

The Role Of Startups In Collective Innovation Agendas

Author:

Ing. R.B.J. Bonants

Student Number: 5903475

Contact Details:

Email: rickbonants@hotmail.com

Phone: +316 1189 0454



Supervised by

Dr. Ir. M.J. Janssen

Email: M.J.Janssen@uu.nl

Phone: +316 4599 0939

Second read by

Dr. J.H. Wesseling MSc

Email: J.H.Wesseling@uu.nl

Phone: +31 30 253 6746

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Department Innovation, Environment and Energy Sciences

Faculty of Geosciences, Utrecht University

Universiteit Utrecht



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Abstract

With nowadays societal challenges, striving for optimised 'directionality' of innovation is more essential than ever. Mission-Oriented Innovation Policy (MIP), translates current Sustainable Development Goals (SDGs) into missions, which are believed to be achieved by a portfolio of research and innovation projects. MIP emphasises the importance of 'challengers' as well; parties that could bring ground-breaking innovations to the mix of solutions. In this regard, startups are frequently looked upon as potential vehicles for (radical) innovation.

Yet, little has been examined about the role of startups in collective innovation efforts such as missions. Knowledge of how their potential contributions could be harnessed more effectively is limited as well. Therefore, this study examines the role of startups in collective innovation efforts, and it provides suggestions on how to improve their potential contribution. In the report, we assess their roles and contributions through a qualitative, exploratory study of past collective innovation efforts in the Dutch Top Sectors Agri-Food and Horticulture.

Five clear roles through which startups contribute to collective innovation efforts for solving societal challenges have been identified: (1) filling market gaps and changing the supply chain, (2) developing and utilising new technology and knowledge, (3) doing risky, rapid and flexible value creation, (4) applying new technology in industries and creating crossovers, (5) challenging the established order, consisting of (a) systems and structures, and (b) innovation culture, attitude and the way of thinking. Startups contribute to collective innovation efforts via one, and often multiple roles, either consciously, or unconsciously.

During the formulation of collective innovation agendas, a sixth role is fulfilled; the more indirect role of providing input via overarching representative organisations. Improving the representation is deemed necessary and could optimise the contribution of startups via their five roles. The improved startup representation and the insights in this report, could be of excellent help for improving the Top Sectors' support activities to the five startup roles.

Interviewees agree that the contribution of startups to collective innovation efforts, could also be improved outside the collective innovation agendas. The emergence and growth of startups, and therefore their contribution, can be better facilitated by improving the conditions in the overall ecosystem. This report provides many potential suggestions for that.

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Table of Contents

Abstract.....	2
Acknowledgements.....	3
Table of Contents.....	4
1. Introduction.....	6
2. Theory.....	8
2.1 Transitions, Multi-Level Perspective and MIP Missions.....	8
2.2 Strategic Niche Management & Startup Types.....	10
2.3 Interaction and Collaboration.....	11
2.4 Conceptual Framework.....	12
3. Methodology.....	13
3.1 Research Design.....	13
3.2 Case Description.....	14
3.3 Analysis Method.....	15
4. Results.....	16
4.1 Definition Startups, Types and Development Phases.....	16
4.2 Role and Contribution of Startups to Innovation Ecosystems.....	17
4.2.1 Fill market gaps and change the supply chain.....	18
4.2.2 Development and utilisation of new technology and knowledge.....	18
4.2.3 Doing risky, rapid and flexible value creation.....	18
4.2.4 Apply new technology in industries and create crossovers.....	19
4.2.5 Challenge the established order.....	20
4.3 Formulation of Collective Innovation Agendas.....	21
4.3.1 Current involvement practices.....	21
4.3.2 Necessity of more involvement.....	23
4.3.3 Improvement suggestions of interviewees.....	23
4.4 Support Collective Innovation.....	25
4.4.1 Networking.....	25
4.4.2 Subsidy instruments.....	27
4.4.3 Communication.....	32
4.5 Remaining Bottlenecks Regime and Suggestions.....	33

4.5.1 Market / User-Preferences	33
4.5.2 Industry	35
4.5.3 Policy	38
4.5.4 Technology	41
4.5.5 Culture	42
4.5.6 Science	50
5. Conclusion	54
5.1 Discussion	54
5.1.1 Main Findings.....	54
5.1.2 Implications	58
5.2 Limitations of this study	60
5.3 Potential avenues for future research are	61
6. Reference list	62
Attachment 1: Interview Guide	67

1. Introduction

It is self-evident that innovation is important for economic growth. But innovation can contribute to solving societal challenges as well, such as in health- (care), the energy transition, sustainability, agriculture, water, food and safety. With nowadays societal challenges as the basis for the 2030 United Nations Sustainable Development Goals (SDGs), striving for optimized 'directionality' of innovation is more essential than ever (Mazzucato, 2018; United Nations, 2019). Political agendas recognize this, e.g. by the European Commission's Mission-Oriented Innovation Policy (MIP) (Georghiou et al., 2018).

Over the last few years, traction for Mission-Oriented Innovation Policy increased (Cagnin et al., 2012; Hicks, 2016). Through MIP, broadly defined SDGs are translated into missions; clear, more concrete, ambitious objectives that are believed to be achieved by a portfolio of research and innovation projects (Mazzucato, 2018). Missions offer a mobilizing, connecting perspective in looking for, finding and realizing solutions for nowadays, complex, societal challenges. Consensus also exists on the opportunities for market-creation of this mission-based approach (Georghiou et al., 2018). So, MIP is now being adopted on national, regional and sectoral scales (Goetheer et al., 2018).

Both the design and selection of missions, as well as implementation and execution, involve numerous actors, ranging from governments, universities and corporates to civil society, NGOs and startups. The legitimacy that is built during this process, contributes to the engagement and support for the missions (Goetheer et al., 2018). Often, 'grand' societal challenges are hard to solve due to e.g. inertia in incumbents, institutions and technological pathways. Therefore, emphasis is placed on 'challengers', which are parties that could bring ground-breaking or radical innovations to the mix of solutions (Goetheer et al., 2018). In this regard, startups are frequently looked upon as potential vehicles to deliver such innovations.

Literature defines startups, among others, by the following four characteristics; young enterprises *with limited resources*, which offer an *innovation*, focus on *development and scalability*, and generally have a *technological element* (Skala, 2019). Although this definition might be suitable for hybrid intermediary organizations too, it excludes social startups and grassroots movement, which do not necessarily aim to scale and do not always have a technological element (Billis, 2010; Caneparo & Bonaverò, 2016; Thompson, 2002). In this report, the term 'startup' is used for the whole spectrum: Regular startups, scale-ups, social enterprises, grassroots movements, hybrid intermediary organizations etc.

It is already known that startups play a key role in innovation dynamics e.g. by filling market gaps and challenging lock-in and capture of incumbents (Colombo & Piva, 2008; Parrish & Foxon, 2006). In relation to economic growth and job creation, startups have been thoroughly researched. Though, its relationship to collective innovation efforts like missions has not. While MIP literature does refer to industry, it does not explicitly address startups.

One promising theoretical angle for understanding the place of startups in MIP is by placing missions in the wider perspective of the Multi-Level Perspective theory (MLP), which deals with strategic, long-term processes of transformative change (Elzen et al., 2004; Geels, 2005; Grin, et al, 2010). MLP is closely associated with Strategic Niche Management (SNM), which is useful to assess the roles of different actors (like startups) in developing niches. These theories support us in the aim to establish a list of possibilities for startup involvement in collective innovation with a 'directionality' i.e. collective innovation agendas.

What is important to consider when reflecting on startup involvement is that they generally have limited resources, hence, it could be expected that it is hard for them to represent themselves in the design and selection of the MIP missions. Apart from reflecting on their role in mission formulation, the way in which they could be structurally involved in the implementation and execution phase of MIP has also not been examined so far.

In sum, little is still known about (policy) possibilities to involve startups in MIP. Yet, studying their roles in MIP is rather impractical due to MIP's newness. This study aims to provide theoretical and empirical findings by studying the role of startups in current collective innovation agendas. This broadened perspective enables us to translate the findings into insights specified to MIP, which aims to solve societal challenges. In practice, the insights could support us in harnessing startups in a more effective way while implementing MIPs and accomplishing missions. This leads us to the following research question:

What is the role of startups in collective innovation efforts for solving societal challenges, and how can their potential contribution be improved?

In the Netherlands, government departments, knowledge institutes and companies have recently established 25 MIP missions around four central themes: Energy Transition & Sustainability; Agriculture, Water & Food; Health and Care; and Safety (Ministerie van Economische Zaken en Klimaat, 2019). The missions get a central role in the Knowledge and Innovation Agendas 2018-2021 (KIA's) of the Dutch Top Sector Policy (Keijzer, 2019).

The Top Sector Life Sciences & Health, Agri & Food and Horticulture have already gained good experiences with start-ups and scale-ups (Keijzer, 2019). However, all parties related to the Top Sectors, e.g. multinationals, SMEs, knowledge institutes, Enterprise Agency the Netherlands, the Ministry of Economic Affairs & Climate and TechLeap.NL are currently looking for ways to harness startups in an even more effective way. After all, this will allow society to benefit optimally from the potential innovation that startups could bring to the table; leading to improving solutions, at a faster pace, for lower prices, for more people.

2. Theory

To address the research question, the integration of a combination of theories, frameworks and concepts might help to put the role of startups in MIPs in perspective. First, Transition Studies and in particular the Multi-Level Perspective aim to provide a sense of how macro-, meso- and micro-level effects influence transitions. Such insights are also useful for describing scientific and policy developments regarding variations in Mission-oriented Innovation Policy. Furthermore, Strategic Niche Management provides an understanding of how transition experiments occur in niches and how this allows radical innovations (of startups) to grow and expand in them. Lastly, literature on Innovation Networks and Corporate-Startup Collaboration aims to give an impression of the influence of interplay and interaction between startups, the industry and governmental parties, as this will influence their behaviour towards each other and towards collective agenda-setting and execution.

2.1 Transitions, Multi-Level Perspective and MIP Missions

The 'grand' challenges being addressed through missions typically cannot be solved by just one single solution, but demand on an interplay of technical, social and institutional change. Such systemic changes are described by e.g. transition thinking and transition management, from which MIP also originates. As society's technological, social, economic, institutional and political spheres grew and evolved over significant periods of time, all sorts of structures, habits and practices were deeply embedded in it. To resolve issues such as climate change, an escape from this "lock-in" condition is needed (Unruh, 2000, 2002). Over the last few years, transitions literature has, therefore, gained more and more attention in strategies and policies of an increasing number of countries (Lachman, 2013).

Transitions have been described by many scholars, e.g. Grin et al. (2010), Markard et al. (2012), Olsthoorn & Wieczorek (2006) and Geels (2005). One of the most recent definitions, by Loorbach and Rotmans (2010), defines a transition as: "a fundamental change in structure (e.g. organizations, institutions), culture (e.g. norms, behaviour) and practices (e.g. routines, skills)". Transitions are radical in nature and typically take 25 to 50 years to be achieved (Alkemade et al., 2011; Kemp & Loorbach, 2003; Rotmans et al., 2001). Due to their complexity, they cannot be managed by exerting full control. However, to some extent can their direction be steered and their speed can be accelerated (Kemp & Loorbach, 2003).

Two approaches aim to provide help and insights in how change can be encouraged: Multi-level Perspective (MLP) and Innovation Systems (IS) theory. At the heart of MLP, are strategic, long-term transformation processes with a goal-oriented focus (Geels, 2004, 2005; Grin et al., 2010; Rotmans et al., 2001). The currently dominant approach in innovation policy is IS, which has a more specific focus on optimizing the institutional environment of firm-based innovation processes (Alkemade et al., 2011; Tukker et al., 2008). Both have their own advantages, which is why scholars now aim to complement the IS with MLP's long-term transition perspective (Weber & Rohracher, 2012).

Yet, transition policy and innovation policy can also be aligned, when both economic growth and sustainability benefit from innovation (Alkemade et al., 2009). Alkemade et al. (2011) suggest accompanying such alignment-based policies by policies that support disruptive innovations, as alignment-based policy could favour existing and proven technologies that are closer to market, over more disruptive innovations. This report

addresses both types of innovation; disruptive, as well as incremental, as the variation among startups' innovation type could influence the startup's role in the collective agendas.

In this study, the regime and niche levels of MLP and SNM are leading to provide insights into the role of startups in collective innovation agendas, as that is where startups operate and interact with most. (Geels, 2002). The Technological Innovation Systems (TIS) puts emphasis on new entrants and entrepreneurial activity as well (Hekkert et al., 2007). However, this theory is less suitable than MLP and SNM because it has technologies at its core and transitions have shown to involve more than just technological change.

MLP displays shifts in socio-technical systems by differentiating three levels that interplay: Landscape (long-term exogenous trends, physical artefacts and key events), regime (current structures, rules & routines, stabilize existing systems, incremental innovation) and niche (testbeds, actors and radical innovation). Pressure from the landscape on the current way of doing things, for instance due to the widespread attention for societal challenges, and the intention to connect those with economic growth, could create a window of opportunity for new innovations (Geels, 2002, 2005; Rip & Kemp, 1998; Rotmans et al., 2001). It must be emphasized that the focus of this study will be on the regime and niche level, and the interaction between those two levels, as startups are most involved in those.

As an attempt to benefit most effectively from these windows of opportunity, the European Commission's introduced MIP, a collective policy approach that emphasizes not only the rate of research and innovation, but also its "directionality" towards solving societal challenges. MIP theory will help us in translating the findings of studying current collective innovation agendas into insights that are more specifically adapted to MIP implementation.

MIP recognizes the need for bottom-up experiments, risk-taking and investments of private and public actors and it also gives governments a role in shaping and co-creating new markets (Mazzucato, 2017). The MIP missions present ambitious, smart, inclusive and sustainable growth opportunities (Mazzucato, 2018b). Characteristics of a mission are: Bold, inspirational, targeted, measurable, time-bound, ambitious but realistic, cross-disciplinary, cross-sectoral and cross-actor and has multiple, bottom-up solutions (Mazzucato, 2018a).

Missions have two phases; *design & selection* and *implementation* (Goetheer et al., 2018). The phase in which startups are involved might prove relevant in this research. As well as the *degree of wickedness* of the societal problems and its solutions. These can be assessed regarding three aspects: i) contestation, ii) complexity and iii) uncertainty. Both problems and solutions can be diverging (contested, complex, uncertain) or converging (uncontested, well-defined, informed). Legitimacy can be improved by determining a mission's position in that (Wanzenböck et al., 2019).

Lastly, the *type of mission* might be relevant. There are two archetypes of missions; Accelerator missions and Transformer missions. Accelerator missions are directed towards speeding up the technological development and groundbreaking application thereof, like the Apollo project. Transformer missions, on the other hand, demand system change and are more comprehensive. They generally demand societal acceptance, application and use. Accelerator missions can, in theory, be part of a transformer mission (Goetheer et al., 2018).

2.2 Strategic Niche Management & Startup Types

To complement MLP in explaining how innovations (of startups) grow and expand in niches, aforementioned Strategic Niche Management (SNM) is introduced. SNM describes how transition experiments in niches could result in a regime-shift (Raven & Geels, 2010). Niches are characterized by their *radical nature, mismatch with the regime, social desirability and contribution to long-term goals* (Schot & Geels, 2008). Due to these preconditions of niches, SNM is a particularly useful analytical tool to assess startup innovation in relation to MIP.

Often, *incremental innovations* arise from the regime level and *radical innovations* originate from niches (Schot, 1998). Startups can provide (themselves or in collaboration with corporates) incremental innovation. However, by definition, startups are less burdened by routines and procedures, and less intertwined in all sorts of structures than incumbents. Inherently, they are associated with freedom and creativity, allowing them to tap into radical innovations more easily (Danneels, 2004). Hence, generally startups are niche experiments.

Mokyr (1990) describes radical innovations as 'hopeful monstrosities' due to their low technical performance and often cumbersome and expensive character. If properly protected against the regime's selection criteria, allowing the experimentation with technology, user experience and regulatory structures, niches or niche cumulations can gradually grow strong enough to change the prevailing regime (Schot, 1998; Schot & Geels, 2008).

Niches can be either *technological (testing technology)* or *market-related (specific user preferences)*. The process of voicing and shaping of *expectations and visions*, in combination with *learning processes* and building the *social networks* needed to support the innovation, are of key importance for successful niche building (Kemp et al., 2001; Kemp et al., 1998; Rosenberg, 1976). They also not necessarily compete with or substitute the prevailing regime, some are incorporated and transform a regime from within (Raven, 2006). Therefore, attempts have been made to distinguish different types of niches and transition pathways (Elzen et al., 2004; Geels & Schot, 2007). This research adds to that by describing possible pathways in which startups (in niches) could be involved in regime change.

Another aspect that might influence how startups are involved in building and populating niches is likely to depend on differences in startup type. Inspired by Billis (2010), Blank (2011) and Howells (2006) the following types are identified: *Scalable startup, buyable startup, social startup, grassroots movement and hybrid intermediary organization*. Each type has unique characteristics. In practice, the division is not as clear-cut, e.g. a startup company can be pursuing both profit and non-profit objectives. Nevertheless, we aimed to classify them in terms of their dominant objective to facilitate comparative analysis.

Firstly, scalable startups, they search for a scalable and repeatable business model and focus on high growth e.g. Google, Airbnb, Facebook etc. The goal is to create equity in a company and eventually make it publicly traded or acquired, generating millions of payoff. Venture capitalists are interested in this type of startups and their investments fuel its rapid growth. Successful startups of this type later turn into scale-ups and are generally located in innovation clusters, e.g. Silicon Valley, Israel, Amsterdam etc.

The second type is buyable startups, which are founded to be sold to a larger company for about €5-50 million. This type of startup has a short time to market and arise thanks to decreasing costs of building digital applications and the availability of angel capital.

The third type is social startups, which apply commercial strategies to maximize improvements in human and/or environmental well-being. They can be either non-profit, for-profit, or hybrid (Blank, 2011).

Fourth, are grassroots movements. Here, members of a community self-organise by taking responsibility and action to contribute collectively. Frequently they take the initiative to accomplish new social institutions based upon values that differ from mainstream. However, grassroots movements usually appear to struggle in upscaling to the regime level (Hatzl et al., 2016; Seyfang & Smith, 2007).

Lastly, hybrid intermediary organizations are “organization(s) or bod(ies) that act as agent(s) or broker(s) in any aspect of the innovation process between two or more parties.” (Howells, 2006: 720). Hybrid intermediary organizations have been proven to have unique capabilities in aspiring organizational and institutional change (Battilan & Lee, 2014; Dorado, 2005; Padgett & Powell, 2012).

It is likely that all types have the potential to contribute to collective efforts to solve societal challenges. However, their roles, priorities and the way they relate to the regime might differ. Due to the comparatively new aspect of missions, namely a societally relevant ‘directionality’, gaining insights in collective agendas could increase the effectiveness and efficiency of collective efforts by preventing hinder and stimulating a diverse set of synergies.

2.3 Interaction and Collaboration

The importance of niche actors in bringing about regime shifts is recognized, but they do not operate in a vacuum. Linkages, interplay and interaction with external processes matter, as they influence all actors involved, as well as the collective innovation agendas i.e. missions themselves. However, according to Schot & Geels (2008), more research is needed on niche protection and interaction patterns between niches and regimes.

The successful creation of niches is sometimes hampered because incumbents are favoured by risk-averse policymakers. Also, institutional strategies can be an obstacle for niches, as they can incorporate a form of lobbying for regulations which exclude or hinder new entrants. In case incumbents see a viable business case, they seem to use constraining strategies until they are prepared for the new technology (Smink et al., 2015).

Literature on startups shows that building relationships with external partners is of high importance for their success (Kask & Linton, 2013; Pangarkar & Wu, 2012; Teece, 2010). Their size generally leads to a structural shortage of e.g. financial and human resources, limiting them creating new innovation processes (Wymer and Regan, 2005). The duration of collaboration also impacts the startups’ innovation. Long-term collaboration with e.g. customers, suppliers, and competitors positively affect a startup in generating radical innovation, while short-term collaboration alliances with the aforementioned actors often lead to more incremental innovation (Neyens et al., 2010).

For a startup, it is rather uncertain whether it should *cooperate* with incumbents to pursue growth, or to conduct a more *competitive approach* (Lin et al., 2011). After all, a cooperative approach could pose a threat for the performance and survival of a startup because of e.g. unintended knowledge spillovers and the perceived risk of losing control over its own operations (Alvarez and Barney, 2001; Forrest, 1990). Two practical examples of how incumbent-startup collaboration might be expressed in the empirical part of this research are R&D networks and corporate venturing practices.

2.4 Conceptual Framework

The concepts introduced in the theory section are integrated into a unique conceptual model, illustrated in Figure 1. The figure is based on the MLP framework and displays, through time, how startups build niches, interact with the regime via collective innovation agendas setting and its implementation, and ultimately how they play a role in causing regime change.

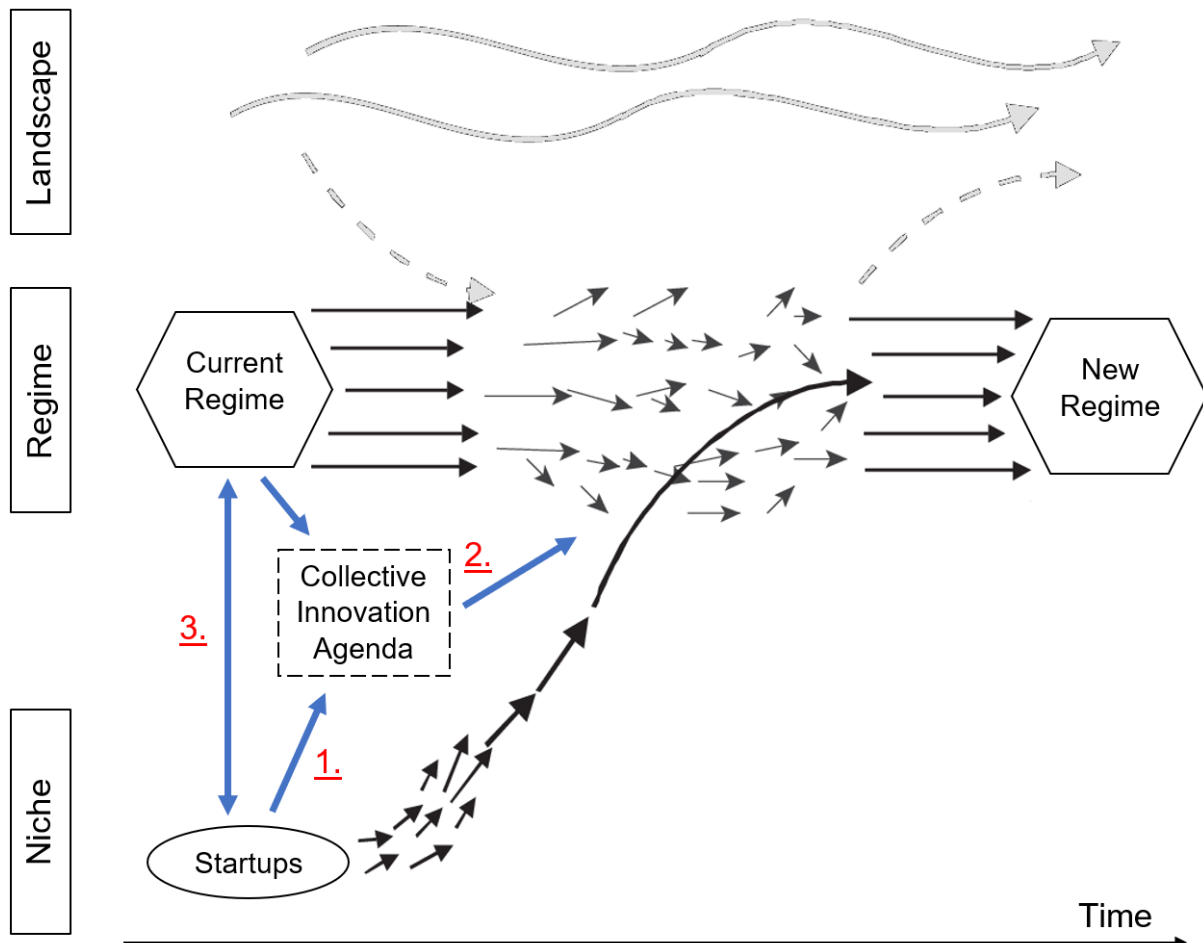


Figure 1. Conceptual framework, showing how startups, the current regime and collective innovation agendas are positioned in the MLP framework and how it can lead to regime change. Based on Geels (2002).

The red numbers indicate the core principles that are studied, they are defined as follows:

1. Roles and contributions of startups in formulating and executing the agenda.
2. Supporting activities to let the roles and contributions of startups flourish.
3. Regime elements that influence the roles and contributions of startups.

Figure 1 shows a rather high level perspective on the concepts for the sake of maintaining a clear and insightful view on all concepts. This text provides further specification of how the theoretical concepts are incorporated in the figure. The overall figure is based on MLP, which provides an excellent view of the overall socio-technical systems and the dynamics between the landscape, regime and niche-level (Y-axes), through time (X-axes). The second concept, collective innovation agendas, i.e. MIP, is in fact the operationalisation on developments (i.e. windows of opportunity) created by the landscape level. Therefore, it is positioned between the regime and niche level. The focus of this study is on the operationalisation of MIP, hence, the influence of landscape developments on the missions'

topics are explicitly not discussed. Therefore, the landscape and its influence are also depicted in grey, to emphasise that these are not within the scope of this study. The differentiation between formulating and executing a collective innovation agenda has been taken into consideration too, by the blue arrows that go respectively in and out of the “collective innovation agenda” box. Last, SNM integration is established because niche experiments, (i.e. the activities of startups) could lead to a shift in the regime, as exemplified by the stream of arrows pointing to ‘New Regime’ hexagon. This distinctive integration of concepts allowed for a valuable contribution to the existing theory.

3. Methodology

This section conveys transparency on how the methods and data analysis will lead up to a valid answer to the research question: *“What is the role of startups in collective innovation efforts to solve societal challenges, and how can their potential contribution be improved?”*.

3.1 Research Design

The exploratory research question is addressed by an inductive, qualitative study. (Bryman, 2012). Analysis allows for a better understanding of the research problem and deepens the knowledge about important factors and variables, relationships between them, and potential underlying motivations. The theoretical findings from the theory section are used as core for the interview guide, as well as the three core principles that were identified in paragraph 2.4 Conceptual Framework. The interviewee guide can be found in ‘Attachment 1’ of this report.

As the exploratory nature of this research suggests, all data that might be interesting to gain new insights is collected. The semi-structured interviews allowed us to diverge from the interview guide if that was deemed relevant. Qualitative case studies, as well as desk research, led to high-quality data to be obtained and validated. Theoretical concepts from the theory section were not just the basis for the interviewee guide, during the interviews, they were also constantly reflected on, to stay alert of potential connections to the theory.

As a result, the database of transcripts will allow a number of roles to be identified. It will display what potential routes for involving startups, in both formulation and execution of a collective innovation agenda exist. A hypothetical role could be e.g. ‘applying technologies to new markets’. Next to the roles, also other perspectives on the current support for startups in collective agendas and the interactions with the regime are described in a nuanced way.

The in-depth understanding of the combination of startups and collective innovation agendas could form the groundwork for instigating follow up research that can provide more insights about certain elements of the involvement of startups in collective missions. Some examples are: Strategies to improve startup involvement in certain phases of MIP, when and how startup-incumbent collaboration proves to be most beneficial for society as a whole, and how the benefits of collaborations should be fairly distributed over its participants.

3.2 Case Description

Top Sectors were selected for the case study, as selecting missions could have led to a lack of data on actual startup involvement due to the newness of the missions. The Top Sectors have in fact been functioning as collective innovation programs for years. Besides, the Top Sectors Agri & Food and Horticulture already gained good experiences with start-ups and scale-ups in the past, so startup involvement in those can be guaranteed (Keijzer, 2019).

These two Top Sectors recently also launched a shared 'Knowledge and Innovation Agenda 2020-2023' (Top Sector Agri-Food, 2020). Due to the cross-sectoral nature of missions, this made the choice for these two Top Sectors even more evident during the case selection. Also, Agri-Food and Horticulture have been related to societal challenges for years. Life Science & Health would have been a suitable option too. However, the diversity of startups in the Agri-Food and Horticulture is expected to be higher. After all, Life Science & Health generally have long test procedures to guarantee safety of e.g. medicines.

Top Sectors High Tech Systems & Material and Chemistry, which could be defined more as 'enablers' due to the technologies and new materials they bring about, were also not ideal. One criteria for choosing the Agri-Food & Horticulture has been the fact that these Top Sectors can encompass both technical, as well as non-technological aspects of change. This is important for the exploratory scope of this research, as it allows for studying data that does not only include technical aspects of change, but also aspects such as institutional, organizational, and societal change, which are deemed essential for societal transitions too.

Top Sectors have an internal hierarchical structure, moving from broad to specific (left to right) similar to figure 2 below. From all these levels, the 'Knowledge and Innovation Agenda' (KIA) is expected to be of a comparable degree of wickedness, measurability and time-boundness as MIP missions. At the start of the interviews, some questions about their KIA were included to indicate the correctness of this expectation (see Attachment 1). Based on the answers of the interviewee, the level of zoom on hierarchical level could be adjusted.

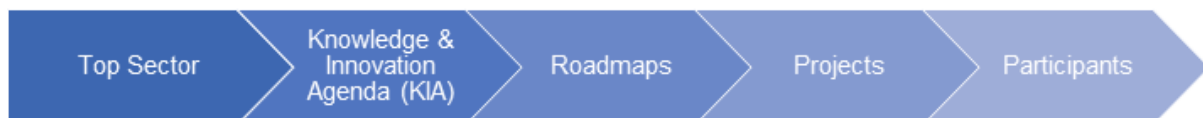


Figure 2. Generalised hierarchical structure within Top Sectors.

For this reason, the first two interviewees have been someone from each Top Sectors' team. Due to their overseeing, coordinating position, these persons could verify whether the 'Knowledge and Innovation Agenda' is indeed the most suitable level to zoom in on. Also, this person is in the best position to advise us on other unexpected practical barriers we could encounter, as desk research was not able to fully disclose that. Also, the mission characteristics as defined in paragraph 2.1 Transitions & Missions appeared rather comparable with the content of their Knowledge and Innovation Agenda 2020-2023.

Once those two interviews were conducted, the empirical research could proceed to the next phase. This started with interviewing startups, as those are a good starting point for studying their roles and contributions. Eight startups with rather diverse characteristics were selected, so that most potential roles and contributions were represented.

Furthermore, two corporates were interviewed, three startup supporting organisations and four more (semi-)governmental parties. All interviewees had some relationships, were interacting, or have been interacting with startups in sectors Agri-Food or Horticulture. The choice to interview multiple interviewees of the same stakeholder category is done in the

pursuit of validity, as it allowed for recognising contradicting personal beliefs in each other's stories. Together, this led to the following interviewee scheme, displayed in Table 1 below.

Interviewees			
Category	Name Interviewee	Organisation	Function
Startup	Anonymous	Anonymous	Managing Director
	Bert Rijk	Aurea Imaging & Dronewerkers	Co-Founder & Director
	Bernadette Kooijman	No Fairytales	Founder
	Lucas Noldus	Noldus Information Technology BV	Founder & CEO
	Mendelt Tillema	UmaMeats	Co-Founder & CEO
	Fred Bergmans	Carezzo Nutrition BV	Founder & Entrepreneur
	Sander Peltenburg	Burgs Foods & De Krekerij	Co-Founder
Government	Jaap Korteweg	De Vegetarische Slager	Co-founder & CEO
	Kees de Gooijer	TKI Bio-Based Economy (Top Sector AgriFood)	Chief Inspiration Officer
	Michiel Roelse	TKI Horticulture and Starting Materials	Operational Director
	Mark Leunissen	Dutch Enterprise Agency (RVO)	Liasion Top Sector AgriFood
	Klaas Boer	GroenPact (Topsector AF & TU)	Coordinator Human Capital Agenda
	Marcel de Groot	Ministry of Economic Affairs and Climate	Secretary Topteam AgriFood
Corporate	Margo Stam	Ministry of Agriculture, Nature and Food Quality	Senior Policy Officer Science and Innovation Policy
	Aart van 't Land	Lely Holding BV	Director Business Development & Startup Mentor
Supporting	Rob Hamer	Unilever	Vice-President AgriFood External Affairs
	Puck van Holsteijn	HortiHeroes (Programme Startups)	Director
	Anieke Wierenga	ScaleUpFood	Program Director
	Jan Meiling	Startlife Wageningen (Incubator)	Managing director

Table 1. Interviewee scheme

The purposive sampling strategy is complemented by a snowball sampling approach (Bryman, 2012). This was done because the Top Sector interviewees could refer us to other relevant interviewees, which increased the likelihood of cooperation in this study. Some startups have been approached separately from the Top Sectors suggestions, to also include the perspectives of startups that potentially had no direct relationship to them. For the sum of the two missions, a total of 19, on average, one-hour-long interviews have been conducted as those provided sufficient insights, without exceeding the time and financial constraints set on this study. The semi-structured interviews allowed interviewees to provide contextual understanding, guaranteeing full comprehension of the topic under examination.

3.3 Analysis Method

As the interviews are reflections of an interviewees' view on reality, the researcher aimed to be impartial while analysing the data. The entire interviews were literally transcribed so that loss of valuable data was prevented to the most reasonable extent. This resulted in a large and rich dataset of about a hundred pages of transcript, which are confidential. The data (i.e. interviewees' perspectives) was analysed via open coding (Bryman, 2012). After that, the axial coding process led to categories. In this iterative learning process, categories were repeatedly adjusted so that they best represented the collected data in a structured and well-ordered way. The categories were then compared to theoretical concepts in the theory section, to see whether any evident overlap could already be recognised. Based on the most evident similarities, some minor adjustments were made to the categories.

The results were described based on the categories that were identified. This allowed a nuanced and realistic reflection of the interviewees' perspectives to be displayed. These descriptions are supported by literal statements from the interviewees. For ethical reasons, the interviewees have been notified about what quotes would be used, so that they could check them for misinterpretations and other sensitivities, and eventually approve them. The contrasting and overlapping perspectives have been described as objectively as possible.

4. Results

In this chapter, the results of the research will be presented. Quotes will be used to provide examples and bring the text alive. The first results that were deemed relevant to discuss, are the differing definitions of startups, the identified types, and the phases of developments that are used in the field. Then, their roles and contributions to the overall innovation ecosystem, as well as collective innovation efforts to solve societal challenges are presented. This will be succeeded by results about the formulation of collective innovation agendas. Then, the current support for startups in collective innovation efforts will be discussed. Lastly, results about the remaining bottlenecks and suggestions for regime improvements are described.

4.1 Definition Startups, Types and Development Phases

The first thing that emerged in the interviews was that interviewees seem rather ambiguous about the definition of a 'startup'. Many displayed a certain degree of uncertainty on whether something was for example a startup, or would be considered just as SME. The boundaries of the definition do not seem to have a clear delineation to many. One governmental official referred to the following definition: 'A startup is a temporary organization designed to search for a repeatable and scalable business model'. This definition is generally most agreed upon in the startup world. Interviewees indeed considered grassroots movements not as a startup but rather as just an 'initiative'. Grassroot movements, hybrid intermediary organizations and social startups were hardly explicitly emphasised by interviewees. All interviewees did have certain convictions about what a startup is and all seemed to agree about scalability. Still, the term seemed to be rather multi-faceted due to two reasons. First, the development phase a startup finds itself in. This was classified by one corporate interviewee as; standup, startup or scaleup. His explanation about each phase of development is displayed below:

"There is an enormous difference in the scale in each phase of development. We distinguish standups, startups and scaleups. A standup is someone with a good idea but there is no prototype yet. A startup is at the prototype level, but is not able to provide large amounts yet but they have a realistic, testable product or service. A scaleup is able to provide for large amounts. Among these categories, there is a huge difference in dynamics." - Corporate.

In e.g. the US, this complete spectrum is classified as 'startups'. Though, in the Netherlands, a distinction between 'startups' and 'scaleups' is more accepted. What society is not (yet) accustomed to though, is the term 'standups', and hence, this appears to be a somewhat novel term. The second classification interviewees appeared to distinguish for standups, startups and scaleups, either consciously or unconsciously, were 'technology-driven' and 'market-driven' startups. In each of the three development phases (standup, startup and scaleup) and in both venture types (technology-driven and market-driven) the needs are slightly different. The interviewees of both Top Sectors seemed to agree, they encounter technology-driven startups most frequently, as the following quote also indicates:

"Most startups we deal with are technology-driven." - Top Sector Agri-Food.

Of course, technology-driven and market-driven startups are on a spectrum that merges at some point. After all, technologies find a market at a point, and market-needs can be filled by

products or services that include technology. Still, it is notable, that both the government and the Top Sectors speak primarily about dealing with technology-driven startups. However, a significant number of entrepreneurs, some of which were proposed by the Top Sectors, were actually market-driven ones (namely five out of eight). Of which the most successful example according to many entrepreneurs; 'De Vegetarische Slager', was considered an 'exception':

"The company 'De Vegetarische Slager' is a bit of an exception because they started from the market side and started looking from there to technology. But usually, it starts at the technology side and from there, looking for application domains." - Government.

One potential explanation lies in the fact that Top Sectors are traditionally research-oriented, and hence, confronted more often with technology-driven startups. It is however noteworthy that many of the interviewees, and potentially also startups in the sector at large, incline to the market-driven side. Therefore, needing other types of support, assistance and policy. It also seems that technology-driven startups entrepreneurs are way more positive about Top Sector subsidies than. As for the subsequent chapters and paragraphs, the term 'startups' will be used to indicate both technology-driven and market-driven ventures, as well as all three phases of development, unless indicated otherwise. The increased understanding about the classifications will support the following paragraphs in providing more depth to the role of startups in collective innovation efforts, and how to improve their contribution.

4.2 Role and Contribution of Startups to Innovation Ecosystems

Before getting into depth about what the role of startups in collective innovation efforts to solve societal challenges is, a valuable insight to gain is whether all stakeholders agree on whether startups bring value to the table and what defines this value. About the value of startups, all interviewees were unanimous; startups definitely contribute to the flourishing innovation ecosystem. They bring the renewal in, it is beyond the hype and businesses and government increasingly see a necessity to involve them. Not merely to keep innovating and pioneering, but also specifically because they can provide innovation that we highly need to accomplish societal goals. An incubator even estimated their future importance numerically:

"Corporate and SME expenditure on R&D in Agri-Food is about 2,8 billion. If you look at venture capital in Agri-Food, this is about 1,4 billion. The first number is decreasing every year, while the latter is increasing every year. I expect that within 2 to 3 years, the venture capital investments are on equal height as the R&D expenditure in this sector. I consider this as an indicator that a fair share of innovation will come from young companies." - Incubator.

Overall, the interviewees had a rather high regard towards startups' contributions, and many promising future expectations were voiced. Particularly in context to being an innovative engine behind innovative economies and societal transitions. This aligns with the recognition MIP grants to the importance of 'challengers' in accomplishing missions. 'Contributing to innovation' is still quite generic. Interviewees were more specific about the distinguishing contributing roles that startups adopt. The identified roles are not solely applicable to solving societal challenges or collective innovation efforts, but to innovation ecosystems in general. Startups exercise one or multiple roles. All five are discussed in the following paragraphs.

4.2.1 Fill market gaps and change the supply chain

As Colombo & Piva (2008) and Parrish & Foxon (2006) already recognized, filling market gaps is one specific role that startups play in innovation dynamics. This study recognises their findings, both an accelerator and an entrepreneur mentioned this opportunity for startups. Large players in the ecosystem are not always interested in specific gaps in the market, which could be due to it being too far removed from their core business, or the perceived advantage is too limited. The reasons that were provided to explain the value of startups, is that they are an ideal candidate to pick up those pieces and fill the gaps. They can establish the new market that would otherwise not have been filled, or they can prove that from a novel position, a certain business case was viable after all, as mentioned here:

“In the Agri-Food, there are a couple of large players, enormous billion-euro companies. They leave pieces behind that are not interesting to them. Also, they are, of course, stuck in their oil tankers. Small companies are still capable of using the degrees of freedom between those corporates, allowing them to bring new things to the market and thereby changing the supply chain in surprising ways.” - Accelerator.

4.2.2 Development and utilisation of new technology and knowledge

Every startup is involved with technology to some extent; using it, developing it themselves or developing it in collaboration with external partners. The startups which most frequently seem to develop technologies are university spin-offs and corporate spin-outs. Interviewees mentioned that startups are exceptionally suitable to develop technology fast and efficiently.

“Startups are tailor-made to develop technologies rapidly and efficiently. Having 80% of the product finished against 20% of the costs. However, 80% of the costs still need to come to finish up.” - Corporate.

Certainly, SMEs have the capabilities to develop technologies rather fast and efficiently as well, but due to path dependency, they are constrained in their decision-making. Hence, the imminent necessity for startups to develop technology as well. One university spin-off also explicitly expressed their role as a technical innovator in the ecosystem. Yet, there is another role that startups are frequently familiarized with, as can be identified in the following quote:

“Startups are an element in the renewal we need together with existing businesses. In the ecosystem way of thinking, they can also contribute to knowledge production and knowledge utilization via new technologies, new tests and new applications.” - Government.

Their ability to generate and utilize new knowledge within the ecosystem e.g. through rapid testing of new applications was expressed, by both startup entrepreneurs and a government official. After all, startups engage in rather novel activities, often initiating certain research projects that produce new insights and substantiate why certain solutions prove effective.

4.2.3 Doing risky, rapid and flexible value creation

Startups are characterised by their agile, lean and risky search for a repeatable business model. This allows them to add value by looking for, and validating, potential business

opportunities, in a rather fast and flexible way. They are able to take certain risks that other parties divert from. Hence, this vehicle can prove the viability of more radical innovations.

“Startups can approach things way faster and more agile than corporates.” - Government.

Methodologies such as Lean Startup have made it possible for founders to gain a very high understanding of the problem and customer demands, as for example an interviewee of the Top Sector Horticulture mentioned. Most of all, the risky experimentation and new disruptive business models are a feature that receives more and more corporate attention throughout the Netherlands, with initiatives such as the Corporate Venturing Network and CoSta aiming to constructively support this development. The need is well represented by this interviewee:

“If there are high (future) costs for a company, it is highly appealing if a young, dynamic group decides to go against the grain and try something anyway.” - Top Sector Agri-Food.

4.2.4 Apply new technology in industries and create crossovers

As technologies are being developed, the search for repeatable business models for those technologies kicks off as well. Startups in their early phases, as well as technology, are not sector-specific. Hence, it is an ideal vehicle to assess how certain (new) technologies can be applied to diverse domains and markets. Inherently, this is a crossover with another industry, such as High-tech or Chemical inventions applied to the Agri-Food or Horticulture sector.

“On the terrain of technology, there is a lot of interest from existing businesses and branch organisations, where also a lot is being done. We need companies from outside the sector to solve problems within our sector, such as the labour shortage.” - Top Sector Horticulture.

From a traditional perspective, the Horticulture sector is particularly inclined to solve issues themselves. However, now increasing acknowledgement is given to solving ‘grand societal challenges’, creating more multi-disciplinary, cross-sectoral collaboration is of the essence. To stakeholders, corporate and governmental, it is evident: startups should be provided with the possibilities to operate and innovate between intersecting domains, as concluded below:

“Around 2016-2017, we concluded that we should do more with the crossover of Agri-Food and HighTech domain, we organised a couple of sessions with the field and it was clearly brought forward, if we want to do more on these intersecting terrains, then the topic of startups cannot be left behind.” - Government.

As for the startups, all seem to pursue a world-improving vision. Thinking in terms of sectors is of little importance to them, intersectoral collaboration is second-nature. What is on their mind is simply capturing value in a particular market. The quote below also describes that:

“With new technologies come new opportunities, it’s up to us to look at what is the best market to apply these new technologies to.” - Young entrepreneur.

4.2.5 Challenge the established order

Next to the activities above, startups contribute to a healthy challenge of the status quo and the incumbents in the ecosystem. In this paragraph, a division is made between the culture in the ecosystem, as well as the systems and structure that startups potentially challenge.

4.2.5.1 Systems and structures

Some structures and systems in the ecosystem have developed through time in a certain way, but do not support the best solutions to a problem, e.g. ingrained funding patterns or governance of stakeholders that deal with a problem singularly from their own perspective. For the participants it is hard to recognize the axioms and standards on which the current systems are based. Startups with superior solutions to the ones in place, put a spotlight on the structures that limit certain progress from being adopted. One entrepreneur expressed:

“As a startup, you are a candidate that rocks the boat, exposes limiting structures and voices that some existing systems are no longer acceptable.” - Experienced entrepreneur.

This conclusion was shared by all interviewees; their role of shaking up established, usually rather capital intensive, markets is unique. The specific value startups provide then, is their pursuit of more radical transitions, which is peculiarly hard for existing players to propose and pursue, as also theorised in Christensen’s innovator’s dilemma. A startup is somewhere on a dichotomous scale of incremental to radical, meaning that plenty of them can cause a certain degree of disruption to existing systems and structures. However, those which lean to the incremental side, like the interviewee below, could also disrupt ingrained structures:

“Our business model brings together universities, hospitals, dieticians on the discussion: What do you actually need?” - Experienced entrepreneur.

The entrepreneur initiated a new discussion, in a new setting, with stakeholders of which the interdisciplinary collaboration was expected, but had never fully flourished. From this fresh perspective, he was able to recognize this limitation, provide all stakeholders with legitimate reasons to get together and directly make a collective decision. Due to the funding structures being reconfigured at the spot, the outperforming solution became a great success for all.

“The established order does things their own way, the way they are familiarized to, but that does not necessarily bring us to the turnaround society needs.” - Government.

It must be emphasized that systemic and structural change is never easy, often intertwined, and therefore rather complex to interact with, and accommodate new solutions. However, as the quotes above indicate, startups can detect, initiate and facilitate discussion on seemingly contradicting or restricting systems and structures in society. This allows the focus to return to the deeper, underlying core of problems. Which, bottom-line, enables genuine goals to be set and pursued, by integrating innovations that end-users and society benefit from most.

4.2.5.2 Innovation culture, attitude and way of thinking

Lastly, a matter that was brought forward in a substantial amount of interviews, either directly or indirectly, was the significant influence startups could have on the traditional attitude, the

way of thinking and way of working of the established order. The risk-appetite, not wanting to manage everything because it provides a sense of security, letting go of the current way of thinking and the entrepreneurial drive to search for new ways of doing things. All of these features are highly valued by the established order, as exemplified in the following quote:

“Startups, most of all, work with another attitude. It is essential; the attitude, the risk appetite, not wanting to manage everything because that provides a feeling of security. I think the existing companies should learn from that, being able to respond faster, being less stuck in procedures, integrating the startup attitude in large companies.” - Top Sector Horticulture.

The quote above did touch upon many points, hence the choice to display it. However, most progressive businesses seem to value this startup feature. One interviewee explicitly noted that some businesses even view it as part of their change management. By engaging and collaborating with startups, entrepreneurial behaviour is regularly adopted to the corporate setting. This is not only a legitimate argument for businesses. Also, government institutions aim to utilize this feature. Though, adjusting one's culture to new circumstances is a rather inert process. To some extent, existing systems, structures and culture even seem to have a somewhat preserving effect on each other. Fortunately, startups do not seem to be bothered much by this, challenging their corporate counterparts is, for most, just part of the journey:

“We try to push organisational systems, to show that innovation does not have to be a five year during trajectory with 30 organisations, but that it can also be agile and lean, to make fast steps forward. We go for low-hanging fruits and push through some agile developments in organisational structures that can naturally be very ponderous.” - Young entrepreneur.

4.3 Formulation of Collective Innovation Agendas

The findings have so far indicated that stakeholders agree about the value which startups could bring to the table, and how this value is exactly defined, it is time to go into more depth about their role in the specific processes of collective innovation agenda setting and execution. In this paragraph, the collective innovation agenda setting-process i.e. formulation, will be examined. It aims to gain insight in whether startups have a role in formulating collective innovation agendas, and what that role, in previous and current Knowledge and Innovation Agendas, possibly entails.

4.3.1 Current involvement practices

First, it is worthwhile to assess whether startups are aware and familiarized with Top Sectors' collective innovation agendas. As it appeared during the interviews, the knowledge of startup entrepreneurs about these agendas is incredibly limited, this includes both experienced and less experienced entrepreneurs. The following quote best exemplifies the overall responses:

“I am hardly aware of the existence and content of their collective innovation agendas.” - Experienced entrepreneur.

Some entrepreneurs tried to do an educated guess about what would be the content of the Top Sectors' collective innovation agendas, but it was crystal clear; none of them had exact insight in the topics, focal points or themes. Most startups were aware that certain subsidies were linked to the agendas, but this did not motivate them to delve into them or get involved:

“Time to get involved in such an agenda is simply super limited. I am also not familiar with what is in such an agenda of the Top Sector. Everyone in our team needs to contribute to our core business, otherwise, you simply cannot survive. I would like to contribute to such agendas, but it is simply impossible due to time constraints.” - Experienced entrepreneur.

As mentioned, there seems to be a willingness among certain startup entrepreneurs to get involved in formulating such collective innovation agendas. However, it must be strongly emphasized that bringing their products or services to market is way more urgent to them. Limited time and resources are pressing issues. Besides, there is little knowledge about the long-term payoffs of being involved in formulating an agenda. Lastly, some of them also had no idea how they should get involved, and one startup entrepreneur mentioned the following:

“It is also a matter of money. In case there are resources available there, you would make more time for it.” - Experienced entrepreneur.

However, some entrepreneurs did mention being involved in formulating certain research agendas, e.g. via consortiums. Those are generally more directed to a specified topic, and therefore, make it more suitable for a startup to join. Whether the agendas were, directly or indirectly, also linked to the collective innovation agendas of the Top Sectors was uncertain to the interviewees. However, many startups that were interviewed seemed to be involved in other similar, more specific projects, in which they have a direct influence on the agenda.

In the Top Sector AgriFood, direct involvement of startups in formulating collective innovation agendas is not considered the most practical manner; there are many startups, and all can just represent a small piece of the whole picture. However, they have startup representation included in the process via overarching organisations, by e.g. SME representatives. After all, startups are an SME as well. Next to that, startups are consulted as a sounding committee:

“The agenda is afterwards assessed by a sounding committee, which is represented by large companies, R&D departments, but also startups.” - Top Sector Agri-Food.

Whether those startup representatives, and the startups involved in the sounding committee, provide a correct image of startup-specific needs and contributions is questionable. After all, there are differences between startups and e.g. SMEs. Also, an incubator interviewee noted:

“I think you should ask startups and entrepreneurs to the table as well, however, I have seen in the past that the type of entrepreneurs going to these tables is a specific type, they are less busy with building their company and more busy with sitting at tables. So I am not sure whether the startups that go to the tables give the right signal.” - Incubator.

At the Top Sector Horticulture, they seem less familiarized with startups in the formulation of collective innovation agendas. Which can be explained by the fact that there are simply few

startups active in that specific sector. As the interviewee of the Top Sector Horticulture noted:

“It will be difficult for startups to play a content-wise role in agenda formulation. There are just a few, and they are not connected to the right networks. I also would have no clue who to contact then. They are not in our projects because they cannot pay for that, and so, they are also not in our networks.” - Top Sector Horticulture.

Both Top Sectors seem to recognise and bear a willingness to get the perspective of startups involved. Particularly, for their role of getting optimal impact out of the research agendas they are currently valued. Due to practical concerns and unclarity about the direct benefits for the startups themselves, it is hard to directly involve them in the agenda-setting process. Hence, it seems that indirect representation is preferred. All interviewees appear to agree on this: Startups bring most value in the execution of collective innovation agendas.

4.3.2 Necessity of more involvement

Now it has been assessed how and to what extent startups are currently involved in setting up the collective innovation agendas of the Top Sectors, it is possible to examine whether it is desirable, according to interviewees, to adjust their future involvement. Most interviewees agreed on this matter, namely that involving startups more in a direct sense is not desirable for a multitude of reasons: They do not have the knowledge and overview to be of value for the agenda-setting process, their focus is too individualistic and not per se on the collective gain of the sector, and it would be impractical to the governance of formulating the agenda. What most interviewees lean towards, is indirect representation of startups' contributions:

“If you look at the theory of Geels, the government can, from its role, set the framework that offers space for starters to provide new products. So I question whether it is necessary to involve startups in formulating the agenda and think about societal challenges. At the same time, we should realise they have much to contribute.” - Executive organisation government.

It seems that, for representing the needs and contributions of startups, most interviewees do prefer to depend on governmental officials and overarching startup organisations. Besides, it is the most widely accepted way of how another stakeholder group, SMEs, are collectively represented. Though, there are concerns about the way startups are currently represented:

“I do not think they can play a large role in agenda-setting because you cannot speak with all of them. But what I do think is important, is that these companies are given the opportunity to grow autonomously for a longer period.” - Accelerator.

Some entrepreneurs also felt like their perspective is currently insufficiently represented. And they expressed a need to be better represented and consulted about certain issues. Such as the barriers why innovation would currently not succeed, the actions of governmental parties while acting on those barriers and the speed at which processes are generally running.

4.3.3 Improvement suggestions of interviewees

The need that seems to arise, concerning the involvement of startups in the formulation of collective innovation agendas, is basically improving the formal representation of this specific

stakeholder category. That is not a surprise, because from a historical perspective, involving startups has never been a high priority for the Top Sectors. Yet, recently, the implementation of research in the market and startups in general, started receiving more and more attention:

“We are primarily a research funder, only for the last two years there is more time and space to look at how research actually influences the market or society.” - Top Sector Horticulture.

Both Top Sectors mentioned that needing to look at the implementation of research is a new element to be elaborated on in their collective innovation agendas. According to government officials, there was also no startup policy line for startups established before. Though, in the upcoming period, that will be up for discussion again. The most recent Knowledge and Innovation covenant, of November 2019, included a valorisation plan which mentions startups already. Besides, the food agenda of state secretary Martijn van Dam is ending in 2020, so new policy needs to be formulated. What direction and which parties to involve is something that is being assessed at this particular moment. Fortunately, interviewees gave some suggestions for future improvement of the role of startups in collective agendas, like:

“In the scale-up phase, usually ex-managers of corporates run the company, because those are better at growing a company than the initial entrepreneur would most likely be. Though, the high-risk perspective of the entrepreneur would be most contributing.” - Corporate.

A similar statement was provided by the interviewee of an incubator in the Agri-Food sector. It might be tempting to involve the CEO of a scaleup in the agenda-setting of a collective innovation agendas, since those companies are more stable and have grown for a couple of years already. However, the person in charge of a scale-up is often not the initial risk-taking entrepreneur, which would have been the perspective that is most needed in agenda-setting.

The provided alternative of interviewees, is to better involve executive organisations which support startups. Such as incubators, accelerators and ecosystem builders. Because after years, they gained tremendous knowledge and experience concerning the needs, wishes and contributions that startups could bring to the table. As the interviewee below mentions:

“I would make an appeal to executive organisations that support startups, like TechLeap.NL, and parties like Startlife. After years of supporting startups, we have a feeling of what lives there and what is happening, but also how much potential something has. These parties can share that knowledge and be of value during the policy-making process.” - Incubator.

One startup did a similar suggestion, namely involving various sub-agendas, communities and networks that are out there. It is not clear whether those are already connected to the Top Sectors and if its governance allows for linkages with the Top Sectors. Anyhow, for both initiatives counts that also those should be involved with caution, since not every network or executive organisation brought forth significant numbers of successful startups. So their view on the true needs and contributions of startups might be biased as well. Lastly, statements about choosing to subsidise certain solution directions were given, exemplified by this one:

“You could say: We are going to subsidise a specific direction and other directions we do not subsidise, this would allow you to give it some direction.” - Accelerator.

This argument about subsidising certain specific solution directions (e.g. electric cars over hydrogen cars) would provide more direction to existing parties concerning their innovation efforts, because of a sense of certainty, clarity and support to go all-in. However, by doing so, it is risky that alternative innovations, which could have superior long-term features, are being harmed. One entrepreneur mentioned the meat substitute discussion. By only looking for plant-based protein sources, all other alternatives would be discarded, e.g. protein-rich products based on insects. One Dutch Secretary-General recently mentioned the following:

“Camps, Secretary-general of the Ministry of Economic Affairs and Climate, says that fear of failure and picking the wrong winners seems to exist. He thinks the government should let go of this restraint, because research showed that bold and valuable innovations often arise as a result of targeted government interventions.” - Het Financieele Dagblad. (2020)

A clear example of this would be choosing to design the policy instruments in such a way that they support the development and acceptance of electric cars over hydrogen cars. The motivation behind this would be to create clarity and certainty for businesses, also startups, so they know what to focus their attention on. After all, if one direction is chosen, everyone knows that that will be the way forward. However, in that case, alternative innovations, (in the previous example, e.g. hydrogen car related innovations) are not as valuable to pursue anymore. This means that the chances of success for startups that were already active in that arena will most likely diminish because the support for that innovation will collapse. It is, therefore, logical that policy-makers are wary of choosing the winners.

4.4 Support Collective Innovation

In the previous paragraphs, the role of startups in the formulation of Top Sectors' collective innovation agendas was elaborated on. Now, it is time to dive into the role of startups in the execution of these agendas. Hence, it is assessed whether, how and to what extent startups are involved in the collective innovation activities. The Top Sectors have formal activities and instruments, as well as informal ones to support collective innovation. This will be discussed.

4.4.1 Networking

First of all, some informal activities of Top Sectors. According to the Top Sector Agri-Food, about half of the time they encounter startups is via phone calls or meeting them at certain events. In those cases, the startups are asked what they do and why it is new. Sometimes, one of the Top Sectors' 'innovation brokers' is sent to go into more detail with a specific startup. Not per se to attract them to a subsidy programme, but mainly to help them with a point of entry at key persons at the right level in a certain market or organisation. Many government officials and entrepreneurs also see that as the explicit value of Top Sectors:

“The value of the Top Sector, is especially in their network, getting parties in contact with each other, in order for both to benefit from a collaboration.” - Experienced entrepreneur.

This is a highly valuable activity with an eye on the collective innovation agendas, because Top Sector can then prioritize and steer collaborations in a certain societal direction. A great many interviewees mentioned Top Sectors as orchestrator of the interplay between different organisations, especially from an ecosystem perspective. They stimulate smart connections,

give a place to startups and give startups a push where necessary. Because for startups, the sector, or field, can be incredibly complex. Also to find launching customers. As quoted:

“Evidently, Top Sectors have an enormous amount of contacts. They can make you aware, advise you to talk to certain people, and even lay contacts with potential customers. I was in another industry for a long time, it helps a lot to know people.” - Experienced entrepreneur.

As a provider and connector of domain-specific knowledge, Top Sectors' role is valuable as well. A corporate interviewee mentioned that once the most pressing problems in a sector are known to many, that increases the likelihood of finding a solution. After all, startups need to be aware of a problem, before they can relate their solution or technology to that specific sector. They need to be informed about the problems, and they need to be connected to the people dealing with those problems. Top Sectors can provide valuable insights to startups:

“Startups need to be facilitated, preferably with knowledge about the industry, content-wise and about the context. There is plenty of information about business operations, venture capital, and rights and duties. But the content-wise knowledge about the industry is lacking. In the Agri-Food you are usually part of the larger system, you need access to that system in order to see whether, where, and how your specific solution can contribute.” - Corporate.

Hence, how to deal with the complexities and specifics of their industry and sector, is an important aspect that could be provided to startups by the Top Sectors and its participants. However, currently, startups have little knowledge of what the Top Sector could do for them. Except for entrepreneurs that had already been in contact with someone from the Top Sector team in their previous career. Those did know what to contact the Top Sector for. But others were highly unaware of the value that Top Sectors could bring them. Hence, most startups also never considered contacting the Top Sectors, like the interviewee below indicated too:

“I knew they had a figurehead, but I had no idea there was an actual organisation behind it. I thought it was primarily a collection of focal points within the government, but I was not aware that they promote interests or organise things.” - Young entrepreneur.

One other startup interviewee that was already familiar with someone within the Top Sector from her previous career supported this statement. She had the impression that startups, indeed, have no clue about what the Top Sector is, and what they do. Besides, she explicitly mentioned the fact that she regarded the network, knowledge and experience of her contact person valuable, she did not per se perceive it as the network of the entity 'Top Sector'. The value of such informal contacts was a recurring theme in interviews, as mentioned was here:

“One of our partners is also in the Top Sector team, so we had short lines with him and some others. That allowed us to be close to the fire. Just like they forwarded you to us, they probably mentioned our name in other places too.” - Experienced entrepreneur.

The benefits of these informal ambassadors of your startup were highly valued by a number of entrepreneurs. One entrepreneur, for example, mentioned an employee within a bank that was enthusiastic about their solution and hence spread the word. Which was highly valuable to the startups, as it, of course, led to all kinds of new contacts and leads. This is for many other entrepreneurs also a reason to maintain connected to the Top Sector. It could lead to

all kinds of new partners, collaborations and even future clients. Therefore, the innovation brokers of the Top Sectors are also highly appreciated. As the following interviewee stated:

“Indirectly, the innovation brokers mean a lot; to enable innovation, and think about us from time to time, and think along with us, he most definitely knew us.” - Young entrepreneur.

Another young entrepreneur aligned with this statement, he argued that maybe without the startups actually being aware of it deliberately, the innovation brokers probably meant more to them than they knew. Just by dropping their name to relevant people or using their startup as an example during a presentation. Though, according to the entrepreneurs, it is never fully objective which startups have the most potential. To a certain extent, it can, of course, be estimated whether a startup could ever meet the regular quantities for a client. But often, it is also rather subjective, even for experienced people in the industry. Because in the end, the point of a startup, is the risky validation of whether a product-market fit can be found. If Top Sectors are sufficiently aware of this personal bias is unknown, as can be seen here:

“The crux is to pick the winners, there are also startups among them from which you can predict that market demand is so thin that it will never fly.” - Top Sector Agri-Food.

Anyhow, there seems to be an increased effort to involve startups in Top Sector activities. There are events and organisations which put startups in the spotlight, that are established or supported by the Top Sectors. In the Horticulture sector, there is for example HortiHeroes. In the Agri-Food sector, there are events such as FoodNexus and F&A Next. Next to that, startups are actively scouted in other sectors, primarily technological ones at the Technical Universities. While startups look for application domains, Top Sectors can be a catalyser:

“We are seriously scouting startups in our network, we have many collaborations with the TU Delft and Eindhoven, where many technologies are developed. The technologies might not be meant for this sector originally. But Sensors, Robotics or Artificial Intelligence, can be of value here too, so we try to involve those startups in our networks.” - Top Sector Horticulture.

This process is encouraged in both ways. Technology-driven startups are sought to apply their technologies in those specific sectors. As well as problems in those sectors, are being distributed in startup networks so that startups can recognise markets for their solutions.

4.4.2 Subsidy instruments

Some formal instruments of the Top Sectors are its subsidies, which are set out in open calls. The goal is to support innovation, via PPP projects (Public-Private Partnership), MIT (SME Innovation Subsidy Top Sectors) or participation in Seed Money Projects for international collaboration (Top Sector Agri-Food, 2020; Top Sector Horticulture & Starting Materials, 2020). The first two are most well-known among the interviewed entrepreneurs.

Public-private partnership projects

Starting with the PPP projects. These are research consortiums consisting of companies and research institutes, of which the costs are financed up to 50% by the PPP subsidy. Once a year, consortiums can submit a project proposal for the next year. The projects have a run-

time between 2 and 4 years and the Top Sectors try not to honour similar projects multiple times. Startups can join as well:

“PPP calls are open to everyone, including startups, scale-ups etc. For a while, we worked with a plus in the score if it was an SME that submitted the application, that worked so well, that by now, it is rather homogenous.” - Top Sector Agri-Food.

According to the Top Sector Agri-Food, SMEs are equally represented in the PPP projects. What is unknown, is what percentage can be classified as a startup or scale-up. However, both a young and two experienced startup entrepreneurs who were interviewed mentioned that they indeed participated in a PPP project. The Top Sector Horticulture also mentioned that the financing conditions of these projects are not always particularly attractive to small SMEs or startups, due to the compulsory co-financing requirement, as mentioned here:

“We always ask for 50% co-financing from the private sector. Those are serious amounts, sometimes also ‘in kind’. But you are never certain whether something comes out of it. Hence, we are not always equally interesting to startups.” - Top Sector Horticulture.

One startup mentioned this same issue. For them to participate in a PPP project, resources need to be made available for them to realise this. But they would be interested, since they thought they could definitely do things together on e.g. product development or marketing.

One young entrepreneur that participated in two PPP projects mentioned the in-kind costs as well. It did not hold them from participating. Wageningen University took the lead, but those projects were very ponderous and large. The interviewee remembered that it took one or two years before everything was figured out and written down. And as mentioned, the approval of projects is for the upcoming year. The PPP projects take about three years, so you need to look up till five or six years into the future while setting up such proposals. Often that is just impossible, especially for startups, which develop at such high speed, as stated here:

“The PPP projects were not very useful to us, it costs an enormous amount of meetings and discussion, because those structures are simply very ponderous. And then, the results are already caught up by reality.” - Young entrepreneur.

Though, an experienced entrepreneur was actually quite positive about participating in PPP projects. Initially, hospitals did not want to collaborate with a startup, but after some months, they came back with the proposal to set up a consortium. Hardly anyone developed products like theirs, so the startup was asked to join. Within four years, they scientifically developed the products and tested them in the target audience. Leading to multiple scientific articles as well. They built a rather large range of products and then merged with the other startup in the consortium. Once the consortium finished and a trade fair was visited, the startup was welcomed with open arms. Within about three years, half of the hospitals in the Netherlands were their customers. The startup mentioned the following about their role in the consortium:

“The products on the market did not meet expectations. Within the consortium, we definitely contributed to providing a solution that would actually work.” - Experienced entrepreneur.

It was also stated that in consortiums, you cannot split research and innovation. The startup entrepreneur had the impression that the government sometimes artificially splits those, but

that is not the way in which companies reason. After all, if you are developing something for the market, you need to know what is important if you look at market-perspective. That is also why research consortiums increasingly seem to include businesses in the projects they run; to include the market perspective and look for a party to implement the actual outcomes. Though, one experienced entrepreneur, which might be considered an SME, mentioned this:

“Before the Top Sectors policy, subsidies were way higher and allowed for real R&D projects. There was more freedom and less reporting and accountability too. Instruments like MIT are more sober. Back then, PhD candidates could be hired by a company, and so guaranteeing a valuable contribution for the company. Now, the research is done more within the walls of the university, which might contribute academically. But of course, it should lead to products and services too, as those make the actual societal impact.”- Experienced entrepreneur.

Hence, the opinions about whether the current inclusion of companies in research practices is optimal seem to differ. Overall, all entrepreneurs seemed to agree that PPP projects are especially suitable for specific kinds of research questions, ones that are more long-term. It could be that PPP projects are a bit expensive, and for some instances also too inefficient.

SME Innovation subsidies

The second instrument that is discussed is the MIT (SME Innovation Subsidy Top Sectors). The Ministry of Economic Affairs and Climate, Top Sectors and regions (provinces), work from this shared instrumentation with the goal to harmonise and connect national and regional innovation stimulating instruments as much as possible. It consists of viability projects, R&D collaboration projects and knowledge vouchers. The startups that were interviewed in this research are overall positive about this subsidy, like this startup:

“The MIT, which are smaller, bilateral collaborations with 2 or 3 companies, was very useful, it suits the fast-developing character of our kind of innovation better.” - Young entrepreneur.

Multiple startups thought this was a very pleasant arrangement, about 30% of the costs are financed, so it is a helping hand to be able to do just a bit more research and development. It is an accessible way to finance substantial projects that are not megalomania. Also, one of the startup interviewees participated together with a couple of other startups, which became an R&D collaboration that went rather well. However, there was also one startup that gave the MIT R&D a try but pulled out eventually, due to the reasons that are mentioned below:

“You do not know who runs off with what information. Also, it is a lot of work you put in, and you are not sure what you get out of it. I stopped looking at subsidies at some point. It is a peculiar piece of work for which you need to hire experts to have a chance. It was not ‘the way to go’ for us, we chose to focus on selling products and attracting capital. It was unclear how much time it would cost and what would happen to the money.” - Young Entrepreneur.

As this interviewee already mentioned, they needed to hire experts to have a chance. This is more common. One startup entrepreneur explicitly vented her frustration about this; needing to work with such no-cure-no-pay agencies to even have a chance. She suggested that that is something that should change. She also had the impression that many of the subsidies go to large corporates because they have a team to attract them. Corporate spin-outs thankfully appear to make use of their mother company’s experience, expertise and knowledge about

subsidies and applying for them. Not only on Top Sector related subsidies, also alternatives like European subsidies. This one startup entrepreneur also mentioned that the urgency for small companies to receive those sums of money is way higher than that of corporates. She suggested differentiating more between the innovation of large corporates and startups. As well as questioning whether the 'societal good' is served best by some of the corporates:

“At the Top Sectors, in which the ‘societal good’ should be served because it is paid with tax money, why should large corporations, which have their shareholders on number one, be strengthened? Why not the truly mission-driven companies?” - Experienced entrepreneur.

Two experienced entrepreneurs, rather successful ones, also questioned whether the most revolutionary companies actually receive the subsidies. One remembered submitting a proposal which got denied. While talking to the committee that had to grant those subsidies, he noticed that the team was not knowledgeable enough about the actual content, as noted:

“In conversation, it was clear that they had no real knowledge about what they were talking about. Their main thought was: ‘politically this is important, so let’s do that, and they added some criteria so it looked good’. Those are real risks; people managing budgets, who say things, but have no intellect about what they are talking about.” - Experienced entrepreneur.

The other experienced entrepreneur seemed to agree with this point. He acknowledged that if you are doing incredibly innovative activities, then it is often very hard for people to get it right. People, for example, do not understand it because it is too early for them, or they think it will never fly because they do not see the potential or have the imagination. People need to dispose of a certain fantasy and vision, which really innovative people seem to have. The quality of an evaluation committee is priceless, hence, this experienced entrepreneur said:

“That must be done better; the quality of the evaluation committees, but people who are that innovative, are not in the mood to sit in such a committee.” - Experienced entrepreneur.

What happens too, is that those evaluating parties approach it with their calculators, which is totally possible according to this entrepreneur, as long as you have sufficient imagination as well. However, envisioning it and having a vision about the future, about what such an idea or development could bring, that is just super hard. And in the end, it simply comes down to the work of man. This might also be the destiny of true radical innovation according to this entrepreneur; that it is not supported by the government. However, what he mentioned, is that people from those committees were also willing to honestly express their mistakes to him afterwards. To contribute, he also suggested some potential improvements to the whole situation of evaluating and recognising potential, to start with the following quote below:

“It is invaluable to have good people in your evaluation committee, but who determines what good people are? Those are not the ones who led large corporates or scientists. It should be people who earned their score, who have proven to be really innovative. But it is hard to get those people, they are often busy with their own ideas.” - Experienced entrepreneur.

If the process of evaluating dossiers and business plans of potential cases would be more effective and manageable, e.g. by letting startups pitch, it might also lead to more interest of himself, for example. Also, this allows the team to be assessed, which is deemed important by another experienced entrepreneur as well. He stated that in the end, the people in the

team make it happen. Both agreed that innovation is per definition not plannable, so you can submit a certain plan for innovation, but in reality, it practically always diverges from that. So in the end, unbelievably good people are key, as this experienced entrepreneur phrased:

“Everyone always puts so much value on a genius idea. Which is important, but it is just 1%. Then comes 99% perspiration, execution and perseverance.” - Experienced entrepreneur.

The plannability is the last aspect that gets the attention of many experienced entrepreneurs concerning the topic of assessing proposals. Maximal flexibility is needed so that startups can readjust, without getting into problem with their financing. One entrepreneur mentioned that sometimes, while the project has been an enormous success, their grant was still being cut due to the bureaucracy of the system. Hence the last suggestion: involving the people who judge the proposals in the execution, already from the start. And keeping them involved, so that sufficient flexibility is built in to enable that higher goals or the bigger picture benefits.

International Seed Money Projects

The third subsidy instrument the Top Sectors are involved with are the International Seed Money Projects. This instrument supports SMEs from their sector with starting innovative, international collaborations. Creating consortiums is a central theme, and the call for these projects is opened up every year. The goal is creating a collaborative project, and usually a follow-up project is formulated. One condition is that a local problem owner, company or business, participates. It was striking that only one interviewee, namely a government official, spoke about these projects. Hence, not a lot is known about them. What is known, however, is the following:

“We look for market imperfections like seed capital assurance. What we do, is supporting that the advantage for putting private capital into a seed fund is getting more attractive. By sharing risk and thereby allowing it to get off the ground. The same thing we try to do with banks so they start investing in things they normally think are too risky.” - Government.

In the case of the Agri-Food and Horticulture, they experimented with two funds: The Future Food Fund and SHIFT Invest. The latter was an already existing fund which was not doing seed capital yet. Both were set up from the philosophy that to tackle societal challenges you also need a technological HighTech or ICT component, like in precision agriculture or meat replacements. After the experiment, funds like these started to arise from the regular market. Still it is notable that the quantity of Horticulture startups falls behind on other sectors:

“We did research to compare the quantity of startup with the Top Sector Agri-Food and High Tech Systems & Materials, but in the Horticulture, this number falls behind. However, as a startup in the Horticulture, the chances to keep existing are larger.” - Top Sector Horticulture.

One experienced entrepreneur also had the impression that the Top Sectors focus a lot on supporting existing companies, instead of generating new ones from e.g. universities. The focus of the instruments is, according to this interviewee, too much on scale-ups rather than startups. Also some younger entrepreneurs seemed to agree with this. They stated that next to the group which is in need for large amounts of money, there is also a group with a need for smaller amounts, which would make it more realistic. No gigantic amounts of money, just more ‘tailor-made’ and flexible. The startup entrepreneur gave the following example of this:

“To accelerate the piece we did over the last period, some parts in between would have been useful; small amounts of money to accomplish specific checkpoints.” - Young entrepreneur.

One corporate interviewee also advised startups to be careful in participating in subsidies because of two mistakes that are often made; it costs an enormous amount of time, and due to the cash flow startups can lose their focus. They might be very proud about getting the subsidy, but subsidies hardly ever align fully with what the startup stands for. Hence, subsidies can work as a catalyst, but in many cases, it leads to a lot of distraction. According to most interviewees, no one-size-fits all exists, but some emphasise that more attention should be paid to which startups to involve and at what moment. One entrepreneur also advocated for more interaction with supporting parties like Startlife, about what startups need and are looking for. In the end, interviewees seem to agree on one thing though, which is best exemplified by the following statement:

“Robust and subsidy-free, that is always good.” - Top Sector Agri-Food.

4.4.3 Communication

An element that proved to be essential as well, is the communication between Top Sectors and startups. Most startups do not seem to have a good impression of what the Top Sectors are and what those could mean to them. One startup for example mentioned the following:

“To my knowledge, the multinationals are in charge of those Top Sectors, how big the ecosystem around that is, is unknown to me. I do know that universities are involved, but to what extent SMEs or the National Science Agenda is part of that, I have no insight in that. I am also not aware of the instruments Top Sectors have.” - Young entrepreneur.

This unclarity is recognised by more entrepreneurs. The startups acknowledge that if it is more clear what problems there are and where their efforts are needed, they are more than willing to contribute to that. Especially because startups are still so flexible in adjusting their solutions to the needs of the Top Sectors. But startups do not seem to be in their channels, which most startups think is a big waste of potential, as many creative and entrepreneurial brains are not optimally used to contribute to those collective innovation agendas now. And even when startups approach their innovation officers, they do not always feel helped:

“I am not sure what I can get from the Top Sectors. I reached out to their innovation officers once, but that did not bring me much value.” - Young entrepreneur.

The channels and the speed at which information reaches startups does not always seem optimal. One startup entrepreneur noted that what they often hear, is that people learn too late about specific instruments, and therefore, do not have an opportunity to participate anymore. Transparency and communication about what the Top Sectors want and what they have in mind, and communicating that in channels in which startups actually are, allegedly could already lead to way better results. For example, this could consist of promoting subsidy arrangement (in as far as they are relevant) via incubators, as one interviewee mentioned. The Top Sector Agri-Food mentioned the following about communication:

“Subsidy agencies know our subsidies. We also publish it on our website, in the newsletter and it is picked up by farms etc. Sometimes it goes via NWO.” - Top Sector Agri Food.

A potential explanation of why this miscommunication occurs, could be the interpretation of what startups and SMEs distinguishes. The semantics seem relevant here, because if not all startup entrepreneurs are aware that some stakeholders consider them SMEs, they would not feel addressed by some instruments that are provided. Besides, if the instrument-making organisations are not aware of the specific differences between startups and SMEs, not all instruments might be attuned to their different needs. Top Sectors also do not seem 100% clear about how they should deal with startups. The reason for that lies in the quote below: *“Prototypes and applications are not in our primary domain, we need to focus on the stadium before that, developing new ideas and testing their viability.” - Top Sector Horticulture.*

This statement is so surprising because even though this Top Sector interviewee claims that developing new ideas and testing their viability has their priority, some startups seemed to feel like the Top Sectors' instruments are too focussed on supporting scaleups and too little on generating new startups. Though, the opposite would be what to expect if developing new ideas and testing viability is their priority. After all, that is exactly what startups do; searching for ideas and testing their viability. One interviewed government official that specifically focussed on startup involvement stated the following about communication with startups:

“We should listen better to startups. Many say they need money. RVO gives a clear overview of financing options on their website. Maybe startups cannot find it yet?” - Government.

As this quote implies, there are governmental stakeholders that have a certain degree of awareness about the occurrence of miscommunication. They also seem to be improving on that. Whether all stakeholders are sufficiently aware of such miscommunications is unknown.

4.5 Remaining Bottlenecks Regime and Suggestions

This paragraph provides insight into what actions, according to interviewees, are needed to improve the ecosystem. The remaining bottlenecks in the regime that currently hinder the success of startups will be addressed, as well as the alternative improvements and solutions interviewees suggested. These insights can be harnessed to potentially improve the role of startups in the ecosystem in general, as well as in the formulation and execution of collective innovation agendas. During the axial coding process, the categories of the labels showed a crystal clear resemblance with the six regime aspects as displayed in the MLP. Due to their almost identical arrangement, the decision was made to organise the paragraphs as those.

4.5.1 Market / User-Preferences

Entering the market as a startup can be hindered by a number of reasons. One could think of opposing societal acceptance, not meeting customary standards or user-preferences in the market, or certain cost structures that obstruct an innovative change. First, societal acceptance will be discussed. Two things might be expected to be form a delay in this, first:

“Innovations might look different in practice than people expect.” - Top Sector Horticulture.

The examples this interviewee provided were the ideas people have about e.g. feeding ten billion people in 2030. Many might think urban horticulture will look like small acres on city rooftops, but whether this is realistic is questionable. This interviewee expected that it might look more like office buildings full of LED lights. How society will respond to that is unknown. This could form a barrier to the growth of companies in general, and also to startups, which generally experiment with more radical concepts. The second reason is trust in technology:

“There is a large resistance against the use of e.g. DNA-related technology. For example, using CRISPR-cas in food chains. If societal acceptance for those technologies does not increase business life will notice. Especially if China and America, or other countries do allow certain technologies like those to be used out there.” - Top Sector Horticulture.

Also, an experienced entrepreneur mentioned that societal acceptance can be limiting. For example, in the Netherlands, biomass is not always per definition the most favoured way of generating energy. NGOs seem to have influence on such debates. One interviewee was of the opinion that an offensive strategy of NGOs could sometimes harm Dutch organisations. After all, as a company, and especially as a startup, it is really hard to deliver sufficient resistance to that, with the limited resources they sometimes have. This frustrated this experienced entrepreneur. He articulated that concern and those frustrations as follows:

“We are good at the content, we know that what we do is sustainable. If we speak to NGOs, they also agree with us. Still, political and societal debates harm us. Which could mean that we need to point our marketing and sales more towards the Scandinavian market. Actively trying to enter the Dutch market, I can better stop with that.” - Experienced entrepreneur.

The Scandinavian countries the discussion towards sustainable technologies seems to be more advanced, hence, the decision of this specific company. But, Top Sector do not per se consider it to be their task to get involved in such debates. It falls beyond their reach. Their focus is on whether certain inventions can be scaled so they can have an impact. Societal acceptance is something that comes after that and does not fall in their scope.

The Top Sector Horticulture is involved with research projects that use CRISPR-cas. As a method, separate from all the societal and political aspects, they claim it is highly relevant. Researchers and businesses would be put at a disadvantage if they would stop financing it. But they definitely seem to recognise the worries, as can be read in the following quote:

“One company using CRISPR-cas already said to them that they have had enough, they are moving to Canada or America.” - Top Sector Horticulture.

According to the Top Sectors, it is not their position to conduct that discussion. However, one experienced entrepreneur was of the opinion that this should be thought about somewhere. He argued that if it is decided to fund an innovation because it could solve a certain societal problem, then everyone needs to be able to go all-in. Meaning that money should also be made available for implementation, and giving the market certain obligation so it will actually succeed. The quote below exemplifies the discussion about this governmental hesitance:

“There, where you have a say as government, you need to create a level playing field, otherwise some innovations will never get accepted.” - Experienced Entrepreneur.

The example given was hospital food, which was reimbursed by insurers. However, the product to be introduced by this entrepreneur would not have been reimbursed. Even though its specifications were better for the patients, it could potentially even save costs. In these cases, this experienced entrepreneur argues that government should choose to intervene. The same counts for certain tender systems, which cause perverse incentives. Often, those lead to a choice in which the product with the lowest price is then chosen. Therefore, certain innovations will never get a chance to enter the market. One interviewee also observed this:

“Innovation is sometimes seen as technical; we are going to develop new products. But once you get to a point when money is needed to enter the market, that is being seen as state aid, which is not allowed. I.e. we are going to develop something, but evade giving it any chance to enter the market.” - Experienced entrepreneur.

So there are certain structures that limit innovation to enter the market. Also, this interviewee highlighted the capacity of government to intervene with regulation. An example given was some performance indicators for hospitals. These increased the urgency, thereby shifted the discussion from: We cannot fit your product in our budget, towards, we need to start shifting with our budget to fit this product in. In other words, sometimes there is demand, but there is no willingness to purchase, then encouragement via regulation is needed. Of course, such a decision can be difficult, as was already touched upon in paragraph 4.2.3. Though, more barriers to market entrance of startups exist, for example, related to market-preferences:

“Startups should think carefully about their sales channels because also retailers have a certain profile and requirements which your product should fit into.” - Top Sector Agri-Food.

These could be physical requirements for a product, but also scientific substantiation that a product is effective, or potential costs related to showcasing products in the supermarket shelves. Another example would be that customers are not interested in buying one single product, but only sets of products, or only once the startup is able to supply bulk quantities.

4.5.2 Industry

Interviewees brought up a couple of industry-related issues. In this paragraph, that concerns primarily the financial costs of scaling, since that appeared to be highly characterising for this specific industry. This is relevant because if industry-specific barriers hinder the emergence and growth of startups, those industry-specific elements should be dealt with accordingly. Of course, matters like culture, legislation and technology have industry-specific characteristics too. However, those topics will be discussed in other paragraphs because they accord better with other MLP regime elements. One accelerator summarised some industry-related issues:

“Startups start to linger because it is a conservative industry, much relation management is needed, it is capital intensive, lead times concerning regulatory agreements and technology development are long, and there is little money available. There is money for seed loans, but not for bigger investments that are needed for startups to make the next step.” - Accelerator.

This accelerator interviewee also stated that there is quite some money for research, seed loans for startups and amounts up to one or two million. It must be emphasised that startups that failed have not been interviewed, so counter-arguments might not have been identified

due to that reason. The government has supporting instruments for these financing options, also for private investments. But they acknowledge that it is still not always easy to receive:

“With seed loans, within three to six months, people can use this arrangement to develop their idea so it is ready for further conversation. But still, it can be a lot of work to get investments because investors want to see profits.” - Government.

It is hard to guarantee whether low investments are really not an issue. But for now, the high investment costs for scaling will receive the primary focus. Interviewees did indicate that as a significant bottleneck causing problems. This is relevant, because if startups scale, they can have more societal impact. However, in the phase where startups should scale, hire senior management and build a factory, most millions are being spent, as mentioned here:

“If you need to scale to a commercial scale in this industry, then it starts to get really capital intensive. Also, you need to manoeuvre through the valley of death, otherwise you just go bankrupt. Getting such amounts is incredibly complicated.” - Experienced entrepreneur.

As discussed in the previous paragraph, many clients in these sectors need bulk products. So in order to get clients interested in purchasing startup products, the startup must be able to deliver large quantities of product. Sometimes, partnering with SMEs or corporates is an option, which prevents high initial investment costs. But due to certain strategic reasons, the need to build a factory themselves can also be of preference. For many startups that choose to scale independently, it takes long to get investors to provide sufficient capital, as quoted:

“There was a company that was founded which was able to run a pilot rather fast and come up with a whole new generation of products. But to get to the market, they had to scale to production scale, it took them two or three years to get the financing.” - Government.

This issue of attracting sufficient investment capital for scaling is recognised by more startup entrepreneurs that were interviewed. It is so complex, that it contributed to the decision of two startups to merge together because one already had financing, as mentioned by one of them. Another one showed how subsidies and own capital can lead to more investments:

“We first invested our own capital, we received some subsidy confirmations, then banks were also willing to invest, because the risk was shared.” - Experienced entrepreneur.

A governmental official mentioned that there is a lot of money, but financiers are inclined to invest in regular companies rather than startups. There is a certain mismatch which is most likely caused by risk-averseness. The interviewee of the Top Sector Horticulture mentioned that there are a number of funds for the Food and Horticulture industry, but they appear not to invest much in startups yet, the reason is explained by this statement that was given:

“The funds told me that they hardly have any leads. Their requirements were way too high, they expect the startups to have products on the market and positive results already. But once a startup is that far, they do not need the funds anymore.” - Top Sector Horticulture.

That is a big problem in the Netherlands. In America, it seems that there are financiers that have 10 or 12 startups in their portfolio. Once there is interest or traction around a startup, they put some money in. Of course, 9 out of 10 times that goes wrong, but the tenth time

makes up for that. The industry there is just different, one government interviewee gave the example of protein and meat replacements, also lab-grown meat. In America, tens of millions are invested and over a hundred people are put to work to get things rolling. All of which is privately funded. That allows for a completely different starting point and gear for acceleration. Since the private parties in the Netherlands do not step in yet, you might expect that the government picks this up. But according to this experienced entrepreneur:

“Once real capital is needed, the Dutch government finds that too thrilling. In America, for example, getting such amounts of money is way easier.” - Experienced entrepreneur.

Also, corporates are not super active yet because they need to convince their shareholders that investing makes sense. The reason, according to an accelerator, is that there are other markets in which making money is way faster, like the chemical or pharmaceutical industry. In the Agri-Food, a long breath is needed, because it generally leads to a more long-term, stable source of income. Which could be very interesting as well. Dutch family corporations seem to be doing this rather well, they are aware that they should invest, and to them, it is not a question if it will bear results, the question is when it will show its results. And for them that is not a problem, because their kids and grandchildren usually take over their company:

“Scale-ups should be made aware to provide long-term value to the chain, and then be connected to investors with a long breath. What investors need is trust in those scale-ups, because their frame of reference is usually a different industry, like health tech where you have other business models, or digital, in which it is easier to earn money fast.” - Accelerator.

Clearly there are efforts to improve the situation; the government has certain initiatives like ROM financing, which are regional instruments. There is an instrument that supports banks to do more risky investments. Also, there is the innovation credit to support in making the next technological step. To provide for the costs of new factories and equipment, there are regular financing support instruments of the ministries. Another effort of the government to fill the gap is the initiative Invest-NL, which is a vehicle to invest in large transitions. It has just been launched, but many interviewees believe this could contribute to solving the issue.

Of course, it should not be forgotten that there are private alternatives as well, like using a crowdfunding campaign. The Vegetarische Slager, for example, raised 2,5 million euro within three weeks via crowdfunding to increase its production and build their own factory. Though, most interviewees agree that increasing the risk tolerance of private investors is needed too. In the end, the Agri-Food and Horticulture sectors just have generally long lead times. This means there are hardly any exits after 3 to 5 years, because most startups take much longer to reach that point. Building a factory, including all permits, can simply take up to four years and twenty million to get there, according to the Top Sector Agri-Food interviewee. This is a characteristic that is deemed relevant to the role that startups (can) play in the ecosystem.

4.5.3 Policy

Policy related issues in this study include the attitude of the policy-making institutions, the influence processes of stakeholders on policy and legislation processes. The first matter that will be discussed is the attitude of the policymakers, usually, these are governmental parties like ministries. Both the Dutch government, as well as Brussels, have numerous instruments and organisations now to support startups. However, one interviewee of an incubator was of the opinion that there are countries in which the overall support for startups is much higher, such as Israel. The interviewee praises the governmental and multinationals' activities to support startup instruments there. He aspires that a collective boost for startups here too:

"I would love to see a collective effort of regional and national governments to empower all the startup-focused executive organisations and instruments." - Incubator.

The reason for this statement is the development he expects concerning the importance of startups in innovation ecosystems. As within each organisation, employees can differ about the importance and priority they assign to a certain issue. The same counts for the topic of startups. Within the government, there are interviewees that are startup ambassadors, and ones that are more sceptical about its future importance. Already, governments deliberately employ people to enhance the opportunities for startup innovation to flourish. As with most policy-making processes, it is essential to listen closely to the needs of stakeholders. After all, if companies do not adopt the policy, its success will not be optimal. However, multiple interviewees doubt whether the overall startup-affinity in both governments and corporates is currently at the desired level. Many startups do not feel heard and understood yet. This does not mean governments should be reckless, as this interviewee indicated in the quote below:

"The conversation should not only be that we would love to have them because a startup is per definition good. It is also slowing them down if needed. And that is a message you do not hear very often in politics and policy." - Top Sector Agri-Food.

Though, most interviewees seem to agree that the government should go up a gear. Some examples that were provided, is acting as launching customer, preferably of technologically progressive innovation. People can think about that what they want, but if the government shows this degree of leadership, then business life knows what to count on. One programme already aims to stimulate this launching customer role, which is called Startup in Residence:

"If as an employee of the government you have a problem which you cannot solve, or which the management or minister does not show interest in, you can use the Startup in Residence programme. It publishes your challenge on Tendernet, and the programme teaches startups to collaborate with corporates, and our institutions become a bit more startup-like because of the process. It took a long while before this initiative was agreed upon." - Government.

Clearly, there are efforts to improve the situation, but also some governmental officials agree that things take long. For startups, time is of the essence. If progress is too slow, their burn rate leads them to fail and go bankrupt. Whether this urgency truly penetrated the conscious awareness of most government officials, and if they (are able to) act accordingly, is doubtful.

Significant efforts have been made on seed-capital, network activities and international publicity. Also, the interaction with StartupDelta (now TechLeap.NL), Rockstart, and getting

similar activities from the ground. Interviewees seem to agree that governmental efforts in the last three to four years may not be downplayed. Also, the chosen sectoral approach was also endorsed by an incubator interviewee. IT startups, robotics or engineering startups and Agri-Food startups do need slightly different approaches. And ministries have subsidised all kinds of other initiatives like Dutch Base Camp, which focuses on the internationalisation of startups. Or the Youth Food Movement which brings people together and offers training, coaching and a network. So, the policy seemed to pay off, but it also led to a new issue:

“Sometimes you are looking in so many different directions, there are so many islands.” - Young entrepreneur.

Especially for young entrepreneurs, all the new initiatives led to a maze of organisations and instruments. Some seem to have trouble determining which are relevant to them, and which are not. It seems that the new phase of policy arrives at exactly the right time. The question that remains, is how the perspective of startups can be better integrated into policy-making. As was already suggested, organisations like Techleap.NL and Startlife can represent their perspective. For some local incubators like Startlife, this does mean that they need more budget. Next to that option, it is also suggested to include experienced entrepreneurs:

“I have the feeling that the voice of experienced entrepreneurs is heard too little. So from our perspective; which lessons can be drawn from previous policy and could consciously be incorporated in current or future policy.” - Experienced entrepreneur.

In this context, the NGO influence can be placed as well. After all, they do not only influence the market and societal acceptance of certain technologies. They also influence the political debate and the policy-making process. The entrepreneur is not per se against NGOs, some behave very constructively and advocate admirable, well-substantiated visions. But a couple of them especially destroy or hinder some sustainable companies, as mentioned here:

“The more sustainable, the better. But some NGOs spread fear and make enemies and that is really frustrating. They only advocate issues they are against, so against Shell, against Essent, against RDW. But they do not provide solutions.” - Experienced entrepreneur.

According to this interviewee, that is hard to justify. If such visions are not formulated in a nuanced, pragmatic way, they can pose a risk. Some NGOs seem to advocate things like less flying. Of course, that would help to combat CO2 emissions. But it might not be the most constructive approach towards economic considerations and setting-up for new innovations. Another experienced entrepreneur also advocated accurate formulation, and then aligning activities so that the underlying end goal is taken as a key starting point and is best served:

“The goal should be central, e.g. what does the patient really need. With that as a starting point, the government should operate and put barriers aside.” - Experienced entrepreneur.

One activity that has already been touched upon to put certain barriers aside, is legislation. This came forward as a valuable tool for governments to induce change. In some cases, the current legislation hinders or even forbids specific innovations to be adopted. In other cases, new regulation is needed to create a sense of urgency for change. Both types can lead to a window of opportunity for entrepreneurs. Hence, many startup entrepreneurs are positive about a pro-active government. Most institutions are also open to such changes, but the

unfortunate thing for startups is that it can take a lot of time to apply for permits or before certain legislation is implemented or adjusted. As this experienced entrepreneur states:

“We needed a permit, it demanded significant effort to get the environmental permit. After all, what we did was new, and it is easier for institutions to pick something that has been done before, so a number of things needed to be adjusted.” - Experienced entrepreneur.

If getting permits or change of regulation is slow, one interviewee mentioned that people start to look for creative ways around that, which could be classified as illegal practices or fraud if you look at it formally. The intentions behind it might be sound. But if the government does not respond fast enough, thinking arises like ‘then at least get out our way’. Also the way of financing or governing certain institutions, like hospitals, can be rather controlling, which limits professionals in the freedom to perform their jobs optimally. A very concrete example of slow, and even expensive regulation is the European Novel Food regulation:

“The Novel Food application system should have been really fast, but it has proven not to be. If you apply, it takes between nine months and two years.” - Young entrepreneur.

For startups, such time spans can simply kill their company. After all, all money is burned before the official permit is in. Now the Dutch government applies a tolerance policy towards these cases, but the uncertainty is far from optimal for e.g. attracting investments. After all, investors are not eager to invest in startups that did not get the official permit yet. There is a lot of unclarity about the regulation and its developments. So the only response of the Dutch industry was launching their first products in the United States or the United Kingdom, since those do not treasure this regulation so dearly. As the same young entrepreneur mentioned:

“We simply need to have a thorough product on the market within two years, otherwise you go bankrupt in the food industry. Next to that, the costs of such a permit are €120.000,- up till €150.000,- per dossier.” - Young entrepreneur.

The entrepreneur acknowledged that the system also has its advantages. There are way fewer outbreaks than in America or China because the European system is also more solid. But the pay-off for that, is that some startups choose to move their whole team to the US and proceed there. Which is also attractive due to the fact that the market is more homogeneous and there is only one culture and language. For now, the startups dealing with this issue trust that it will be fine because the minister gave it a high priority. However, it would be desirable if governments dealt with similar issues in a more preventive and proactive way in the future. However, both government and one startup mentioned that not for all startups this has been an issue or struggle. But interviewees mentioned more limiting construction in the legislation:

“If crop prices are bad, you can choose to plough them and use it as fertiliser. However, after you harvest them, you are not allowed to use them as fertiliser anymore. You can shout that regulation should change, but that does not go very quickly.” - Top Sector Agri-Food.

Entrepreneurs recognise that making legislation is definitely not always easy. Interaction with other levels and indirect results sometimes appear hard to predict. One suggestion that was made is to improve this by speeding up the flexibility and the learning processes about policy-adjustments. Also reflection on what the transcending goal of certain policy is should

get a more central position while establishing a new policy. Also, one interviewee mentioned stimulating institutions to become a learning organisation, for example by giving them a budget to experiment and ignore the current laws for a while to give a new project a chance. Lastly, the difference between SMEs and startup should be kept in mind closely. Startups are characterised by their 'search for a business model', hence they are different from SMEs.

4.5.4 Technology

The technological advancement or developments of a specific technology, geographical area or sector can be of influence to the role and success of startups as well. In the Netherlands, technological aspects do not seem to lead to any bottlenecks in the Top Sectors Agri-Food and Horticulture. One entrepreneur mentioned that it even is an advantage that developed countries like the Netherlands are already more accustomed to technology. That made sure that the preconditions for acceptance of new technologies, like the ones startups sometimes develop, are already present. Another younger entrepreneur praised the vegetarian industry:

“Technologically we are very lucky, because the vegetarian industry in the Netherlands was already really good, so as a startup we benefit from that.” - Younger entrepreneur.

What some interviewees noticed though, is that for startups which develop technology, it can be quite a quest to find a suitable market. After all, once a startup has a new technology that has numerous potential application areas, the sky is the limit, so where to start? Financiers then often force the startup to choose one specific market, because if they keep spreading their chances, it is expected that the startup will never make it at all. One private accelerator also chose to support technology-driven startups in specific, because according to them:

“We believe that companies that come up with new revenue models, like home delivery, such models will be successful at some point anyway. Those come and go. That is why we focus on technology-driven companies.” - Accelerator.

Also, it seems that startups that work with new technologies need to collaborate more with existing parties. For example to test their products or use their production facilities. For them, it is of the essence to find a suitable technologically facilitating environment. Environments that facilitate the organisational elements are already in excess. But especially those technically supporting environments, which e.g. can be found at SMEs, need to be found and used. Last but not least, the interviewee of the Top Sector Agri-Food mentioned that startup should not underestimate the importance of having the technological aspects in order, as stated here:

“Some teams have a great market promise, but the technology is a bit messy, then it will also never work.” - Top Sector Agri-Food.

4.5.5 Culture

The cultural aspects of startups in the overall ecosystem has shown to be a topic that many interviewees spoke about. This entails the culture itself, as well as collaboration practices between startups and corporates, and between startups and SMEs. Some open innovation principles are also touched upon. But the cultural aspects are discussed first. Starting with the matter that was most often mentioned, the risk averseness in the Netherlands compared to e.g. the United States. The appetite for risk of both entrepreneurs, as well as financiers, is mentioned regularly as being rather low here. The Top Sector Horticulture assumes that that is one of the biggest breaks on the startup scene in the Netherlands. Also, the ambitions and what entrepreneurs envision is much higher there. In the US, entrepreneurs also seem to be willing to sacrifice more for the success of their startup, like moving to another city. The risks you were willing to take yourself is something financiers also look at, so whether you quit a good job or used your pension money to work on the invention. One accelerator said:

“The biggest problem is the culture, not daring to think big.” - Accelerator.

This does not mean that putting a lot of money in it, the fail-fast motto, is the most innovative way. But according to one interviewee, a bit more entrepreneurial spirit in the Agri-Food would already be a great start. The Agri-Food sector has a very technology-oriented way of thinking about innovation. Anticipating trends and looking for smart product-market fit combinations is not in the original nature of this industry. According to some interviewees, more people are needed who dare to dream big, like the Vegetarische Slager. It is maybe even a cultural norm to think small and not take too much risk. The accelerator mentioned that having the ambition to become worth about 100 or 200 million should be totally fine. An interviewee of an incubator did mention that there might be some change occurring on this:

“What I notice among young people around me, is that the appetite to work for established businesses is much lower. Nowadays, young people dare to make more radical choices. And, what I think, is that that could become a great advantage to us.” - Incubator.

A governmental official appeared to agree with this point. He had the impression that over the last years, the willingness to become an entrepreneur had increased. Especially among young people starting a company got way more normal. And that is an important matter according to the interviewee; that people have a mindset in which they consider starting a company as a serious option. Also, the ecosystem around this is developing. For example, there are more and more peers or role models that can share their story or share their expertise. Such elements might be much further in the United States, but in the last five years, big steps have been made on this terrain in the Netherlands too. At least, according to this governmental official, that is what happened in the Agri-Food domain. Hence, it might be interesting what younger entrepreneurs thought about this, one mentioned the following:

“In Europe, we always talk about policy. I have never been to a session about food in which the word policy was not dropped. That already indicates that a sort of anxiety is present to introduce new things. Everyone is always watching the government, do they approve of it? Or they wait until the government takes the lead. Of course, that is not a really healthy sign of what startup innovation should look like, at least in Agri-Food.” - Young entrepreneur.

The risk averseness seems to be coming back in this statement as well. But another aspect that was mentioned was the way in which we market things in the Netherlands. According to one young entrepreneur, we should be more proud of our startups and the ecosystem we have for them. That marketing-spirit to actively get the message about startups, as well as the ecosystem, out there, is something we should get better at. We have a great climate for startups and startups also go out into the world, so we have all right to put a spotlight on it. By doing so, the value of all great things we have could grow way faster. One other strength of the ecosystem is the amount of multinationals in the Netherlands. More collaborations with those could be of high value to startups, as this experienced entrepreneur mentioned:

“The Netherlands has fantastic corporates, like Friesland Campina, which truly wants to become sustainable, those are perfect to collaborate with.” - Experienced entrepreneur.

There are numerous ways in which collaboration with a corporate can be valuable for a startup. They can for example perform as a launching customer, as a partner for growth or development, or as a provider of network, knowledge and experience. Friesland Campina acted as a launching customer in the previous quote. Due to their willingness to provide a purchase contract, the startup was also able to attract external capital, which enabled them to cross the valley of death. The other collaboration here was with Stork, which helped to develop the industrial installation. After all, the startup did not have sufficient knowledge and capabilities for that internally. Last but not least, both provided highly valuable perspectives about what could be done better by the startup. Providing knowledge is a recurring theme of what potential collaboration with corporates can bring startups, as this example shows too:

“You need to give startup the right context information. What about sustainable packaging, regulation, scaling internationally, logistics, the supply chain, quality requirements or quality control? It is way more than they thought about while in the lab environment.” - Corporate.

This corporate interviewee mentioned constantly to encounter startups that have not thought about many elements which are involved with scaling. He gave the example of a startup they acquired. There were many elements that still needed to be upgraded before it could actually scale. The interviewee mentioned that there are so many things that parties like Startlife or Startupbootcamp could never add to a startup. For this reason, corporates also join forces with parties like those. To improve the situation, share knowledge and share network. Both interviewed corporates seemed to agree that they can offer way more knowledge, and more depth than e.g. incubators. Think of competitive relationships in a market. Or if a product is really new, whether it should be protected and whether it even can be protected. Since the corporates have been active in the market for so many years, they also have market-specific knowledge which incubators can hardly provide either. Lastly, there is also their network:

“We were involved in a startup event called FoodNexus. What we did is proactively ask the participating startups what companies can we bring you in contact with? All of them were super enthusiastic because we have so many contacts with companies.” - Corporate.

The element of potential collaboration partners was brought forward more often, also an incubator interviewee mentioned this need, as can be identified in the following quote:

“Complex value chains, long time-to-market, access to raw material. At some point, as an Agri-Food startup, you simply need collaboration partners. I support that 100%.” - Incubator.

Also for sales e.g. in retail, collaboration partners are frequently needed. One entrepreneur mentioned that your startup needs to be really good, with a lot of experience and very deep pockets to do that. Anyhow, there is an initiative of a Dutch supermarket that experiments with a startup shelf, to give startups more opportunities in retail. But since most retailers do not have such initiatives, it is almost inevitable to do sales with a corporate. As well as going abroad. The entrepreneur mentioned that if they had the funding to hire forty people, they might have been able to do it themselves. But still, as a founder, you usually do not have the experience to compile and manage such a team. Hence, corporates with similar DNA can strengthen the startup enormously. For technology-driven startups, collaboration with certain corporates can offer advantages, namely of testing their technology in practice, as quoted:

“Ionica, a startup of the TUE, recycles PET bottles and has been collaborating with Unilever from an early stage. They will test their technology in practice with one of Unilever’s regular packaging materials, as a sort viability study or pilot project.” - Government.

The interviewed incubator recognised this testing or piloting aspect as well, for example to improve the taste of products and the decrease of the products’ prices. I.e. collaboration with a corporate can also positively influence the product specifications. Causing more people to be satisfied with the product and being able to pay for it. This can lead to real societal impact to be made. Anyhow, the most obvious benefit of collaborating with a corporate is of course the ability to scale. A governmental official gave these reasons for collaborating on scaling:

“In the lab, things are still overseeable. But once you need to build a factory, you also need money. Both take quite long. Corporates can provide in both, enabling startups to run regular production and generating revenue, so that you can make the next step.” - Government.

For bringing the product from a local to a world scale, collaborating with a corporate can be highly attractive. So why might it be interesting for a corporate to collaborate with a startup? By understanding the motivation of corporates better, we can get a better grasp of how a startup innovation could flourish. There seem to be a number of reasons for corporates to collaborate with startups. First, to solve a problem within a corporate. The Ionica startup, which recycles PET bottles is a perfect example of this. Corporates like Unilever envision to become more sustainable. To do that, they need new innovations. Technology like Ionica’s could contribute to solving the problem of the corporate. Hence, allowing a corporate to keep an edge over their competitors. Therefore, it is in their best interest to support such startups. But it is not only short-term innovations they want, they also value long-term opportunities:

“We think it is important to find real radical innovations, so our long-term existence can be guaranteed. We strategically select startups that can be valuable to us.” - Corporate.

The startups are in those cases of strategic value for the corporate. There can be numerous reasons for that, one of which is that the startups’ technology could become superior in the long-term. In that case, a corporate aims to prevent falling prey to the Innovator’s Dilemma. But there is not only interest in technology-driven startups, also market-driven startups prove to be strategically interesting to corporates. As can be read in the following quote below:

“It is fantastic if a consumer-facing startup gets really successful. It might lead us to become interested in acquiring you. Many entrepreneurs were very glad that we have acquired them, like the founders of Ben & Jerry’s or De Vegetarische Slager.” - Corporate

In this case, the renewal or expansion of their product portfolio would be guaranteed, hence guaranteeing the long-term success of the corporate as well. For this reason, corporates are also involved in some startup-related events. There, they can spot them early on and stay connected with them until they are larger and of more value to them. Generally, corporates are not very interested in getting anything in return in the short term. Speaking to a startup costs the corporate a couple of minutes, and connecting them to partners just a couple of emails. So they are happy to help the startups, and sincerely hope that their help will be of value to them. As eventually, in the long-term, both could benefit from that. But except for their innovations, corporates also have an interest in their way of working, as can be seen:

“Innocent Drinks was acquired by Coca Cola, which mentioned that they had no interest in touching them. They stay intact, we bought them to learn from them, to see how it works, what attitude is in the startup and what their innovation method is. We will not even start doing their marketing, because even that could lead us to kill them.” - Incubator.

Last but not least, there is another reason why corporates are interested in startups. Namely to let them experiment with some of the ideas the corporate has. Corporates also appear to work together with incubators like Startlife for this. The ideas are usually too small and risky for the corporate to undertake, but it does offer opportunities for a startup to experiment with. Anyhow, collaboration is not always the ideal route, or taken for granted. Frequently, there is a bit of a hate-love relationship between corporates and startups. Among startups, their trust in corporates differs immensely. Of course, that makes sense because in some innovations, products or technologies are easier to be copied than others. According to a governmental official it is slightly less risky in Europe to protect technology than e.g. in the US. So if the business case is good, attracting financing would not be a major issue. But one experienced entrepreneur was not afraid at all that their technology would be copied in collaboration with corporates. The following statement explains the motivations behind this perspective:

“You already built a knowledge base and develop way faster than a corporate, you can keep that advantage. But with our technology a corporate can perform better as well, so they will benefit from our success.” - Experienced entrepreneur.

In this case, the corporate was also the client. But that is not always the case. But also an entrepreneur that collaborated with corporates in product development was not bothered much by the risk of corporates copying their technology. You have to make clear agreements that the intellectual property (IP) is for the startup, and the corporate pays for a customised product. Also the IP of the product itself stays for the startup. This startup entrepreneur notes that they have always been clear about this, and it never led to any problems.

But these were technology-driven cases, both in which patenting or other forms of protection were possible. That is not always the case, for example for food products. It is indeed shown that among those entrepreneurs, there is less trust in corporates. It might be legitimate that they have some fear. Especially market-driven startups seem particularly careful to approach corporates. For this reason, these entrepreneurs are incredibly careful about what corporate they want to contact, as can be read in the following quote of this younger entrepreneur:

“You choose specifically who to collaborate with, to prevent that they walk away with your product. It would not be sane if you did not have that anxiety. We experienced it before. But

not approaching corporates also entails risk. So you try to get a grip of the corporate nature. Some are more directed towards collaboration, some towards acquisition. Often, the culture indicates their preference and the control they want on the strategy.” - Young entrepreneur.

Another young entrepreneur seemed to agree with this statement. Also they look at whether a company has the ambition to put consumer products on the market, or whether they prefer to be e.g. a supplier of ingredients. In the case of a supplier of ingredients, the risk of them copying the startup’s product is estimated to be much lower. He acknowledges though, that these decisions are just estimates, there are no guarantees. The corporates also elaborated on this topic. One corporate that dealt with food products claimed they had no interest in consumer-facing startups before they are worth 100-200 millions. The reason for this is that they want them to establish a stable brand first. As mentioned in the following statement:

“The trust issue, we dissolve that concern very easily. We are not interested in them before they have a yearly revenue of more than 100 million. Once they do have that, they have the option to sell to us, which will earn them a fortune, like De Vegetarische Slager.” - Corporate.

Among startups that are more business-facing, meaning their goal is to sell their product to businesses instead of consumers, there is sometimes some hesitation too. According to the interviewee of the business-to-consumer corporate, there is no need for that with them. The reason is that business-facing startups are not interesting to take over for them. In fact, the corporate even wants to help them to make their products more relevant and accelerate, because the corporate can benefit from that as well in the long-term. Startups are generally totally surprised if they find this out. Hence, it seems that in some cases, miscommunication and wrong expectations are also an issue. But of course, startups are not the only ones that need to be trusted. Startups have to earn their trust as well, as can be seen in this quote:

“It took a while before corporates considered us a reliable partner. But since then, they even started asking whether we could contribute to their ambitions. The biggest fear of corporates is that they go into business with a startup, and invest time and money in that collaboration, but then the startup goes bankrupt after a year.” - Young entrepreneur.

For startups with an interest to collaborate with a corporate, it can thus take a while before the relationships with corporates are properly established. Finding the right person within a corporate seemed essential. But once you find someone that is enthusiastic and has the needed authority, that person can be of great value to a startup. At the start it might take a while before sufficient trust is established, but it can lead to a mutually benefiting relation.

The interviewed corporates actively search for startups themselves as well. One corporate interviewee participated in missions to startup hubs in the US, Israël and of course the Dutch incubators. The other one also actively searches, networks, asks around and is present at meetups about startups. Although these corporates actively look for startups, and some of the startups actively look for corporates to collaborate with too, the interviewee of the Top Sector Horticulture mentioned that getting the right parties together is experienced as hard:

“I was at a brainstorm with Constantijn van Oranje and some parties, about innovation in the Horticulture sector. The main point that was brought up was that the startups do exist, but connecting them to each other is a real struggle. The contacts are simply not there. The startups do not know who to contact and vice versa.” - Top Sector Horticulture.

Whether this process is organised optimally is doubtful. But also during corporate-startup collaboration there are challenges. To improve this, the COSTA initiative was launched. It enables corporates and startups to share their best-practices. Interviewees in this study also mentioned some struggles during corporate-startup collaboration. Most of which were due to a lack of mutual understanding. For example, for startups it appears rather hard to make an estimate about what risk a corporate is willing to take. One startup for example mentioned that they had to adjust their technology in such a way that if the technology failed after all, the corporate would be able to directly fall back to their previous system. Another struggle that was mentioned was the ease with which corporates are willing to deviate from internal processes. Startups often seem to underestimate such matters, according to the Top Sector Horticulture. Another struggle startups experience, is the one mentioned in the quote below:

“If you are doing something new, that demands a lot of empathy and sensitivity towards the other. Like the long decision-making processes. At corporates that can take up to months or years. But we, so to speak, can decide things by tomorrow.” - Experienced entrepreneur.

But misunderstandings do not only arise at the side of the startups. Also at the side of the corporate there are challenges. For example the acceptance of a startup internally within the company. Sometimes people within the corporate seem to think that they can do things way better than the startup. According to a corporate interviewee, you need to bridge that gap and put a lot of attention in guiding this process. The startup might think that their product is ready and just needs some little adjustments before it can be scaled or put on the market. But a large company needs it to be reliable and run for days in a row. That is a completely different story. An estimation that the interviewee makes, is that 80% of the costs come in that part of the process. In other words, the priorities and realities of both parties sometimes differ tremendously. Also the governance is an obstacle, as the statement below clarifies:

“As corporate, you expect structure, roadmaps etc. But startups work completely differently, which causes a lot of insecurity, because where does my money go? The governance of such undertakings needs to be arranged very carefully. How do you keep the demanded control whilst that is inherently impossible, or hardly possible, with a startup.” - Corporate.

For corporates, this is a learning process as well. Something that seems to work is putting the startup next to the corporate. Corporates should not meddle too much, but the startup can use the corporate's infrastructure. In the end, the most important thing for startups is to make deliberate choices in their strategy concerning the collaboration with corporates. Of course, as a startup, you can choose to take a competitive approach and avoid interaction with corporates to prevent them from buying or sabotaging you. This can be an option, but decision on this matter should be made strategically. One entrepreneur stated the following:

“I get approached, and I approach corporates myself too. I start to have more conversations with them because I have a clear view of how I should approach it and what my goals for a collaboration are. First, I saw threats, now I mainly see opportunities.” - Young entrepreneur.

As can be seen, this entrepreneur changes his view of collaborating with startups over time. The interviewee of an incubator was also convinced that collaborating with a corporate is inevitable over time. It is also suggested not to get your first investment from a corporate, because this could lead a startup to adjust its technology only to one client even though the technology could have been applied to a way bigger market. Most interviewees agree that

timing is essential, as well as having a clear view of your goals and (exit) strategy for the collaboration. There is some discussion about whether you should approach corporates early on in the process, but there is no one-sided perspective on this matter. It seems to differ per startup case. Overall, the following suggestions are being made, as quoted:

“Look for the right one, specify the goal of the collaboration, how can the corporate reinforce your startup and do you have similar DNA?” - Young entrepreneur.

In general, it seems that corporate venturing practices are lacking behind compared to other countries. Both a corporate and an incubator mentioned that Dutch corporates are not doing that much with startups yet. Compared to corporates from Swiss, Germany and France, the Dutch corporates are remarkably late. It seems to be improving, and Dutch corporates seem to understand how to integrate it more and more. One interviewee suggested that the Top Sectors could play a role in accelerating and improving this development, especially with an eye on the ever increasing importance of startup innovation. Another interesting observation is that all interviewees seem to envision a situation in which ‘open innovation’ principles are prevailing. However, the current situation is not yet there, as e.g. the quote below indicates:

“What we should do as country in the totality of the whole system, meaning all stakeholders; research institutions, universities, corporates, SMEs and startups, is we should make sure there are cases with perspective. And if those cases cannot be valorised in one place for whatever reason, that they are valorised in another place. All to allow that the collective benefits optimally of all innovation that is being done.” - Government.

In the current situation, corporates are not able to do all innovations that are needed to solve the societal challenges we currently face. One startup entrepreneur also mentioned that they meet a lot of other food startups, but none of them are involved in open innovation networks. Of course there are attempts to operate more according to open innovation principles. One example was startups working together with each other and doing combined development. Also some consortiums and R&D activities already entail elements of open innovation, and on a more regional scale, one could think of ecosystems. A governmental interviewee gave the examples of the region of Eindhoven on High Tech or Leiden with Life Sciences. Such ecosystems have to develop over time. Also examples of such clusters for Agri-Food and Horticulture are mentioned, for example the Brightlands Campus in Venlo, Greenport in West-Holland and Food Valley in Wageningen. Field Labs are another example that is provided. A governmental interviewee also mentioned the following about corporates:

“It is an interplay between all kinds of companies, I think there is a win-win for everyone. The corporates have a need for a more dynamic environment around them. Maybe not all of them are equally far, and some may do it a bit differently than others. But all of them are moving in the same direction, we must do open innovation.” - Government.

The interviewee claims that all companies are becoming increasingly more open. Everyone gives each other a little push so that the overarching system gets a bit more innovative. An example of a corporate initiative is the new building in Wageningen which Unilever recently opened in Wageningen. It is a lab which has space for parties they want to collaborate with, also universities can do things in their labs. There is a pilot plant that is accessible to third parties as well. Such initiatives aim to boost open innovation, the corporate interviewee also mentioned that the building is in fact also a cause to do things differently. They want to do it

in a manner that leads to way more collaboration with small companies. It should allow that, in collaboration with partners, new systems are developed. Both in research facilities and on the production side. Its purpose is also to boost startups that can work there. It is designed as open as possible so that people can comprehend ever better what is needed to get to a sustainable food production system. However, the interviewee acknowledged that also they need to learn how that works, so that all parties can utilize their knowledge. The collective innovation efforts, according to a governmental interviewees could also benefit indirectly:

“If a technology is being developed in a company, and it has more applications, employees should be able to step out of that company at some point and start other companies in other markets or domains. After all, companies need to keep focus to thrive. There are examples of this in the past, the path towards new products generates new things too.” - Government.

Overall, all interviewees seem to agree that open innovation is something worth striving for and should be constantly improved over the upcoming period. For this reason, it might be interesting to look at what barriers are currently experienced by the interviewees to get such open innovation principles of the ground that could help startups solve societal challenges. There seem to be a couple of elements that hinder this development towards more open innovation systems, the first of which can be identified in the following quote:

“I started by going around through Wageningen to see what was hot and happening. I did not tell anyone my idea yet, that is also not wise to do in the food industry. After all, it is not possible to patent food, so people can copy it. If you get more successful, you will get copied anyway, that will happen to us as well at some point. Also with partners you make very clear agreements about the collaboration.” - Experienced entrepreneur.

The risk of being copied is clearly present in this entrepreneur. Also other less experienced entrepreneurs seemed highly cautious to share their ideas. This does not really align well with the open innovation principles. They cope with this by doing rapid innovating and trying to bind people to their brand. But startups do not seem the only ones that can be cautious:

“We have a platform now, and what we notice among a couple of our partners, is that at the end of the day, the corporates have no time or they are not willing to publicly reveal their innovation questions because they are afraid that competitors will walk away with it. That makes collaboration with startups really hard.” - Executive organisation.

The corporates seem hesitant, and some also struggle to publish their innovation questions. Of course, this is not beneficial to open innovation practices. Another aspect that has been touched upon before, are the silos in which some institutions are financed or structured, all disciplines have their own separate money streams. Which prevents them from talking to each other and collaborating on shared challenges. Another impression that a corporate interviewee had, was that a whole industry arose around supporting startups. Of course, startups do need certain forms of support, but it seems that many people at events of e.g. TechLeap.NL are there for their own personal interests, and not for the collective interests. Another barrier to accomplishing societal missions with the help of startups, is the lack of space to test and innovate. People should get more space to accomplish policy goals. Now, many people seem scared whether something will be allowed by the rules. There seems to be room for improvement and interviewees had more examples of what needs to improve:

“Via subsidies, collaborative innovation is already encouraged. But this does not feel sincere. These usually feel like workshops and conferences. Working together in a lab or kitchen, or building something together, that is what I call real innovation.” - Young entrepreneur.

Some startups appear to experience this world to be quite harsh and difficult to penetrate in. Parties are not considered as open as they should be. One younger entrepreneur mentioned the climate and connections in Wageningen and the sector in general, those should become way more open to startups. Also corporate interviewees seem to agree with this. The contact between startups, corporates, SMEs, research institutions and universities should intensify. People should be willing to share more. One entrepreneur mentioned the example of test labs in the US. Entrepreneurs generally have many tests they want to run, but do not have the experimental facilities to run those. In the US, there are test labs which everyone can hire and in which everyone is running all kinds of tests. So in that sense, corporates could facilitate this, but they should be aware that an often heard complaint from startups is that the corporates need too much time. For example test facilities that are promised to startups, it takes ages before startups can actually move in there and start testing. Startups operate on way shorter time scales, corporates should be aware of that and facilitate their resources in an appropriate way. But also SMEs can play a role, as mentioned in the following quote:

“SMEs are really innovative, they get new things done.” - Experienced entrepreneur.

A corporate interviewee also explicitly mentioned SMEs as a startup option for collaboration. In many cases, such collaboration can be a perfect stepping stone or phase before they set up a collaboration with a corporate. Of course, some situations demand direct collaboration with corporates, but since SMEs are more similar to startups, they are automatically more on the same page about many collaboration practices. In field labs it is already more common that startup collaborate with SMEs early on. Overall, the changing mindset, attitudes and values towards open innovation is permeating all stakeholders, that seems essential.

4.5.6 Science

Next to culture and collaboration, interviewees deemed the interactions with the scientific world, the application and implementation of its knowledge, and its education practices as highly relevant to contributor or hindrance to the startup success in the ecosystem. First, the interaction between the scientific world and startups is discussed. All entrepreneurs in this study seemed to be in contact with research institutions. Some explicitly chose to avoid PPP projects and preferred direct collaboration, generally on smaller projects and developments. The most evident reason for this can be identified in the following quote of an entrepreneur:

“We need experiments to learn, not studies to prove whether something is significant. You would be surprised how slow the universities operate. If you go to a university and provide them with a question, they have to make a subsidy for that, receive the money and let PhD candidates do the research. It can take up to five years.” - Experienced entrepreneur.

The entrepreneur mentioned that everyone is aware about this inertia, but it hardly seems to be changing. Most of the entrepreneurs that collaborated with universities have experienced this struggle. A lot of paperwork is needed and they need a lot of time. Another frustration that the startups have, is that once they do a project with a research institution and the end results are published, the results are frequently still not significant. The reason for this is that

the study was too small because of too little budget. The entrepreneurs find this to be quite frustrating because they could have been of much help to constituting larger experiments. In which the startup would then operate in a role like mentioned by the following interviewee:

“A lot of money is spent on researchers to invent technologies, but that division needs to be changed. We should enable researchers to focus on long-term fundamental developments. And let startups do the fast developments. Currently many fast developments need to be done by the slow and expensive research institutions as well.” - Young entrepreneur.

The scientific world does already try to involve businesses in the research to improve market relevance. But according to one entrepreneur, an even more holistic approach is needed. In which the starting point would be a vision for the ideal situation for society. And then letting research institutions do the long-term research. While simultaneously, in collaboration with companies, like startup, being in touch with the market. So that the companies can develop products that in practice seem to align with what the market wants. Through this interaction, research can be more aligned with the market and in the meantime, the products operate as experiments that generate useful sources of information for the scientific world. Embracing a learning-by-doing approach more. Now, the existing funding structures avoid such practices:

“Startups are missing a lot of opportunities for financing and networks. They do not have the expertise and possibilities to access those sources because they are already being taken by large research institutions.” - Young entrepreneur.

By integrating such practices more, this could also lead to a better cohesion to the collective policy goals. After all, now one entrepreneur mentioned that the research projects they run in collaboration with universities felt like separate projects. It is simply driven by the knowledge institution and them, but it did not seem to be part of a collective direction.

Of course, there should also be room for really fundamental research. But research projects that show opportunities to be applied, should have a header ‘implementation’ at the top of the research proposal. To some entrepreneurs, it felt like a lot of research is currently being done without thinking about the implementation. Hence, one interviewee suggested finding implementation partners already at the start of a research project. And according to some entrepreneurs, maybe even more importantly, making budget available for implementation practices. There could also be a role for the universities of applied sciences (hbo’s) in this:

“There are many complaints that research is not implemented and too little valorisation takes place. I think the reason for that is that we keep viewing things in silos. If you speak about applied research, that should be done at the universities of applied sciences. Universities should do fundamental research. They do not collaborate.” - Experienced entrepreneur.

Overall, it seems that most research projects startups are involved with are separated from any overarching collective directions. At least, they do not experience it as such. They do see a lot of value in collaborating with universities, particularly to stay up to date about the latest developments and prove that their products are scientifically justified. According to most entrepreneurs, a lot more value can be drawn from connecting knowledge better. Another reason why valorisation for the impression of many entrepreneurs that valorisation practises are not ideal, is that the reward system for researchers is not directed towards it:

“The evaluation of PhD candidates and researchers is purely on academic achievements, not at bringing inventions to the market and having an impact.” - Experienced entrepreneur

There are efforts to improve this (VSNU, 2019). Of course, becoming an entrepreneur also entails risk. The interviewee of the Top Sector Agri-Food mentioned that there are certain parties that strive to detach more researchers from their gilt-edged employment conditions. But it has shown to be difficult to do that in a way which everyone is comfortable with. Many researchers seem to have ideas in their heads and would like to get active with it. But as the interviewee noted, those researchers also have e.g. a mortgage and three kids, so the choice for the entrepreneurial route is a big leap in the unknown. Over the last years, policy instruments aimed to increase the consciousness about the possibility of the entrepreneurial route as a researcher. A lot has already been accomplished, but interviewees seem to agree that more can, and should be done to improve this. Again, the differing realities, this time the academic and finance world are emphasized. Also, most academic inventions need a couple additional steps before the innovation is suitable for the market. There are efforts to improve the capabilities of universities to valorise e.g. via tech transfer offices and incubators. Yet, one interviewee warned that these practices can lead to a hindrance for collaboration too:

“The return on patent applications is minor and high risk. I think universities should not want to be involved with that. Of course, there are some exceptions. However, they smell money once the word ‘patent’ is dropped, that is a severe hindrance to collaboration.” - Corporate.

The interviewee refers to an article that was recently published about Intellectual Property rights for startups that were established by students. That showed that universities start to play a highly dubious role once they get involved with patents. Which is also something they have been forced in by the Ministry of Education, Culture and Science. After all, those made universities prioritise valorisation more. The interviewee also doubts whether it is something that universities should be involved with at all. It does however, occur more and more often according to interviewees. Not only from the side of researchers, but also from students. The interviewee of the Top Sector Agri-Food did the following statement about founding startups:

“The best age, is when you just graduate, because then you are still satisfied with a cheap, second-hand car and a little attic room. More and more are doing it.” - Top Sector Agri-Food.

As can be expected, the young entrepreneurs seemed to agree on this. One entrepreneur explicitly chose to gain business-wise and commercial experience during his technical study, because at Wageningen University, you particularly get educated as a researcher. Room for entrepreneurship hardly existed. Though, he acknowledges that entrepreneurship education among Dutch universities seems to differ. However, after a visit to a university at Lausanne, he discovered that trying to found a company is practically a norm there. All researchers are involved with companies as well. There, establishing startups is regarded as a high priority. According to this interviewee, this cultural change should be strived for here too. He is aware that there are developments on this in Wageningen too, like incubator Startlife and Starthub, which is the version for students. As well as in entrepreneurial education, but still he regards it as way too little. The interviewee of Startlife agreed, and went a step further, as quoted:

“More long-term investments on entrepreneurship are needed, that is the weakest link. Over the overall spectrum; primary schools, high schools, universities and universities of applied sciences, more efforts on entrepreneurship education are needed. The biggest bottleneck for

innovation and entrepreneurship are people. There are plenty of ideas and money. However, educating good entrepreneurs, that is where I would like to see more efforts.” - Incubator.

It was striking though, that in the Human Capital Agenda of the Horticulture and Agri-Food Top Sectors, entrepreneurial qualities get little emphasis. The interviewee that was dealing with these agendas mentioned that research gets most attention. Although matters such as valorisation and implementation are not emphasised much yet, the interviewee agreed that an entrepreneurial mindset and skills should be a point of discussion in the new versions.

5. Conclusion

First, in the discussion, the main findings are discussed and interpreted so that the research question can be answered. Second, the most unique findings are linked to the theory so that theoretical contributions of this research become evident. This research also has practical implications which could become of excellent use to stakeholders. Lastly, limitations of this study and promising avenues for future research are provided to give a well-rounded view.

5.1 Discussion

Insights in the (policy) possibilities to involve startups in Mission-Oriented Innovation Policy were limited. To increase the understanding, this study assessed startups in relationships to current collective innovation efforts. In the Netherlands, collective innovation policy with a 'directionality' is partly allocated to the Top Sectors, in so called 'Knowledge and Innovation Agendas'. For 2020-2023, the Top Sector Agri & Food, Horticulture & Starting Materials and Water & Maritime composed a shared agenda. The Top Sector Agri-Food and Horticulture have been assessed as case study, as those displayed an inherent societal 'directionality' and sufficient experience in involving startups in its current collective innovation efforts. The framework for this study was built on the Multi-Level Perspective theory and Strategic Niche Management. Both allowed the study to assess theoretical and empirical findings, that were of support while compiling a comprehensive answer to the research question of this report:

What is the role of startups in collective innovation efforts for solving societal challenges, and how can their potential contribution be improved?

5.1.1 Main Findings

Here, a critical and concisely formulated answer to the research question is presented. The findings are supported by the results and aim to provide unique insights into the topic. First, three aspects that could have influenced people's perception of the specific contribution and roles of startups to collective innovation efforts for solving societal challenges are discussed.

First, the degree of uncertainty that interviewees displayed on the semantics of what defines a 'startup'. Multiple interviewees indicated that the delineation with respect to SMEs and scaleups is rather unclear. Only one governmental official referred to a startup definition: 'A startup is a temporary organization designed to search for a repeatable and scalable business model'. The definitions in use are not clear-cut and there is no universally accepted standard used. The slightly differing interpretations of stakeholders in the field is not ideal.

Second, an insight that was acquired is that the term 'startup' appeared multifaceted. One interviewed corporate classified three types by development phase; standups, startups and scaleups. Many interviewees just used 'startups' for the whole spectrum. Some explicitly distinguished between 'scaleups' as well. However, there is no uniform agreement on this.

Third, most interviewees made an explicit distinction between 'technology-driven' and 'market-driven' startups. The two different types could influence the roles and contributions of startups, and hence, both could need different kinds of support, assistance and policy.

A surprising insight in how the potential contribution of startups can be improved can be found in the fact that Top Sectors stated that they are confronted most frequently with

technology-driven startups. An explanation might lie in the fact that Top Sectors have always been quite closely related to universities and corporates, in which technology is more often developed, rather than by random individuals in society. Most interviewees considered 'De Vegetarische Slager' (a market-driven startup) the most impressive startup example. Also, five out of eight startups in this research could be defined as market-driven startups. It is, therefore, remarkable that Top Sectors' engage most with technology-driven startups.

Many interviewees voiced promising future expectations in context to the increasing importance of startups as an innovative engine behind innovative economies and societal transitions. Interviewees agreed that startups definitely contribute to a flourishing innovation ecosystem. Five clear roles in which startups contribute to collective innovation efforts for solving societal challenges have been identified: (1) filling market gaps and changing the supply chain, (2) developing and utilising new technology and knowledge, (3) doing risky, rapid and flexible value creation, (4) applying new technology in industries and creating crossovers, (5) challenging established order, which consists of (a) systems and structures, and (b) innovation culture, attitude and way of thinking. Startups contribute to innovation efforts, either consciously or unconsciously, via one, and often multiple, of these roles.

In the process of formulating the agendas, a sixth role is fulfilled; a more indirect role of providing input. This happens via overarching representative organisations which aim to influence the collective innovation agendas on their behalf. Most interviewees agreed that direct involvement is not of the preference because of time and knowledge constraints of startups. Most also did not consider it to be practical; there are many startups, and all can just represent a small piece of the whole picture. Though, very occasionally, startups are directly consulted in the role of sounding committee, once the agendas are formulated.

As for improving the contribution of startups via this sixth role, many entrepreneurs felt that their perspective is currently not adequately represented through the representative bodies. Some suggested involving executive organisations as TechLeap.NL or incubators in the sector more. Those parties have years of experience with the priorities and the struggles startups encounter, and they are with both feet active in the field. Hence, some interviewees expect them to be exceptionally capable of advocating needs and contributions of startups during the formulation of a collective innovation agenda for solving societal challenges.

Traditionally, Top Sectors have a somewhat research-oriented focus. However, over the last few years, attention for the implementation and societal impact of research results started increasing. Many interviewees mentioned that startups have a very valuable role in research valorisation. If this is combined with the estimated general increase of startup importance, improving the startup representation in agenda-setting is of the essence.

The Top Sector offers informal and formal support to collective innovation efforts for solving societal challenges. The support activities could potentially be used to improve the contribution of startups via their five roles. One way, would be because the sectors, or field, can be incredibly complex for a startup, and their content-wise knowledge about the industry is often lacking according to interviewees. Therefore, startups should have more connections to stakeholders in the ecosystem with domain-specific knowledge, as well as development partners or potential launching customers. Interviewees argue that is the unique value of Top Sectors; making such smart connections and granting access to the right organisations.

Yet, many startups never reached out to the Top Sector, because they are not aware of this value of Top Sectors. Startups that have been in contact with them, or their innovation brokers, highly valued their support. One startup entrepreneur also mentioned that the Top Sector probably meant more to them than the founder was deliberately aware of. The Top Sector network, is for many also the reason to stay linked to the Top Sectors; it could lead to new connections and leads. Top Sectors' input and knowledge is also welcome. However, entrepreneurs emphasise that Top Sectors should be wary about deciding whether a startup can become a success. This is often subjective, also for experienced people in the industry.

Startups would like to play a more extensive role in collective innovation efforts, but they feel like they are currently not being involved. Top Sectors feel like startups are hard to reach and seem uncertain about how to involve them. Though, both do not seem to share the same communication channels. To optimally benefit from the contribution of startups to collective innovation efforts, it is again suggested to Top Sectors to intensify collaboration with incubators, to increase the understanding and cause even more outstanding results.

Another way in which Top Sectors support the execution of the collective innovation agenda, and through which the contribution of startups to collective innovation efforts could be improved, is subsidies. Some startups mentioned that PPP projects led to rather (time-) costly and ponderous trajectories. Startups, which are generally rather fast-paced, did not always feel like they aligned well within the PPP projects. Though, some entrepreneurs were very positive. PPP projects are especially suitable for long-term, research-focussed projects. Aligning the nature of startups in PPP projects shows promise but needs a bit of fine-tuning.

MIT already seems to suit the fast-developing character of startups. The need to hire experts to have a chance seems quite common. This is something that needs adjustments according to many startups. It is also suggested to offer mission-driven companies higher chances than companies which prioritise shareholders. It is paid with tax money, hence it should serve the 'societal good'. This could increase the chances of startups contribution.

An overall challenge is the quality of evaluation committees. Those are, according to some experienced entrepreneurs, often not knowledgeable enough or lack the capabilities to identify true potential. This did not seem to be based on frustration, these were experienced entrepreneurs, that built highly successful companies. Besides, more flexibility and focus on the team are suggested; projects with startups simply experience more changes in direction.

One Top Sector interviewee said that developing new ideas and testing their viability has their priority. Though some startups felt like the Top Sectors' instruments focus only on supporting scaleups, and too little on generating new startups. This is surprising because 'developing new ideas and testing viability' is something startups do, not scaleups. Hence, startups suggest more small subsidies, tailor-made, flexible, for specific check-points.

Results revealed that to allow the roles and contributions of startups to collective innovation efforts to solve societal challenges come to optimal fruition, the extent to which the ecosystem facilitates startups is essential. The characteristics of the regime (Market/user-preferences, industry, policy, technology, culture and science) strongly determine how well the success of startups to contribute to collective innovation efforts is facilitated.

First, the market/user-preferences. Little (future) societal acceptance of an innovation or a specific technology can be a burden to startup innovations. It even motivated a startup to move abroad. Also, interviewees noted to target abroad markets, because the societal acceptance for their technology is much higher there. If a (semi-)governmental organisation

funds an innovation, then, a level playing field also needs to be created to enhance adoption in the market, either via budget or legislation. Paradoxically, that is often seen as state aid.

Second, the industry. Here, there are primarily concerns about the high investments needed for scaling, which are characterising for this specific industry. This is an important bottleneck that limits and delays startups to increase their contribution. The prominent cause is expected to be the risk-averseness of investors. In some other countries, that is dissolved by making use of high-risk portfolios, hence spreading risk. Governments have initiatives to improve this too, but many startups agree that this improvement should arrive much faster.

Third, policy-related matters. Policy-makers are open to change, though the urgency and speed at which are not yet at the desired level of most entrepreneurs. Many startups do not feel heard and understood yet. Governmental processes that are too slow lead startups to fail and go bankrupt. Previous initiatives are praised, yet, it is time for (learning) processes and flexibility to go up a gear. Legislation is viewed as an excellent tool to induce change. A more proactive, entrepreneurial government is essential for that. The difference between 'search for a business model' and SMEs should be kept closely in mind here.

Fourth, technological aspects. The technological advancements and developments in the Netherlands seem to be experienced as an advantage, also for technology acceptance. For technology-driven startups, it is of the essence to keep focus and figure out what market offers the most potential. Collaboration with existing parties on technology development is often needed. There seems to be a need for more technologically facilitating environments.

Fifth, is culture. This is deemed as one of the most vital elements. The Dutch low appetite for risk, and thinking small, is regularly stated as a hindrance to the contribution of startups. In Agri-Food, the mainly technology-oriented way of thinking is seen as limiting. Though, over the last years, the willingness to become entrepreneurs increased, especially among young people. Role models are also considered important. Yet, an overall anxiety to introduce new things seems to exist; waiting for what the government does. Trust can also be an issue towards corporates, even though collaboration with corporates poses so many advantages according to most interviewees; as a launching customer, partner for growth or development, or as provider of network, knowledge and experience. Especially in startups of which the products cannot be patented, distrust is experienced. Hence, they also do not easily approach corporates. Even though they could highly benefit from a corporate as well. The corporate venturing practices seem to lack behind compared to other countries. Yet, all of the interviewees seem to envision a situation in which 'open innovation' principles prevail. Such initiatives exist, but still startups appear to experience the culture to be quite harsh and difficult to penetrate in. Parties are not considered as open as they should be. Due to the low speed of corporates, SMEs are mentioned as a stepping stone collaboration partner too. The eagerness, pace and flexible attitude of startups does change mindsets, attitudes and values towards open innovation principles. Yet, they aspire way more and faster joint initiatives.

Sixth and last, the scientific world. Most startups seem to collaborate with knowledge institutions. Also separate from PPP projects, as those are rather slow and do not allow them to learn and gain evidence for their products quick enough. Although everyone seems aware of the inertia of scientific institutions, it still hardly seems to change. Yet, interviewees agree that collaboration could be highly valuable to both. As such, universities keep the long-term focus, while startups stay in touch with the market and develop products that will actually get accepted. This could lead to a learning-by-doing way of research and aligns with increasing priorities to implement research. More collaboration between universities and universities of applied sciences is also suggested, as the latter has focuses on applying knowledge. Also, current changes in rewarding and recognising researchers should improve implementation

practices according to many entrepreneurs. Last but not least, students are mentioned as an promising group to start companies. The weakest link, according to some interviewees, is that students are not trained how to become (good) entrepreneurs. The Top Sectors' Human Capital Agendas appeared to put little emphasis on entrepreneurial skills either. For now.

Overall, a main take-away, would also be that the urgency for startups for institutions to change faster is much higher than to many other stakeholders in the field, to them the speed at which things change, can be a matter of live or die. Also, a more proactive role of the government could relieve anxiety and increase mutual trust and initiatives to innovate.

So, whilst formulating the collective innovation agenda, startups are not deemed really important. All interviewees agree that an indirect, representative role is most suitable for startups. Though, improving the representation could lead to better integration of their five execution roles, and hence, that could already lead to outstanding improvements.

In execution of collective innovation agendas, five roles through which startups can contribute were identified. The potential contribution via these roles could be improved by fine-tuning the formal and informal activities of the Top Sectors to their needs, the insights in this report and the improved startup representation could be of excellent help.

Interviewees agree that, outside collective innovation agendas, startup contribution can be enhanced too. The emergence and growth of startups can be better facilitated by improving the conditions of the overall ecosystem, this report provided promising options.

5.1.2 Implications

This paragraph explains what the most relevant contributions of this research are to the frontiers of science and to practice and society. These are substantiated and the innovative nature is shown. The study provided exploratory, qualitative insights into the role of startups in collective innovation efforts to solve societal challenges. First, it aimed to contribute to the academic literature on MIP by explicitly assessing the roles of 'challengers' like startups. The second goal of this report was to provide structural (policy) possibilities for involving startups, so that in practice, their role can be harnessed in a more effective way while implementing MIPs and accomplishing missions. Both contributions will be discussed in this chapter. After that, the most essential limitations of this study and potential avenues for further research.

Theoretical Contribution

The theory about transitions explained what a transition entails: "a fundamental change in *structure (e.g. organizations, institutions), culture (e.g. norms, behaviour) and practices (e.g. routines, skills)*". The fifth role of startups in practice was; *challenging the established order, which consists of (a) systems and structures, and (b) innovation culture, attitude and way of thinking*. This role is almost identical to the definition of transitions. Therefore, startups can be considered an exceptionally suitable contributor to accomplishing change and transitions.

The theory also explained that to some extent, the transition direction can be *steered and their speed can be accelerated*. The study showed that some interviewees root for e.g. governments to 'pick the winners' and choose what specific solution directions to pursue, as this could create more certainty and clarity for businesses and hence, speed up transitions. However, simultaneously, it could also diminish opportunities for startups, and companies in general, that are pursuing other alternative solution directions. This adds to the importance

of *applying the theory of Wanzebock et al. (2019)* during the formulation of MIP missions as well as in the Top Sectors' collective innovation agendas for solving societal challenges.

MIP defined missions as: *bold, inspirational, targeted, measurable, time-bound, ambitious but realistic, cross-disciplinary, cross-sectoral and cross-actor*. To accomplish MIP missions, the theory section explained that *multiple, bottom-up experiments and solutions* are needed. This study viewed startups as challengers that execute such experiments and potentially deliver solutions. This innovative connection that was laid between the mission criteria in MIP and the characteristics of startups, led to an increased understanding of what role and how startups, i.e. *bottom-up experiments*, could contribute to collective innovation agendas with a societal 'directionality', i.e. *setting and accomplishing MIP missions*.

As was already indicated in the theory section, the phase of MIP missions; *design & selection and implementation*, did indeed prove to be relevant to the role of startups. During the *design & selection phase* (i.e. formulation process), *indirect involvement* is deemed most suitable. While in the *implementation phase* (i.e. execution), *direct involvement* is preferred.

Theoretically, startups could be viewed as 'challengers' in accomplishing missions or executing collective innovation agendas for solving societal challenges. However, startups hardly view themselves as *part of an explicit collective*. For their sake, they are just solving a problem in society. As an addition to the literature, this means that the *five roles of startups* can now be given a more explicit place in the theory about accomplishing MIP missions.

As stated in the theory section, MIP's *Transformer missions* demand more societal acceptance, application and use, than *Accelerator missions*. Since all startups aim to sell their products to the market, *acceptance, application and use are key*, one could argue that startups are more suitable for Transformer missions. However, due to the role as '*developer and utiliser of new technology and knowledge*', and the role of '*applying new technology in industries and creating crossovers*', startups can also play a role in Accelerator missions.

As for the MLP framework and the *interaction between regime and niche level*, this study contributes to that literature by concluding that collective innovation agendas hardly seem to play an explicit role in the interaction between both levels. Startups that operate as niche experiments, *interact directly with the regime level* and the incumbents in that level.

Niches can be either *technological (testing technology)* or *market-related (specific user preferences)*. The interviewees showed that in practice, the same distinction is made between the types of startups; *technology-driven startups* and *market-driven startups*.

The theory section mentioned that more research was needed on *niche protection* and *interaction patterns between niches and regimes*. This study recognises *risk-averseness* of policymakers. As well as the importance for success of *building relationships with external partners*. However, it does not recognise deliberate *institutional strategies as an obstacle* for startups or niches. The opposite has been identified, corporates *support new entrants*.

The *cooperative* or *competitive* approach dilemma of startups towards corporates is strongly recognised as well. However, the interviewees in this study bring in the nuance that once something is not *possible to be protected*, a competitive approach might be more suitable. However, corporates claim that they have no interest in obstructing the success of startups, they rather want to benefit from it as well, following *open innovation principles*, ones the startups has grown big enough to *mutually benefit* from a collaboration.

Practical Implications

All parties related to the Top Sectors, e.g. multinationals, SMEs, knowledge institutes, Enterprise Agency the Netherlands, the Ministry of Economic Affairs & Climate and TechLeap.NL are currently looking for ways to harness startups in an even more effective way. After all, this will allow society to benefit optimally from the potential innovation that startups could bring to the table; leading to improving solutions, at a faster pace, for lower prices, for more people. The insights of this study could support policymakers in harnessing startups in a more effective way while implementing MIPs and accomplishing missions.

First, as for formulating MIP missions and collective innovation agendas, it is deemed rather unsuitable to involve startups directly. Rather, it is advised to let representative bodies that are of an overall satisfying quality to the startups, represent the startups perspectives.

As for the implementation of MIP missions, and the execution of collective innovation agendas, the five described startup roles can be of value to policymakers. These allow them to assess how and where, each of the startup roles can be of most value to implementing MIP missions or executing collective innovation agendas for solving societal challenges.

Third, it is advised to put focus on improving the bottlenecks in the ecosystem and regime, as that will directly influence the success of startup innovation, and hence, it will benefit their contribution to solving societal challenges in a broad sense.

5.2 Limitations of this study

In this paragraph, the most relevant and important limitations of this study are discussed to give a nuanced view of the limitations of this study and to provide additional insights.

First, for this exploratory, qualitative study, nineteen interviews were conducted. This is a significant amount and resulted in interesting insights in the role of startups in collective innovation efforts for solving societal challenges. However, nineteen interviewees are just a small percentage of all stakeholders that potentially relates to this subject. Stakeholders that have not been interviewed because of time constraints of this study could hold contradicting views on the studied topic. These could be stakeholders with a similar profile to the ones that were interviewed in this study, as well as stakeholders with a somewhat different profile, for example nascent entrepreneurs or failed entrepreneurs. Perspectives of research institutions have also not been directly included, except for one interviewee that worked for a university too. Moreover, many interviewees were referenced by the Top Sectors. Yet, it could be that stakeholders that hold other views on the topic have not been included in this research. Also, stakeholders could have provided strategic answers of which they might benefit.

Stakeholders could have been biased because they did not recognise the concepts, words or terms that have been used by the interviewee. For example, 'collective innovation agendas' could be unfamiliar to them, whilst 'roadmaps' would have been well-known). The interviewer aimed to prevent this by naming multiple names for the same concepts during the interviewees to guarantee whether any confusion or questions arose.

This study zoomed in on the Dutch Agri-Food and Horticulture Top Sectors. Other contextual incentives, e.g. subsidies that are provided by other institutions than Top Sectors could have been missed. The interviewer aimed to prevent this by asking, encouraging and giving spaces to interviewees to bring up relevant topics in a broader context.

5.3 Potential avenues for future research are

Based on connections with the theory and developments in society and practice, the most important potential future research topics are elaborated on in this paragraph.

First, an examination of the correctness and comprehensiveness of the five roles is interesting, as well as their completeness. Preferably, with a larger sample, to make sure that no new roles or definitions are identified. This study could also put more attention to making sure that the definitions are mutually exclusive, collectively exhaustive (MECE).

Second, it might be interesting to examine to what extent corporates and research institutions, consciously or unconsciously, already actively make use of these startup roles. As these roles have specific advantages, optimal use by these actors could be improved.

Third, the relationships between market-driven and technology-driven startups, as well as developments phases of startups, towards the exact support, assistance and policy they need, could be interesting to be examined. This could improve policy even further.

Fourth, more research on corporate-startup collaboration and trust is deemed relevant, as this was a very pressing issue according to many interviewees.

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Attachment 1: Interview Guide

Due to the arrival of Mission-Oriented Innovation Policy, I am writing my thesis for the MSc. Sustainable Business Innovation, on the role of startups in collective innovation agendas. The goal is to harness startups as a potential vehicle to deliver innovation in collective efforts to solve societal challenges in a more effective way in the future. In this research I defined all types of startups, meaning regular startups, social startups, scale-ups, hybrid intermediary organisations etc. under the same label, namely “startups”.

First, we will discuss your background, allowing us to get more contextual understanding of your perspective and knowledge areas. Later, we will go into depth about the roadmap you are involved with, what startups are involved in those, who they interact with and how.

Do you accept that I record this interview? Do you see a need to be anonymized?

Questions:

- About the interviewee: (*All Interviewees*)
 - Please introduce yourself.
 - For which organisation(s) are you active?
 - What is/are your function(s)?
 - What is your role in the Top Sector, KIA and/or Roadmap(s)?

- Could you tell me more about the roadmap(s) that involve(s) startups? (*Top Sectors*)
 - What is the theme or goal? And is it linked to a specific societal challenge?
 - Would you define the goal(s) of the roadmap as bold, inspirational, targeted, measurable, time-bound, ambitious but realistic, cross-disciplinary, cross-sectoral and cross-actor and having multiple, bottom-up solutions?
 - Would you consider the problem and solution(s) as diverging (contested, complex, uncertain) or converging (uncontested, well-defined, informed)?
 - Accelerator (tech development) or transformer (broader societal change)?

- What are the characteristics of the startups involved in roadmaps? (*All interviewees*)
 - Do startups interact in the collective agenda formulation? Why? How? Which?
 - What startups interact in the execution of the agenda? How? Why?
 - Would you define their innovation as incremental or radical?
 - Are the startups testing their technology or market user preferences?
 - How would you define the startup type? (Scalable / Buyable / Social / Grassroot / Hybrid Intermediary organization / Other?)
 - In what phase is the startup? (First rounds of funding? Customers?)
 - To what extent do the following matters successfully take place:
 - Expectations and visions are being shaped and voiced.
 - Learning processes take place.
 - Social networks are being built which support the innovation.

- What support for startups in roadmaps exists/do you use? (*All interviewees*)
 - What activities of the the Top sectors are you aware of? What do you know?

- Who makes use of those? Why? How was it experienced?
- What does the interaction with the regime look like? (*All interviewees*)
 - What does the interaction look like with each stakeholder? And with policy, technology, culture, science, market/user preference, industry?
 - In which areas does potential friction occur and what roles for startups seem to function particularly well? Why? How can it be further improved?
- Are there any other elements that should be reflected on as well? (*All interviewees*)
 - Are there any other things I should be aware of, or have knowledge of?
 - Are there any other prominent barriers to the contribution of startups?
 - Who else should I talk to, to increase the insights in the research topic?
 - Any other remarks, advice or questions?
 - Do you have an interest in the results?

Thank you for the interview.