangspunt te nemen."

"I think i twill be very hard to get [internal] funding for "Okay, let's see how a living lab works". No, it needs to be, the topic needs to be spot on in terms of alignment with our strategy. Yes, that would be the first point of departure."

-

"Maar ik denk dat als je een omgeving creëert binnen SFI, dat er dan ook ook met een stukje ondersteuning, laten we wel wezen, een stukje ondersteuning vanuit de overheid. Dat er dan wel meer, euhm, hoe heet dat, mogelijkheden ontstaan voor die bedrijven om te zeggen 'ok, dan kunnen we ieder geval dat wel doen."

"But I think if you create an environment within SFI, also with some support from the government. Then more opportunities will arise for those companies to say: 'Okay, than we can at least do that."

-

"ik denk dat het nog gewoon ontbreekt aan één of twee of drie goede voorbeelden waar wij een samenwerking hebben gehad met living lab of met een field lab –daar geldt hetzelfde voor– waarin we dingen samen hebben gedaan, van 'hé, dat iedereen er tevreden over... we hebben heel stel dingen kunnen testen, heel snel dingen kunnen ontwikkelen. We hebben gelijk feedback verkregen van de consument. Euh, er zaten een aantal goede mensen bij die ons geholpen hebben met een stukje marketing, een stukje R&D, een stukje co-creation'. Dus ik denk dat, dat moeten nog eigenlijk groeien. Euh, aan de hand van een aantal voorbeelden. Ik denk dat had eigenlijk het grote is. Om die voorbeelden te creëren denk ik dat het goed is om te weten 'oké, welke, waar bewegen zich die living labs? Uh, wat zijn hun focus gebieden? Wat zijn hun mogelijkheden?' Maar ook uhm ja, 'wat zijn hun capaciteiten? Waar kunnen ze die waarde toevoegen? Wat zijn hun specifieke capaciteiten?"

"I think that there is still a lack of one or two/three good examples where we've had a collaboration with a living lab or field lab –the same goes for both– in which we did things

together of which we can say: "Hey, everybody was satisfied with this... We have been able to test a lot of things, develop things really quickly. We got instant feedback from consumers. Some good people were involved that helped us with some marketing, R&D or co-creation." So I think that that should still grow, following a couple of examples. I think that that is the big thing. To create these examples, I think it's good to know 'Okay, which, where do these living labs manifest? What are their focus areas? What are their opportunities?' But also, 'What are their capacities? Where can they add value? What are their specific capabilities?'"

-

"Alles wat we nu op de markt zetten is maar een topje van de ijsberg, waar we alle R&D organisaties mee bezig zijn, dit is toch geen tien procent van wat er... Wat er op de markt komt is maar 10 procent van wat er eigenlijk in de pipelines allemaal heeft gezeten." En ik denk als je, als je een Cargill of een Unilever of een Danone zegt: "Wij denken dat we met een living lab van 10 procent naar 15 procent kunnen gaan." Ik denk dat ze echt in de rij voor je staan, want dat is zo'n grote hoeveelheid geld die ze daarmee kunnen winnen."

"Everything that goes to market is just a tip of the iceberg of what R&D organisations are working on. [...] What gets to the market is a mere 10 percent of what has been in the pipelines. And I think that, if you tell a Cargill, or Unilever, or Danone: 'We think that with a living lab we can increase this 10 percent to 15 percent". I think that they will line up for you, because they could win such a large sum of money with that."

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"Gisella [00:10:26] Ik zei dat living lab heel erg aan de consumentenkant ligt. En niet circulair aan technologie of aan ketens of aan veiligheid. Of al die uitdagingen waar we nu nog mee te maken hebben.

Thijs [00:10:44] OK. Maar hoe zou je dat dan voor je zien? Dat dus eigenlijk eerst alles achter in de keten helemaal strak moet worden gemaakt? En dan moeten we gaan kijken of je bij de consument aansluiting vindt?

Gisella [00:10:56] Nou ja, óf het is niet zo'n grote... Ja, ik denk zelfs dat dat niet zo'n hele extreme uitdaging is eerlijk gezegd. Als je nu kijkt naar de vleesvervangers. Die vinden hun weg naar de consument ook wel denk ik."

"Gisella [00:10:26] I said that a living lab is very much on the consumer side. And not circular on technology or chains or security. Or all the challenges that we are still facing now.

Thijs [00:10:44] Okay, so how would you picture it? Do we need to fix the backside of the value chain first? And then afterwards see if there is a connection with the consumer?

Gisella [00:10:56] Well, either is not such a big... Yes I think that is not such an extreme challenge. If you look at meat alternatives now. I think they will find their way to the consumer."

-

"Ik denk dat dat je alles wat je doet zodanig moet beredeneren vanuit de hele keten hè. Dus als je het zegt we gaan de boeren erbij betrekken en gaan bijvoorbeeld kijken naar nieuwe teelt of iets dergelijks. Dan is het ook wel interessant dat als je daar boeren hebt en die gaan aan de slag, dat vervolgens wel hetgene wat van het land komt ook verwerkt kan worden. En vervolgens krijg je dan de vraag: "Nou, dan moet ook nog iets lekkers van gemaakt kunnen worden." dus je moet wel altijd in dat ketendenken gaan zitten, als je iets gaat gaat doen, dus... Dat vind ik wel een hele belangrijke."

"I think that you should approach everything you do from the perspective of the entire value chain. So if you say we will involve the farmers and look at e.g. new production or something similar... Then it will be interesting if you have farmers working on it, that whatever is

produced can also be processed. Subsequently you will arrive at the question: "Well, now we also have to make something tasty from this". So you should always be in this 'value chain way of thinking' if you go and do something. To me that is very important."

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"Als je dan hebt over. Overheden is, is voor ons alleen relevant als je het over de dienstverlening hebt."

"If you're talking about governments. That is only interesting to us if it's about service."

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"Marc [00:22:56] [...]. Wat is de gemeenschappelijke belangstelling? En kunnen we daar samen in optrekken om een living lab te gaan creëren?

Thijs [00:23:11] Ja, dus verder kijken dan naar: wat is er praktisch? Wat staat hier, wat staat er daar? Meer: Wat is de echte motivatie en de belangstelling erachter?

Marc [00:23:19] Ja, ja. Ik denk dat je dan een onderscheidend effect heeft op hetgene wat er al is."

"Marc [00:22:56] [...]. What is the common interest? And can we work together to create a living lab?

Thijs [00:23:11] Yes, so look beyond 'What is practical? What do we have here, what do we have there?' But focus more on: "What is the real motivation and interest behind this?"

Marc [00:23:19] Yes, yes. I think that then you will have a distinguishing effect on that what's already there."

-

"Wat altijd belangrijk is, is dat er dat alle stakeholders zeg maar het initiatief dragen en daarin geëngageerd zijn. En dat allemaal op iedereen, en dat doe je alleen maar als je er allemaal een belang in ziet."

"It is always important that all stakeholders carry the initiative and are engaged with it. And that all from everybody, and you only do that if you see the purpose of it."

-

"Daar moet je denk ik ook in die zin opgelegd krijgen om samen te werken zodat je geen dubbelingen krijgt. Euh, want het helpen van een scale-up en het bieden van de juiste apparaten om zo'n bedrijf te helpen kost geld. Dus die apparaten hoef je ook niet tien keer te kopen in Nederland. Die hoef je maar een paar keer aan te schaffen op plekken waar het zinvol is om dat te laten doen. En daarop kun je regie voeren, maar dan kom je weer uit op: regie voeren staat weer haaks op wat wij vinden in Nederland; iedereen kan dat doen, want SFI heeft geen macht. Macht vinden wij niet zo fijn."

"There, in that way, you should somehow be forced to collaborate in order to prevent doubles. Erm, because helping a scale-up and offering the right equipment to help such a company costs money. So you shouldn't have to buy those machines ten times in the Netherlands. You only have to buy a few in locations where they can be useful. And here you can enforce control. However, then you come to the point: control is against common opinions in the Netherlands: everybody can do anything, because SFI does not have power. We don't like power."

-

"Dat het, want we zijn erachter gekomen dat, dat is niet heel wetenschappelijk onderzocht hoor, maar we komen erachter dat er veel minder living lab zijn dan dat we willen, omdat

mensen verschillende talen spreken. Dus bedrijfsvoering en onderzoek spreekt verschillende talen. Ze werken met hele andere deadlines en dat is ook met andere partners. Een bedrijf werkt met andere deadlines, andere eindproducten dan een onderzoeker.”

“We discovered, not scientifically, but trough our experience, that there are far fewer living labs than we would like, because people all speak a different language. So business and research speak different languages. They work with different deadlines and also with different partners. A company works with different deadlines and end products than a researcher does.”

-

“Weet je wel dat je echt zorgt dat dat er niet twee zuivelbedrijven inzitten, weet je wel dat het echt aanvullend is. Dat kan ook een keuze zijn, maar dat is inderdaad wel een hele lastige.”

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“Weet je wel dat je echt zorgt dat dat er niet twee zuivelbedrijven inzitten, weet je wel dat het echt aanvullend is. Dat kan ook een keuze zijn, maar dat is inderdaad wel een hele lastige.”

“You know, that you really take care not to have two dairy companies, but to make sure it is complementary. That is also an option, but indeed a difficult one.”

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“Nouja, ik denk dat dat eigenlijk alleen kan in als je je gezamenlijke behoeftes definieert en daarbij even je IP ambities aan de kant schuiven.”

“Well, I think that that’s really only possible if you define your common needs and try to set your IP ambitions aside.”

-

“Tijdens een van die SFI discussies, dat is misschien wel een interessante discussie, die is nog steeds niet uitgeklaard, waren zelfs, geloof iemand van Danone die zei: "Is er nog een toekomst voor IP?" En als je dat bekijkt, dan uhm, kijk de marktontwikkelingen gaan zo gigantisch snel en voor je, als jij vandaag iets ontwikkelt en je wilt daar een patent op aanvragen, ben je anderhalf, twee jaar verder voordat je daar überhaupt mee naar de markt kunt gaan.”

“During one of those SFI discussions [...] I believe someone from Danone said: “Is there still a future for IP?” And if you look at that, well erm, look, the market developments are so enormously quick and before you, if you develop something today and want to patent it, you will be waiting for 1,5 or 2 years before you can even think about going to market with it.”

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“Er zijn natuurlijk wel diverse co-creatiemodellen waar je mee kan werken en waarmee je ook van tevoren kan starten om als stakeholders om op daar je je 'wat wil brengen, wat wil je halen?' Om daar samen openlijk over te praten en een bepaald vertrouwen te creëren? Ik denk dat dat wel key is. Dat je het allemaal draagt en dat je het wel een bepaald vertrouwen met elkaar hebt. En daar waar issues zitten, dat je die ook gewoon bespreekt en afspreken wat je daarmee doet.”

“There are, of course, various co-creation models that you can work with and that you can use as an initial start for stakeholders to focus on your “What do you want to bring? What do you want to obtain?”. To discuss these things openly and create some trust. I think that that’s key. That everybody carries it and that you have a certain level of trust amongst each other. And wherever there are issues, that you can discuss them and agree what you will do with them.”

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"Les denk ik wel die gewoon goed is, van probeer, het is gewoon een groot netwerk waar vele belangen in spelen en en en vele personen maar zou. Kijk het mooie hiervan is dat dit netwerk is ontstaan. En laat dat vooral zo blijven. Laat het niet stranden weer in de zin dat je elkaar de dingen niet gunt of zo en of in de zin van niet transparant bent."

"A lesson that I think is good: try, it's a big network where many interests play a role and many people. Look the beauty of this is that this network has arisen. And please let it stay that way. Don't let it strand again, in the way that you do not grant each other things or that you are not transparent in that way."

-

"ik denk dat je [...] een aantal partijen bij elkaar zou kunnen brengen in een keuken om eens wat dingen te gaan testen en is wat productontwikkeling te gaan doen. Als je daar ook wel potentiële consumenten bij zet om die producten te gaan beoordelen, dan heb je een soort van co-creatie van een product. En dan is de feedback van de consument leidend voor de richting die je opgaat met je nieuwe productontwikkeling."

"I think that you [...] could bring a few parties together in a kitchen to test some things and do some product development. If you include potential customers to review these products, then you have some form of co-creation of a product. And then the feedback of the consumer will lead which direction you will go with your new product development."

-

"Het doel van een living lab is, is het testen van je nieuwe product of je nieuwe proces of onder relevante condities. Dat is volgens mij waarbij alle omgevingsfactoren invloed kunnen hebben op je nieuwe product of proces."

"The aim of a living lab is to test your new product or new process under relevant conditions. I think that is when all environmental factors can influence your new product or process."

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"De vraag die ik dan heb is: waarom zou je dit willen doen?"

"The question I would have is: Why would you want to do this?"

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"Dus dan bedoel je. Want dan zou je kunnen zeggen dat je gewoon een focusgroep of consumentenonderzoek doen, maar dit gaat dan om te kijken of je dat in een real life setting op kleine schaal kan gaan proberen. (Thijs: Ja). Ja, en dat zie je natuurlijk sowieso steeds meer, maar vooral onderling. Kijk, als wij iets op kleinere schaal willen proberen, dan gaan we dat met een retailer X in een X aantal winkels proberen."

"So you mean... Because then you could say that you could use a focus group or conduct consumer research, but this will be to see if you can try it in a real life setting on a small scale (Thijs: Yes). Yes, and I see this more and more of course, but mostly amongst one another. Look, if we want to try something on a smaller scale, we will do that with retailer X in X amount of shops."

-

"Ik zou héél, dát is misschien wel een hele mooie: als de retail zou kunnen aansluiten bij het SFI en je meer binding zou kunnen krijgen met de retail sector. [...] Die zijn toch wel moeilijk om om aan te sluiten, om ze geinvolveerd te krijgen binnen bepaalde ontwikkelingen."

"I would *really*, *that* would be a very nice one: If the retail could join the SFI and we could get more connection with the retail sector. [...] After all, they are difficult to attatch, to get involved within certain developments."

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"Ik denk dát, als je zegt van dat is het idee, dan denk ik dat daar nog wel mogelijkheden voor zijn. Maar dan zit ik bijvoorbeeld niet alleen te denken aan, naja burgers is natuurlijk een heel breed begrip, maar je zou ook bijvoorbeeld kunnen denken van 'betrekken we boeren hier al voldoende in"

"I think that *that*, if you say that is the idea, then I think there are some opportunities. But then I'm not only thinking of, well citizens is a broad term, but you could for instance also think 'are we sufficiently including farmers in this?"

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"Nou blijkt die koppeling van de techbedrijven aan de food, of de agro-food sector is vrij lastig. A, omdat daar natuurlijk een hele grote groep zit van mensen, boeren, die het al heel moeilijk hebben, die, er is daar voor zo'n techbedrijf is ook niet zoveel in zekere zin te verdienen, zoals dat bijvoorbeeld is in de farma, health of automotive, noem maar op. [...] Je ziet een verschil in elkaars taal spreken, ze spreken elkaars taal totaal niet. [...].En je hebt een groep die eigenlijk niet zo goed zeg maar georganiseerd is. Want elke boer is een zelfstandige ondernemer. [...] Plus wat speelt in de tech, dat lijkt relatief eenvoudig, maar als je te maken hebt met een boer op het land, dan heb je te maken met regen, wind, stof, droogte, noem maar op."

"Now it appears that the connection between tech companies and food or the agro-food sector is pretty difficult. A) Because there is of course a large group of people, farmers, that is already struggling to survive. For a tech company, that means there is not so much to gain as with for example the pharma, health or automotive sector, you name it. [...] You [also] see a difference in speaking each other's language, they do not speak each other's language at all. [...] And you have a group that's not really organised that well, because every farmer is an independent business owner. [...] Plus, what's going on in tech, it seems relatively simple, but if you are dealing with a farmer on the land, you need to deal with rain, wind, dust, drought, you name it."

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"Kijk, de gezondheidsproblemen zitten toch vooral bij de meer laagopgeleide mensen. [...] die mensen doen minder vaak mee aan ons soort onderzoek, zijn lastiger te bereiken voor ons. En denk ik ook zullen misschien minder makkelijk deelnemen aan inspraak in de wijk en dat soort dingen. [...] Ik zou vooral mee willen geven: let er op dat je ook voldoende wortel hebt of voldoende input hebt vanuit zeg maar de achterstandswijken of de laagopgeleiden omdat je ziet in dat je, dat zie je ook in de politiek zelfs. Het verschil tussen hoog en laagopgeleiden in Nederland wordt wat dat betreft alleen maar groter en dat is jammer. En dat is bij deze, dit probleem –voeding in het algemeen en de voedselvoorziening en de gezondheid en de duurzaamheid daarvan– wel een hele belangrijke. Dus ik zat te denken op moment dat je zegt je hebt overheid, je hebt ngo's, je hebt de onderzoekers en je hebt ook ergens de burgers. Dat je wel moet zorgen dat het niet alleen de hoogopgeleide burger is die meepraat in dingen"

"Look, the health issues are more prevalent along less educated people. [...] Those people do not participate in our research as often, they are harder to reach for us. And I also think they would not join their neighbourhood participation as easily, and other similar things. [...] Mostly, I would like to say: make sure that you have strong enough roots in or input from let's say deprived neighbourhoods or the lower educated people because you see that, you even see this is politics, the difference between higher and lower educated people in the Netherlands is constantly growing and that is petty. And for this problem –food in general and the food supply, health and sustainability of it– that is very important. So I was thinking that when you say you've got government, NGO's, you've got researchers and you also have citizens

somewhere. You should make sure that it is not only the higher educated citizen that participates in these things."

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"En aan een jij gaf in een filmpje aan dat het vaak met meerdere partijen en co-creatie, multidisciplinair. Die varianten ken ik, maar ik ken ook wel varianten zegmaar waar het redelijk monodisciplinair is. Vanuit één vakgebied bepaalde innovaties getest worden en in de praktijk."

"And you already said in your video that it is often a co-creation with multiple parties, multidisciplinary. I've seen those variants. But I also know variants where it is basically pretty monodisciplinary. Where, from one field of research, certain innovations are tested in practice."

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"je gaat echt interdisciplinair of transdisciplinair. [...] Praktijk en theorie vindt ook al, en dus inderdaad de consument en de burger erbij, dus dat maakt het transdisciplinair. En om dat te managen, dat is best moeilijk. Dus als een SFI dat graag wil doen. Ja, heel fijn."

"You will really go interdisciplinary or transdisciplinary. [...] Practice and theory is already combined, and then indeed including the consumer and the citizen, that makes it transdisciplinary. And it is pretty difficult to manage that. If the SFI would like to do that, that would be very nice."

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"Voor mij is het niet zozeer dat het een echte entiteit moet zijn, een fysieke entiteit moet gaan worden met zijn een eigen verdienstructuur, maar meer de landelijke paraplu over ook een aantal partijen."

"For me it does not really need to be a real entity, it does not have to become a physical entity with its own profit model, but more like a national umbrella over a variety of parties."

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"Hij is gewoon een grote keuken waarin die eigenlijk mensen ontvangt, dat hij zegt van daar kan iemand komen, want ik heb eiwit ontwikkeld en hij laat zien in de keuken dat je daar een hamburger van kunt maken. En dan kun je met z'n allen proeven. Zo simpel is het. En dat moet iemand wel zijn die dat kan koken. Hij heeft stagiaires nodig, koks, stagiaires. Dus ik ga hem helpen om die koksschool erbij te halen. En wat doe ik dan op bestuurlijk niveau, om te zorgen dat er een goede verbinding worden gelegd. Nou dat zou SFI in het groot kunnen doen. Want uiteindelijk heeft die grote afzetmarkt nodig. Hij is nu nog maar een pilot. Hij wil volgend jaar komt er een demo, ja dan komen er gewoon wel miljoenen vega kipballetjes komen op de markt. Die moeten afgezet worden."

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"He is just a large kitchen where he receives people. He would say somebody who developed a protein can come there and he will show in the kitchen that you can make a hamburger out of it. And then you can taste it all together, simple as that. And that needs to be somebody who can cook that. He needs interns, chefs, etcetera. So, I will help him involve this chef's school. And I do this on an organisational level, to ensure that a good connection is made. The SFI could do this on a larger scale. Because eventually he will need a large market to sell. Now he is only a pilot. Next year there will be a demo, yeah, than there will be millions of veggie chicken balls on the market. Those need to be sold."

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"Dus dat is monitoring en en evalueren en leren. Zeg maar dat je dat echt goed moet inbouwen vanaf de start. Als je dat niet goed doet, dan zit je aan het einde met iets waarvan je denkt oh ja."

"So that is monitoring, evaluating and learning. Like that you should really implement that from the start. If you do not do that correctly, then eventually you will end up with something that makes you think 'hmm, well, yes I should have done this"

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"dat is ook een advies wel om dat zo snel mogelijk meteen in te richten. Want ergens word je toch een keer de maat genomen door een partij, vaak een financier, dusdat kun je maar beter voorstaan. Dan kun je zelf een beetje richting geven aan wat je meet en hoe het gemeten wordt."

"That is also an advice to integrate this as soon as possible. Because at some point, somewhere you will be measured by a party, often a funder, so it is better if you get a head start. In that way, you can provide some direction as to what you measure and how it is measured."

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"Hoe wij dat doen? Kijken de mensen tekende bij ons een informed consent, zeg maar. [...] Ik denk wel dat het dat het goed is dat je de mensen meegeeft dat als je data verzameld en die verzamel je, want dat zouden wij ook graag doen om mee te helpen. Zeg maar, om wat de voedingsinname van de mensen nou precies is –dus wij zijn zeker geïnteresseerd om mee te doen– dan zou je kunnen denken dat de mensen toch wel beseffen van OK, deze data worden alleen voor onderzoek gebruikt. Zoiets. Dat je daar wel toch een statement over maakt. Zeg maar wat de mensen ook echt even bewust moeten lezen en dat ze bewust toestemming geven. Ja ja, dat weet. Dat, weet je wel. En dat het anoniem gebeurt dus dat dat soort zaken, daar hebben wij ook wel voorbeelden voor van. Hoe dat precies zit met de privacy en dat soort dingen, de AVG?
Thijs [00:19:41] Ja ok. Dus met informed consent moet dat wel?
Edith [00:19:45] Ja, moet dat wel lukken, ja."

"How we do that? With us, people signed an informed consent form. [...] I think it's good that you explain to people that if you collect data, which you do, because we would also happily do that to contribute. Let's say, to measure what the food intake of people is exactly –so we would really be interested to participate– then you can imagine that people realise 'Okay, this data is only used for research'. Something like that. At least make a statement about that. Something that people need to read consciously and they have to agree with consciously. Yes, yes, you know. And sometimes it happens anonymously, we also have examples of that. How it works exactly with privacy and stuff, the AVG?
Thijs [00:19:41] Yes, alright. So with informed consent you should...?
Edith [00:19:45] You should be fine, yes."