

What More to Innovate?:

*A Case Study of Plant-based Food Start-ups in Sweden for
Food System Transformation*

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Abstract

Food systems can negatively impact the environment and human health, posing challenges to global sustainability goals. Employing the Three Spheres of Transformation framework, this thesis examines sustainable entrepreneurs' role in transforming food systems to support plant-based food consumption. Focusing on Swedish plant-based alternative food start-ups, I conducted 11 interviews to explore entrepreneurs' roles on creating consumer behavior, addressing institutional challenges, and intervening in mindset shifts. Findings reveal start-ups employ strategies like product innovation, strategic communication, and business expansion to overcome several consumer behavior barriers. Start-ups collaboratively target institutional challenges, creating new practices and norms within the dominant animal-based food system. While startups view mindset shifts as significant, they do not perceive themselves as change agents. The study underscores channeling innovation focus from technical to social and enhancing collaborations among different actors. Insights can inform initiatives aimed at facilitating smoother pathways for start-up and governmental efforts to address consumption patterns.

Keywords: plant-based food; dietary shift; food systems; sustainable entrepreneurship; food consumption; system transformation

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1 Introduction

1.1 Problem definition

Food systems are major drivers of environmental degradation and poor human health (Crippa et al., 2021; Richardson, 2023; Willett et al., 2019). They encompass all processes engaging with food, including production, distribution, preparation and consumption (van Berkum & Ruben, 2021). Food production is one of the largest drivers of global environmental change, with significant impact on greenhouse gas emissions, biodiversity loss, freshwater depletion, eutrophication, and land system alterations (Willett et al., 2019). Our diets connect health with environmental sustainability, highlighting the interconnectedness between individual health outcomes and the ecological impacts of food production and consumption (Springmann et al., 2020; Willett et al., 2019). Addressing food consumption therefore is crucial to achieve targets such as the Sustainable Development Goals (Castillo-Díaz et al., 2023; Clark et al., 2020). Despite this, reshaping food systems to provide healthy diets while safeguarding planetary health remains challenging (Herrero et al., 2021).

According to the UN, moving away from animal-based diets is essential to address climate change (Alvaro, 2017). Globally, meat consumption contributes nearly 42% of individual nutrition-related emissions, underscoring the potential for climate change mitigation through dietary shifts (Alvaro, 2017; Gordon et al., 2017; Hunecke & Richter, 2019). Strong evidence suggests reducing animal-based food consumption and increasing plant-based food consumption become crucial to mitigate climate change (Bezner Kerr et al., 2022). Moreover, such dietary shifts can positively impact health, by reducing chronic diseases and premature death (Herrero et al., 2021; Springmann et al., 2020; Stefanovic et al., 2020). Shifting dietary patterns thus offer the potential to both decrease anthropogenic impacts on the environment and improve human health (Springmann et al., 2020).

However, abrupt and voluntary mass dietary shifts are challenging as dietary habits are influenced by many factors (Bendz et al., 2023; Bezner Kerr et al., 2022). These factors include food systems, socio-cultural factors, and socio-material factors such as availability and affordability (Bendz et al., 2023; Bezner Kerr et al., 2022). As noted in the IPCC report, carefully considering these factors are crucial to achieve dietary shifts (Bezner Kerr et al., 2022). To this end, plant-based alternative food, such as meat and dairy substitutes can encourage consumers to reduce animal-based food intakes by replacing animal-based food to plant-based alternative food (Collier et al., 2023; Onwezen et al.,

2021; Willett et al., 2019). Shifts between “like-for-like” products such as replacing beef with meat substitutes can ensure lowering environmental impact of food while improving nutritional impact for human health (Clark et al., 2022; Hassoun et al., 2024).

1.2 System transformation for food system

To understand how food consumption patterns can change, I argue that it is necessary to broaden the scope to encompass the whole food system. How can the current animal-based food system transform to support plant-based food consumption? Altering food consumption necessitates more than just interventions at isolated points but requires a fundamental societal transformation (Standal & Westskog, 2022); therefore, I bring in a systems approach and transformation as key concepts emphasizing the interconnectedness and multidimensionality of systems (Weber et al., 2020).

In this thesis, I acknowledge the disruptive nature of transformation as well as its normative character, which views transformation as a deliberate change that goes beyond gradual enhancements, spanning *practical*, *political*, and *personal* spheres (Béné, 2022; Bennett et al., 2016; O’Brien & Sygna, 2013; Weber et al., 2020). Due to its normativity along with sustainability, transformations towards sustainability are understood in many different ways (O’Brien & Sygna, 2013; Salomaa & Juhola, 2020; Sovacool & Hess, 2017). The core concept of transformation encapsulates profound changes, which encompass shifts in beliefs, attitudes, values, behaviors, technologies, and institutional frameworks, aiming to challenge the status quo (Béné, 2022; O’Brien & Sygna, 2013; Weber et al., 2020). Therefore, I define a transformed food system as one where plant-based alternative food is accessible and no longer considered as an “alternative” option. Instead, it will be considered as normal as, if not more so than, animal-based food.

1.3 Sustainable entrepreneurship

Discussions on sustainable development underscore entrepreneurs’ contributions to address social and environmental challenges while fostering economic growth and innovation (Larsson et al., 2016). For instance, the UN General Assembly recognized the vital role of entrepreneurship for advancing Sustainable Development Goals as it tackles various societal and environmental issues (Secretary-General & UNCTAD, 2018). I focus on sustainable entrepreneurship, which encompasses the creation and management of businesses focusing on providing long-term environmental and social benefits, “promoting a cause beyond the success of the business” (Larsson et al., 2016, p. 15).

The current food system is dominated by a few large corporations which hinders transformation (Béné, 2022). Depending on a few actors risks the positive significance of technology and innovation towards sustainability transformation and limits the capacities of other stakeholders (Béné, 2022; Eliasson et al., 2022). While large corporations tend to have strong financial interests to maintain the status quo (Béné, 2022), sustainable entrepreneurs treat profits as a means and an end that opens up opportunities to integrate sustainability into core business practices (Horne & Fichter, 2022; Larsson et al., 2016). This positions sustainable entrepreneurs uniquely as value-driven change agents with transformative capacities (Horne & Fichter, 2022; Lüdeke-Freund, 2020; Westman et al., 2023).

1.4 Research aim and research questions

This thesis aims to understand to what extent sustainable entrepreneurs in plant-based food production contribute to the transformation of the current animal-based food systems. Employing the Three Spheres of Transformation framework (O'Brien & Sygna, 2013), I shed light on the role sustainable entrepreneurs play in shaping food system transformation pathways across the *practical*, *political*, and *personal* spheres. I focus on Sweden as a case, recognizing the Swedish government's ambition to largely change its food system (Regeringskansliet, 2017). The Swedish food system can be viewed as an animal-based food system with high consumption of meat and dairy products (Clark et al., 2020; Eliasson et al., 2022), which makes an interesting case to investigate (see section 4.2.1). Moreover, recognizing the potential of plant-based alternative food for influencing consumption patterns, I narrowed my scope to plant-based alternative food start-ups which focus on developing and selling plant-based alternative food products, e.g., dairy alternatives and meat alternatives.

This thesis aims to fill the gap in the current literature on sustainability, entrepreneurship, and transformation and thus contribute to better addressing global food system challenges which are closely linked to climate change, public health, and Sustainable Development Goals. Firstly, as argued by Stefanovic et al. (2020), food systems are intertwined with multiple Sustainable Development Goals, possibly encompassing all of them. Through a case study of plant-based alternative food start-ups in Sweden, this thesis provides a context-specific analysis of the Swedish food system regarding dietary shifts, a point emphasized in the IPCC report: "*There are a range of options to change dietary patterns, but more research is needed in this area, adjusted to the regional, socioeconomic and cultural context*" (Bezner Kerr et al., 2022, p.800). Moreover, while entrepreneurs are recognized for their potential to propel system transformation towards sustainability, their

specific roles have been overlooked in existing research (Bakker et al., 2023; Eliasson et al., 2022; Larsson et al., 2016). As several studies point out, recognizing and integrating perspectives of diverse actors are crucial for driving sustainable transformations in the food system (Fanzo et al., 2021; Klerkx & Villalobos, 2024; Weber et al., 2020). Additionally, addressing food consumption from a business perspective provides an understanding of the processes that connect producers and consumers, a point emphasized by Gordon et al. (2017).

With an overarching research question of “To what extent do plant-based alternative food start-ups act as change agents in the Swedish food system transformation?”, I pose 3 research questions addressing the *practical*, *political*, and *personal* spheres of transformation (Table 1).

Table 1. Research questions developed by the author. Three research questions are developed based on the Three Spheres of Transformation framework (O’Brien & Sygna, 2013). Section 3.2 Operationalization entails detailed description of concepts and theories used to develop the research questions (Author, 2024)

Overarching RQ	To what extent do plant-based alternative food start-ups act as change agents in the Swedish food system transformation?
RQ 1: Practical	How do plant-based alternative food start-ups face and overcome barriers to create consumer behavior change?
RQ 2: Political	How do plant-based alternative food start-ups face and target institutional challenges in the current animal-based food system?
RQ 3: Personal	How do plant-based alternative food start-ups perceive their role as change agents for inner transformation?

2 Setting the scene

2.1 Previous research on food system transformation

Food system transformation requires technical innovations (*practical*), collaborative governance (*political*), and paradigm shifts (*personal*). This section provides a comprehensive overview of research regarding food system transformation.

2.1.1 Technological innovations for: Practical transformations

Historically, technological innovations have played a significant role in the transformation of food systems (Béné, 2022; Leeuwis et al., 2021; Reardon et al., 2019; Stefanovic et al., 2020). For instance, the use of synthetic nitrogen fertilizer facilitated a substantial increase in cereal production (Herrero et al., 2021). One recent example of food innovation is development of alternative protein sources, including plant-based alternative food products, to lower the demand for animal-based food products (Herrero et al., 2020).

Transformations driven by technology and innovation have induced not only positive but also negative outcomes, for instance, the adverse environmental impact of inorganic fertilizer, as the processes of technological innovations often prioritize economic profitability and overlook societal benefits and sustainability concerns (Béné, 2022; den Boer et al., 2021; Eliasson et al., 2022; Herrero et al., 2020; Leeuwis et al., 2021; Stefanovic et al., 2020). Béné (2022) and den Boer et al. (2021) suggest that the disconnection between technological innovations and effective governance pathways has hindered progress of food systems toward sustainability. Several studies point out that technological interventions should be embedded as part of systemic changes, encompassing the *political* and *personal* spheres to gear such technological interventions to induce positive transformative outcomes (Béné, 2022; den Boer et al., 2021; Eliasson et al., 2022; Herrero et al., 2020; Leeuwis et al., 2021; Stefanovic et al., 2020; Weber et al., 2020).

2.1.2 Collaborative governance for: Political transformations

Achieving transformation in food systems demands a multifaceted strategy that engages various stakeholders across different tiers of governance in the *political* sphere (Stefanovic et al., 2020; Leeuwis et al., 2021; Herrero et al., 2020; den Boer et al., 2021; Eliasson et al., 2022; Weber et al.,

2020; Béné, 2022). Transforming food systems entails challenging the entrenched socio-political and economic structures upholding the status quo (Béné, 2022). To this end, literature calls for collaboration and alignment of diverse actors in the governance (Herrero et al., 2020; Willett et al., 2019). Governance frameworks must exhibit diversity and inclusivity, encompassing not only formal governmental bodies but also fostering collaborative endeavors among societal stakeholders (den Boer et al., 2021; Leeuwis et al., 2021; Ludwig et al., 2022; Weber et al., 2020). As Béné (2022) points out, the discussion surrounding food system transformation is currently dominated by nutritionists and health scientists, lacking socio-political perspectives. As a result, the precise mechanisms for political change for food system transformation remain ambiguous (Eliasson et al., 2021). Nevertheless, amidst this uncertainty, a common thread emerges—the importance of collaboration among all actors (Herrero et al., 2020; Willett et al., 2019).

2.1.3 Paradigm shift for: Personal transformations

According to Willet et al. (2019), food system transformation requires a fundamental shift in paradigms, which requires reevaluation of perceptions and interactions with food systems. However, few studies address the role of individual values, mindsets, and collective paradigm shifts for food system transformation. In their study on integrating internal and external transformation for sustainability, Wamsler et al. (2021) emphasize the importance of aligning external objectives with internal initiatives to facilitate a deeper cultural shift. Moreover, some studies highlight the necessity of mindset shifts and discuss moral values as pivotal in driving systemic food change (Eliasson et al., 2022; Herrero et al., 2020; Webb et al., 2020). In their research on Swedish food system transformation, Eliasson et al. (2022) identified a disconnection between consumers and food production regarding the true value of food. The general Swedish population does not consider food as an experience and culture and therefore, price becomes the dominant determinant when choosing what to consume. The study contends that prevailing policy and economic frameworks continue to endorse the notion of cheap food and consumerism. Therefore, it underscores the necessity for a fundamental shift in values and mindsets within the Swedish society in order to achieve food system transformation (Eliasson et al., 2022).

3 Theoretical framework

3.1 Three Spheres of Transformation

The Three Spheres of Transformation framework is developed as a heuristic tool by O'Brien and Sygna (2013) to understand "how, why and where transformations toward sustainability may take place" (p. 1). The three spheres refer to *practical*, *political*, and *personal* spheres. To achieve sustainability transformations, it is crucial to integrate all spheres, which are not separate from each other but embedded into and interact with each other (O'Brien & Sygna, 2013). This framework is chosen to structure my research as it offers a systems approach towards sustainability.

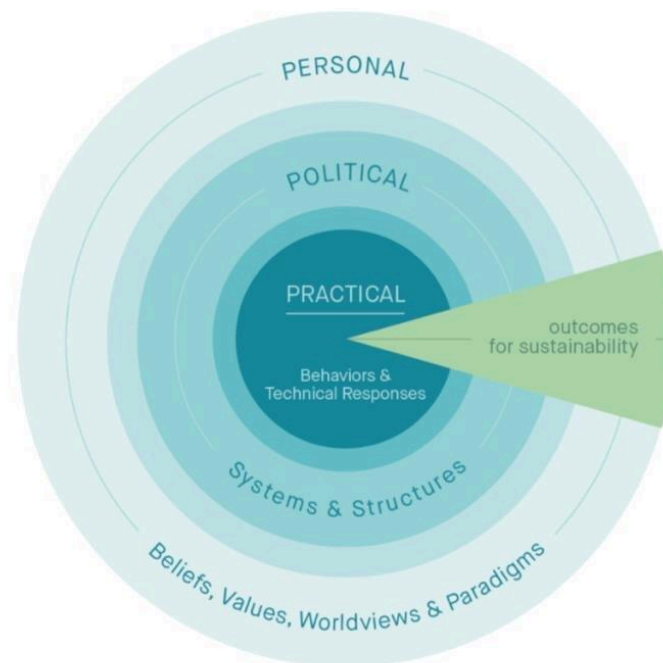


Figure 1. The Three Spheres of Transformation Framework. (Reprinted from O'Brien & Sygna (2013, p. 5))

The *practical* sphere represents specific actions aimed at directly contributing to desired outcomes, including strategies and innovations (O'Brien and Sygna, 2013). It has been the primary focus of sustainability interventions as interventions in this sphere enable monitoring and measuring direct outcomes (O'Brien, 2018). This aspect is mirrored in the food system transformation as well, most studies on food system transformation focusing on technology and innovation (Béné, 2022). While

the *practical* sphere drives the least effective system change (O'Brien, 2018), understanding how entrepreneurs drive changes in the *practical* sphere cannot be understated as the idea of innovation is a key of entrepreneurship (Béné, 2022; Westman et al., 2023). Therefore, I look into how entrepreneurs harness food innovation and strategies to create consumer dietary shifts in RQ1.

The *political* sphere reflects the structure and system that provide enabling and hindering conditions for practical responses (O'Brien, 2018). Systems are connections among components that together create a bigger whole, and structures refer to the elements that influence the design, organization, and governance of systems, e.g., norms, regulations, and institutions (O'Brien, 2018). Therefore, transformations in the *political* sphere often happen through contesting the ruling system and structures that uphold the status quo (Béné, 2022; O'Brien, 2018). Literature on food system transformation underscores the importance of shaping the *political* sphere to align with sustainability-related goals, which will allow steering practical interventions toward desired outcomes (den Boer et al., 2021; Eliasson et al., 2022). Therefore, I explore how sustainable entrepreneurs overcome institutional challenges within the Swedish animal-based food system, shaping the *political* sphere to create favorable conditions to better contribute to reducing animal-based food consumption in RQ2.

The *personal* sphere encompasses individual and collective beliefs, values, paradigms, and worldviews, which subtly yet significantly influence other spheres (O'Brien, 2018). Often referred to as the *inner* sphere (Wamsler, 2020; Wamsler & Bristow, 2022), the *personal* sphere shapes individuals' understanding and construction of systems and structures that drive their behaviors and practices. Despite its profound impact, the *personal* sphere is frequently overlooked (O'Brien & Sygna, 2013; Wamsler et al., 2021). However, there is a growing recognition of the need to address this sphere within sustainability discourse (Ives et al., 2020; Woiwode et al., 2021). Addressing sustainability issues goes beyond technology or governance alone, but necessitates a broader cultural shift that encompasses the *personal* sphere (Wamsler & Brink, 2018). From here, I use the term "mindset" to address different elements in the *personal* sphere and the term "inner transformation" is used interchangeably with the *personal* sphere of transformation (Wamsler & Bristow, 2022). Research on the inner transformation is very limited and I found no research about how entrepreneurs could contribute to the *personal* sphere to induce food system transformation. However, I found it relevant to investigate in RQ3 how sustainable entrepreneurs intervene in this sphere, recognizing the importance of change agents, and inner transformation as key forces for profound transformation.

3.2 Operationalization

This section explains how I operationalized the Three Spheres of Transformation for the case of Swedish plant-based alternative food start-ups. Operationalization involves situating the spheres within the context of the dominating animal-based food system as well as characterizing the elements and concepts in this context. This subsequently shapes the methods and results, as it determines what is included and analyzed.

Figure 2 is a visualization of the outcome for sustainability (O'Brien & Sygna, 2013), plant-based alternative food start-ups' roles in each sphere to reach the outcome, key theories and concepts used to operationalize each sphere. In the *practical* sphere (RQ1), start-ups' role is to create consumer behavior change by facing and overcoming consumer barriers through business strategies. I primarily used the 4Ns concept by Piazza et al. (2015) to analyze consumer barriers (see section 3.2.1). In the *political* sphere (RQ2), start-ups play roles as change agents by facing and targeting institutional challenges within the Swedish animal-based food system. To investigate the institutional challenges and how start-ups address them, a study by Westman et al. (2022) provided guidance (see section 3.2.2). Lastly, in the *personal* sphere (RQ3), start-ups may act as change agents by intervening in mindset shifts to foster plant-based food consumption. To understand how start-ups view mindset shifts and perceive their role as change agents in this, I adopted 5 facets of mindfulness (Table 5), that I synthesized from literature (see section 3.2.3).

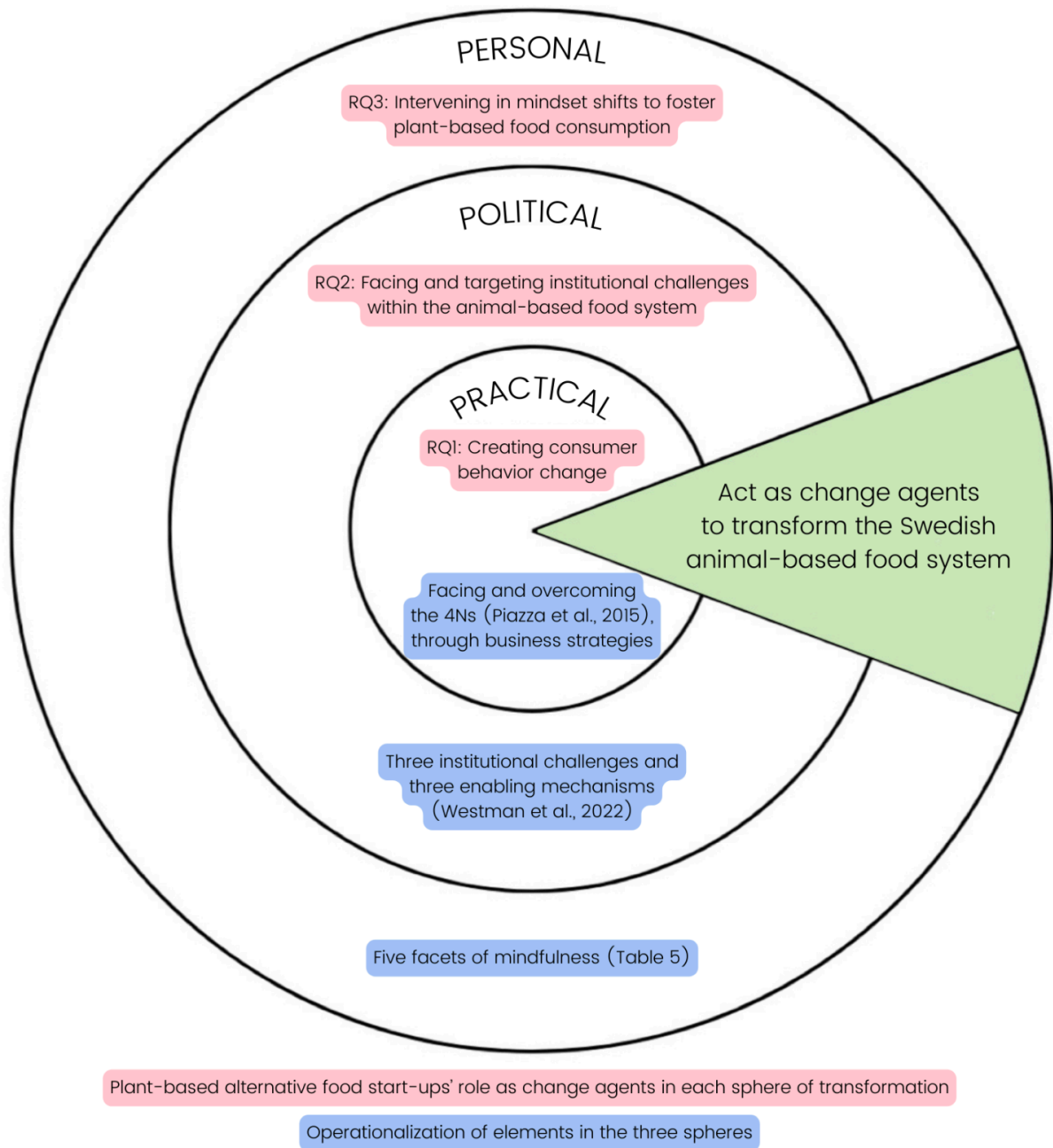


Figure 2. Operationalization of the three spheres for this thesis. Outcome for sustainability is identified as “act as change agents to transform the Swedish animal-based food system” (Source: Based on the Three Spheres of Transformation by O’Brien and Sygna, 2013. Adapted by the author for this thesis)

3.2.1 Practical sphere

Sustainable entrepreneur, as a value-driven actor, is well established to drive transformation in the *practical* sphere through innovation (Klerkx & Villalobos, 2024; Lynde, 2020). According to FAO (2022), development of protein sources alternative to animal-based has accelerated innovation.

Therefore, I argue that plant-based alternative food start-ups play an active role in the *practical* sphere of food system transformation. Key elements of the *practical* sphere include innovation and strategies (O'Brien & Sygna, 2013). Therefore, understanding how plant-based alternative food start-ups create consumption shifts involves looking into how they face and overcome consumer barriers through business strategies and food innovation. Since the average food consumption pattern in Sweden is highly animal-based (Clark et al., 2020), various barriers have to be overcome for dietary shifts (Collier et al., 2021).

To identify consumer barriers, the 4Ns concept by Piazza et al. (2015) presents an entry point (Table 2). These are common rationalizations used to defend people's choice of eating animal-based food: that they are *natural*, *normal*, *necessary*, and *nice* (Piazza et al., 2015). This concept has also been used to analyze Swedish consumers' barriers to replacing meat with plant-based meat substitutes and animal-based dairy with plant-based dairy, which is why I found it suitable for this thesis (Collier et al., 2021, 2023). Although these studies are based on consumers' perspectives, I argue that gaining insights into how businesses view consumer barriers allows the understanding of the processes linking producers and consumers, a point emphasized by Gordon et al. (2017).

Table 2. The '4Ns' concept of how the dominant animal-based food system is upheld and rationalized (Source: Based on Piazza et al. (2015) and Collier et al. (2021, 2023). Summarized by the author)

4Ns	Description
Natural	It is natural for human to eat animal-based food as human naturally craves animal-based food.
Normal	It is normal for humans to eat animal-based food as it is an acceptable practice in my society.
Necessary	It is necessary to eat animal-based food in order to be healthy.
Nice	Meals without animal-based products would not be delicious.

3.2.2 Political sphere

I bring in 3 types of institutional challenges and three enabling mechanisms of sustainable entrepreneurs suggested by Westman et al. (2023) to understand how plant-based alternative food start-ups face and target institutional challenges in the Swedish animal-based food system. Westman

et al. (2023) suggests that to realize shifts toward sustainability, systemic resistance of the ruling system must be overcome, particularly through deconstructing institutions that uphold prevailing systems and structures. Three institutions that support the ruling system are: cultural-cognitive, normative, and regulative institutions (Table 3) (Westman et al., 2023).

Table 3. Three types of institutional challenges for sustainable entrepreneurs, adopted to the Swedish animal-based food system (Source: Based on Westman et al. (2023). Summarized and adopted by the author)

Institutional challenges	Description
Cultural-cognitive	Established social practices, customs, skill set and routines within the Swedish animal-based food system
Normative	Poor alignment of values among sustainable entrepreneurs and other organizations within the Swedish animal-based food system
Regulative	Policies, standards, and regulations not in favor of sustainable entrepreneurship within the Swedish animal-based food system

Westman et al. (2023) argues that sustainable entrepreneurs encounter substantial limitations when attempting to contest the institutional challenges individually. However, their collaborative efforts could better target these challenges thus contributing to shaping transformation processes and driving systemic change in the *political* sphere. The emphasis on collaboration is aligned with literature on food system transformation (Herrero et al., 2021; Willett et al., 2019), which validates using the study of Westman et al. (2023) as guidance. Three enabling mechanisms of entrepreneurs targeted toward these institutional challenges are: *network learning*, *collective norm construction*, and *collaborative advocacy* (Table 4) (Westman et al., 2023). Corresponding to the interactions within the spheres (O’Brien & Sygna, 2013), some elements of institutional challenges and enabling mechanisms manifest in the other spheres. For instance, *network learning* encompasses “dissemination of knowledge to customers to increase the market segment” (Westman et al., 2023, p. 944), which can also be a business strategy that I look at in the *practical* sphere. However, I focus on start-ups’ joint efforts to study their role in the *political* sphere while focusing on their individual business activities in the *practical* sphere.

Table 4. Three enabling mechanisms of sustainable entrepreneurs to deconstruct cultural-cognitive, normative, and regulative institutions (Source: Based on Westman et al. (2023). Summarized by the author)

Three Enabling Mechanisms	Description
Network Learning	<ul style="list-style-type: none"> • “Deliberate efforts to collectively build knowledge and practices within communities of businesses and other organizations” (Westman et al., 2023, p.944). • Network learning involves sharing knowledge and experiences among sustainable entrepreneurs and throughout their supply chains. • Network learning breaks down cultural-cognitive institutions. • Through network learning, sustainable entrepreneurs expand sustainability-oriented market segments and demand, and enhance their competitiveness.
Collective Norm Construction	<ul style="list-style-type: none"> • “Collective action to build new norms and systems of meaning that support and sustain markets” (Westman et al., 2023, p.945). • Collective norm construction underscores shaping sustainability narratives to make their solutions legitimate. • Collective norm construction aims to overcome normative institutional challenges. • Collective norm construction goes hand in hand with network learning as both share the goal of building shared belief systems to support sustainable businesses.
Collaborative Advocacy	<ul style="list-style-type: none"> • “Action taken by coalitions of businesses and allied organizations to shift policies, regulations or other formal rule systems” (Westman et al., 2023, p.946). • Collaborative advocacy involves engaging in formal decision-making processes such as business coalitions and/or councils. • Collaborative advocacy is targeted toward the resistance of regulative institutions. • Collaborative advocacy enables sustainable entrepreneurs to level the playing field by eliminating regulatory constraints or establishing new competitive benefits.

3.2.3 Personal sphere

Research on the *personal* sphere of transformation, i.e., inner transformation is very limited and I found no research about how entrepreneurs could contribute to the *personal* sphere of transformation. However, I found it relevant to investigate to what extent sustainable entrepreneurs act as change agents in this sphere, recognizing the importance of change agents, and inner transformation as key forces for profound transformation. To look into how sustainable entrepreneurs intervene in mindset shifts, I first aim to understand how they view inner transformation. This involves investigating what kind of mindset shift they regard important to transform the Swedish animal-based food system. Moreover, I investigate how they view themselves as change agents in mindset shifts.

Plant-based food consumption is commonly considered as a pro-environmental behavior (PEB) which involves individuals' efforts in changing their daily behaviors and adopting a sustainable lifestyle (Perez-Cueto et al., 2022; Siebertz et al., 2022). Research on sustainable consumption behavior in relation to mindfulness is relatively new (Werner et al., 2020), yet, some inner transformation literature finds mindfulness as inner capacity that fosters PEB (Geiger et al., 2020; Siebertz et al., 2022). From a synthesis of the literature, I identified 5 facets of mindfulness that could potentially affect PEB (Table 5). For the synthesis of the literature, I reviewed 7 articles through search terms including "mindfulness" AND "food*" AND "sustainability".

Table 5. Five main facets of mindfulness that could potentially affect pro-environmental behavior (Source: Geiger et al. (2020), Hunecke & Richter (2019), Siebertz et al. (2022), Thiermann & Sheate (2022), Werner et al. (2020), Winkelmaier & Jansen (2023). Own synthesis by the author)

Five Main Facets of Mindfulness	Description
Disruption of Routines	Becoming aware of unconscious unsustainable consumption routines and making choices more deliberately (Geiger et al., 2020; Hunecke & Richter, 2019; Siebertz et al., 2022; Werner et al., 2020; Winkelmaier & Jansen, 2023).
Congruence of Attitude and Behavior	Ability to convert individuals' sustainability-focused intentions into actual day-to-day behaviors (Geiger et al., 2020; Hunecke & Richter, 2019; Siebertz et al., 2022; Thiermann & Sheate, 2022; Winkelmaier & Jansen, 2023).
Prosocial Behavior and Connectedness to Nature	Widening individuals' focus from being self-oriented and better understand a broader sense of responsibility towards other living beings and non-living nature (Geiger et al., 2020; Hunecke & Richter, 2019; Siebertz et al., 2022; Thiermann & Sheate, 2022).
Values and Meanings in Life	Eudemonic constructions of meaning in life and values, which are opposed to hedonist and materialistic values (Geiger et al., 2020; Hunecke & Richter, 2019; Siebertz et al., 2022).
Personal Health and Wellbeing	Subjective well-being and physical health indicators (Geiger et al., 2020; Hunecke & Richter, 2019; Siebertz et al., 2022; Thiermann & Sheate, 2022; Winkelmaier & Jansen, 2023).

4 Methodology

4.1 Qualitative research

I conducted qualitative research, gathering data through semi-structured interviews with a case study approach to understand plant-based alternative food start-ups perspectives. I embraced an interpretivist/constructivist epistemological stance, emphasizing the agency and influence of the individuals being studied (Weick, 1979). Semi-structured interviews were chosen as they offer flexibility and depth, obtained from interviewees' individual perspectives (Knott et al., 2022). Moreover, the case study approach was chosen as it enables in-depth analysis within a specific context, capturing complex dynamics (Gomm et al., 2009). Given that the qualitative method aims to generate comprehensive insights into context-specific cases, limitations could emerge as findings might not be readily generalized (Bryman et al., 2022).

4.2 Case description

4.2.1 Sweden

I chose Sweden as my case study because, despite its reliance on an animal-based food system, the Swedish government's commitment to transforming its food system is evident. The Swedish government's commitment to promote sustainability within the food system, coupled with their emphasis on increasing food production capacity, enhancing collaboration among stakeholders, promoting innovation, and allowing regulations to better embrace sustainability aligns well with my research focus.

Sweden stands second in the EU for per capita greenhouse gas emissions associated with food consumption, largely attributable to its high intake of meat, dairy, and eggs (Clark et al., 2020; Eliasson et al., 2022). These dietary patterns pose significant risks to public health associated with ischemic heart disease, stroke, and diabetes (Clark et al., 2020; *GBD Compare*, n.d.). The Swedish population witnessed a steady rise in meat consumption until 2016, peaking at 88.3 kg per capita, followed by a gradual decline to 79.3 kg per capita in 2020. However, there was a slight increase observed up to 2022, reaching 80.6 kg per capita (Swedish Board of Agriculture, 2024). A national survey in 2020 revealed a low willingness among the Swedish population to reduce meat consumption, with approximately 75% expressing no intention to eat less meat in the future (Collier

et al., 2021). A study on dietary climate impact among Swedish individuals aged 56 to 95 indicates that red meat consumption in Sweden contributes to 29% of total dietary greenhouse gas emissions, while providing only 11% of total energy intake (Hallstrom et al., 2021). Moreover, Sweden is a significant consumer of dairy products (Van Parys et al., 2023). Per capita milk consumption in Sweden, although fluctuating since 2009, remains 18% higher than that of other high-income countries (Food and Agriculture Organization of the United Nations, 2023). Dairy consumption in Sweden contributes to 30% of total dietary greenhouse gas emissions while providing 24% of total energy intake (Hallstrom et al., 2021).

The Swedish government's recognition of importance in transforming the food system towards sustainability is reflected in the *National Food Strategy for Sweden* (Eliasson et al., 2022; Regeringskansliet, 2017). With a mission to strengthen the country's sustainable development, the *National Food Strategy* entails strengthening Sweden's food production capacity while considering its environmental impacts, enhancing collaboration across the supply chain to address challenges, empowering consumers, and ensuring long-term stability and growth (Regeringskansliet, 2017). Three targeted areas are described as: *rules and regulations*, *consumers and markets*, and *knowledge and innovation* (Regeringskansliet, 2017). Within the focus area of *rules and regulations*, the objective is to redesign rules and regulations to support competitive and sustainable supply chains (Regeringskansliet, 2017). In *consumers and markets*, consumers' ability to make informed decisions towards sustainable diet is emphasized (Collier et al., 2021; Regeringskansliet, 2017). Lastly, *knowledge and innovation* emphasizes the role of innovation in advancing sustainable food production and consumption (Regeringskansliet, 2017).

4.3 Data sampling

Sampling of entrepreneurs and relevant organizations was conducted through purposive sampling and snowballing to target specific groups who have experience within the Swedish food industry (Busetto et al., 2020; Knott et al., 2022). To primarily understand perspectives of plant-based alternative food start-ups, start-ups producing and selling plant-based alternative food: plant-based protein, plant-based dairy, and plant-based fish, were included in the initial sampling as follows.

To gather the data of start-ups, I first identified 6 food-related networks in Sweden through Google search, using search terms including "food network Sweden". Through this, I identified (1) Foodtech Innovation Network, (2) Livsmedelsakademin (Skåne Food and Innovation Network), (3) Krinova, (4)

Good Food Institute, (5) Sweden Food Tech, and (6) Växtbaseratsverige. Based on these websites, I aggregated data of plant-based alternative food start-ups. Without duplicates, there were 26 start-ups that fit in the criteria. Additionally, I identified 1 more start-up through Malmö Food Council. I reached out to all via email and interviewed 9 start-ups (Table 6). Since it was important to understand the perspectives of entrepreneurs, my participants are in leadership positions.

Table 6. Start-up interview participants (Author, 2024)

Start-up Code	Product	Founding Year	Interviewee	Via	Sampling Source
S1	Plant-based dairy	2020	CEO	In-person	Foodtech Innovation Network & Krinova
S2	Plant-based fish	2021	Co-founder & Operations Manager	Video Call	Foodtech Innovation Network & Krinova
S3	Plant-based protein	2017	CEO	Video Call	Foodtech Innovation Network
S4	Plant-based dairy	2016	CEO	Phone Call	Good Food Institute Database
S5	Plant-based protein	2017	Co-founder & Product Development Manager	Phone Call	Good Food Institute Database
S6	Plant-based protein	2022	Co-founder & Product Development Manager	Video Call	Malmö Food Council
S7	Plant-based egg	2021	CEO	Video Call	Krinova
S8	Plant-based protein	2020	Co-founder & Brand	Video Call	Foodtech Innovation Network
S9	Plant-based dairy	2017	Founder & Owner	Video Call	Foodtech Innovation Network

In addition, I included some organizations that work with plant-based alternative food start-ups and facilitate the networking of different food actors in Sweden in my sampling. Interviewing these helped me gain insights regarding RQ2 and helped me diversify perspectives and further avoid a bias toward desired results (Bryman et al., 2022). Among the 6 organizations mentioned above, 3 organizations fit the category of engaging Swedish food start-ups. Additionally, I found Malmö Food Council through personal connection. Ultimately, I reached out to 4 organizations via email and interviewed 2 organizations (Table 7).

Table 7. Organization interview participants (Author, 2024)

Organization Code	Organization	Founding Year	Interviewee	Via
O1	Malmö Food Council	2021	Food Incubator Manager	In-person
O2	Livsmedelsakademin	1994	Project Leader	In-person

4.3.1 Malmö Food Council

Malmö Food Council is a member-based non-governmental organization that aims to support sustainable local food systems by engaging different actors within Malmö kommun (Hem, n.d.). The organization is the only food council in Sweden with 120 members, and it originally stemmed from the environmental department of the Malmö kommun. In 2021, they became an independent organization to connect diverse food actors with the vision of making local food systems sustainable (O2).

4.3.2 Livsmedelsakademin

Livsmedelsakademin is a non-governmental organization in Skåne, with a mission is to “work with complex issues that require cooperation between business, academia, and society and that contribute to an innovative, competitive, and sustainable food industry” (Hem - Livsmedelsakademi, 2019). They partner with different stakeholders, including businesses, research institutes, and the national government. Although the majority of business actors they cooperate with are not start-ups,

3 start-ups in my sample were members of the organization. Therefore, I found it relevant to include Livsmedelsakademin as they engage with a few start-ups and help them connect with other actors.

4.4 Semi-structured interviews

4.4.1 Data collection and interview design

Data collection involved conducting semi-structured interviews in English with 9 entrepreneurs and 2 organizations, between end-February and early-April, 2024. Interviews, lasting between 30 to 60 minutes, were conducted in person, via video call, or phone call, based on interviewees' availability. Interview questions were developed deductively based on the Three Spheres of Transformation framework and aforementioned theories and concepts. However, these were supplemented with broader, open-ended questions to accommodate emergent insights and align with the exploratory nature of this thesis, allowing participants to explain their experience in their own words (Bryman et al., 2022; Knott et al., 2022). I developed interview questions separately for start-ups and 2 external organizations. While I followed a topic guide, I allowed myself to ask follow-up questions and diverge from the structure when it was necessary for the flow of the interviews (see Appendix A and Appendix B) (Knott et al., 2022).

4.4.2 Ethical considerations

All participants received a detailed consent form prior to the interviews (Appendix C), outlining the purpose, procedures, and confidentiality measures of the study (Bryman et al., 2022, p. 140). Participants provided informed consent for both participation in the interview and the recording. Anonymity was maintained by refraining from disclosing the names of the start-ups. Explicit permission was obtained from Malmö Food Council and Livsmedelsakademin to include their names of the organizations in the thesis. Additionally, participants were informed about their right to withdraw from the study at any time without consequences.

4.5 Data preparation and analysis

The interviews were recorded and transcribed primarily using an AI-driven transcription tool (Otter.ai), with manual corrections. To maintain focus on content rather than manner of speech, an intelligent verbatim transcription approach was employed (Knott et al., 2022). The intelligent

verbatim transcription approach involves capturing the essence of what is said while omitting unnecessary elements such as false starts, repetitions, and filler words (Knott et al., 2022).

Nine interviews with start-ups were analyzed to answer all 3 research questions; however, 2 interviews with Malmö Food Council and Livsmedelsakademin were only analyzed to answer the RQ2. This is because I found it irrelevant to ask these organizations about start-ups' business strategies and how the start-ups view inner transformation. On the other hand, these organizations were identified to be strong support systems for the start-ups facilitating networking, and thus can provide valuable insights for the *political* sphere (RQ2).

Data analysis followed a six-step thematic analysis guideline by Knott et al. (2022) (Figure 3), facilitated by the NVIVO coding program. This iterative process involved multiple rounds of transcript review, coding application, and refinement to ensure coherence and relevance to the thesis' analytical focus (Knott et al., 2022).

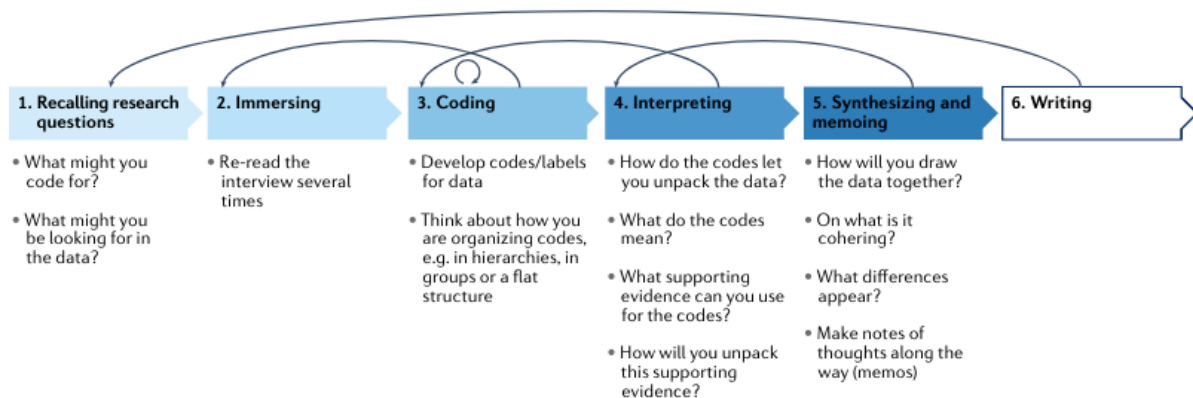


Figure 3. A six-step thematic analysis guideline (Source: Reprinted from Knott et al. (2022, p. 8), applied to the analysis of 11 interviews in this thesis)

To address RQ1, I analyzed the consumer barriers encountered by start-ups, and linked them with the 4Ns concept where applicable (Piazza et al., 2015). Then I looked at business strategies, an element of the *practical* sphere (O'Brien & Sygna, 2013). Taking an interpretivist approach, business strategies to overcome consumer barriers were categorized into 3 parts: product development, communication and branding, and business development. For RQ2, I categorized the collaborative efforts of start-ups into three enabling mechanisms, exploring how these efforts target institutional challenges and reveal nuanced details about them. Institutional challenges were also categorized into 3 based on

Westman et al. (2023). Lastly, I delved into start-ups' perspectives on mindset shifts and their perception of being change agents for inner transformation. I categorized mindset shifts they view necessary based on the 5 facets of mindfulness I synthesized (Table 5). Despite the initial separation of interview questions based on *practical*, *political*, and *personal* spheres, some responses overlapped, reflecting the interconnected nature of these spheres as highlighted by O'Brien and Sygna (2013).

5 Results and analysis

This section presents the results and analysis of 9 interviews with plant-based alternative food start-ups and 2 interviews with Malmö Food Council and Livsmedelsakademin. The section consists of 3 sub-sections: 5.1 Practical sphere, 5.2 Political sphere, and 5.3 Personal sphere.

5.1 Practical sphere

Consumer barriers and business strategies were revealed in the *practical* sphere, and I analyzed them to understand how plant-based alternative food start-ups face and overcome the barriers to create consumer behavior change (RQ1). Six themes in the barriers are: (1) *affordability*, (2) *familiarity*, (3) *sensory experience*, (4) *health*, (5) *availability and visibility*, and (6) *veganism discourse*. Business strategies are categorized into: (1) product development, (2) communication and branding, and (3) business development. Figure 4 visualizes how different business strategies address each consumer barrier.

While the 4Ns concept by Piazza et al. (2015) was used to uncover consumer barriers to plant-based alternative food, not all 6 themes correspond to the concept (Table 8). This might have occurred as I investigated consumer barriers from a business perspective, which might have uncovered aspects that could not be captured by consumer's perspective. As one participant noted, there could be a gap between consumer's intention and actual behavior: "[...] if you ask around [...] everyone says that they don't eat much meat. [They say] they are eating much more vegan [food], but when you look at how they buy in the stores, that's not true" (S5).

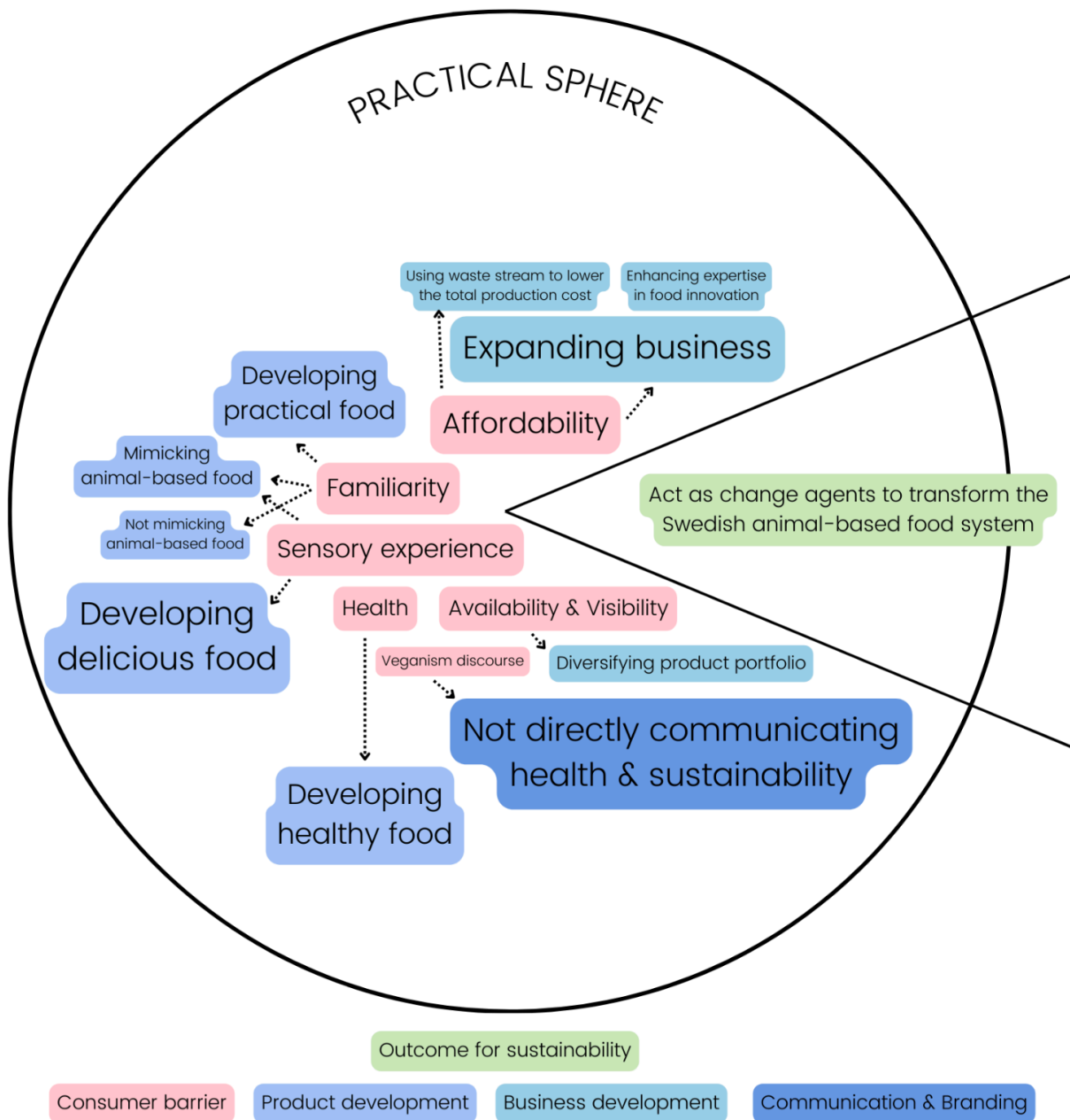


Figure 4. Consumer barriers (pink) and business strategies (blue) to overcome the consumer barriers, identified in 9 interviews with plant-based alternative food start-ups. Text size signifies the importance of each element, as justified by the interviews. The arrows represent the connectedness between barriers and strategies (Source: Inspired by the Three Spheres of Transformation by O'Brien and Sygna, 2013. Created by the author)

5.1.1 Consumer barriers to plant-based alternative food

5.1.1.1 Affordability

Affordability emerged as the biggest consumer barrier (n=9). All start-ups demonstrate an understanding of the pivotal role of price in influencing consumer decisions. Despite some consumers harboring positive inclinations toward plant-based options, price considerations ultimately deterred purchases, as expressed by the participant S2: “[Consumers] know sustainability, [...] at the end of the day, it comes down to price.” Start-ups face difficulties in achieving price parity with animal-based counterparts for several reasons. First, scaling up production to lower production costs becomes crucial for price alignment, yet start-ups face financial hurdles to scale up their productions. Moreover, institutional challenges within the current animal-based system compound these struggles (see section 5.2.1).

5.1.1.2 Familiarity

Familiarity emerged as the second biggest barrier (n=7). Interviewees cited habit, norms, tradition, and customs as factors influencing consumer’s preference for animal-based over plant-based alternatives, corresponding to *normal*. This is embedded in the Swedish animal-based food system, as highlighted by S4: “[...] most of the things that we eat today are from habits. [...] If you're grown up in a country like Sweden, where you drink milk even though you are an adult, [...] it's a habit that you got from growing up.” Moreover, *familiarity* encompasses aspects such as taste, texture, and appearance of plant-based alternative foods, which are often perceived as less familiar than animal-based food (n=4). This corresponds to *nice*, as consumers tend to enjoy the taste of familiar food. However, it was noted that younger generations in Sweden embrace plant-based alternatives more readily from an early age, suggesting that this barrier will diminish over time.

5.1.1.3 Sensory experience

Sensory experience was the third biggest barrier (n=6). Start-ups are aware that some consumers perceive plant-based alternative foods as less satisfying in terms of taste and texture, corresponding to *nice*. As food businesses, this barrier is the main focus for many start-ups when operating their businesses (n=7) (see section 5.1.2.1).

5.1.1.4 Health

Health was the fourth biggest barrier (n=5). Four of the 5 start-ups highlighted that many of current plant-based alternative options contain high sugar and are highly processed. One start-up also noted the lack of attention to other nutritional aspects in products, citing that many solely focus on protein content. While *health* is closely linked to *necessary*, the participants primarily focused on the perceived lack of healthiness in plant-based options rather than the unquestioned belief that animal-based food is healthy. They emphasized the increased consumer awareness of the health risks associated with animal-based food consumption.

5.1.1.5 Availability and visibility

Availability and visibility was equally as significant as *health* (n=5). The lack of abundance and diversity of plant-based options are reasons for their low visibility. One participant highlighted that there are limited plant-based alternative sources in the current market, which leads to low diversity. Moreover, start-ups struggle to make their offerings stand out on the shelves partially because they offer a narrow range of products due to small operations. Furthermore, plant-based alternative options are often overshadowed by animal-based food products, as captured by this quote: “*Even if people want to eat more vegetarian or vegan [food], when they are in a store, they might see some meat products that they like or that they think it's a good price[, they] buy it instead of buying vegan products*” (S5). Additionally, cultural-cognitive institutions exacerbate *availability and visibility* (see section 5.2.1.1).

5.1.1.6 Veganism discourse

Veganism discourse emerged as another barrier (n=1). Although voiced by only a single participant, it seemed to resonate with multiple start-ups, each clarifying their aim to not advocate for exclusively plant-based diets (see section 5.1.2.2). Discussions surrounding veganism can sometimes become polarizing, potentially influencing individuals against transitioning towards a more plant-based diet.

Table 8. Six themes of consumer barriers summarized and connected to the 4Ns where applicable. See Table 2 for the definition of the 4Ns concept by Piazza et al. (2015) (Author, 2024)

Themes	Description	Connection with the 4Ns
Affordability	Consumers find it hard to afford plant-based alternative food products	N/A
Familiarity	Consumers are not familiar with plant-based alternative food products	<i>Normal and Nice</i>
Sensory Experience	Consumers view plant-based alternative food products to be less satisfying in terms of taste and texture, compared to animal-based food	<i>Nice</i>
Health	Consumers think plant-based alternative food products are not healthy	<i>Necessary</i>
Availability and Visibility	Consumers cannot easily find plant-based alternative food products in stores	N/A
Veganism Discourse	Consumers are reluctant to shift to plant-based diet as veganism discourse has been polarizing	N/A

5.1.2 Business strategies

5.1.2.1 Product development

The primary goal for start-ups is to deliver products with outstanding taste and texture, targeting *sensory experience* barrier (n=7). Similarly, start-ups supplying plant-based alternative ingredients to food companies aim to help their partners develop high-quality plant-based alternatives regarding *sensory experience* (n=2). Each company employs varying degrees of food innovation to achieve this, ranging from fundamental techniques like fermentation, food microbiology, and food chemistry to more innovative technologies such as protein isolation, novel plant-based protein production, and proprietary inventions.

Start-ups hold varying perspectives on whether plant-based alternative foods should mimic their animal-based counterparts or not. Five indicated the necessity to mimic animal-based foods in terms of taste, texture, and appearance to overcome *familiarity* barrier (n=5). While acknowledging the presence of vegan and vegetarian consumers, they emphasized the need to target a broader

demographic of consumers including meat-eaters. From their market insights, mimicking animal-based food is essential to reach broader consumer segments.

Conversely, 4 emphasized their objective to not replicate animal-based counterparts, but to introduce a new food category (n=4). Some do this while maintaining the functionality of animal-based products to overcome the *familiarity* barrier. For instance, plant-based cheese need not mimic the taste of dairy cheese but should still have the same melting properties as dairy. Notably, this participant highlighted a contrasting perspective on product replication, suggesting that efforts to mimic animal-based primarily target vegan consumers. From their point of view, mimicking animal-based food is not necessary to reach a broader consumer segment. While vegan consumers may seek plant-based alternatives that mimic specific animal-based products, e.g, blue cheese, non-vegan consumers prioritize taste and functionality over product specificity.

Developing practical products to overcome the *familiarity* barrier was emphasized (n=7). One strategy is by developing food products that align with existing products, such as breaded fish, burgers, and meatballs. Another approach is to produce par-cooked and pre-marinated products to facilitate easier consumption. Additionally, enhancing the *familiarity* of products is achieved by utilizing natural, local, and few ingredients.

While the *health* barrier is not the primary focus during product development for most, many ensure their products possess a comparable nutritional value compared to their animal-based counterparts (n=8). Start-ups rely on nutrient-rich ingredients and supplement their products with substances, e.g., omega-3 fatty acids, to enhance their overall nutritional profile. Using “sustainable” ingredients, e.g., plant-based, organic, healthy, was also highlighted to reduce *health* barrier.

5.1.2.2 Communication and branding

While there is consensus on the significance of lower environmental impact and health considerations in product development, most start-ups concur that these aspects are not their primary focus in communication and branding (n=5), to address the *veganism discourse* barrier. While the *veganism discourse* emerged as the least significant barrier, it was evident that it resonated with multiple start-ups, as not framing their products as “sustainable” and “healthy” was an important part of their communication strategies. Targeting a diverse consumer base extending beyond vegans requires a nuanced approach, where overtly discussing environmental sustainability

and health might deter some potential customers. Start-ups asserted that these characteristics should be inherent to their products, but should not be the central selling point, as captured by this quote: “You can’t say this is a healthy product for you and this is a sustainable product. They are not gonna buy it. This is a vegan product. No. This is a vegetarian product. No. You can’t say that. The product needs to talk for itself” (S4). S4 stressed the importance of product naming aligned with this approach, describing their trial of different names for the same food product to assess consumer response. They found that products labeled with terms like "sustainable," "healthy," or "vegetarian" sold the least, despite being identical to the product named “Italian herbal lasagne”.

Start-ups articulated that their emphasis on communication and branding revolves around positive messaging that highlights the merits of their products, rather than advocating against animal-based food consumption aligned with addressing the *veganism discourse* barrier. They stressed the importance of fostering trust and loyalty among consumers through an approach that is inspiring, friendly, humorous, and transparent, to gently push consumers to consume more plant-based.

5.1.2.3 Business development

Expanding business is pivotal for many start-ups in addressing the *affordability*, and *availability and visibility* barriers (n=6). Scaling up their businesses could decrease production costs, subsequently lowering end prices. Additionally, some leverage waste streams from larger companies to lower production expenses, using waste as their primary ingredients (n=2). Moreover, start-ups strategically diversify their product offerings to enhance *availability and visibility*, by expanding their product portfolio to encompass a variety of products.

Moreover, some start-ups prioritize food innovation as a cornerstone of their growth strategy (n=3). Recognizing the potential for innovation within the food sector, they focus on research and development to enhance the quality of plant-based alternative options to address the *sensory experience* barriers. They view innovation as a pathway to unlocking new opportunities for business expansion and market penetration, partially to be able to address *affordability*, and *availability and visibility* barriers.

5.2 Political sphere

Through interviews with 9 start-ups, Malmö Food council, and Livsmedelsakademin, 3 types of institutional challenges and three enabling mechanisms (Table 3 and 4) of plant-based alternative start-ups were revealed (RQ2). Institutional challenges consist of 6 *cultural-cognitive*, 2 *normative*, and 4 *regulative* institutional challenges within the Swedish animal-based food system (Figure 5). To target these, all start-ups engage in extensive *network learning*, with some also involved in *collective norm construction*, and a few engaging in *collaborative advocacy* (Table 10). Malmö Food Council and Livsmedelsakademin were identified as support systems, facilitating the enabling mechanisms (Table 10).

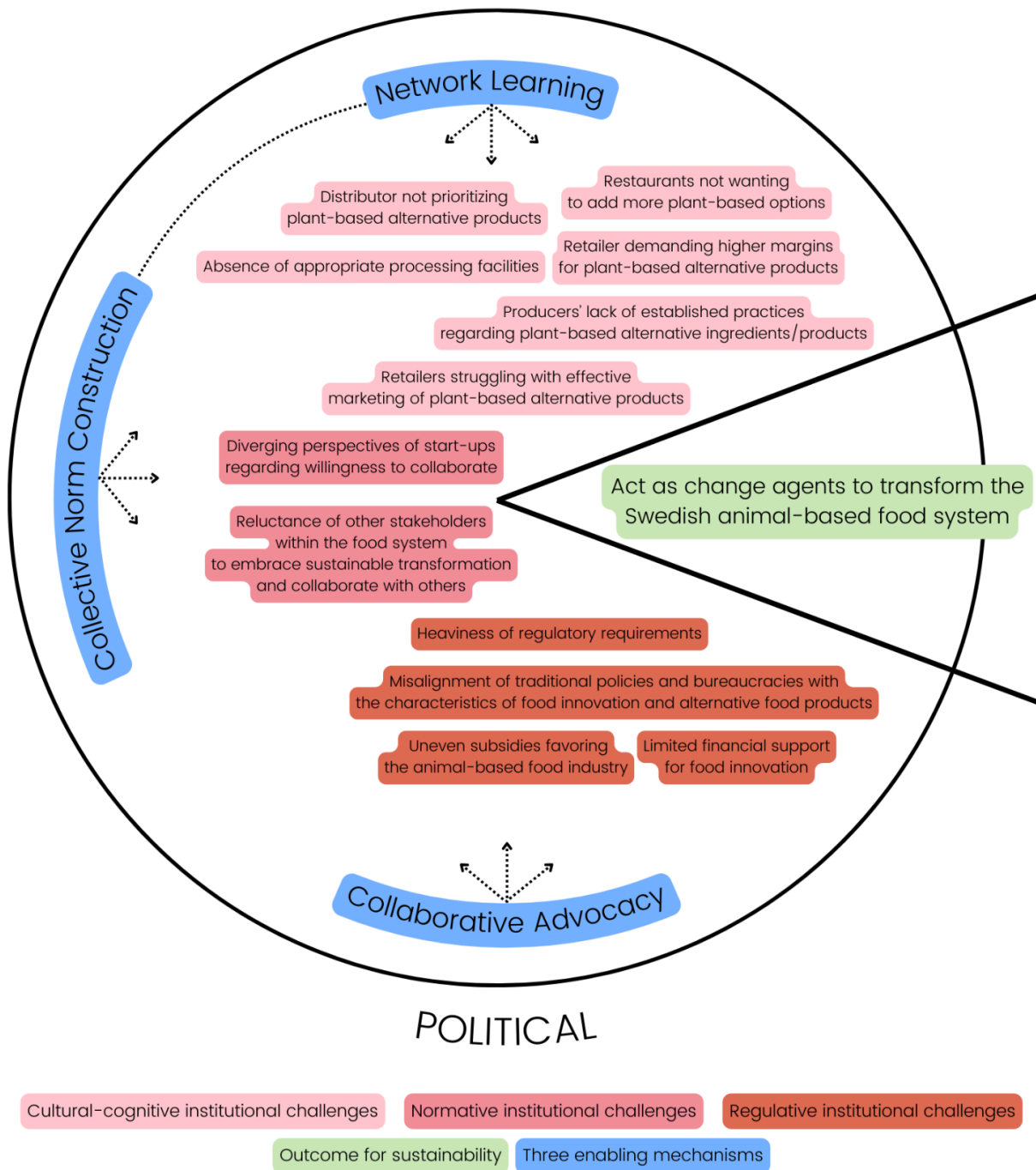


Figure 5. Cultural-cognitive, normative, and regulative institutional challenges and three enabling mechanisms. The arrows show how three enabling mechanisms target different institutional challenges. Network learning and collective norm construction are connected as they go hand in hand with one another (Source: Institutional challenges and three enabling mechanisms by Westman et al. (2023), created by the author for the case of the plant-based alternative food start-ups in the Swedish animal-based food system, inspired by the Three Spheres of Transformation framework by O'Brien & Sygna (2013))

5.2.1 Institutional challenges within the Swedish animal-based food system

5.2.1.1 Cultural-cognitive institutional challenges

Start-ups encounter 6 *cultural-cognitive* institutional challenges in their collaborations with industry partners throughout their supply chains. Firstly, some confront a lack of producers' familiarity and established practices regarding novel plant-based ingredients, e.g, hemp and mycoprotein (n=2). Moreover, (2) the absence of appropriate processing facilities presents a significant hurdle in implementing innovative solutions, necessitating substantial investments in new machinery and equipment upgrades (n=2). Challenges when working with distributors and retailers were also identified (n=4). From the start-ups' point of view, (3) distributors often do not prioritize plant-based alternative food products partially due to lower profitability. (4) Retailers frequently demand higher margins for stocking plant-based alternatives, placing financial strain on both distributors and start-ups, who must contend with selling products at lower margins compared to animal-based counterparts. This aspect exacerbates the *affordability* barrier as the end cost of plant-based alternative products ultimately gets more expensive compared to animal-based food. Additionally, (5) some retailers struggle with marketing these products as they lack experience with plant-based alternatives, exacerbating *availability and visibility* barrier. Furthermore, (6) start-ups supplying restaurants encounter resistance from establishments unwilling to expand their plant-based offerings, reducing the *availability and visibility*, citing the need for recipe development, menu updates, and promotional efforts.

5.2.1.2 Normative institutional challenges

Two *normative* institutional challenges were found: (1) diverging perspectives of start-ups regarding willingness to collaborate; and (2) reluctance of other stakeholders within the food system to embrace sustainable transformation and collaborate with others. I found that start-ups within the plant-based alternative food industry hold diverging views on collaboration. While all participants recognized the importance of collaboration to expand their influence and some displayed strong enthusiasm to collaborate, an interplay of cooperation and competition emerged (Table 9). Given their shared niche, a sense of competition appeared inevitable. For some, constraints in time and resources are hindering aspects that affect their engagement with other entrepreneurs (n=4). As leading start-ups necessitates high work loads, these participants explained that they simply do not manage to foster deeper connections with others even if they wish to. Furthermore, practical

concerns and trust deficits surfaced regarding transparent collaboration and technical knowledge-sharing, partially affecting their willingness to collaborate as captured by the following quote:

“You have to invent so much by yourself and that is worth so much money [...] So you don't want to share it with anyone else. Because then they can take your invention [...] I think that is the little problem. I've been talking about it with other companies. Well, all of us think the same. It would be nice if there was a little group of companies that work together and could share their thoughts and their inventions. But no one wants to do that because that is worth something in your company” (Anonymous).

Despite this diverging view, my result shows that all start-ups engage in some sort of knowledge sharing and networking (see section 5.2.2.1), which could be explained by how differently start-ups define collaboration and to what extent they are willing to collaborate.

Table 9. Selected quotes demonstrating a sense of competition and collaboration identified from interviews (n=9). I found it inadequate to quantify how many are willing to collaborate and how many are not willing to collaborate, as there was a nuanced interplay of competition and collaboration. For instance, the quote in the paragraph above demonstrates that while one is reluctant to collaborate due to practical concerns, they still hold a positive view on collaboration (Author, 2024)

	Competitive	Not Competitive
Quotes	<p><i>“If you're in the same niche, it's more like your vegan or vegetarian colleague is more of a competitor. It's tough out there and it's business, so you have to be [competitive]”</i> (Anonymous participant).</p> <p><i>“...if you think about sharing knowledge and so on, I would say that that's something that people are not that good at. It's also a bit competitive”</i> (Anonymous participant).</p>	<p><i>“There's a really nice friendly tone in Sweden within the plant based startups. I would say that we are more friends than we are competitors. From the beginning, we have been very keen on trying to help and support each other. [...] We are all on the same mission”</i> (Anonymous participant)</p> <p><i>“Companies in the startup food tech space are not competitors. Even if you seemingly have similar products, everyone sees it as we are on a mission together”</i> (Anonymous participant)</p>

The other *normative* institutional challenges involve various actors within the food system. While some start-ups noted a growing consciousness among different food actors regarding the necessity

of transforming the system for health and environmental sustainability reasons, others observed a lack of awareness (n=3). Moreover, a notable obstacle lies in the reluctance of some players within the food system to embrace change and acknowledge the importance of collaboration. Communication gaps further exacerbate the situation, as different actors often fail to engage in meaningful dialogue with each other (n=4).

5.2.1.3 Regulative institutional challenges

Four *regulative* institutional challenges were identified: (1) heavy regulatory requirements; (2) misalignment of traditional policies and bureaucracies with the characteristics of food innovation and alternative food products; (3) uneven subsidies favoring the animal-based food industry; and (4) limited financial support for food innovation. Firstly, regulatory requirements and permits within the food sector impose significant financial burdens on start-ups (n=5). Moreover, the lack of collaboration within the food industry, explained as *normative* institutional challenges (see section 5.2.1.2), exacerbates this constraint. For example, if companies were to share processing facilities and premises, significant cost and resource savings could be achieved. Livsmedelsakademin suggested that fostering industrial symbiosis could alleviate this challenge, wherein start-ups and large companies mutually benefit each other by offering innovative solutions and shared facilities (O2).

The second significant *regulative* institutional challenge is within the mismatch between traditional policies and bureaucracies and the characteristics of food innovation and alternative food products (n=4). Lengthy bureaucratic processes at both national and European levels were expressed by the following quote:

“Bureaucracy makes things take a long time, sometimes way too long. And unfortunately, in innovation, you can't wait. You are a start-up meaning you have money for a year to survive [...] you might go bankrupt. [...] There are some struggles with bureaucracy that really inhibit moving fast, but moving fast is one of the characteristics of innovation and transformation” (S7).

Moreover, inconsistency in food labeling regulations across *kommuns* in Swedish regions was identified (n=1). For instance, while one *kommun* in Skåne permits the use of the term "buttery" for plant-based butter, another prohibits it, leading to confusion and regulatory hurdles.

Furthermore, significant subsidies and support for the animal-based food industry create an uneven playing field, hindering the ability of plant-based alternative food start-ups to compete under the same conditions (n=4). Consequently, this imbalance contributes to higher end prices for plant-based alternative food products which was identified as the biggest consumer barrier: *affordability* (see section 5.1.1.1).

Lastly, limited financial support for food innovation was highlighted (n=2) as another challenge. For instance, there is no grant nor incentive for innovative plant-based resources. Moreover, the recent 50% reduction in funding for food tech innovation by the Swedish government further compounds these challenges (Cybercom, 2023). Furthermore, it was noted that funding for food innovation predominantly prioritizes technical advancements, while social innovation aims to reshape norms and mindsets is frequently overlooked (O2).

5.2.2 Three enabling mechanisms targeting the institutional challenges

Findings show that plant-based alternative food start-ups employ three enabling mechanisms to differing extents targeting institutional challenges. The three enabling mechanisms are: *network learning*, *collective norm construction*, and *collaborative advocacy* (Table 10). It was observed that all start-ups actively participate in *network learning*: (1) within their own networks, (2) across their supply chains, and (3) with other stakeholders in the system. *Collective norm construction* emerged as a less prevalent enabling mechanism, identified in 4 of the start-ups. *Collaborative advocacy* was recognized in 2 of the start-ups. Collaborative efforts often take place in official platforms such as start-up incubators, innovation networks, exhibitions, fairs, and conferences. Interviews with Malmö Food Council and Livesmedelsakademin provided useful insights as they facilitate network events and incubator programs (see section 5.2.2.4).

5.2.2.1 Network learning

All start-ups engage in *network learning* among entrepreneurs for deconstructing cultural-cognitive institutions (n=9). Sharing advice and experience via phone call is a common way of *network learning* in private settings. Many participate in start-up incubators, innovation networks, exhibitions, and conferences to connect with each other and moreover discover collaborative projects, co-founders, and potential partners (n=5).

Network learning by building knowledge and practices permeates several stages of the supply chain, targeting *cultural-cognitive* institutions. Some start-ups collaborate with producers, sales companies, food service sectors, and distributors specializing in plant-based products, expanding their market segment (n=3). In some cases, this cooperation involves knowledge sharing by start-ups to their partners. For instance, one start-up conducts workshops for their business-to-business customers, educating them about product development with novel plant-based alternative sources. Start-ups do not limit their collaborations to partners exclusively within the plant-based food segment. One start-up emphasized strategic partnerships with traditional meat companies in developing half-meat, half-plant-based sausages, fostering new practices within the food industry (S3). Another aspect of knowledge-sharing with non-plant-based industry partners involves education about product categorization, communication strategies with end consumers, establishing vegetarian sections in stores (n=2).

Building knowledge and new practices encompasses collaborating with research institutions and large corporations (n=6). These involve validating and testing products, initial product development, and waste valorization. While research centers boast advanced technology, they often lack market and consumer insights. Entrepreneurs play a crucial role in bridging this gap, leveraging their market expertise and insights to foster mutual benefits. Collaborating with large corporations also presents mutual benefits, as start-ups offer innovative solutions while large corporations provide facilities and extensive production capacities. While waste valorization lowers production costs for start-ups as mentioned in the section 5.2.1.3, this enhances circularity within the supply chain for large companies and thus creates reciprocal benefits. Cooperation that brings mutual benefits overlap with *collective norm construction* (see section 5.2.2.2). One start-up highlighted that signing non-disclosure agreements with partners to safeguard their intellectual properties facilitate technical collaborations, alleviating concerns around protecting intellectual property.

5.2.2.2 Collective norm construction

Collective norm construction emerged as the second prominent enabling mechanism, deconstructing *normative* regulations by collectively building new norms (n=4). This process unfolds within start-up incubators, innovation networks, as well as external exhibitions and fairs and it goes hand in hand with *network learning*. Start-ups engaging with large companies emphasized the importance of building partnerships based on trust. Interviewees emphasized that food actors including large corporations acknowledge the pivotal role of start-ups in offering innovative solutions that deviate

from conventional norms and practices (P4, O2). Harnessing this opportunity, some start-ups strategically establish themselves as innovation experts to become trusted partners by enhancing their expertise in innovation. When engaging with other actors, e.g., large companies, within the food system, establishing common ground and collaboratively identifying industry challenges were deemed crucial, as said by S4: “[...] *what is really important here is that we find common ground, something that we all look for a problem that we would like to solve [...] create a win-win-win that everybody is gaining something from this cooperation.*”

Moreover, participants underscored the importance of investors’ belief in innovation. To this end, start-ups actively participate in fairs and exhibitions, where investors are often present, to discuss global food production issues and present innovative ideas. Notably, one participant cited that they found an investment opportunity in another plant-based alternative food start-up at a food fair—an illustrative example of leveraging such a platform.

5.2.2.3 Collaborative advocacy

A few start-ups are involved in business coalitions or are open to the idea of participating to better target *regulative* institutions (n=2). On a national level, Vaxtbaseratsverige (Plant-based Sweden) was highlighted as an organization primarily composed of plant-based food companies, aiming to influence policies and regulations. Similarly, one start-up mentioned initiating a business coalition with incubators in other European countries. However, these initiatives were recent and have yet to yield any tangible results to shift policies and regulations to create favorable conditions for plant-based start-ups.

5.2.2.4 Support system to facilitate the three enabling mechanisms

Malmö Food Council and Livsmedelsakademin serve as robust support systems, providing valuable networking opportunities for start-ups to connect with various stakeholders within the industry. Drawn from start-ups’ perspectives, it was evident that networking opportunities these organizations provide facilitate the 3 enabling mechanisms.

According to Malmö Food Council, networking opportunities for start-ups are crucial as they facilitate replication within the plant-based food sector (O1). In their *food incubator program*, they invite entrepreneurs with more experience as guest speakers, providing new entrepreneurs with

inspiration as captured by this quote: “All start-ups start with an individual with one idea. [...] These ideas do not come from nowhere. It’s like a little bit of a chain reaction” (O1).

Livsmedelsakademin also serves as a catalyst for connecting and fostering collaboration among various stakeholders in the food industry (O2). This encompasses forging connections between large food corporations, start-ups, and academia to facilitate knowledge exchange and drive forward innovation and sustainability endeavors. Through initiatives like the *Innovation and Sustainability Network* and the *CEO Network*, Livsmedelsakademin promotes connectivity within the food industry, facilitating sharing of best practices and resources among industry players.

Furthermore, both organizations emerge as vital pillars in supporting *collective norm construction* within the food industry. According to Livsmedelsakademin, transformations in the food system might involve risks, and distributing these risks evenly throughout the entire chain becomes vital (O2). Discussions within their networks involve collectively examining issues within the current food system, identifying opportunities and the common ground, and fostering innovations. By doing so, their members not only find new knowledge but also inspiration and companionship, creating a sense of community.

Support for *collaborative advocacy* from both organizations was also identified. Malmö Food Council highlighted their close ties with the Malmö municipality, being initiated by the municipality (O1). This connection enables their members to effectively influence policies and regulations. Through their intersectional workshops, they foster connections among their members including politicians and plant-based start-ups, which are gaining more visibility due to increasing numbers. Livsmedelsakademin also underscored their role in unifying voices across the food system chain (O2). They facilitate connections between various stakeholders, including the food industry, academia, governmental bodies, farmers, and civil society, recognizing the critical importance of interconnectedness. From their perspective, disjointed voices may lead to suboptimal outcomes, whereas engaging multiple stakeholders can draw attention to pertinent issues, prompting policymakers to take appropriate action. While not politically affiliated, they emphasized their role of connecting the dots and facilitating engagement of different stakeholders to reshape the *regulative* institutions.

Table 10. Three enabling mechanisms to target institutional challenges within the Swedish animal-based food system. The last column shows Malmö Food Council and Livsmedelsakademin’s roles as support systems, facilitating the enabling mechanisms (Source: Three enabling mechanisms by Westman et al. (2023), created by the author based on the results)

Three Enabling Mechanisms	Description	Malmö Food Council and Livsmedelsakademin as support systems
Network Learning (n=9)	<ul style="list-style-type: none"> (1) Sharing advice and experience among start-ups (2) Educating industry partners about plant-based alternative product development, categorization, and communication with consumers (3) Fostering new practices by partnering with traditional meat companies (4) Collaborating with research institutions to build new knowledge and practices, seeking mutual benefits (5) Collaborating with large corporations to build new knowledge and practices, seeking mutual benefits 	<ul style="list-style-type: none"> (1) Fostering networking among plant-based food entrepreneurs (2) Forging connections between large food corporations, start-ups, and academia to facilitate the exchange of knowledge and drive forward innovation and sustainability endeavors
Collective Norm Construction (n=4)	<ul style="list-style-type: none"> (1) Establishing start-ups’ roles as trusted partners by enhancing expertise in innovation (2) Establishing common ground and collaboratively identifying industry challenges within the food system (3) Discuss global food production issues and present innovative ideas at fairs and exhibitions to influence investors 	Establishing networks to identify common ground and collectively undertake risks involved in transformation
Collaborative Advocacy (n=2)	Being involved in business coalitions to be able to influence policies, standards, and regulations	Fostering connections to enhance communication between multiple stakeholders including politicians and start-ups

5.3 Personal sphere

Through 9 interviews with the start-ups, I analyzed how start-ups view mindset shifts and how they perceive their role as change agents for inner transformation (RQ3). My findings indicate that all plant-based alternative food start-ups recognize the importance of mindset shifts to promote plant-based food consumption (n=9), while not viewing themselves as change agents in the *personal* sphere of transformation. During interviews, entrepreneurs touched upon various aspects of mindset shifts that would promote plant-based food consumption, which I found connections to the 5 facets

Additionally, the significance of empathy, compassion, and ethical considerations, including animal welfare and sustainability concerns were highlighted.

The second prominent facet was the *disruption of routines* (n=5). Participants agreed that consumers becoming more aware of their choices and the impacts of those choices are crucial in disrupting their consumption routines. Open-mindedness and consciousness were mentioned as factors fostering this facet. *Personal health and wellbeing*, and *congruence of attitude and behavior* were equally discussed. Participants highlighted the importance of prioritizing personal health as a factor in dietary shifts (n=3). They also agreed that bridging the gap between awareness and action poses challenges (n=3), with curiosity being mentioned as a potential tool in addressing this value-action gap as said by S8: “if you're curious, you ask questions, you try new things and you change things”. Lastly, one participant identified going against materialistic *values and meanings in life* as integral (n=1).

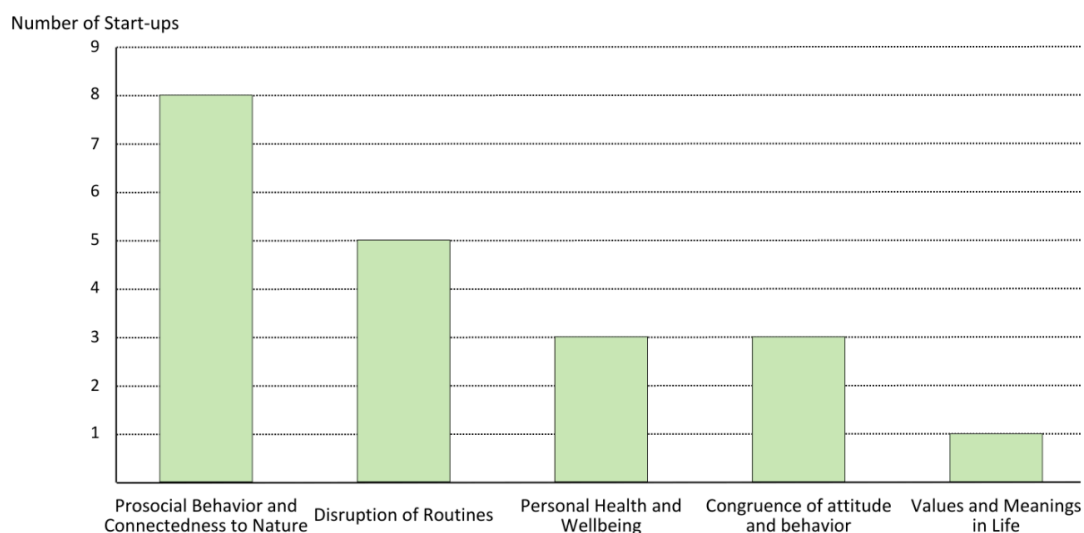


Figure 7. Five facets of mindfulness (synthesized by the author (Table5)), identified from the interviews with 9 plant-based based alternative start-ups (Author, 2024)

5.3.2 Plant-based alternative food start-ups’ perception on their role as change agents in inner transformation

Although all start-ups recognize the significance of inner transformation, none view themselves as key change agents in this context (n=0). However, this perspective does not stem from a lack of willingness to take responsibility. Rather, they perceive their role as primarily providing high quality

plant-based alternatives to facilitate easier adoption of plant-based diets among consumers, as captured by this quote: *“Our vision is health and sustainability and mission is to make plant-based the new normal, that it should be normal to eat plant-based. With our mission, we are talking about desirability. We want customers to desire our products”* (S4). Start-ups consider consumers not perceiving any sense of sacrifice with dietary shifts as crucial, as said by S8: *“I would be very happy if the mindset changed without sacrifice. The plant-based options which are really getting good at this point don't ask consumers to sacrifice, both nutrition-wise and taste-wise.”* Taking their primary responsibility as food producers, start-ups strive to create excellent products that enhance desirability, aiming to make plant-based options appealing to consumers.

As businesses, start-ups encountered challenges in influencing people's mindsets directly, as captured by the quote: *“I think it's maybe not just our thing to change people's mindset. [...] because if we tell people what to eat, everyone thinks it is just for our profits, but it's not. [...] So we are trying to make it easy to eat vegan food. I think that is more our mission”* (S5). To this regard, they emphasized the importance of effective branding and positive communication of their values, as said by S8: *“The values are super important. And the trick is to try to affect also the omnivore eaters or the meat-eaters into taking these steps. But it's important [...] being a value based and a storytelling based brand”*. This approach aims to avoid alienating potential consumers and instead fosters an environment conducive to acceptance and engagement.

Unanimously, it was underscored that a single actor alone cannot foster mindset shifts (n=9). Instead, collaborative efforts involving governmental bodies, media, the education system, research institutions, and civil society are vital for instilling awareness of the environmental impact of dietary choices and fostering discussions about ethical concerns.

6 Discussion and conclusion

In addressing the imperative to transform the current food system to foster dietary shifts to plant-based, I investigated the role of sustainable entrepreneurs as change agents within the Swedish animal-based food system. Focusing on a case of plant-based alternative food start-ups, the 3 research questions sought to understand the extent to which they act as change agents in the *practical*, *political*, and *personal* spheres of transformation.

I found that start-ups actively contribute to the *practical* sphere of transformation by addressing various consumer barriers: *affordability*, *familiarity*, *sensory experience*, *health*, *availability and visibility*, and *veganism discourse*. By employing business strategies like product innovation, targeted communication, and business expansion and diversification, start-ups foster consumer acceptance and adoption of plant-based alternative food. Their objectives lie within developing delicious food, branding their products as tasty food rather than sustainable and healthy food, and expanding their business operations. In the *political* sphere, start-ups face *cultural-cognitive*, *normative*, and *regulative* institutional challenges within the current animal-based food system. The institutional challenges encompass entrenched social practices, routines, policies, and regulations inherent in the Swedish animal-based food system, hindering plant-based start-ups' business operations which ultimately interfere with their influence on consumer dietary change. Moreover, misalignment of values among the actors within the food system was another institutional challenge. Start-ups strive to overcome these institutional challenges, by sharing knowledge and experience with other stakeholders, building trust and finding companionship, and engaging in business coalitions to influence policies and regulations. By doing so, start-ups contribute to reshaping the transformative processes in the current animal-based food system, paving their ways to better influence dietary shifts. In the *personal* sphere, it was evident that start-ups perceive inner transformation as essential, valuing different facets of mindfulness in fostering plant-based food consumption. Most prominently, *prosocial behavior and connectedness to nature* was highlighted by all but 1 start-ups. However, start-ups did not necessarily perceive themselves as change agents in the *personal* sphere. Instead, they primarily viewed their role within the food system as providing delicious plant-based alternatives to facilitate easier adoption of plant-based diets.

6.1 Alignment of findings with existing knowledge

6.1.1 4Ns - *natural, normal, necessary, and nice*

While the 4Ns concept by Piazza et al. (2015) provided valuable insights, its effectiveness was limited in certain aspects (Table 8). This constraint may stem from its emphasis on examining consumer barriers strictly from a consumer perspective, thereby offering only partial insights into consumer behavior. As highlighted by one participant, adopting a consumer-centric approach unveils the discordance between consumers' stated intentions, such as reducing meat consumption, and their actual purchasing behavior (see section 5.1).

First, the notion of *natural*: the perceptions that humans inherently crave animal-based food, did not feature in my findings. Interviewees indicated an increasing familiarity towards plant-based products among younger generations in Sweden, contesting *natural*. This suggests that *natural* may be outdated within the Swedish context, where an increasing population does not find plant-based diets as unnatural. I posit that the *natural* barrier might have already been surmounted in the Swedish context.

Furthermore, the *necessary* concept focuses on consumers' unquestioned belief that animal-based food is healthy. However, my finding indicates that *necessary* in the Swedish context is more about perceiving some plant-based alternative options as unhealthy, as many Swedish consumers are aware of health risks of animal-based food. Yet, this perception might be biased as I interviewed entrepreneurs who are well aware of health risks associated with animal-based food.

By analyzing consumer barriers through a business lens, several obstacles that surpass the scope of the 4Ns emerged. Among them, *affordability* and *availability and visibility* correspond to Benz et al. (2023) and Bezner Kerr et al. (2022), who mention socio-material factors such as enhanced availability and affordability as crucial to shape dietary patterns. Therefore, it can be still viewed that start-ups have an adequate understanding of what is necessary to induce consumer behavior change despite the consumer barriers that they face not perfectly matching the 4Ns concept.

6.1.2 What more to innovate?

Drawing upon literature emphasizing the role of technical innovation in system transformation (Herrero et al., 2020; Lynde, 2020), my findings demonstrate the role of food innovation for certain start-ups aiming to engage with larger industry players and assert their roles as innovation experts within the food system (see section 5.1.2.3). However, it is evident that not all entrepreneurs prioritize technical innovation, as some entrepreneurs lean more towards basic food science principles rather than extensive food tech innovation. This variance can be attributed to the cultural and personal significance of food, which entrepreneurs often deeply appreciate. In many cases, entrepreneurs' genuine reverence for the value of food—spanning dimensions such as gastronomic experiences, cultural symbolism, and nostalgic associations—was a driving force behind their entrepreneurial pursuits within the food industry. While not adhering to extensive technical innovation, they focus on improving the palatability and attractiveness of plant-based options, recognizing the tasty and enjoyable food as a pivotal component in driving widespread dietary change (Willett et al., 2019). Throughout this process, they face significant challenges closely connected to established practices and norms in the current animal-based food system, as noted by Eliasson et al. (2022).

Therefore, the emphasis on technological innovation in the Swedish food systems and sustainability transformation prompts the question: Is there an imbalance with excessive focus on technological advancements overshadowing the importance of social innovation? As aligned with the systems approach to transformation, there exists a compelling need to innovate the entire food system and challenge prevailing mindsets to transform food systems (Béné, 2022; Eliasson et al., 2022; Weber et al., 2020; Willett et al., 2019). As noted by one participant, innovation funding in Sweden predominantly targets technical innovation, leaving social innovation without adequate financial support (see section 5.2.1.3). Therefore, broadening the concept of innovation to address not only technology but also societal practices, norms, and mindsets becomes imperative for fostering systemic transformation and addressing the multifaceted challenges confronting the Swedish food system.

6.2 Generalizability of findings and limitations

My findings are based on semi-structured interviews with a case study approach, which may limit the generalizability of the results. The study primarily focuses on start-ups' perspectives, which may not

fully capture the perspectives of other stakeholders within the food system, such as consumers and policymakers. Moreover, analysis of start-ups' contribution could be complemented by thorough investigation of their market impact. The cultural significance of food and context-dependent nature of the food system present challenges to broad applicability (Leeuwis et al., 2021). The Swedish market's relative abundance of plant-based alternative options likely shapes consumer and producer perceptions differently than in other contexts.

Moreover, while the total sample size of Swedish plant-based alternative food start-ups and relevant organizations was 30, my results are based on interviews with only 11 individuals. Obtaining insights from more start-ups would have allowed me to potentially categorize them based on their size and years of experience, understanding how maturity influences their effectiveness as change agents across the three spheres of transformation. Additionally, gathering insights from more organizations that support plant-based food entrepreneurs could have expanded my understanding of the support system and delved deeper into the diverse roles these organizations play in facilitating enabling mechanisms.

6.3 Further speculations, implications, and further research

The findings of this study offer significant implications for future research, policy, and practice. The 3 focal points of Sweden's *National Food Strategy*—rules and regulations, consumers and markets, and knowledge and innovation—resonate with my research outcomes (Regeringskansliet, 2017). This implies that my findings hold potential for shaping additional strategies aimed at advancing the Swedish government's endeavor to bolster the nation's sustainable development through the enhancement of its food system. For instance, the findings could inform initiatives aimed at facilitating smoother pathways for start-ups, assisting governmental bodies in their efforts to address food consumption. Moreover, insights into institutional challenges and enabling mechanisms can guide policy interventions supporting sustainable entrepreneurs.

In line with Willett et al. (2019), this study underscores that it needs more than one actor to drive systemic change, due to interconnectedness and interactions of the three spheres (O'Brien & Sygna, 2013). Consumer barriers and institutional challenges permeate all three spheres, and they are often influenced by actions of other actors within the food system. Therefore, start-ups alone encounter significant hurdles when driving transformation. For instance, barriers emerged from the *practical* sphere, e.g., *affordability*, and *availability and visibility* are intertwined with the *political* sphere.

Institutional challenges such as established social practices of prioritizing animal-based food products and regulatory hurdles of subsidies on animal-based food, not only worsen consumer behavior barriers but also impacts consumers' mindsets (Bezner Kerr et al., 2022; Eliasson et al., 2022). Here, it becomes evident that factors shaping dietary patterns are influenced by other actors within the value chain. To this end, *network learning* by start-ups helping retailers building vegetarian sections can increase plant-based food consumption (Bezner Kerr et al., 2022).

Additionally, *normative* institutional challenges could affect the *personal* sphere, dealing with values among stakeholders within the food system. This underscores that achieving transformation in the food system requires not only the involvement of start-ups but also a collective effort from all nodes in the value chain. However, due to time constraints, this study could not fully explore the interactions among various components across the three spheres. As highlighted by Willet et al. (2019), transformation depends on these interactions. Thus, future research could benefit by employing analytical frameworks such as the Multi-Level Perspective by Geels (2006), to further explore these interactions (Leeuwis et al., 2021). Moreover, future research could explore potential synergies of industrial symbiosis between plant-based start-ups and other players such as traditional food companies to foster interactions of different actors within the food system.

Moreover, considering the interplay of the three spheres, I argue that start-up's involvement in the *practical* and *political* spheres may extend beyond behavior modification to influence perceptions and mindsets regarding food. However, a research gap persists in exploring the intricate dynamics between behavior and mindset, calling for further research. It remains unclear how mindset shifts can come about to foster plant-based food consumption. Considering the imperative of inner transformation and collaborations among different actors to drive systemic change (Herrero et al., 2020; Wamsler & Brink, 2018), future research can potentially focus on investigating how different entities collaboratively could contribute to inner transformation, to achieve profound systemic transformation.

6.4 Concluding remarks

Addressing the urgent need to transform current food systems towards supporting plant-based food consumption, this thesis has illuminated the pivotal role of sustainable entrepreneurship within the Swedish context for realizing such transformations. By employing the Three Spheres of Transformation framework, the study shed light on how sustainable entrepreneurs shape pathways

towards systemic change across the *practical*, *political*, and *personal* spheres. Through a focused investigation of plant-based alternative food start-ups, this thesis filled gaps in the existing literature by providing context-specific insights into the transformative potential of sustainable entrepreneurship in reshaping the Swedish food system. Moreover, by recognizing the overlooked role of value-driven actors like entrepreneurs, this study contributes to a more comprehensive understanding of the complexities inherent in driving sustainable transformations in food systems. By addressing these research gaps, this thesis not only advances academic discourse but also offers practical insights for policymakers, businesses, and stakeholders aiming to address the interconnected challenges of climate change, public health, and Sustainable Development Goals. Moving forward, continued research and collaborative efforts are essential to build upon these findings and foster a more sustainable and healthier food system for future generations.

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8 Appendices

Appendix A: Interview guide for start-ups

Introductory questions

IQ Tell me about yourself.

IQ Tell me about your company.

Main RQ: To what extent do plant-based alternative food start-ups act as change agents in the Swedish food system transformation?

RQ1 (Practical sphere): How do plant-based alternative food start-ups face and overcome barriers to create consumer behavior change?

Topic guide: consumer barrier, business strategies, and food innovation

IQ1.1 Could you tell me about your product(s)?

IQ1.2 Why do you think consumers like your product(s)?

IQ1.3 Why do you think some people would choose animal-based food instead of your products?

IQ1.4 How do you address those barriers?

RQ2 (Political sphere): How do plant-based alternative food start-ups face and target institutional challenges in the current animal-based food system?

Topic guide: Cultural cognitive, normative, and regulative institutional challenges, network learning, collective norm construction, collaborative advocacy

IQ 2.1 How do you collaborate with other plant-based food alternative start-ups?

IQ 2.2 How do you collaborate with businesses throughout your supply chains?

IQ 2.3 How do you collaborate with other actors within the food industry?

IQ 2.4 Are you engaged in any business coalition to potentially shift policies and regulations?

RQ3 (Personal sphere): How do plant-based alternative food start-ups perceive their role as change agents for inner transformation?

Topic guide: mindset, value, role as change agents

IQ 3.1 Do you think people need a mindset shift for food system transformation?

IQ 3.1.1 If yes, how should mindset change?

IQ 3.1.2 If yes, how does your business try to contribute?

IQ 3.1.3 If not, why?

Overarching questions

IQ What does food system transformation mean to your company?

IQ What was the motivation when you started your company?

Appendix B: Interview guide for Malmö Food Council and Livsmedelsakademin

Introductory question

IQ Tell me about your organization

RQ2 (Political sphere): How do plant-based alternative food start-ups face and target institutional challenges in the current animal-based food system?

Topic guide: Cultural cognitive, normative, and regulative institutional challenges, network learning, collective norm construction, collaborative advocacy

IQ 1.1 How does your organization support plant-based alternative food start-ups to network with each other?

IQ 1.2 How does your organization support start-ups to connect with other actors in the food industry?

IQ 1.3 How does your organization support start-ups to shift policies and regulations?

Appendix C: Consent form

Consent Form (for start-ups)

For participation in Lund University research on food system transformation

FOR QUESTIONS ABOUT THE STUDY, CONTACT: Jae-Eun Jenna Jeong, Claesgatan 15, 214 26, Malmö. Cellular: +46762587983. E-mail: jaeun.jeong95@gmail.com

Before I ask you if you agree to participate in this research project, I am going to give you some information about the research and what is expected from your participation. I invite you to ask me any questions that you feel will help you understand this information.

Presentation of the researcher

This research is being conducted as part of Jae-Eun Jenna Jeong's master's project, directed by Kimberly Nicholas, Associate Professor at Lund University Centre for Sustainability Studies (LUCSUS).

Description

This research is entitled "How does food system transformation take place through vegan start-ups?" The aim of this research is to investigate the business activities and collaborations of vegan start-ups to tackle food system transformation. In addition, I aim to understand how vegan start-ups view food system transformation and perceive their role as business actors.

You will be asked questions about your business strategies and collaborative efforts through business coalitions and participation in allied organizations if you take part in any. Additionally, you will be asked about how you view the mindset shift for food system transformation. The goal of the study is to understand to what extent vegan start-ups drive food system transformation in the Swedish context.

You will be asked to answer questions orally, which will be audio recorded if you consent. The oral interview will take place in person at an agreed location or through a zoom call, which will last between 45 minutes to 60 minutes. Audio files will be transcribed and used for the analysis. Copies of your interview files will be made available to you if you wish.

Risks and benefits of participation

The risks associated with this study are anticipated to be minimal, not greater than those experienced in daily life. If you wish to not answer a particular question, you are free to simply decline. The benefits of participating in this study is that you will have the opportunity to reflect on and discuss your business strategies that aim to create food system transformation. Moreover, you will have the opportunity to reflect on your role as business actors to address such transformation. However, we cannot and do not guarantee or promise that you will receive any benefits from this study.

Payments

Participation is completely voluntary, and you will not receive any monetary compensation for your participation.

Subject's rights

If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. You have the right to refuse to answer particular questions. Your individual privacy will be maintained in all published and written data resulting from the study.

If you have questions about your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish - to the provided contact details stated on the first page.

Unless the assigned written acknowledgement of consent has been received before the interview, a verbal consent will be given on the audio recording, at the start of the interview.

Do you understand the project and the implications of your participation?

Response:.....

Do you agree to confirm that you consent to participate?

Response:.....

Do you agree to have this interview recorded as well?

Response:
.....

The extra copy of this consent form is for you to keep.

SIGNATURE _____

DATE _____

Thank you very much for your time to participate in this study.

Consent Form (for relevant organizations)

For participation in Lund University research on food system transformation

FOR QUESTIONS ABOUT THE STUDY, CONTACT: Jae-Eun Jenna Jeong, Claesgatan 15, 214 26, Malmö. Cellular: +46762587983. E-mail: jaeun.jeong95@gmail.com

Before I ask you if you agree to participate in this research project, I am going to give you some information about the research and what is expected from your participation. I invite you to ask me any questions that you feel will help you understand this information.

Presentation of the researcher

This research is being conducted as part of Jae-Eun Jenna Jeong's master's project, directed by Kimberly Nicholas, Associate Professor at Lund University Centre for Sustainability Studies (LUCSUS).

Description

This research is entitled "What role does vegan alternative food start-ups play in the Swedish food system transformation?" The aim of this research is to investigate the business activities and collaborations of vegan start-ups to tackle food system transformation. In addition, I aim to understand how vegan start-ups view food system transformation and perceive their role as business actors. Additionally, I would like to understand the supporting activities of the network and/or council that they are part of.

You will be asked questions about vegan start-ups' business strategies and collaborative efforts through business coalitions and participation in allied organizations. Additionally, you will be asked about how you view the mindset shift for food system transformation. The goal of the study is to understand to what extent vegan start-ups drive food system transformation in the Swedish context.

You will be asked to answer questions orally, which will be audio recorded if you consent. The oral interview will take place in person at an agreed location or through a zoom call, which will last between 45 minutes to 60 minutes. Audio files will be transcribed and used for the analysis. Copies of your interview files will be made available to you if you wish.

Risks and benefits of participation

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Participation is completely voluntary, and you will not receive any monetary compensation for your participation.

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If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. You have the right to refuse to answer particular questions. Your individual privacy will be maintained in all published and written data resulting from the study.

If you have questions about your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish - to the provided contact details stated on the first page.

Unless the assigned written acknowledgement of consent has been received before the interview, a verbal consent will be given on the audio recording, at the start of the interview.

Do you understand the project and the implications of your participation?

Response:.....

Do you agree to confirm that you consent to participate?

Response:.....

Do you agree to have this interview recorded as well?

Response:
.....

The extra copy of this consent form is for you to keep.

SIGNATURE _____

DATE _____

Thank you very much for your time to participate in this study.