

Master's Programme in Global Development, Population and Economic Change

Natural fibre production in Sweden

Understanding the Challenges and Opportunities faced by the actors

By Frideborg Hjorth

Fr1586hj-s@student.lu.se

Abstract

New EU laws, policies, and strategies establish that European fibre, textile, and fashion producers must transform to operate more sustainably. This need for transformation raises numerous questions about the future of the European fibre, textile, and fashion industry. This thesis aims, through a case study approach explore the experiences and perspectives held by producers and other industry actors in Sweden who are engaged in natural fibre production, particularly cannabis production. The thesis seeks to enhance our understanding of the challenges and opportunities faced by those involved in this work. It presents three main takeaways: first, the sector in Sweden requires better coordination; second, many actors within the industry have responded to the requirement for transformation with an approach referred to here as "making the best of a situation". This approach denotes how many actors have sought ways to create circular systems around existing materials, rather than pursuing bio-based fibres like cannabis. Finally, intermediary agents should act as risk managers or risk-takers, guiding the industry forward.

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1. Introduction

This thesis investigates the potential for reintroducing cannabis fibre production in Sweden, using it as a case to explore the broader challenges and possibilities of local natural fibre production in high-cost, post-industrial countries. This thesis is particularly interested in the perspective of producers and other stakeholders involved in this work. This thesis specifically researches the reintroduction of cannabis fibre production in Sweden. Cannabis is of particular interest because of the historical usage of the plant in Scandinavia and because of its performance in terms of sustainability. In addition to this, cannabis is of interest as it is not yet significantly established on the market there are undoubtedly challenges associated with this, but also inherent potential particularly in terms of market formation. The central **research question** guiding this work is:

How, from a social and ecological embeddedness perspective on innovation in farming-related markets, can we understand the present obstacles to market formation efforts—exemplified by the case of cannabis fibre production in Sweden today?

Cannabis and other bast fibres like flax have been used in textile production in Scandinavia as far back as the Viking ages and early Middle Ages, (Skoglund, 2013), (Skoglund et al., 2020). However, as argued by scholars like Skoglund et al., the usage of cannabis in textile production in Scandinavia has, to some extent, been forgotten or not recognised enough. Cannabis fibre is (and has historically, to a significant extent in Scandinavia been) used for yarn, rope, fabric, reinforcement, etc., Skoglund et al. (2013). Cannabis products and the cannabis production process can be considered environmentally friendly, particularly in comparison to the processes used in the cultivation and production of other plant fibres like cotton, Eyupoglu (2020). The cannabis plant is described as a low-input crop. The plant can be grown in a relatively wide range of soil types; it requires little to no pesticides, herbicides, and fertilisers. Additionally, cannabis requires little to no irrigation, as it has a relatively deep root system. It works well when cultivated in a suitable or somewhat suitable climate, and Sweden has such a climate, (Skoglund et al., 2013).

The need to transform our production methods and consumption behaviours towards operating more sustainably motivates the increased interest in re-arranging value chains and the potential return of some local production. It can't be stated that local production always is better in terms of ecological, economic, and or social sustainability, as it has to be evaluated on a case-by-case

basis. However, the strengths associated with local agricultural production relate to its multifaceted embeddedness in the local context, (Schmitt et al., 2017). Local agricultural production does, to some extent, perform better in terms of health, socio-economic dimensions, territory care related to biodiversity, animal welfare, and governance or resilience (accountability and national self-sufficiency) (Schmitt et al., 2017). Beyond this the primary benefit with regard to sustainability is that more local production improves the ability of consumers and policy workers to influence, evaluate, and measure the performance of a product and the processes responsible for its production, (Hess, 2004).

It is arguably difficult to evaluate the process behind the production of a certain product with regard to all three forms of sustainability, ecological, economic, and or social, when that product is the result of an extended global value chain. As stated in the 2023 ETC-CE Report, textile and fibre production involves one of the worlds most complex supply chains and issues related to the sector's impact on the environment and climate arise at all life cycle stages. According to the European Commission (2022), the consumption of textiles ranks third highest in terms of land use and water use, and fifth in terms of greenhouse-gas emissions and raw material use. The textile industry has the fourth highest negative impact on the climate and the environment. Out of the EU's total consumption of textiles, 81 per cent of it is comprised of clothing, EU strategy for sustainable and circular textiles, (European Commision, 2022). The textile sector is broadly speaking unsustainable in its current mode of operation as the result of unsustainable production methods and material uses, as well as unsustainable consumption behaviours and business models. According to the reports by the European Commission, we can see a trend of decreasing quality of clothing over time, coupled with a decrease in the price of clothing.

To transform the textile ecosystem, it is argued by schoolar and policy makers that we, among other things, need to increase the durability of the products we consume, reduce our dependency on virgin raw material and create circularity in the system, ECT-CE Report (2023) Essential steps in this process are, increasing the production of more sustainable bio-based material, increasing the diversity of bio-based material used in textile production, and decreasing our dependency on cotton. Increase recycling of fibres in a fibre-to-fibre circular system, ECT-CE Report (2023). When it comes to recycling, the the use of mixed materials or blended textiles is a big issue. This often means a mix of bio-based fibres and synthetic plastic-based fibres. In addition to this the usage of plastic-based fibres is an issue on its own as it contributes to the pollution of our environment in the form of hard-to-manage microplastics (European Commision, 2022). When faced with the need for more sustainable practices regarding how we produce our products, how we consume them and how we manage them after they are no longer usefull. Multiple challenges

are associated with encouraging, incentivising and or forcing such transformation. Among others, it raises questions related to who has the power to exert such influence, to reshape the market, to transform the sector.

As the number of actors involved in cannabis production in Sweden is small, the scope of the thesis includes a broader variety of actors, all involved in natural fibre production and processing in Sweden. The thesis is constituted of a case study approach and is interested in through a qualitative research method gathering insights from actors engaged in natural fibre production in Sweden. The aim of the thesis is to generate a better understanding of the future of natural fibre production in Sweden, a high-cost post-industrial nation. The thesis hopes to generate insights that improve our understanding of how to incentivise and or force sustainable transitioning of our industries, particularly in this case, agricultural industries, fibre production and textile production. Specifically, to understand Sweden's role in this, whether the changing policy frameworks change Sweden's potential role. Large-scale transformation takes time, but collecting insights from stakeholders of significance who are or will be concerned by the need for transitioning can potentially lead to an improved understanding of how to adjust policy initiatives and investment schemes so that the transitioning can be encouraged and eased.

1.1 Aim and scope

This thesis investigates the potential reintroduction of cannabis fibre production in Sweden, using it as a case study to explore the broader challenges and opportunities associated with local natural fibre production in high-cost, post-industrial countries. The primary aim is to improve our understanding of the conditions necessary for market formation in Sweden's natural fibre sector, with a particular focus on plant-based fibres especially cannabis.

The research concentrates on gathering insights from the key actors involved in efforts to develop a natural fibre, specifically cannabis fibre production in Sweden. However, the scope is subject to limitations, as few stakeholders in the Swedish market are solely or primarily focused on plant fibre production. This fragmentation presents both a challenge and an opportunity for examining how a new market might emerge within an evolving industrial and agricultural context. The thesis seeks to contribute to a better understanding of how innovation and market formation occur in the context of cannabis cultivation in Sweden, and what the reintroduction of this crop might mean for the future of domestic fibre production and related industries.

This investigation is grounded in the broader context of sustainable development. A growing body of research suggests that achieving ecological, social, and economic sustainability requires the diversification and restructuring of markets and value chains, Morris and Kirwan (2011). This includes recognising a wider array of values in the products we produce and consume, values that should inform both production practices and consumer choices. The findings of this thesis may offer valuable insights for policymakers, investors, and other stakeholders interested in supporting sustainable domestic development and enabling the conditions necessary for market formation in Sweden's natural fibre sector.

2. Empirical context

The historical explanation for how a larger cannabis market formation was prevented centres on the success of cotton and synthetic fibres. Today's fibre market is characterised by a low diversity in plant fibres and a dominance of synthetic (human-made) fibres.

Today, cotton is the most widely produced plant fibre globally. Cotton represents 81 per cent of the world's total natural fibre production, according to the Food and Agricultural Organisation of the United Nations (*FAO, UN*) (2021). Compared to other natural fibres cultivated worldwide, cotton cultivation and the processing methods used to refine it into consumer goods are, to a large extent, unsustainable from an ecological perspective. Cotton production demands the highest agrochemical (insecticide and pesticide) and water consumption in the world compared to the cultivation of other plants, Gedik and Avinc (2020). When innovation and market formation are understood as not only socially, but also ecologically embedded, this becomes a huge problem.

Contrastingly Eyupoglu describes the cannabis plant as a low-input crop in comparison to other industrial crops. The plant can be grown in a relatively wide range of soil types but still requires relatively high levels of specific nutrients; it needs little to no pesticides, herbicides, and fertilisers. Additionally, cannabis requires comparatively little irrigation as it has a relatively deep root system (Skoglund, 2016). The plant's abundant foliage at the top prevents sunlight from reaching the ground where it is grown, and thus weeds cannot thrive in that same field. The deep root system of the plants loosens and oxygenates the soil, creating favourable conditions for further cultivation of the field after the cannabis is harvested. Cannabis thrives in suitable or

moderately suitable climates, and Sweden provides such a climate, Skoglund says (2013). The cannabis plant is naturally low in flammability and relatively easy to dye. The fibre is also resistant to mildew (fungal or mould growth) and antibacterial. The characteristics of the cannabis plant described in the work by Eyupoglu (2020) support the perception that fostering increased cultivation of the cannabis plant and the production of cannabis goods could, if executed properly, be considered ecologically sustainable. However, Eyupoglu recognises that even if the cannabis plant can be regarded as a low-input crop, there remains a need for human intervention to produce high-quality fibre. Farmers require specific machinery to process and handle the plant during and after harvest; this represents a fixed cost that cannot entirely be circumvented (Skoglund, 2016). Thus, there is a demand for field research, experimentation, and innovation in order to truly understand the potential inherent in cannabis as a fibre that could potentially replace some of the unsustainable fibres used in goods today.

However, in a world dominated by synthetic and human-made fibres, natural fibres (both animal and plant) still represent a minority of all fibres produced globally. Specifically, natural fibres account for only 29 per cent of the world's total fibre production; see *Figure 1* and *Figure 2*, FAO UN (2021). Our reliance on synthetic fibres must be recognised as problematic from an ecological sustainability perspective. Synthetic fibres (un-organic substances) are unbiodegradable and, thus, are reliant on good waste management and recycling (if possible) to not contribute to harmful pollution and for there to be a circularity in the interaction between production and consumption, Gedik and Avinc (2020).

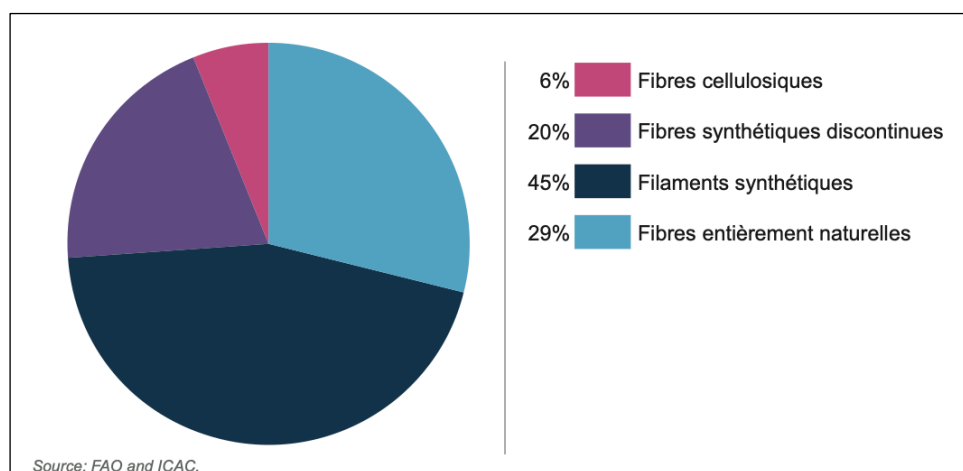


Figure 1: World fiber production 2018/2019

Source: Food and Agricultural Organisation of the United Nations (FAO UN) (2021)

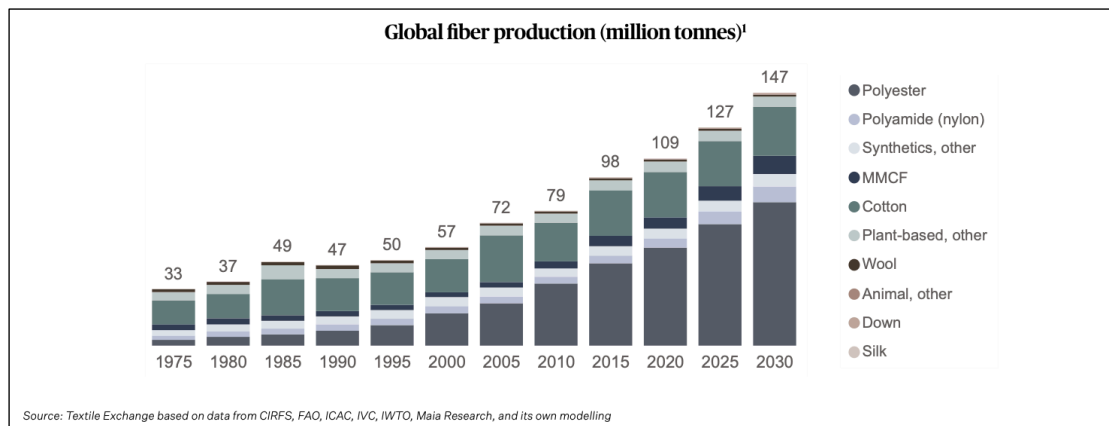


Figure 2: Global fiber production (millions of tonnes)

Source: Textile Exchnage (2023)

In a world where cotton dominates as the primary natural fibre cultivated for production, it is important to note that cultivation occurs exclusively outside of Europe. This is not surprising given the plant's origin, and as a result of the global value chains we see in place today (see Figure 2 (Eyupoglu, 2020)). Nonetheless, it is worth emphasising that this renders Europe a virtually insignificant player in the plant fibre farming market. There is hardly any production of raw materials in Europe today, see Figure 3. As the global demand for natural fibres increases, as recognised in the report by the *FAO UN* (2021), a development resulting from growing consumer interest and policies aimed at encouraging enhanced production of more sustainable products, Europe's relative lack of natural fibre production could be seen as problematic to some extent. From an entrepreneurial perspective on innovation it could also be viewed as an opportunity to disrupt an old equilibrium and initiate new market formation, (Granqvist et al., 2020) (Drucker and Noel, 1985).

There is evidence that cannabis and flax have been used in textile production in Scandinavia as far back as the Viking ages and early Middle Ages (Skoglund et al., 2013), (Skoglund, 2020). However, arguably the usage of cannabis in textile production in Scandinavia has, to some extent, been forgotten or not recognised enough. Cannabis fibre belongs to the family of Bast fibres. The fibres extracted from the cannabis plants are long and strong. Cannabis fibre is (historically, to a significant extent in Scandinavia) used for yarn, rope, fabric, reinforcement, etc., (Skoglund, 2013). In their work, Eyupoglu (2020) states that cannabis and its production can be considered environmentally friendly, particularly when compared to the processes used in cultivating and producing other plant fibres, such as cotton. Improving our understanding of the usage of native resources in the past can help us retrieve lost knowledge that can prove useful for

the transition towards more sustainable resource management and cultivation today and in the future. This would, therefore, have market-formation implications (Granqvist et al., 2020). According to Skoglund (2020), there is a lack of research investigating the historical usage of cannabis, hop, and flax for textile production in Scandinavia. Specifically, there is a lack of research studying the use of the three plants individually, rather than as a bundle. From the perspective of this thesis, this has implications for innovation and market formation. The recognised gap in the literature not only motivates the importance of the research done by Skoglund et al. (2013) but also supports this thesis research, which aims to, to some extent, contextualise the research on the historical usage of cannabis and flax to nuanced the understanding of the potential inherent to the pioneering contemporary efforts of re-introduction of cannabis cultivation as well as existing efforts made with regards to other forms of natural fiber production, and refinement in Sweden.

The historical background to the material and crop, given by Skoglund's research, is important for an understanding of what today conditions this attempt as a market-forming effort (Skoglund et al., 2013), (Skoglund, 2020). From more recent history, there are some interesting facts concerning the cultivation of cannabis in Sweden. In her book Skoglund (2016) states that during the Second World War, there was a resurgence of natural fibre production within Europe. As a part of this trend, there was an increase in the production and processing of cannabis in Sweden. The Swedish government encouraged and facilitated these initiatives by providing financial support to farmers. Until 1966, the Swedish government financially supported cannabis farmers and others involved in the industry, (Skoglund, 2016). During this period, a national federation, a central organisation for the cultivation and processing of flax and cannabis, was established. Alongside this, a processing plant (AB Hampaberedningsverk) was set up on Gotland, utilising governmental financial support. As part of this support, the Swedish government provided a price guarantee for cannabis to reduce the risks and barriers to entry for farmers involved in cannabis cultivation. However, this became part of the problem when other support was eventually withdrawn.

By 1970, the United Nations (UN) recommended a legally enforced restriction of cannabis and cannabis cultivation. It's interesting to point out here that "det finns källor som visar att multinationella kemiföretag som tillverkade plast var aktiva aktörer i förbudet som medverkade till att odlingen av cannabis stannade försvann" (Skoglund, 2016, pp. 27), ["There are sources that show that multinational chemical companies that manufactured plastics were active players in the prohibition that contributed to the disappearance of cannabis cultivation."]. The plant

became associated with the drug substance THC, which can be extracted from certain types of the plant. Sweden was one of the countries that took action and adhered to the UN recommendations. This, combined with a decreased interest in native natural fibre production in Europe following the end of the war and an increased interest in synthetic fibres, led to the significant decline in cannabis production in Sweden. Subsequently, synthetic fibres took over, and the demand for them exploded. Synthetic fibres were presented as the cheaper option; this was and is, in many ways, true. However, considering the aim of this thesis, it must be stated that the perception of synthetic fibres as the cheaper option is the result of a calculus that prioritises markers more readily measurable in economic terms, while the various risks associated with ecological and social sustainability are not sufficiently considered.

3. Theory

Theoretical Perspectives and Previous Research

The theoretical framework serves to contextualise and enrich the findings of this thesis. Rather than testing the validity of existing theories, this section introduces them as analytical tools that will be used to interpret and discuss the findings of this thesis. The theoretical concepts presented here are intended to support the overarching aim of this thesis: to explore the broader challenges and opportunities of local natural fibre production in high-cost, post-industrial countries. Previous research by Pal et al. (2018) is also introduced here to provide a bridge between theory and empirics.

Reviewing the previous research of Pal et al. on the subject is of interest to this thesis as it allows for a comparison and consequently a productive point of departure for a discussion around the results of this thesis. The research concerning the future of natural fibre production in Sweden can be argued to be related to the topic of the reshoring of manufacturing to high-cost countries. In the paper by Pal et al. (2018), the authors study the challenges and opportunities perceived by industry professionals associated with the effort of reshoring the manufacturing of textiles and clothing production to Sweden, a high-cost environment. The paper has a scope that is focused on an organisational level of analysis. In addition to this, the research by Pal et al. also included a review of existing literature on the topic. The paper included a selection of interview subjects, all engaged in textile and clothing manufacturing in Sweden. In total, the paper included a sample of

19 companies (20 participants). The paper has, with consideration to its selection of interview subjects, a broader scope than this thesis. Considering this, part of this thesis contribution to the topic is its particular focus on cannabis as well as agents involved in the natural fibre production part of the industry.

In the paper, reshoring is by Pal et al. (2018) defined as the return of manufacturing to high-cost countries, the opposite of offshoring. Sweden is, by Pal et al., considered a high-cost manufacturing country based on parameters such as GDP per capita (PPP) and average income per person, thus defined based on the cost of labour. See *Table 1* for the competitive manufacturing capabilities identified by Pal et al. should manufacturing be reshored to Sweden, specifically concerning textile and clothing production.

Competitive Manufacturing capabilities	Key Challenges
Flexibility <i>Responsiveness to demand</i> <i>Reduces the need for large inventories, enhances responsiveness</i>	Difficulty balancing low inventory with high variety
Exceptional product and service quality <i>Competitive advantage, quality</i> <i>Differentiation factor</i>	Cost competitiveness compared to low-cost countries
Ability to customise products and services	High fixed production costs
Speed to market <i>Launching collections faster, proximity to market</i>	Difficulty balancing low inventory with high variety
Integration of advanced technology <i>Lean production can offset high labour costs</i>	Strict labour and environmental regulations

Table 1: Competitive manufacturing capabilities and Key Challenges

Source: Pal et al. (2018)

Below three theoretical themes are presented, *Social and Ecological Embeddedness*, *Institutional Entrepreneurship*, and *Market Formation*. Among these, Social and Ecological Embeddedness serves as the foundational layer, offering the conceptual grounding upon which the other two themes build, derive depth and context. At its core the notion of embeddedness challenges the idea that markets are purely economic or neutral arenas, instead emphasises its intertwinement with the surrounding context. Institutional entrepreneurship provides us with an understanding of the agents of change and how they take part in the process responsible for change. These actors engage in processes that lead to shifts in norms, values, and structures within markets. Market formation embraces the complexity and multidimensionality of change. Market formation

discusses the process of transformation as a multi-actor, multi-level process that involves both structure and agency. Together the three theoretical lenses offer a comprehensive perspective on market transformation. They improve our understanding of why markets are hard to change, by who and how markets can be change and what change looks like.

3.1. Social and Ecological Embeddedness

In the literature review by Hess (2004), the author describes the concept of embeddedness by tracing its conceptualisation and critically discussing how scholars of different academic disciplines use it today. Hess explains how the concept originated from the works of Karl Polanyi and Mark Granovetter.

The concept of embeddedness, specifically social and ecological embeddedness within economics, is among other things used to improve our conceptualisation of value. Specifically, beyond the traditional economics view of relying on or prioritising value markers that are more readily measurable in economic terms. According to Morris and Kirwan (2011), the concept of embeddedness originates from economic sociology and refers to the interdependency of all economic activity within its social context. The concept of ecological embeddedness speaks of the same interdependent relationship, but regarding the economy and the ecological world that surrounds it. The interdependence that is referred to does not just describe the multiple ways in which the economy exerts influence over the social and ecological world, but also how the social and environmental world exerts an influence over all economic activity. According to Morris et al., the concept of social and environmental embeddedness speaks for more than just the recognition of the general impact that one (the economy) has over the other (the social context, the ecological context). The concepts are used to show that changes in the relationship between the two do produce benefits and or drawbacks for both.

Morris and Kirwan (2011) argue that although economists recognise politics, culture, society and various aspects of the ecology as factors of influence on the economy, these factors are still too often ignored in the sense that they are not directly built into economic frameworks of analysis. Hess recognises this as well in his work and states that the concept of embeddedness when established by Karl Polanyi arose from a “dissatisfaction within the absolutization of the market and its underlying rationale of self-regulation and economizing behaviour” (Hess, 2004, P.167). This, according to their reasoning, manifests the tendency of economic activity to have an extractive relationship to the surrounding social and ecological context. Instead, nature should be

seen as more than a passive entity, and this should be reflected in our rhetoric on the relationship between the economy and the ecology. This improved conceptualisation and rhetoric will be seen in our accounting of the value of things, the cost, the price and the risk associated with various economic activities.

Morris and Kirwan (2011) specifically discuss the concept of ecological and social embeddedness with regard to agricultural activity, the production and consumption of agricultural products. When more directly discussing the potential benefits of using the concepts of ecological and social embeddedness when evaluating the functioning of food systems, some insights can be applied to the context of other forms of agriculturally based production. When the scholars discuss the role of spatiality, they argue that locality or a decrease in the distance between the producers and the consumers of a certain product can improve the ability for consumers to understand the meaning behind the concept of social and ecological embeddedness. It is argued that it is easier for a customer to understand the value associated with a product's social and ecological embeddedness if that product is the result of a more locally rooted value chain or a shorter value chain. It means that the consumer perceives the claims of added value as more authentic, which increases the trust between consumer and producer, and thus there is an increased likelihood of this impacting the consumer's decision-making process.

However, it needs to be recognised that Hess (2004) argues that connecting the concept of embeddedness to spatiality and locality can contribute to a misunderstanding of the meaning of the concept. Hess argues that, according to Karl Polanyi and Mark Granovetter's original conceptualisations of the term, there is no explicit theoretical foundation that justifies the implication of a dependent relationship between the level of embeddedness and locality. However, Hess critique concerns the tendency to overstate the connection between embedders and locality. Hess does not deny that, in some ways, spatial closeness between different actors that emerged in overlapping contexts can positively impact the establishment and maintenance of these networks. For example, Hess points out that operating within the same institutional structures, like legal context, can aid in maintaining proactive relations.

3.2. Institutional Entrepreneurship

Institutional entrepreneurs are actors who want to create a change within a sector that ultimately changes the norms and existing logics within that sector, Svejenova et al. (2007). Institutional entrepreneurship refers to a restructuring of the perception of normal within a field, (Svejenova

et al., 2007), (Boon et al., 2022). Essentially institutional entrepreneurship refers to an endogenous source of change, a system change created and actualised by agents embedded in the field that is the subject of the change, (Boon et al., 2022). Understanding the process behind institutional entrepreneurship is envisioned and actualised is an important piece in our understanding of how institutional level change is achieved. Traditionally there is the perception that institutional level change is best triggered by an external shock to the system. (Svejenova et al., 2007) particularly explores the idea of the external shock as the source perceived as the most productive generator of change.

Svejenova et al., (2007) explores the subject of institutional entrepreneurship within the field of gastronomy. Svejenova et al. concludes that the perception of external shocks as significant sources of institutional change comes from the fact that external actors in many cases possess a lot of power in the form of ability to shape the public's perception of a field. However, Svejenova et al. argues that there are multiple actors that possess enough power and agency to influence the theorizing of the creation of the field. Theorizing is understood as the process of creation of narrative and storytelling which is used to change the perception of value within the field. It's about reputation and the building of consensus, perception of worth and merit among the relevant audience. The audience is however not homogenous. In the case of this thesis, sustainable transitioning of natural fibre production sector, the audience that need to change their perception of value is not only end consumer but, business to business clients and policy makers.

Battilana et al. (2009) defines institutional entrepreneurs and the process they engage in as compromised by the two following: (1) *Initiation of divergent change*, (2) *active participation in the implementation of these changes*. Connecting back to Svejenova et al. (2007) reasoning around theorisation and the perception of value stage 1, *initiation of divergent change*, can be explained as partly being compromised by the process of producing a new perception of value that challenges the existing one. This generates paradoxes within the existing logic something that Battilana et al. argues is a state with inherent potential for change. What the scholars all have in common with regards to their reasonings around what institutional entrepreneurship is and how it works, is that they argue for the recognition of human agency and its power to influence the status quo. They argue that however embedded human agency might be innovative institutional change can be and, in many cases, should be initiated from the people engaged in the sector (Svejenova et al., 2007). The case study of the subject within the context of gastronomy and fine dining provides us with two important take aways, institutional entrepreneurs are dynamic actors who are personally and continually interested in exploring how to do things differently, go against the

homogeneity. The second take away from Svejenova et al. as work is that the actors engaged in the innovative work needs to take part in the story telling and communication about the work to the outside as a way to practice their agency.

3.3. Market Formation

Within the subject of market formation, the aim is to understand how new markets are created and how existing ones can be transformed. This area of study is not only explored through economics but also by scholars in fields such as sociology. A market can be defined in many ways; for the purposes of this thesis, the definition by Boon et al. (2022) as an arena or structure that enables organized exchange is sufficient. Market formation is often discussed in the context of innovation, particularly in relation to launching new products or business ideas. Much of the literature takes a diffusionist perspective, focusing on identifying target groups and market segments to enable adoption of innovations, Boon et al. (2022). However, given today's urgent need to transition to a more sustainable economy, understanding the underlying processes and mechanisms of market formation and transformation is arguably more important. This transformation is conceptually and practically challenging.

A central concern in studying new sustainable solutions is how market systems can be reshaped to accommodate disruptive innovations—those that significantly challenge or replace existing practices. This notion of disruption aligns with Schumpeter's concept of creative destruction, where powerful innovations render old solutions obsolete (Sledzik, 2013). Market formation or transformation is a process of creating new forms of interaction between market participants, Granqvist and Siltaoja (2020). Achieving this requires some level of shared understanding among actors regarding the perception of value and worth. The notion of value should ultimately be defined less in terms of economic concerns and more in terms of varied measures of performance related to ecological and social sustainability. Some scholars like Fuentes et al. (2024) and Granqvist and Siltaoja (2020) have referred to this as a process resulting in the prioritising of moral concerns over economic concerns.

Moreover, the structuring of narratives plays a critical role in market formation. Narratives help align new initiatives with established discourses, facilitating legitimacy and coordination among stakeholders, Granqvist and Siltaoja (2020). This is particularly evident in marketing studies related to entrepreneurship and innovation. Market formation is inherently complex and

uncertain, involving a broad network of actors, institutions, and stakeholders (Boon et al., 2022). Nonetheless, it also intersects with systematic processes, meaning that improved collaboration across actors can help refine and accelerate market transformation. Fuentes et al. (2024) build on Beckert's framework to identify three coordination challenges in market formation:

1. The value problem (agreeing on what constitutes value),
2. The competition problem, and
3. The cooperation problem (building trust among actors).

These challenges are echoed by Boon et al. (2022), who identify key elements in market formation—such as segment formation, user profiling, and organizing producer-user interactions—especially relevant in transition studies. Both perspectives emphasize a multi-stakeholder approach, which includes not only producers and users but also institutions that form an ecosystem capable of shaping markets. Importantly, Fuentes et al. (2024) and Boon et al. (2022) both stress the role of governments and overarching institutions in reducing uncertainty and guiding market development. This involves setting standards, requirements, and incentives to steer transformation.

Faludi (2025) contributes with a focused case study of the fashion and textile industry, mapping current efforts within the ecosystem to promote sustainable transformation among both producers and consumers. Like Fuentes et al. (2024) and Boon et al. (2022), Faludi emphasizes the importance of policymakers in incentivizing or compelling industry actors to change. Faludi explores consumer behaviour and social marketing as indicators of the industry's progress and direction in terms of transformation. Faludi argues that changes in marketing messages—toward more socially and ecologically conscious themes—reflect an increased awareness among producers and consumers. For meaningful transformation, however, regulatory action is necessary. Policymakers must introduce regulations and promote consumer education, enabling people to make more informed choices. Due to the complexity of the fashion value chain, consumer influence is limited; thus, empowering consumers through transparency and accountability tools is crucial.

One of the main barriers Faludi (2025) identifies is the lack of transparency and standardized impact measurement. To change both behaviours and conceptions of value, unified systems for measuring sustainability impacts must be developed. These tools are essential for holding actors accountable and phasing out unsustainable business models.

4. Method

4.1 Research design

The research philosophy and, by extension, the approach refers to the belief held by the researcher regarding how the research, the collected data and the research question relate to the reality of the phenomenon studied. As the aim of the thesis is to collect the insights and perspectives of relevant stakeholders, a qualitative research approach to research the topic. The data presented in this thesis is gathered using semi-structured interviews. The approach and data collection method were chosen because they centre the experience and perspectives of the interview subjects, which aligns well with the for the interpretivist approach that the thesis adopts. The subject is situated within the context of the broader need for a sustainable transformation and explores the effects of the increasing or potentially lacking pressure to transform as perceived by agents within the sector.

The interview subjects were selected as knowledgeable actors with a degree of agency within the sector of interest to this study. The perceptions and perspectives of the agents are shaped by the social, economic, political and theoretical layers that constitute their surrounding context. The interpretivist approach recognises that the meaning and actions of the agent are the results of their sense-making of the context in which they and their work are embedded. The research addresses the subject to contribute to the need for critical reflection on the present and future of the sector as it faces pressure to transform. Engaging with the experiences and views of actors within the sector is assumed to provide a more comprehensive understanding of the existing, desired, or potentially absent internal drivers of transformative change. The research approach defines the strategy for how the researcher chose to approach the research question.

Qualitative research seeks to generate a deep, layered understanding of the research topic that reflects the perspectives of those being studied. It is common for qualitative research to have an inductive relationship between research and theory, where the aim is to generate new theoretical insights rather than to test existing ones. This thesis uses a qualitative abductive approach to research. Qualitative research with an abductive approach does not necessarily aim to generate a theoretical framework but rather to be more in dialogue with the existing theory. In qualitative abductive research, data is collected with little to no consideration for the theoretical implications. Instead, the generated data and existing theory hold a dynamic relationship in the

research, where the content of one is used to critically evaluate and contextualise the other. As a result—and due to the emphasis on the perspectives of interview subjects the research design is somewhat emergent and evolved during the course of the study.

4.2 Data Collection

The data for this research were collected using semi-structured interviews, a common qualitative method. This format allows the researcher to guide the conversation while giving interviewees the freedom to elaborate on their experiences and viewpoints. It allows the researcher to guide the conversations with the interviewees without dictating the conversations.

The interview subjects were categorised into two groups: (1) product developers or raw material processors, and (2) knowledge and communication agents (in between units), see and account of all agents in *Tabel 2*. The interview subjects were selected based on their experience with cannabis in some capacity. There is a very limited number of agents who are or have been working with cannabis in Sweden. All interview subjects are engaged in the production or processing of natural fibres within Sweden. All interview subjects, with the exception of one, have in some way worked with cannabis. The one agent that's not involved with cannabis is engaged in wool production and processing. The perspectives held by this agent still proved to be insightful for this study. In 2023 Länstyrelsen Skåne carried out a project called *Fiber Land* aimed at mapping and connecting different agents involved in natural fiber production in Sweden. The results from *Fiber Land* was partly used as a tool to identify interview subjects for this thesis. All interview subjects were interviewed once, cross sectional time horizon.

Identification	Type of actor	Envolment	Interview type	Duration
2HFT	Knowledge and Communication Agent (2)	Cannabis Fiber (H) Fashion and textiles (FT)	In persson	34:43 Min
1HI	Product developer or raw material processor (1)	Cannabis Fiber Innovation (I)	Video call	72:38 Min
2HR	Knowledge and Communication Agent (2)	Cannabis Fiber Research (R)	In Persson	40:24 Min
2HR	Knowledge and Communication Agent (2)	Cannabis Fiber Research	Video Call	57:38 Min
1W	Product developer or raw material processor (1)	Wool Fiber (W)	Video Call	68:11 Min
1H	Product developer or raw material processor (1)	Cannabis Fiber	Phone Call	18:44 Min
1H	Product developer or raw material processor (1)	Cannabis Fiber	Video Call	41:9 Min

Table 2: Account of Interview subjects

The intterview guides used during the interviews can be found in the apendix. The point of the semi-structured approach is that it acknowledges the possibility that the interviewer may not know in advance precisely what they hope to gain from each interview. Consequently, the flexibility inherent in the semi-structured interview format allows the interviewee to shape the direction of the conversation. In his book, Steinar Kvale (1996) describes two contrasting views on the purpose of the qualitative research interview. The first perspective considers the interview as a means to extract pieces of information from the interviewee. In this view, these pieces are seen as complete and unaffected by the interview context. Conversely, the second perspective regards the interview not merely as a fact-gathering process, but as an opportunity to uncover insights and viewpoints. This view suggests that knowledge is co-created through the interaction between the two participants. The opinions and perceptions held by the interviewees are of interest as it is argued that they are the motivations and explanations behind the interviewee's actions.

The literature used in this thesis can be referred to as secondary data and is constituted by analytical material, evaluative reports and previous research of relevance. The work by other scholars and policy workers is used to contextualise the findings of this thesis, as well as providing the necessary analytical tools used to understand the results of this research.

4.4 Data analysis

A majority of the semi-structured interviews, all except two, were conducted via video call. The two that were not conducted via video call were conducted in person. All interviews were recorded, which allows the research to be fully present in the conversations with the interviewees. Some notes were taken during the interviews to capture the interviewer's initial reactions. The recordings were utilised to transcribe the complete conversation between the interviewees and the researcher and were processed twice to ensure accuracy. Since the interviews were conducted in Swedish, the interview material was translated into English during the transcription process. It must be acknowledged that in the process of translating from Swedish to English, certain aspects of the original phrasing by the interviewees may be lost. The translation was performed by the researcher, who is a native Swedish speaker and a highly proficient English speaker.

For the analysis of the data with regard to the research question the Gioia analysis methodology was used, (Gioia et al., 2012). The Gioia methodology is essentially a method for organising the data collected during the interviews and identifying themes in the data content. Organising the data according to the Gioia methodology allows for a dynamic relationship between existing theory and the findings of the qualitative research (McGrath et al., 2019). The systematic treatment of the data that the Gioia methodology enables ensures that the essentials of the data are identified, and this is done in a manner that avoids biased management of the data concerning pre-existing theory. Kvale (1996) was also used to construct the methodological approach to the data analysis. The work by Kvale, describes some of the approaches used in the Gioia methodology and is thus used to improve the understanding of the method and how to apply it in the context of this research.

The processing of the data according to the Gioia (2012) methodology first encompasses an initial processing, transcribing and organising of the interview subjects' answers according to the questions and topics addressed during the interviews, referred to by Kvale (2014), identifying the natural unit. This is then followed by a first ordering of the data where *1st order concepts* are identified. This is a concentration of the content identified in the first step, the natural unit, of the data processing. In the following step, the *1st Order Concepts* are further processed or analysed according to their content to identify *2nd Order Themes* or, as referred to by Kvale (1996), *meaning-categorisation* and concentration. The final step of the data analysis process leads to the production

of *aggregate dimensions*, initial theoretical insights. When this step is reached in the data analysis process, the theory is now activated in the sense that it is consulted in the discussion and analysis held around the findings. It's crucial to understand that a dynamic relationship exists between emergent concepts and theory. This reflects the interplay between the reality being examined and the applied theory, emphasising that outcomes are not fixed. Furthermore, the model's dynamism underscores the significance of fostering an interactive relationship between theory and practice. It acknowledges that interview subjects are not only knowledgeable agents but also possess the capacity to influence the field relevant to this study.

5. Findings and empirical analysis

The results of this study are presented here. The data was collected through semi-structured interviews and then transcribed by the researcher. The semi-structured interview guide consisted of questions divided into four themes. These themes were as follows: Personal Engagement (1), Innovation (2), Entrepreneurship (3), and Power Dynamics, Agency, and Politics (4). The four themes and the related questions provided some structure to the interview conversations, but no more than that. The interviewees had enough freedom to exert and influence over what was addressed during the interview. As this thesis is conducted with an abductive approach to research, this was the desired outcome. As a result of this, the original interview guide themes were, at the end of the data collection process, no longer considered suitable labels for the initial sorting of the data; thus, these labels are here dropped.

The results are presented below in two figures, *Table 3* and *Table 4*, according to the Gioia methodology (Gioia et al. 2012). The data material is divided and presented in the form of two figures, as the interview subjects were categorised into two groups. The two groups of interview subjects are described as follows: group one, *Farmers, Product developers or processors* and group two, *In between units, Knowledge and communication agents* (2). Within the two groups, there is still some diversity, but considering the agents' role in the sector and the content of each subject's interview, the categorisation of the two groups is considered justifiable. In general, the natural fibre production sector in Sweden is small and characterised by heterogeneity, particularly regarding the agents engaged in this work. To learn more about the individual interview subjects, refer to *Figure 4* above under Section 5.2, Data Collection. The data is presented in the two tables under the structural headings of 1st Order Concepts, 2nd Order Themes, and Aggregate

Dimensions. It must be recognised here that there is a dynamic relationship between the emergent concepts and the theory. The aggregate dimensions are identified in consideration of both the data and the theory used in this thesis. The motivation behind defining the relationship between theory and data as dynamic is that it is argued to be representative of the reality being studied. Theory is limited in how well it can explain the reality of different agents' actions and perspectives, but nevertheless, it is still productive to use it in order to critically evaluate and analyse the findings of this study and studies alike. But thus the relationship between theory and the data should be considered interactive.

Farmers, Product developers or processors (1)

1 st Order concepts	2 nd Order Themes	Aggregate Dimension
- The textile industry has moved many times, but it has often operated in similar ways, just in new places. - The increased awareness and policy initiatives should be seen as an opportunity for the industry to create an traceable and transparent value chain. - hemp has been a plant with an unjustifiable bad reputation. Hemp can be grown organically and has a positive affect on the soil in which it is grown - Perhaps we natural fiber producer can get the industrys attention together. We face simillar challenges and out fibers benefit from mixing with each other.	Within industry collaboration	Coordination
- Perhaps if we are to see a transformative change, we need some type of shock to the system - Many companies are interested in developing circular systems for managing their textile waste more sustainably - There is a big a focus on recycled materials when it comes to sustainable transformation of the textile industry. They think that if we just recycle everything, everything will be solved. - Important to understand that many residual streams are needed to make use of the waste from production and processing.	Diverse and ununified context	Diversity
- The old foxes are too conservative; they are in some form of survival mode. I don't think that the change will come from within the industry itself, but from external actors with a different perspective. - Fashion companies are too far removed from the raw material. - Hemp production and hemp as a material are old knowledge. It is old knowledge that needs to be rediscovered. - Work with knowledge transfers. Consumer insight, be part of creating new relationships between customers and producers. To create context, people must become personally interested.	Inertia within the industry	
- All companies that contact us are experiencing some form of pressure to change. This can then involve finding new materials and improving how they process or taking care of existing materials. - The dialogue with the farmers has been great. It is the least of our problems to engage the farmers - The work today is constituted of a lot of meetings with customers, working with PR and marketing. You must educate the customer at the same time as selling to them. - New words and concepts can create new associations and thus change the ideas of value. - It would be good if we who are involved in raw material production in Sweden cooperated.	The change makers carry a greater risk	Dynamics
- The smaller players bear a large part of the risk, but also push the industry forward many times. - Many high-end and technical textiles for business-to-business customers are produced in Europe. Many products purchased through public procurement are made in Europe - The industry has definite ideas about how various elements should relate to each other in terms of pricing. For example, there are beliefs that the markup should be three times the material price. This old logic creates inertia.	Operational norms	
- We see that companies are afraid to communicate with customers because they not sure how they will be met by the consumer. - A significant portion of consumers lack trust in companies, creating a challenging landscape for both businesses and customers. - Consumers also need to realize their own power, and act accordingly.	In the process of change, conflicts emerge	Conflict
- Would like to see agriculture get more power back a few large companies have a lot of power in agriculture. - Would have liked to see more targeted support both at a national and regional level. - At first glance, many policy initiatives sound good. But when you then understand what it means in practice, you realize that there is a fairly large risk that it will harm small actors. And even if the small actors cannot afford to act according to these initiatives, they often already meet the requirements. - There is a dream that the new regulations will be so powerful that they have a disruptive effect on the existing structures in the industry.	Disrupting exsisting power strucures	

Table 3: Structuring of the interview material. Interview with group 1 Farmers, Product developers or processors

In between units, Knowledge and communication agents (2)

1 st Order concepts	2 nd Order Themes	Aggregate
- There needs to be agents who are engaged in the entire process responsible for the development of these materials - There is a lack of coordination something that is very much needed - In Sweden there is a lot of research and knowledge creation but a lack of action - It is often rewarding to engaged with industry outsiders	Engage a diversity of agents and improve coordination	Coordination
- The industry has been focused on efficiency and economies of scale we need to move on from that - The textile industry in Sweden is small and lives on old merits - We need to focus on organisational innovations and issues related to establishment of market	Organisational and institutional innovation is essential	Infrastructure
- Technological and digital tools are needed to coordinate the work within the industry - We need to use the latest technology, automatization, robotization to be competitive - Hemp can be mixed with other natural fibers to achieve certain quality characteristics - We must actively work to generate cultural changes	Technological and digital tools is part of the solution	
- The entire textile industry has a long history of being fakes, or lying about the material content - There is a big distance between producers and consumer thus a lack of trust between the two - Event like the pandemic created a shock to the system that made people more open to new perspectives	Establishing trust through producer-consumer interaction	Engagement
- Natural fibers are still considered too expensive by consumers and business to business costumers - Belief that we could achieve an impact if we focused on launching few products - There is potential and opportunity in the fact that the Swedish textile industry is so small	Impact through focused efforts	
- The state needs to in part act as a coordination agent. The state needs to support more sustainable business models and operations. - The in-between agents or cooperation coordinators are the ones who should bear some of the risk related to the work of transformation. Us in-between agents can create an interest in change, make it desirable for companies change. Create a feeling of a fear of missing out. - The new requirements should result in an increased risk related to noncompliance. The new laws should affect risk positively thus ensure that the path forward is somewhat more secure or predictable.	New requirement and the work of coordination agents should change the perception of risk	Accountability
- Believe that the expressed attitudes of ordinary people have power to influence the development in general. - Today the ability of the average consumer to assess value is poor. The customer must learn about quality and to identify quality as the price so rarely represents the actual value of a product - It must be recognised that to some extent small-scale producers cannot benefit from various certifications	Empower consumers with knowledge and awareness	

Table 4: Structuring of interview material. Interview with group 2 Inbetween units, Knowledge and communication agents

The analysis is organised according to the structure that emerged during the processing of the data, which was carried out in accordance with the Gioia methodology. This section will provide a more detailed description of the findings. The empirical findings will be discussed and analysed in greater depth. The analysis is structured around the aggregate dimensions and the corresponding 2nd order themes. Four aggregate dimensions, each with two related second-order themes, were identified in the data collected from the first and second groups of agents. This thesis aims to account for the experiences and perspectives of the interview subjects. Consequently, this analysis seeks to centre this.

Under the section discussion and conclusion, the findings will be further described, critically discussed, and analysed using the three theoretical perspectives of Social and Ecological Embeddedness, Institutional Entrepreneurship, and Market Formation, all of which were chosen during the process of this research. This is done to avoid repetition, as some of the themes identified during the data processing are found to have overlapping elements.

5.1 Interview Farmers, Product developers or processors

5.1.1 Coordination

2nd order themes:

Within industry collaboration

Interestingly, several interviewees point out that although the fibre production and textile industry have evolved over time, to some extent, the ways in which they operate have not changed as dramatically as one might think. In many cases, the way the industry operates has changed very little; the industry itself has just moved to new places. This has, according to the experience of the interviewees, resulted in a loss of knowledge and skill in the places where the industry used to exist. For the production that has persisted in some form, this has often meant that a lot of infrastructure and machinery have not been updated or renewed. As a result of this, many natural fibre and textile producers in Sweden face similar challenges despite some agents being producers of materials that have persisted and some working with fibres like cannabis that undergo a process of re-introduction. This explains why the interviewees express an interest in improved *coordination* within the sector. “*Coordination*” here refers to the management and establishment of a supportive network that contains the necessary infrastructure and knowledge to serve the industry and all its agents. The explanation of the need for coordination related to the reasonings of institutional entrepreneurship, this link is explored further in *section 6*. Some

interviewees even highlight that some of the machinery used for processing one type of animal fibre could also be used for processing plant fibres. With this, the interviewees express a frustration over the fact that existing industry organisations with the position, capital and power to act as a coordinator have not done so. According to the interview, these agents have not taken the Swedish initiative regarding natural fibre production in the country seriously.

5.1.2 Diversity

2nd order themes:

Diverse and ununified context

Inertia within the industry

The theme of diversity is, in many ways, already addressed within other themes, such as coordination, dynamism, and conflict. Simultaneously, the concept of diversity as a theme captures something significant from the interviewees' descriptions of their experiences and perspectives. According to the interviewees, the diversity within the sector seems not to have been fully leveraged. It connects, in some respects, to what some interviewees described as a need for them to actively engage in educating the actors with whom they interact. Even if some knowledge exists to a certain extent, some agents operate in silos, and the transfer of knowledge and perspectives between the various groups within the sector has not been sufficiently productive.

5.1.3 Dynamics

2nd order themes:

The change makers carry a greater risk

Operational norms

The sector is facing significant pressure to change. Still, the direction of that change or the future of the industry is not agreed on by the actors engaged in it. The individuals working for the industry to change are engaged in multifaceted efforts work. A majority of the interviewees believe that small actors are the ones most engaged in work that has the greatest potential to generate transformative change. With consideration to the reasoning of institutional entrepreneurship as well as social and ecological embeddedness this is an interesting statement. This connection is explored further in *section 6*. The small actors introduce new ideas and

perspectives to the sector. At the same time, by working for change, they ultimately bear a significant portion of the risk. Not all interviewees fully agree with this perspective. Some argue that the larger agents or companies are engaged in the process of change. The difference may be that they are interested in changing how they work with the materials they use, rather than what materials they use. The interviewees who argue that this is a problem state that this has to do with the industry giants' conservatism. According to these interviewees, the industry has definite ideas about how various elements should relate to each other, often regarding pricing. Instead of being open to dialogue with the individual actors, the industry giants tend to rely on old standardised systems for their decision-making. The inertia described to result from industry giants' conservatism is an interesting point with consideration to the reflections of market formation, this link is explored further in *section 6*. This creates a complicated *dynamics* for the smaller actors to navigate. "*Dynamism*" here refers to issues that arise from the clash of operational norms with the suggestion of change.

5.1.4 Conflict

2nd order themes:

In the process of change, conflicts emerge

Disrupting existing power structures

In the process of change, conflicts seem to emerge, according to the statements by the interviewees. *Conflict* arises when faced with the need to change, as disagreement on how to do so results in stagnation and, consequently, frustration. "*Conflict*" here refers to a disagreement on how to move forward. Some of the statements by interviewees suggest that the natural fibre producers struggle to capture the industry's attention within this environment. For some smaller producers, the hope is that the new regulations will have such a significant impact that they will have a disruptive effect on the industry. At the same time, smaller actors are also concerned that the new requirements will demand significant resources for implementation and therefore be burdensome for them. This is perhaps despite the fact that they are already fulfilling many of the requirements. Naturally, some actors do not wish for the change to have this effect on the sector; this is where conflict arises.

Another interesting source of conflict described by some of the interviewees is that between consumers and producers. Consumers and producers might have different perspectives on what should be considered good action moving forward. The interviewees state that in some ways this leads to a lack of trust between producers and consumers, something that might hinder

communication between the two. The aggregate dimension, conflict and its second order themes connects to the subject of market formation, this is further explored in *section 6*.

5.2 Interview Knowledge and communication agents

5.2.1 Coordination

Engage a diversity of agents and improve coordination

Although they exemplify it differently and highlight somewhat different issues with it, all three interviewees argue that the industry lacks coordination. The three agents are all experts in some way and thus hold very particular insights about how the fibre production and textile industries operate in Sweden. The two researchers argue that, to some extent, the knowledge required to initiate and engage in natural fibre development specifically cannabis fibre already exists in Sweden Today. Thus, a lack in the knowledge needed for engaging in production processes is not the main issue. The issue lies in the inefficient use of these resources. It is, however, important to recognise that the three agents still all emphasise that there are some areas where there is a lack of knowledge and competence in Sweden. Still, this is not seen by them as the explanation for why the sector is stuck in the initial phase.

The Swedish natural fibre production industry and textile industry are comparatively small, which increases the need for *coordination*. ‘*Coordination*’ here refers to linking resources and agents together so that everyone can operate more effectively. The three agents argue that the role of coordinating needs to be carried out by some form of agency or institution that can provide proactive guidance for the sector as well as resources in the form of investments. The coordinator could potentially decrease the sector's perception risk and thus encourage initiatives. The agents also recognise that, to some extent, they, as knowledge and communication agents, serve this role, guiding the sector's work forward. Knowledge and communication agents should be sufficiently informed to guide the industry, particularly in matters related to the sustainable transformation of the sector. As addressed in section 5.1.1 the issue of coordination is connected to the reasonings of institutional entrepreneurship, this connection is further addressed under *section 6*.

5.2.2 Infrastructure

2nd order themes:

Organisational and institutional innovation is essential

Technological and digital tools is part of the solution

Much related to the identified need for coordination, the three agents recognise that the sector faces a need for restructuring not just at a macro level but also at a micro level. Many old business models are, and should be regarded as, unsustainable. The sector's previous focus on efficiency and operating according to the logic of economies of scale must change. For this to become a reality, the agents argue that yes, new, more sustainable business initiatives need to be fostered and encouraged; however, this should also involve the restructuring and transformation of existing ones. This realisation has potential implications for the reasoning's of market formation, this is further addressed in *section 6*.

The agents contend that the few companies and organisations still active today within the natural fibre and textile industry in Sweden, which to some extent possess the capital necessary to invest in new solutions, are too conservative. The older established companies and organisations rely on past successes and are not interested in changing to the extent needed or in adopting new solutions. In many respects, this, according to the agents, relates to how these companies and organisations operate and the tools and techniques they employ. Here, they argue that there is a need for organisational innovations supported by technological solutions that can contribute to a new supportive *infrastructure* for the industry. 'Infrastructure' here refers to a manifestation of organisational innovations, though in some cases, the adoption of technological solutions. In many ways, the sector in Sweden is still relatively small, but the presence of knowledge is quite high, creating an opportunity for transformation and the adoption of new solutions. Within this, the agents also recognise that there is a need for encouragement of cultural change as the consumers' interaction with the industry and consumption behaviour need to change.

5.2.3 Engagement

2nd order themes:

Establishing trust through producer-consumer interaction

Impact through focused efforts

As discussed above, the agents highlight that there is potential and opportunity in the fact that the Swedish natural fibre and textile industry is so small. They also explored the idea that an

external shock, such as the COVID-19 crisis, could have destabilised the system to the extent of creating an opportunity for transformation and restructuring. Furthermore, the agents argue that the shock has at least made some individuals more open to new perspectives. The intention behind the latest laws and policy initiatives is to generate a shock to the system and spark a demand for change. While this might occur, the agents contend that we should not overly rely on the effects of such actions. Instead, there must be active and diverse *engagement* in the process of change. ‘*Engagement*’ here refers to the active involvement of all agents within the industry or those who significantly interact with it. It concerns building trust and inviting input. The concept of engagement is many ways connected to the ideas of social and ecological embeddedness this connection is further addressed in *section 6*. The transformation that the sector in many ways needs to undergo involves a shift in the concept of value. The agents argue that specifically for natural fibres like cannabis to enter the market, they must not be perceived not as luxury goods but as the more sustainable and honest products they are with regards to long-term value. This necessitates engagement in the sense that the distance between consumers and producers needs to be shortened (not necessarily physical distance), and trust must be established.

5.2.4 Accountability

2nd order themes:

New requirements and the work of coordination agents should change the perception of risk

Empower consumers with knowledge and awareness

Because the fibre production and textile industries are so complex and characterised by such an extended value chain, understanding who holds the power to initiate change is complex. The agents argue that some of the delay in action can be attributed to uncertainty. There are many paths to take, but choosing where to start is difficult. As touched upon before, the agents recognise here that it is partly their role to guide the sector forward. The in-between agents can create interest in change and lower the sector’s perception of risk related to the work of transformation. A clearer and more accurate perception of risk should also emerge from the new laws and requirements regarding the sector's transformation. As one agent phrased it, “the new requirements should result in an increased risk related to noncompliance”. This should also then shift things in favour of natural fibres such as cannabis. This relates to the need for *accountability*. “*Accountability*” here refers to the establishment of tools that create real consequences for non-compliance, thereby manifesting change. The new policies must utilise tools of accountability to have a proactive impact on what is regarded as valuable within the sector and thus ensure that

the path forward is somewhat more secure and predictable. The aggregate dimension of accountability relates to the reasonings of market formation as well as institutional entrepreneurship however perhaps in a more indirect way.

6. Discussion and Conclusion

This section discusses the findings of this thesis in relation to the research question. This section also engages with the three theoretical perspectives: Social and Ecological Embeddedness, Institutional Entrepreneurship, and Market formation.

Research Question: *How, from a social and ecological embeddedness perspective on innovation in farming-related markets, can we understand the present obstacles to market formation efforts—exemplified by the case of cannabis fibre production in Sweden today?*

Key takeaways

There are three main takeaways from this thesis, each reflecting themes or aggregate dimensions identified during the analysis of the empirical data:

1. The need for coordination
2. Making the best of a situation
3. In-between agents should act as risk managers or risk takers

Coordination emerged as a significant theme across both interview groups. Despite being addressed in the form of an aggregate dimension, the subject of coordination was so consistently addressed by all interviewees that I, as the researcher, consider it necessary to further highlight. The Swedish textile industry and natural fibre production industry are marked by high diversity, which is also reflected in the varied roles and perspectives of the interviewed agents. Despite this diversity, the participants do not view it as disorganised or fragmented. In fact, many interviewees face similar challenges and are aware of this overlap, which strengthens their collective call for coordination. They argue that because many of the issues faced by the different natural fibre producers overlap an agent accepting the role of coordinator could help overcome these shared challenges. A coordinator who implements a supportive infrastructure consisting of communication and production tools could enable productive collaborations within the sector.

Though this the coordination agent can support the exploration of multiple initiatives related to natural fibre production within the country without requiring full conviction in the potential success of any specific initiative.

The second takeaway relates to how interviewees perceive the industry's reaction to transformation demands. According to their accounts, many established actors respond to the need for change not by rethinking their materials, but by adapting how they work with the same (often synthetic) materials. This "making the best of a situation" approach manifests as efforts to create circular systems around existing materials, rather than exploring alternatives like cannabis. Some of the interviewees connect this to the lack of coordination within the sector. The interviewees argue that if there were more interaction between the agents within the sector, exploring solutions such as switching to bio-based fibres would be considered more often.

The third takeaway is that the in-between agents or intermediaries should act to reduce the perception of risk. The intermediaries expressed that they consider it their role to engage in knowledge creation and knowledge transfer, enabling them to help guide the industry forward. Providing the industry with guidance on how to respond to the increased demand for transformation should lower the industry agents' perception of risk. Some intermediaries mentioned that they have been involved in knowledge creation and knowledge transfer for years yet still perceive a reluctance from the industry regarding the adoption of bio-based fibres like cannabis. They recognised that it is undeniable there is strength in numbers, and bio-based fibres like cannabis require the support of one or more influential players, as this can improve market confidence in this choice.

Theoretical reflections

Social and Ecological embeddedness

This framework helps deepen the understanding of how farmers, product developers, and processors engage with sustainability. All interviewees described their work as rooted in care for the environment and sustainable practices. For many, sustainability is central to their perception of value and has evolved over time through hands-on experience. The interviewees also state that they are aware that most actors do not share their holistic understanding of sustainability. Instead, broader industry understanding tends to be more superficial, aligning with the earlier discussion on "making the best of a situation."

It is evident to me that the producers' comprehension of sustainability arises from their deep embedding in the social and ecological context surrounding their work (Morris and Kirwan, 2011). The actors have realised this themselves, and some describe how they actively work to invite people into their world to make them more engaged. Furthermore, the actor emphasises that they have realised that they must highlight the quality of their products, not merely their sustainability performance, in order to sell to consumers. The experience of the interviewees, to some extent, aligns with Polanyi's original statement (see page 12) (Hess, 2004). The inclusion of considerations regarding sustainability within the context of the market should not lead to a simplification of our understanding of the concept. Polanyi states that the conceptualisation of embeddedness stems from a dissatisfaction with the absoluteness of the market and its underlying rationale of self-regulating economic behaviour. The interviewees' experiences illustrate that economic actions are not purely rational; they are socially and ecologically embedded. Increasing interaction between producers and consumers may help challenge reductive understandings of value and sustainability.

Institutional Entrepreneurship

The analysis of the interview material relates to the reasoning of institutional entrepreneurship. With limited diversity in materials used in the industry, those involved in bio-based fibres and cannabis are challenging the status quo and normality. Furthermore, the producers' efforts to educate consumers and question established norms align with key characteristics of institutional entrepreneurship (Svejenova et al, 2007) (Boon et al, 2022).

Endogenous actors should be recognised as a powerful source of innovation. Importantly, while endogenous actors are often under-recognised as sources of innovation, their role here is significant. As some scholars argue, too much emphasis is placed on external shocks as drivers of innovation (Battilana et al., 2009). Nonetheless, external actors such as policymakers still play a critical role. The interviewees state that policy workers, to some extent, play an important role in encouraging change, as it, among other things, legitimises the work of the producers. Some interviews even state that it has been particularly productive to partner with external actors. According to the interviewees, external actors, in some cases, are more willing than those established within the industry to invest in the producers' initiative. According to the interviewees, the powerful and established actors within the industry are often too conservative to engage in projects that truly challenge the sector's norms.

Market Formation

Considering the notion of market formation, the interviews state that it's not until recently that they, as natural fibre and particularly cannabis producers, have felt like they are on the threshold of entering the market. Market formation is a complex and transitional process, as highlighted by previous literature. Using Beckert's framework of market formation problems:

value, competition, and cooperation, the findings can be further contextualised (Fuentes et al., 2024). The Cooperation problem will, however, not be addressed here as it is already discussed above.

The value problem: Some producers have created platforms and spaces for interacting with consumers. They do this out of an awareness that for consumers to fully understand the value of their products, they need to engage with them. Engaging in these interactions is also a way for them to stand out. This works for some, while for others aiming to attract industry customers in the future, the value problem becomes an issue of industry norms. The producers intending to sell to industry customers in the future are aware that this presents a significant challenge. At the same time, those with these ambitions are convinced that if even one significant industry actor adopts their product, it signals a breakthrough for producers like them.

Competition Problem: The producers have identified promising industry segments, including building materials, European workwear, and high-quality textiles for the automotive sector. These segments are considered suitable due to their scale, adherence to European quality standards, and eligibility for public funding to support sustainable transitions. Still, they remain dependent on broader system changes.

Conclusion

I must conclude that in order for the producers to break through, they seem to be dependent on policy demanding change. The findings suggest that producers in the natural fibre and cannabis sectors are actively engaged in building a sustainable future but face substantial barriers related to coordination, industry inertia, and market entry. To break through, their work requires both grassroots innovation and top-down support, particularly from policymakers willing to demand change. Considering the previous research by Pal et al. (2018), it is clear that the contribution of this study lies in its scope. The work by Pal et al. provides an interesting angle to the subject and introduces concepts such as reshoring to a high-cost manufacturing country. The work by Pal et al. considers the production of goods ready to be sold to the average consumer. This thesis,

however, considers the possibility of producing input goods in a country like Sweden. Input goods refer to the materials used in the production of consumer goods. Thus more business to business products. Together, this thesis and the work by Pal et al. provide an enhanced understanding of the potential inherent in restructuring value chains within the fibre and textile industry. Considering the findings of Pal et al.'s work and the findings of this thesis, I, as the researcher, would argue that, in some cases, a country like Sweden, if it were to take advantage of all available technical and organisational tools, would be in a better position to engage in the reshoring of the production of input goods rather than consumer goods. Beyond this, the three theoretical perspectives, social and ecological embeddedness, institutional entrepreneurship, and market formation, collectively demonstrate that successful transformation depends not only on innovation but also on reshaping norms, values, and relationships across the entire fibre and textile ecosystem.

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Appendix A:

Interview Guide Farmers, Product developers or processors

Interview Guide group 1:

Questions interview langue Swedish

Themes

- A. Introduction: who are you?**
- B. Innovation**
- C. Entrepreneurship**
- D. Power dynamics, agency, policy**

A. Introduction: Who are you?

1. Who are you or you in this industry?
2. Why are you part of the industry, how did you get involved?
3. What do you experience as the industry's self-image in Sweden?
4. If there is no consensus, please elaborate on why you feel that is the case

B. Innovation

5. Can you describe your company's business idea?
6. What are the motivations and values that underpin that business idea?
7. How was that idea born? If you don't have that story – how would you say it was communicated to you? How did you learn about it?
8. Why do you think that idea is needed – (why does that idea continue to create customers)?
9. What role would you say sustainability plays in the creation of the business idea?
10. What role does sustainability play in the need for the business idea (i.e. why do you have and create customers in the market)?

C. Entrepreneurship

11. If you were part of starting the company - how would you describe that experience?
12. Would you say that you found a space for yourself in the market? Or would you say that you created your market?
13. In what different ways do you reach your customers today, and how has it changed since the start?

14. As a Swedish company and actor, you carry a Swedish perspective, how do you view the larger context that you are a part of or have to interact with? The EU? The world market?
15. What are the most critical challenges that you face, in the long term and the short term?

D. Powerdynamics

Within the industry at large – agency

16. Do you believe that you have the opportunity to influence (the context/industry you are a part of)? In what ways?
17. There are expressed goals and policy initiatives from the EU that aim to encourage and support a sustainable transformation of the textile industry within the EU, do you experience any consequences of this?
18. Through what or how do you think institutions such as the EU and local politics can better encourage/support the transformation of the industry?
19. What do you see as the opportunities for this type of business in Sweden?
20. What are the most critical challenges that you face, in the long term and short term?
21. **Is there anything you would like to add?**
22. **Is there anything we have talked about that made you reflect on something that we have not addressed further?**

Appendix B:

Interview Guide In between units, Knowledge and communication agents

Interview Guide group 2:

Questions (interview language Swedish)

Themes

- A. Introduction: who are you?**
- B. Innovation**
- C. Entrepreneurship**
- D. Power dynamics/agency/politics**

A. Introduction: Who are you?

1. Who are you or you in this industry?
2. Why are you part of the industry, how did you get involved?
3. What do you experience as the industry's self-image in Sweden?
4. If there is no consensus, please elaborate on why you feel that is the case

B. Innovation

5. Can you describe what you consider to be the working approaches of companies working with cannabis and flax?
6. What motivations and values underlie the companies you have been in contact with?
7. How were their ideas born? If you don't have that story – how would you say it was communicated to you? How did you get to know it?
8. Why do you think that idea/initiative is needed – (why does that idea continue to create customers)?
9. What role would you say sustainability plays in the emergence of the business idea?
10. What role does sustainability play in the need for the business idea (i.e. why do you have and create customers in the market)?

C. Entrepreneurship

11. If you have followed the start-up of a company closely, what would you describe as particularly important for companies involved in natural fiber, flax and cannabis in Sweden?
12. Would you say that the successful or promising start-ups that you have followed have found a space for themselves in the market? Or would you say that they are rather involved in creating the market?

13. In what different ways do companies try to reach their customers today, and how has this changed since the start?
14. As a Swedish company and actor, you carry a Swedish perspective, how do you view the larger context that you are part of or have to interact with? The EU? The world market (Swedish values)?
15. What are the most critical challenges that you face, in the long term and in the short term?

D. Powerdynamics

Within the industry at large – agency

16. Do you believe that you have the opportunity to influence (the context/industry you are a part of)? In what ways?
17. There are stated goals and policy initiatives from the EU that aim to encourage and support a sustainable transformation of the textile industry within the EU, do you experience any consequences of this?
18. Through what or how do you think institutions such as the EU and local politics can better encourage/support the transformation of the industry?
19. What do you see as the opportunities for this type of business in Sweden?
20. What are the most critical challenges that you face, in the long term and short term?

21. Is there something you would like to add?

22. Is there anything we have talked about that made you reflect on something that we have not addressed further?

Appendix C:

Complementary accounts from interviews

Interview 1: In between units, knowledge and communication agents

Topic	Interviewee 1 (2HFT)
Personal Engagement	<i>"Specifically working with understanding and realising the potential inherent to the sector".</i> <i>"The textile industry consists of a lot of brands that are under enormous pressures to transform. At the same time, the current climate within the industry often hinders effective collaborate"</i>
Innovation	<i>"I feel that when I started working within the industry, the focus was on efficiency, that was the challenge then. Now the perspective has change within the industry. Today one must have a more holistic view on things and consider a products entire life cycle."</i> <i>"Today there is still the perception within the industry that there are high risk associated with investing in natural fibre. People do not yet dare to invest in change involving natural fibers. They don't understand that this is the way forward for the industry."</i>
Entrepreneurship	<i>"Today there is still the perception within the industry that there are high risk associated with investing in natural fibre. People do not yet dare to invest in change involving natural fibers. They don't understand that this is the way forward for the industry."</i> <i>"Natural fibers like these are still considered too expensive and thus have not entered the market yet. I belief that technical solutions need to be used to achieve an adoption of these materials. We need an automation and robotization to be competitive."</i>
Power Dynamics Agency	<i>"There are many paths that companies can take to achieve some form of change. This often makes it difficult for companies decide what to invest in."</i> <i>"Even though some rules and parts of the framework guiding the industry's transformation are already established, we as actors can still play an active role in shaping how that change unfolds at a more detailed level."</i>

Interview 2: Farmers, Product developers or processors

Topic	Interviewee 2 (1HI)
Personal Engagement	<i>"I started studying 12 years ago. At that time, sustainability was already part of my education, but now it has become an even bigger part of the education and the industry in general."</i>

	<i>"It is very nice to be in a country where sustainability is considered important, even if the politics don't always keep up or push things in the right direction. I feel like it today is the companies in both countries that are driving the work towards more sustainable practices."</i>
Innovation	<i>"Different parts of the industry experience different amounts of pressure or support to change. Some companies are more price-pressured and therefore have opportunity to change."</i> <i>"There is a lot of waste produced by the textile industry; what can we do with that? How do we deal with that in a better way? We also engaged in project aimed at developing new materials. Collaboration is key to finding new projects, new solutions and approaches."</i>
Entrepreneurship	<i>"The proportion of companies that contact us who are actually product developers in the textile industry is low."</i> <i>"All companies that contact us are experiencing some form of pressure to change. This can then involve finding new materials and improving how they process or taking care of existing materials."</i>
Power Dynamics	<i>"In general, it is very difficult to get involved in textile production. For example, is the machinery used very expensive. In addition to this lot of knowledge was lost when production was moved outside of Europe."</i> <i>"A significant portion of consumers lack trust in companies, creating a challenging landscape for both businesses and customers. While it is important for corporate scandals to be exposed, this should not result in a climate where meaningful initiatives are discouraged or halted altogether."</i>

Interview 2: In between units, knowledge and communication agents

Topic	Interviewee 3 (2HR)
Personal Engagement	<i>"There is however still a lot of problems with market for natural fibers even in central Europe. Even though they have some more established companies that worked with plant fibre. The construction industry that I represent or have been involved with is quite conservative."</i> <i>"As soon as you talk about natural fibre, many people talk about wood and how they use wood. We have so much forest and wood in this country that we become reliant on it."</i>
Innovation	<i>"It's still a difficult process for those engaged in hemp production and processing. I find that we often have to start over, with each new generation the same story has to be told again. You have to talk about the benefits of hemp again."</i> <i>"We have to move on, we have to develop the market side, that's where the problems lie today."</i>

Entrepreneurship	<i>"Someone needs to be somewhat involved all the way from the cultivation to the product finally entering the market. Farmers need to have the knowledge that what they grow will be bought by someone. You need a contract from the beginning."</i> <i>"You have to establish a form of partner that is ready to receive what farmers produce."</i>
Power Dynamics Agency	<i>"Today, the obstacles are not so many that this would explain the situation today. Companies or the industry must dear to make an effort."</i> <i>"I believe that the attitudes of ordinary people have the has the power to influence the development in general. If ordinary people have a positive attitude towards hemp, it creates an opportunity for companies and farmers to invest in this and build a market for it."</i>

Interview 4: In between units, knowledge and communication agents

Topic	Interviewee 4 (2HR)
Personal Engagment	<i>"It was my culture studies that opened my eyes to hemp. I realized that there is a lot to unravel here. What is simple is often what is made complicated."</i> <i>"Intrested in understanding who has been involved in writing our textile history? Engaged in the preserving of old knowledge. Many times it has not been those who were perhaps actually most involved in the production and processing the plants. As a consequence of this, there are lot of inaccuracies in the historical information that is available."</i>
Innovation	<i>"Lots of projects that have been going on in recent years, but none of them are getting anywhere. It's difficult with textiles, you must be aware of so many aspects, more than you think. Theory is one thing and practice is another."</i> <i>"Hemp can be mixed into conventional products and make the product more sustainable. That alone can improve the value of hemp. It does not have to be products made solely from hemp."</i>
Entrepreneurship	<i>"I have travelled to other countries to see what is happening there. There are companies in Europe that claim to sell hemp but in reality, it is flax."</i> <i>"Hemp is still trendy and therefore companies want to claim that they work with hemp even though they do not. The entire textile industry has a long history of being fake, or lying about material content."</i>
Power Dynamics Agency	<i>"Should focus on going against the synthetic industry. Plastic is everywhere. It costs nothing to manufacture plastic products. The price so rarely represents the value of a product. The ability of the average consumer to assess value is poor."</i>

	<i>“Many times their stamps or certifications say very little about the quality of the product. All the faith in stamping and certification that they will solve the problem of the customer making bad decisions is not true.”</i>
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Interview 5: Farmers, Product developers or processors

Topic	Interviewee 5 (1W)
Personal Engagement	<i>“I think the textile industry is interesting because the story of its beginnings contains the story of the first industrialization. The textile industry has moved many times but often repeated the same behaviour but in new places.”</i> <i>“We can create a competitive, traceable, transparent value chain, thanks in large part to the increased awareness and the policies that have been pushed forward by the EU.”</i>
Innovation	<i>“Realized that there were no technical obstacles to spinning yarn, but it was that there was no infrastructure left to refine it. There was no certification system to ensure the quality of the wool.”</i> <i>“Important to understand that many residual streams are needed to make use of the waste.”</i> <i>“Not a huge craft culture but a cultural pride for Swedish design. Fashion companies are quite good at taking risks but it is about very small volumes. They are also good at marketing.”</i>
Entrepreneurship	<i>“Those who bear the greatest risk are the small agents. But in the end, I feel that it is the large players who will reap the profits.”</i> <i>“Links, dialogue with other natural fibre producers. Shared experiences in challenges. It would be good if we who are involved in raw material production in Sweden cooperated. But perhaps often get stuck in some kind of competition relationship. Passionate actors who have been advocating for their cause for a long time may be an obstacle to having a good dialogue between the different actors.”</i>
Power Dynamics Agency	<i>“Many designers and product developers have very little knowledge of production. It is also one of the reasons why we have to bring production home. They do not understand the processes behind it.”</i> <i>“The small actors may not have the resources required to implement or act according to these initiatives. And even if the small actors cannot afford to act according to these initiatives, they often already meet the requirements.”</i>

Interview 6: Farmers, Product developers or processors

Topic	Interviewee 6 (1H)
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Personal Engagment	<i>"Became involved in hemp because of its climate benefits, as a product and crop. Hemp has positive effects on the farmland where it is grown."</i> <i>"I feel that many are behind or are unprofessional. There are many players who do not have the ambition to grow or produce hemp on an industrial level. I think we need to produce it on an industrial level if we are to create change."</i>
Innovation	<i>"Interest from customers and the industry is growing. One has to court them; it's not something they have directly requested. But there is great potential in the construction industry, if you can get them as a customer, you have a stable foundation."</i> <i>"Organic development of what type of product we are interested in selling."</i>
Entrepreneurship	<i>"The work today is constituted of a lot of meetings with customers, working with PR and marketing. You must educate the customer at the same time as selling to them."</i> <i>"We started by contacting the farmers but now more farmers are coming to us and expressing an interest in wanting to grow for us. They are interested in getting a crop that is better for their soils. You do not need hand-woven pesticides, and the crop will have a greater market value than, for example, wheat."</i>
Power Dynamics	<i>"Would have liked to see more targeted support both at a national and regional level."</i> <i>"Politicians also do not have the time to familiarize themselves with everything they do, so they are not as committed as they should have been."</i>

Interview 7: Farmers, Product developers or processors

Topic	Interviwee 7 (1H)
Personal Engagment	<i>"Think that hemp has been a plant with an unjustifiably bad reputation. Tried to create social change and commitment. This is linked to hemp very great potential in society, as an enabler, in industry and as food."</i> <i>"The stigma that was around hemp would probably say is largely gone today. But a small part of it remains today and manifests itself in somewhat strange forms."</i>
Innovation	<i>"Work with knowledge transfers. Consumer insight, be part of creating new relationships between customers and producers. Must package the arena so that people can absorb new knowledge."</i> <i>"Create context, people must become personally interested. Engages in a lot of knowledge dissemination through social events."</i>
Entrepreneurship	<i>"Only worked with hemp as a natural fibre. Worked with various construction techniques with hemp. Has built a building where large parts are made of hemp as a material in various forms. But is curious about other types of natural fibre."</i>

Power Dynamics	<i>“Would like to see agriculture get more power back. Stopping being dependent on artificial fertilizers can be a way to get more power as a farmer. Few large companies have a lot of power in agriculture.”</i> <i>“There are Nordic varieties of hemp that are not currently allowed to be grown, it would be interesting to work with these.”</i>

Appendix D:

Interview Consent Form